Journal of Applied Psychology
2006, Vol. 91, No. 1, 40–57

0021-9010/06/$12.00 DOI: 10.1037/0021-9010.91.1.40

A Meta-Analytic Investigation of Conscientiousness in the Prediction of Job Performance: Examining the Intercorrelations and the Incremental Validity of Narrow Traits

Nicole M. Dudley, Karin A. Orvis, Justin E. Lebiecki, and José M. Cortina
George Mason University

Researchers of broad and narrow traits have debated whether narrow traits are important to consider in the prediction of job performance. Because personality–performance relationship meta-analyses have focused almost exclusively on the Big Five, the predictive power of narrow traits has not been adequately examined. In this study, the authors address this question by meta-analytically examining the degree to which the narrow traits of conscientiousness predict above and beyond global conscientiousness. Results suggest that narrow traits do incrementally predict performance above and beyond global conscientiousness, yet the degree to which they contribute depends on the particular performance criterion and occupation in question. Overall, the results of this study suggest that there are benefits to considering the narrow traits of conscientiousness in the prediction of performance.

Keywords: personality, meta-analysis, conscientiousness, job performance

Personality inventories are becoming increasingly popular as selection tools. Researchers generally agree that personality is important for the prediction of job performance (Barrick & Mount, 1991; Hough & Ones, 2001; Salgado, 1997). To date, the most accepted and used taxonomy of personality is the five-factor model (Costa & McCrae, 1992; Costa, McCrae, & Dye, 1991; Goldberg, 1981). This model contains five primary factors (i.e., the Big Five) that underlie personality (Norman, 1963). Despite the Big Five's popularity, some researchers have suggested that the five-factor model may be too broad for the prediction of specific aspects of job performance (Hough, 1992; Mershon & Gorsuch, 1988; Murtha, Kanfer, & Ackerman, 1996) and that there is value in considering the narrow traits underlying the Big Five (e.g., Ashton, 1998; Hough, 1992; G. L. Stewart, 1999).

Several meta-analytic studies have generated increased enthusiasm for the use of personality in selection contexts by demonstrating moderate validities for personality variables generalizable across situations (Barrick & Mount, 1991; Ones, Viswesvaran, & Schmidt, 1993). Yet, this meta-analytic work has focused almost exclusively on the Big Five framework of personality (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000; Salgado, 1997; Tett, Jackson, & Rothstein, 1991). As a result, the predictive power of the more specific narrow traits of the Big Five has not been adequately examined. Before an argument can be made for the exclusive use of broad traits in the prediction of job performance, the predictive power of narrow traits must be more thoroughly investigated. The purpose of this article is to present a series of meta-analyses that allows us to evaluate narrow traits that underlie arguably the most important of the Big Five, Conscientiousness (Behling, 1998; Cortina, Goldstein, Payne, Davison, & Gilliland, 2000).

The remainder of the introduction unfolds as follows. First, we briefly discuss research on the predictive power of the broad factor of Conscientiousness. Second, we discuss the potential value of taking the narrow traits of Conscientiousness into consideration. Third, we review and critique prior empirical research relevant to the narrow trait perspective. Finally, we describe four avenues that provide insight into the predictive power of Conscientiousness's narrow traits in the prediction of job performance.

The Value of Global Conscientiousness

Conscientiousness has an extensive history, from its beginning as 1 of 17,953 word descriptors of personality (Allport & Odbert, 1936) to its being touted as the most valid personality predictor of job performance (Behling, 1998; Mount & Barrick, 1998). In fact, empirical research has shown conscientiousness to be positively related to performance across many job performance criteria and occupational groups (Barrick & Mount, 1991; Salgado, 1997). In a recent meta-analysis, Hurtz and Donovan (2000) estimated the average corrected criterion-related validity for the relationship between global conscientiousness and job performance to be .22. Some have argued that global measures maximize criterion-related validity in terms of both broad and specific job performance criteria (e.g., Ones & Viswesvaran, 1996). Research supporting this argument has demonstrated that narrow trait personality measures do not have higher validity in predicting specific criteria than do global measures (e.g., Driskell, Hogan, Salas, & Hoskin, 1994;

Nicole M. Dudley, Karin A. Orvis, Justin E. Lebiecki, and José M. Cortina, Department of Psychology, George Mason University.

Nicole M. Dudley and Karin A. Orvis contributed equally to this article; authorship is listed according to alphabetical order.

Portions of this article were presented at the meeting of the Society for Industrial and Organizational Psychology, Orlando, Florida, April 2003.

Correspondence concerning this article should be addressed to Nicole M. Dudley, who is now at Shaker Consulting Group, Inc., 3201 Enterprise Parkway, Suite 360, Beachwood, OH 44122. E-mail: nikki.dudley@shakercg.com

Holland, 2001[1]; Ones & Viswesvaran, 1996; Reynolds & Nichols, 1997). Many of these authors also have suggested that broad traits hold greater potential for understanding the relations between personality traits and important behaviors common across jobs and settings (Mount & Barrick, 1995; Ones & Viswesvaran, 1996; Ones et al., 1993).

The Value of Narrow Traits of Conscientiousness

Although advocates of the narrow trait perspective agree that broad trait measures generally maximize prediction of overall job performance (e.g., Hogan & Roberts, 1996; Mount & Barrick, 1995; Ones & Viswesvaran, 1996), they assert that narrow trait measures maximize the predictive validity of specific performance criteria (e.g., Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; Mount & Barrick, 1995; Murphy & Lee, 1994; Paunonen, 1993, 1998; G. L. Stewart, 1999). They do note that in order to maximize the validity of narrow traits, as compared with global conscientiousness, a particular narrow trait or traits must be selected based on strong a priori linkages to the criterion (Ashton et al., 1995; Schneider, Hough, & Dunnette, 1996). The notion that personality measures that assess broad, global constructs ought to predict broad job performance criteria with higher validity whereas personality measures that assess narrow, specific constructs ought to predict specific job performance criteria with maximal validity relates to the bandwidth–fidelity issue dating back almost 50 years (i.e., Cronbach, 1960).

In addition, advocates of the narrow trait perspective argue that broad trait personality measurement obscures understanding of the personality-based causes of individual differences in work behavior (e.g., Hogan & Roberts, 1996; Holland, 2001; Hough, 1992; Hough & Ones, 2001; Paunonen, Rothstein, & Jackson, 1999; Schneider et al., 1996). For example, Paunonen et al. (1999) suggested that even if a broad trait measure results in a large criterion-related validity coefficient, one would have difficulty explaining the circumstances underlying the observed relationship between trait and criterion. Is the relationship due to the criterion's association with just one of the narrow traits comprised in the broad trait measure, all of the narrow traits, or some of the narrow traits but not others? In contrast, a narrow trait measure is more indicative of a respondent's standing on an identifiable psychological construct. Thus, a more substantively meaningful theoretical framework of trait–work behavior associations can be established.

In short, some researchers advocate the use of the narrow traits of conscientiousness in the prediction of specific job performance criteria. This assertion is difficult to evaluate because most prior narrow trait research has been conducted at the individual study level. Two exceptions are the studies of Hough (1992) and Mount and Barrick (1995). We review Hough's (1992) and Mount and Barrick's (1995) meta-analyses in the next section. We then use these reviews to identify a set of questions regarding the predictive power of conscientiousness's narrow traits that remain unanswered.

Meta-Analyses Regarding the Narrow Traits of Conscientiousness

Hough (1992) examined the criterion-related validities for two narrow traits of conscientiousness: achievement and dependability. The meta-analysis focused exclusively on army personnel. Hough used 237 studies involving a total of 339 independent samples. The criterion-related validities of achievement and dependability were examined for several different criteria. Hough found that the criterion-related validity of achievement and dependability varied to some extent across the specific criteria of interest. For instance, the criterion-related validities for achievement and dependability were .15 versus .08 for job proficiency, .33 versus .23 for commendable behavior, .14 versus −.07 for creativity, and .21 and .14 for effort.

Mount and Barrick (1995) also examined the predictive validity of achievement and dependability. However, unlike Hough (1992), Mount and Barrick assessed optimal predictor breadth by directly comparing the relative magnitudes of the narrow versus broad trait validity coefficients. Mount and Barrick used 173 studies involving a total of 206 independent samples. The criterion-related validities of global conscientiousness, achievement, and dependability were examined for 10 different criteria: job proficiency, training proficiency, technical proficiency, employee reliability, effort, quality, administration, interpersonal orientation, creativity, and combat effectiveness. They found the following true score correlations for global conscientiousness, achievement, and dependability, respectively, as related to the following dimensions of job performance: quality (.44, .38, and .48), effort (.51, .58, and .43), administration (.35, .28, and .36), and creativity (.13, .19, and −.04).

Although these prior meta-analyses represent important contributions in the investigation of the predictive power of narrow traits, several aspects of these studies are worth noting. First, Hough (1992) did not include global conscientiousness in her study. Thus, although her work does suggest that the narrow traits demonstrate substantial predictive validity for some performance criteria, it does not allow for the comparison of broad and narrow.

Second, although Mount and Barrick (1995) did include global conscientiousness and two of its narrow traits, meta-analytic estimates of the relationships between the predictors were not available. Therefore, the incremental validity of narrow traits above and beyond global conscientiousness could not be examined.

Third, both meta-analyses focused on only two narrow traits of conscientiousness, achievement and dependability. However, various conceptualizations suggest a more extensive parsing of the construct space would be valuable. For example, several individual studies have investigated additional narrow traits such as cautiousness and order (e.g., Billings, 2001; Goodman, 1995; Roman, 1997; G. L. Stewart, 1999). Further, personality scale developers have proposed taxonomies of up to seven narrow traits representing conscientiousness (Costa & McCrae, 1992). Several researchers have offered guidance concerning the direction of future research on this topic (e.g., Hogan & Ones, 1997; Hough & Ones, 2001; Saucier & Ostendorf, 1999). Efforts to identify the key narrow traits of conscientiousness have generally (though not universally) specified four narrow traits: achievement, order, cau-

[1] Holland (2001) found that when examining the predictive validity of personality measures in practice (i.e., the uncorrected validity coefficients), broad trait measures demonstrated higher predictive validity than did narrow trait measures. However, narrow trait measures were found to maximize prediction when corrected for predictor unreliability.

tiousness, and dependability (e.g., Hogan & Ones, 1997; Saucier & Ostendorf, 1999).

Descriptors of each of these narrow traits are summarized below to clarify their conceptual distinctness. Achievement reflects the tendency to strive for competence and success in one's work. This includes adopting high standards for one's performance and working to accomplish one's goals (e.g., Costa & McCrae, 1992; Hough, 1992; Moon, 2001). Dependability reflects the tendency to be a reliable worker. This includes being trustworthy, accountable, self-disciplined, and respectful of laws, regulations, and authority (e.g., Hough, 1992; Moon, 2001; G. L. Stewart, 1999). Order reflects the tendency to apply structure to one's working environment. This includes being well-organized, planful, thorough, detail-oriented, careful, and methodical (e.g., G. L. Stewart, 1999). Finally, cautiousness reflects the tendency to consider risks before taking a course of action. It is in direct contrast to impulsivity, the tendency to take uncalculated risks and act without considering all relevant possibilities of action or the consequences of one's actions (e.g., Ashton & Lee, 2001; Hough & Ones, 2001).

Current Meta-Analysis of the Value of the Narrow Traits of Conscientiousness

We suggest that these two prior meta-analyses (i.e., Hough, 1992; Mount & Barrick, 1995) are steps in the right direction in regards to evaluating the predictive power of the narrow traits of conscientiousness. The goal of the current meta-analysis is to provide further insight regarding the value of narrow traits in the prediction of job performance. To accomplish this objective, we used meta-analysis and regression of "metacorrelation matrices" to investigate (a) the relationships among the four narrow traits of conscientiousness, (b) the relationships between each narrow trait and global conscientiousness, (c) the incremental validity of the narrow traits above and beyond global conscientiousness, and (d) the variability in prediction of job performance across various specific performance criteria and occupational groups.

Interrelationships Among Narrow Traits

A broad trait measure, such as conscientiousness, represents the variance common among a set of narrow trait measures included within the particular broad trait. Further, the narrow trait measures consist of two components: the variance common with the other related narrow trait measures and the specific, nonerror variance unique to a particular narrow trait (Costa & McCrae, 1995; Paunonen, 1998). Because narrow traits included within a particular broad trait are believed to share common variance, researchers generally concur that the narrow traits of conscientiousness are theoretically expected to be interrelated with one another.

If the four narrow traits of conscientiousness are highly correlated with one another, then there is little to be gained by distinguishing among them. Unfortunately, the current literature provides conflicting findings regarding the degree to which narrow traits are intercorrelated. For example, G. L. Stewart (1999) found an overall correlation of .48 between order and achievement striving. Also, Moberg (1998) found a correlation of .37 between order and achievement striving and of .17 between order and another measure of achievement, competence. The correlations between dependability and cautiousness have also been quite diverse. Costa and McCrae (1998) found a correlation of .29, whereas Herringer (1987) found a correlation of .44. Similarly, the findings for the relationship between achievement and dependability have varied, with Costa and McCrae (1998) finding a correlation of .22 and Moon (2001) finding a correlation of .56. Given the diversity of these and other findings, it would be valuable to derive meta-analytic estimates for these relationships. These estimates would provide insight into the degree to which the narrow traits of conscientiousness can be distinguished from one another.

Relationships Between Narrow Traits and Global Conscientiousness

Parallel to our aforementioned reasoning, if the narrow traits are highly correlated with global conscientiousness, then there may be little value in distinguishing between the broad factor of Conscientiousness and its narrow traits. As an example, if the narrow traits are highly correlated with global conscientiousness, an individual who scores high on a narrow trait, such as achievement, should also score high on global conscientiousness. As such, it would be less important to assess an individual's standing on each of the narrow traits because global conscientiousness essentially would provide the same picture of the individual.

Another reason to examine the relationships between the narrow traits and global conscientiousness is to better understand the degree to which global conscientiousness is composed of each narrow trait. For example, if dependability and global conscientiousness were highly correlated, whereas global conscientiousness and the other narrow traits had much lower correlations, this would imply that dependability is more central to global conscientiousness (at least as it is typically operationalized) than the other narrow traits.

Finally, similar to findings for the intercorrelations among narrow traits, there have been conflicting findings regarding narrow trait–global conscientiousness relationships. For example, in terms of the relationship between global conscientiousness and order, G. L. Stewart (1999) found a correlation of .76, Moberg (1998) found a correlation of .35, and Costa and McCrae (1995) found a correlation of .59. In addition, in terms of the relationship between global conscientiousness and dependability, Moon (2001) found a correlation of .73, Paunonen and Jackson (1996) found a correlation of .34, and Moberg (1998) found a correlation of .54. In summary, in terms of the merit of the narrow traits, meta-analytic estimates of the relationships between global conscientiousness and its narrow traits would be suggestive of whether the narrow traits of conscientiousness can be distinguished from global conscientiousness.

Incremental Validity of the Narrow Traits

A third avenue to examine regarding the value of narrow traits is to investigate the incremental validity of the narrow traits above and beyond global conscientiousness. Although comparing relative validity coefficient magnitudes is valuable (i.e., the method used in previous narrow trait meta-analyses), additional information is gained by examining incremental validity. The primary issue is whether a narrow trait of conscientiousness (e.g., order) accounts for variance in a job performance criterion beyond that

accounted for by the broad trait measure of conscientiousness (Paunonen & Nicol, 2001).

There have been several recent calls in the literature to go beyond the examination of bivariate correlations (e.g., Avis, Kudisch, & Fortunato, 2002; Clevenger, Pereira, Wiechmann, Schmitt, & Harvey, 2001; Cortina et al., 2000). Although meta-analytic research has not investigated this call in regards to the incremental validity of narrow traits, individual empirical studies are beginning to examine this issue. For example, Mershon and Gorsuch (1988) provided evidence that narrow traits add substantial incremental validity to that associated with broader traits. Specifically, they examined the incremental criterion-related validities of the primary factors of the Sixteen Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1970) over and above the six broader factors of this questionnaire. In general, they discovered that using the 16 primary traits resulted in statistically and practically significant increments in multiple correlation squared. In addition, G. L. Stewart (1999) examined the incremental validity of achievement and order above and beyond global conscientiousness. He found that the narrow traits provided incremental validity beyond global conscientiousness on a specific job performance criterion across two stages of employee tenure.

In summary, very little research has directly examined the incremental validity of the narrow traits of conscientiousness above and beyond global conscientiousness in the prediction of job performance. In this study, we address the issue of incremental validity by combining the results of new and previously published meta-analyses in order to examine the contribution of the proposed four narrow traits of conscientiousness over and above global conscientiousness.

Variability in Prediction of Job Performance

A final avenue for investigating the predictive power of the narrow traits of conscientiousness is to examine conscientiousness–job performance relationships across different performance criteria and occupational groups. Over the past 15 years, there has been increased theoretical and empirical attention to defining the latent structure of job performance (e.g., Borman & Motowidlo, 1993; Campbell, McCloy, Oppler, & Sager, 1993; Motowidlo, Borman, & Schmitt, 1997; Organ, 1997; Pulakos, Arad, Donovan, & Plamondon, 2000). Researchers and practitioners now appreciate that job performance is multidimensional, and there is increasing theoretical and empirical evidence to suggest that different personality variables may be more relevant in the prediction of different performance criteria. The majority of this research has focused on identifying which Big Five dimensions are more predictive of particular performance criteria (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000; Tett et al., 1991). For example, Barrick and Mount found Conscientiousness to be a fairly strong predictor of job proficiency ($r = .23$) whereas Openness had no relationship with this criterion ($r = -.02$). However, both Conscientiousness and Openness were related to training proficiency ($r = .23$ and .25, respectively).

A few researchers of narrow traits have also investigated the differential validities of narrow traits in the prediction of different performance criteria. For example, in meta-analytic work looking at two narrow traits of conscientiousness, Hough (1992) found the criterion of sales effectiveness to have a moderately strong relationship with achievement ($r = .27$) but a weak relationship with dependability ($r = .06$). In contrast, the criterion of teamwork had a stronger relationship with dependability ($r = .17$) than with achievement ($r = .14$).

Thus, on the basis of prior theoretical and empirical work, we expected that the nature and magnitude of the narrow trait–job performance relationship would vary depending on the performance dimension in question. In addition, researchers have not yet investigated whether specific narrow traits of conscientiousness predict different performance criteria above and beyond global conscientiousness. In the current meta-analysis, we address these issues by comparing the relative validity coefficient magnitudes of global conscientiousness and its narrow traits in the prediction of different job performance criteria and by examining the incremental validity of the narrow traits above and beyond global conscientiousness.

In addition, theoretical and empirical work suggests that analyses of a given occupation's requirements should provide insights into the particular personality traits that will relate to job performance (Ashton, 1998; Hough & Schneider, 1996; Robertson, 1993; Rothstein, Jackson, & Tett, 1994; Tett et al., 1991). Recently, Hurtz and Donovan (2000) meta-analytically examined the predictive validity of the Big Five traits in relation to overall job performance across a variety of occupational types and demonstrated that the observed validity coefficients for a given Big Five trait varied across occupations. However, to date, no prior meta-analyses have investigated the magnitude of broad versus narrow traits of conscientiousness in light of a particular occupational type. In addition, researchers have not yet investigated whether the narrow traits of conscientiousness predict performance in different occupations above and beyond global conscientiousness. We address these issues in this article by comparing the relative validity coefficient magnitudes of global conscientiousness and its narrow traits in the prediction of performance across occupational types and by examining the incremental validity of narrow traits in the prediction of overall job performance in multiple occupations.

In summary, the current meta-analysis contributes to the literature in several ways. First, we derive meta-analytic estimates of the relationships among four narrow traits of conscientiousness. The magnitudes of these correlations provide insight into the degree to which the narrow traits can be distinguished from one another. Second, we derive meta-analytic estimates of the relationships between global conscientiousness and each of the four narrow traits. These results suggest whether the narrow traits of conscientiousness can and should be distinguished from global conscientiousness. Third, we examine whether the four narrow traits account for variance in job performance criteria above and beyond that accounted for by global conscientiousness. These results inform us as to whether particular narrow traits add to the prediction of job performance beyond global conscientiousness. Fourth, we examine the relative criterion-related validities of global conscientiousness and four of its narrow traits in the prediction of performance in multiple occupations as well as across several performance dimensions. Each of these contributions helps to clarify the predictive power of conscientiousness's four narrow traits.

Method

To examine the intercorrelations of the narrow traits of conscientiousness (i.e., achievement, dependability, order, and cautiousness) and the incremental validity of the narrow traits above and beyond global conscientiousness for each job performance criterion, we obtained validity coefficients and intercorrelations among the five predictors. Ten intercorrelations among global conscientiousness and its four narrow traits were generated in this study by conducting meta-analyses of empirical studies that examined these relationships. Next, the validity coefficients, representing the relationships between job performance and each of the following: global conscientiousness, achievement, dependability, order, and cautiousness, were generated. A total of 25 validity coefficients was generated, 5 validity coefficients for each of the five job performance criteria assessed. The five performance criteria are delineated below. It is important to note that the validity coefficients for the relationships between global conscientiousness and job performance were taken from previous meta-analyses, whereas the remaining validity coefficients were generated in this study.

In the following section, we describe the meta-analyses from which the correlation between global conscientiousness and each job performance criterion was taken. Next, we describe the meta-analytic methods used to generate the remaining correlations. Last, we discuss our approach to establishing the incremental validity of the narrow traits of conscientiousness above and beyond global conscientiousness.

Conscientiousness–Job Performance Relationship

The correlations used in this study to represent the relationship between global conscientiousness and four of the five assessed job performance criteria (overall, task, job dedication, and interpersonal facilitation) were taken from Hurtz and Donovan's (2000) meta-analysis, which examined the Big Five personality dimensions and job performance. Accordingly, we used the following correlations to represent the relationship of Conscientiousness with overall job performance ($\rho = .24$), task performance ($\rho = .16$), job dedication ($\rho = .20$), and interpersonal facilitation ($\rho = .18$). These correlations were corrected for sampling error, range restriction, criterion unreliability, and predictor unreliability.

We chose to use this Big Five personality meta-analysis as opposed to previous, well-cited meta-analyses (e.g., Barrick & Mount, 1991; Mount & Barrick, 1995; Tett et al., 1991) for two reasons. First, this is the most recent meta-analysis examining the relationships among the Big Five and job performance. Second, and more important, Hurtz and Donovan (2000) used only "pure" Big Five measures when estimating the meta-analytic correlations. This is in contrast to the prior Big Five meta-analyses just cited, in which validity coefficients were largely based on studies that used measures not designed to explicitly measure the Big Five. Instead, narrow traits were often aggregated into Big Five dimensions in order to obtain validity coefficients. Because the primary purpose of this meta-analysis is to demonstrate incremental validity of the narrow traits of conscientiousness above and beyond global conscientiousness, it is imperative that the indicator of global conscientiousness assesses conscientiousness directly rather than as an aggregate based on narrow traits. Because Hurtz and Donovan did not examine counterproductive work behaviors, the correlation used to represent the relationship between global conscientiousness and this job performance criterion ($\rho = -.26$) was taken from Salgado (2002). All other necessary correlations were generated in the present study.

Meta-Analytic Methods

To identify studies for inclusion in the meta-analysis, both electronic and manual searches were conducted for studies examining the intercorrelations among conscientiousness and its narrow traits and/or the correlations between these five constructs and various job performance criteria. Five methods were used to obtain coefficients from both published and unpublished studies for the present meta-analysis. First, an electronic search for published work and dissertations/theses was conducted for the years 1980–2002, using the PsycINFO, ABI-Inform, ERIC, and Social Sciences Citation Index databases. Second, all articles citing Barrick and Mount (1991), Hough (1992), Mount and Barrick (1995), and Salgado (1997), as indicated by the Social Sciences Citation Index, were examined. Third, a manual search was conducted for the years 1990–2002 of the five journals containing the most relevant correlations as indicated by the electronic search (*Journal of Applied Psychology*, *Personnel Psychology*, *Personality and Individual Differences*, *Journal of Personality and Social Psychology*, and *Psychological Reports*). Fourth, to obtain unpublished papers to be included in the present review, we hand searched conference programs from the last three annual conferences (2000–2002) of the Society for Industrial and Organizational Psychology and e-mailed several researchers who have conducted narrow trait-based personality research. Finally, we conducted a citation search in which the reference sections from previously gathered articles were examined to identify any potential articles that may have been missed by earlier search methods.

Criteria for inclusion. For a study to be included in the present review, two criteria had to be met. First, for the studies that examined the relationship between job performance and one of the four narrow traits of conscientiousness, only those using actual workers as participants in the research were included. If a study reported intercorrelations among global conscientiousness and its narrow traits, abnormal personality and nonadult populations were excluded. Second, if the study examined global conscientiousness, the study had to include a personality inventory that was explicitly designed to assess "pure" global conscientiousness. Studies were included in a meta-analysis if they reported correlations between any of the conscientiousness constructs and/or one or more of the constructs and job performance or information necessary to compute these correlations. Application of these inclusion rules yielded 60 sources (46 of which appear with an asterisk in the References plus 14 unpublished data sets[2]); together these represented 85 studies with 762 relevant correlations.

Coding for conscientiousness narrow traits. As mentioned previously, we adopted a four-trait taxonomy of the narrow traits of conscientiousness based on previous taxonomic research (e.g., Hogan & Ones, 1997; Hough & Ones, 2001; Saucier & Ostendorf, 1999). Specifically, Hough and Ones (2001) developed a taxonomy specifying which subscales of currently used Big Five measures are subsumed under each global Big Five personality trait as well as several narrow traits. Therefore, when classifying scales used in this meta-analysis into one of the five conscientiousness constructs (global, achievement, dependability, order, and cautiousness), we used Hough and Ones's taxonomy. For example, according to Hough and Ones, the following scales are classified as the narrow trait of order: the Adjective Checklist's Order scale, the Comrey Personality Scales' Orderliness Versus Lack of Compulsion scale, the Edwards Personal Preference Schedule's Order scale, the Jackson Personality Inventory's Organization scale, the NEO Personality Inventory—Revised's Order scale, the Occupational Personality Questionnaire's Detail Conscious scale, and the Personality Research Form's Order scale. If a study used a personality inventory not classified according to Hough and Ones's taxonomy, the coders, who included Nicole M. Dudley, Karin A. Orvis, and Justin E. Lebiecki, used the definition of the particular narrow trait scale provided in the research paper to classify the scale. In this case, agreement had to be obtained unanimously across coders; otherwise, the correlation corresponding to this scale was not included (as categorization of the scale was uncertain).

If a definition was not provided in a given research paper, or if more than one narrow trait was included in the scale, then the correlation corresponding to this scale was not used. For instance, we did not use any studies that

[2] Information about the correlations contained within these unpublished data sets is available from the authors upon request.

utilized Project A data. Those data focused on two narrow traits of conscientiousness, dependability and achievement. The definitions of these two narrow traits are composed of descriptors that reference not only dependability or achievement but also the other narrow traits examined in the current study. Thus, such studies were considered inappropriate to include.

Coding of plausible moderators. Consistent with previous meta-analyses (Barrick & Mount, 1991; Hurtz & Donovan, 2000), two study characteristics were coded and treated as potential moderators of the relationships between the conscientiousness constructs and job performance: type of performance criterion and occupational type. Specifically, type of performance criterion was classified according to a four-category classification system. Three of the categories were based on Motowidlo and Van Scotter's (1994) classification: task performance, job dedication, and interpersonal facilitation. In addition, we coded for one other job performance category, counterproductive work behaviors, which has received increased attention in the recent job performance literature (e.g., Bennett & Robinson, 2000; Rotundo & Sackett, 2002; Sackett & De Vore, 2001). Similar to Hurtz and Donovan (2000), we classified performance criteria such as technical performance and completion of specific job duties as indicators of the task performance category. Indicators of the job dedication category included criteria such as work dedication, effort, persistence, and reliability. Indicators of interpersonal facilitation included ratings of teamwork, cooperation, and helping behaviors. Finally, on the basis of prior meta-analyses examining counterproductive behavior (e.g., Hough, 1992; Salgado, 2002), the counterproductive work behaviors category included criteria such as not adhering to policies and procedures, theft, and disciplinary problems.

Next, occupational type was classified according to a four-category classification scheme based on Hurtz and Donovan's (2000) classification: sales workers, customer service representatives, managers, and skilled and semiskilled workers. Studies that were not classifiable into one of these categories because of mixed samples or inadequate information were excluded from this set of moderator analyses.

Studies were also coded for additional information such as sample size, nature of sample (incumbents vs. applicants), and demographic makeup of sample. Each study was independently coded by two of the current study's three senior authors (Nicole M. Dudley, Karin A. Orvis, and Justin E. Lebiecki). Assignment of articles was staggered so that no combination of coders coded the same set of articles. Interrater agreement was computed by using coefficient kappa on a randomly selected sample of 15 studies. For the coding of conscientiousness's narrow traits and dimensions of performance, kappa values of .89 and .87 were obtained, suggesting high interrater agreement. Discrepancies in coding were resolved by having Nicole M. Dudley and Karin A. Orvis review and discuss the original articles until they came to an agreement regarding the correct coding.

Computation of meta-analytic coefficients. In conducting the meta-analysis, we followed the procedures specified by Hunter and Schmidt (1990). Corrections were made for sampling error and unreliability in the predictor and criterion measures. To correct for predictor unreliability, predictor reliability artifact distributions were created for each correlation obtained by using the reliability estimates provided in our sample of studies and those from published personality inventory manuals. Inventory manual estimates were included to be consistent with Hurtz and Donovan's (2000) methodology. Table 1 presents the mean reliability estimate and standard deviation for each predictor artifact distribution that was created.

To be consistent with the criterion unreliability corrections that were made by Hurtz and Donovan (2000) and Salgado (2002) for the estimates involving global conscientiousness, we corrected our criterion correlations involving overall job performance, task performance, job dedication, and interpersonal facilitation by using Hurtz and Donovan's criterion reliability distribution for objective and subjective performance criteria ($M = .59$, $SD = .19$). Correlations involving counterproductive work behaviors were corrected for criterion unreliability by using Salgado's criterion reliability estimate ($M = .69$, $SD = .09$). From these procedures, results yielded (a) sample-size weighted mean correlation coefficients; (b) true validity coefficients; and (c) the variance in the uncorrected correlations, the variance due to sampling error and variability in other artifacts, residual variance, the percentage of variance explained by artifacts, and the 95% credibility interval around the corrected true score mean correlation.

If a study reported separate correlations for several subscales of conscientiousness that we classified under one of our narrow traits, we averaged the within-study correlation coefficients to avoid biasing results by allowing a sample to contribute more than one correlation coefficient to each analysis (Hunter & Schmidt, 1990). Similarly, on the criterion side, when a study provided more than one validity coefficient for a given job performance criterion, we averaged these within-study validity coefficients.

Approach to Establishing the Incremental Validity of the Narrow Traits of Conscientiousness

Correlations from current and previous meta-analyses were combined in metacorrelation matrices. Nine matrices were constructed, one for each criterion type and one for each occupational type. Hierarchical regression based on these matrices was then used to examine the incremental validity of conscientiousness's narrow traits over global conscientiousness in predicting job performance for the various criteria and occupations. Job performance was regressed onto global conscientiousness (Step 1) followed by the four narrow traits: achievement, dependability, order, and cautiousness (Step 2). The sample size used to conduct each hierarchical regression analysis was the average sample size of the 15 meta-analytic correlations derived for the regression analysis in question.

Results

Intercorrelations Between Conscientiousness and Its Narrow Traits

Table 2 presents the results of the meta-analysis regarding the interrelationships between global conscientiousness and its four narrow traits. Of the four narrow traits, the highest correlation with global conscientiousness was dependability ($\rho = .73$), whereas the lowest correlation with global conscientiousness was cautiousness ($\rho = .38$), suggesting that global conscientiousness scores are driven to a greater extent by dependability than by the other three traits and to a lesser extent by cautiousness than by anything else. When one examines the intercorrelations between the narrow traits, the true score correlations ranged from .14 (achievement–cautiousness) to .60 (achievement–dependability), suggesting that the four narrow traits have low to moderate intercorrelations. For the majority of the intercorrelations, the 95% credibility interval was quite wide, suggesting the presence of moderators (e.g., personality test, working vs. nonworking participants; Hunter & Schmidt, 1990). Further, there was a significant degree of unexplained variability in the intertrait correlations.

A regression of global conscientiousness onto its four narrow traits was also conducted. As presented in Table 3, approximately 35% of the true variance in global conscientiousness could not be explained by its four narrow traits. This finding suggests the construct of global conscientiousness is broader than or different from the meaning of the aggregate of the narrow traits.

Validity Coefficients by Performance Criterion

The first several rows of Table 4 contain the results of meta-analyses of the relationships between each narrow trait and overall

Table 1
Predictor and Criterion Reliability Artifact Distributions

	r(11)		*r*(22)	
r between Measure 1 and Measure 2	*M*	*SD*	*M*	*SD*
Intercorrelations				
Global–achievement	.80	.05	.80	.06
Global–dependability	.76	.09	.75	.11
Global–order	.78	.06	.79	.07
Global–cautiousness	.77	.07	.82	.05
Achievement–dependability	.74	.09	.76	.11
Achievement–order	.78	.07	.77	.07
Achievement–cautiousness	.77	.09	.79	.06
Dependability–order	.73	.11	.79	.11
Dependability–cautiousness	.77	.10	.79	.08
Order–cautiousness	.80	.09	.78	.07
Validities				
Achievement–overall job performance	.80	.06	.59[a]	.19[a]
Dependability–overall job performance	.79	.07	.59[a]	.19[a]
Order–overall job performance	.78	.04	.59[a]	.19[a]
Cautiousness–overall job performance	.79	.09	.59[a]	.19[a]
Achievement–task performance	.80	.06	.59[a]	.19[a]
Dependability–task performance	.77	.10	.59[a]	.19[a]
Order–task performance	.79	.03	.59[a]	.19[a]
Cautiousness–task performance	.81	.02	.59[a]	.19[a]
Achievement–job dedication	.78	.06	.59[a]	.19[a]
Dependability–job dedication	.75	.12	.59[a]	.19[a]
Order–job dedication	.78	.05	.59[a]	.19[a]
Cautiousness–job dedication	.81	.01	.59[a]	.19[a]
Achievement–interpersonal facilitation	.80	.06	.59[a]	.19[a]
Dependability–interpersonal facilitation	.63	.01	.59[a]	.19[a]
Order–interpersonal facilitation	.80	.02	.59[a]	.19[a]
Cautiousness–interpersonal facilitation	.80	.02	.59[a]	.19[a]
Achievement–counterproductive	.81	.06	.69[b]	.09[b]
Dependability–counterproductive	.78	.05	.69[b]	.09[b]
Order–counterproductive	.78	.04	.69[b]	.09[b]
Cautiousness–counterproductive	.78	.12	.69[b]	.09[b]
Overall job performance within job type				
Sales workers				
Achievement–overall job performance	.84	.02	.59[a]	.19[a]
Dependability–overall job performance	.80	.07	.59[a]	.19[a]
Order–overall job performance	.77	.03	.59[a]	.19[a]
Cautiousness–overall job performance	.77	.16	.59[a]	.19[a]
Customer service personnel				
Achievement–overall job performance	.81	.03	.59[a]	.19[a]
Order–overall job performance	.80	.01	.59[a]	.19[a]
Managers				
Achievement–overall job performance	.79	.07	.59[a]	.19[a]
Dependability–overall job performance	.82	.02	.59[a]	.19[a]
Order–overall job performance	.81	.01	.59[a]	.19[a]
Cautiousness–overall job performance	.82	.01	.59[a]	.19[a]
Skilled/semiskilled workers				
Achievement–overall job performance	.80	.03	.59[a]	.19[a]
Dependability–overall job performance	.79	.05	.59[a]	.19[a]
Order–overall job performance	.78	.05	.59[a]	.19[a]
Cautiousness–overall job performance	.81	.01	.59[a]	.19[a]
Task performance within job type				
Sales workers				
Achievement–task performance	.80	.08	.59[a]	.19[a]
Order–task performance	.77	.06	.59[a]	.19[a]
Customer service personnel				
Achievement–task performance	.82	.03	.59[a]	.19[a]
Order–task performance	.80	.01	.59[a]	.19[a]
Managers				
Achievement–task performance	.82	.02	.59[a]	.19[a]
Order–task performance	.81	.01	.59[a]	.19[a]
Cautiousness–task performance	.81	.01	.59[a]	.19[a]

Table 1 (*continued*)

r between Measure 1 and Measure 2	*r*(11) *M*	*r*(11) *SD*	*r*(22) *M*	*r*(22) *SD*
Skilled/semiskilled workers				
Achievement–task performance	.81	.02	.59[a]	.19[a]
Dependability–task performance	.82	.01	.59[a]	.19[a]
Order–task performance	.80	.01	.59[a]	.19[a]
Cautiousness–task performance	.81	.01	.59[a]	.19[a]
Contextual performance within job type				
Sales workers				
Achievement–contextual performance	.85	.05	.59[a]	.19[a]
Order–contextual performance	.76	.07	.59[a]	.19[a]
Customer service personnel				
Achievement–contextual performance	.77	.07	.59[a]	.19[a]
Order–contextual performance	.80	.01	.59[a]	.19[a]
Managers				
Achievement–contextual performance	.82	.02	.59[a]	.19[a]
Order–contextual performance	.81	.01	.59[a]	.19[a]
Cautiousness–contextual performance	.81	.03	.59[a]	.19[a]
Skilled/semiskilled workers				
Achievement–contextual performance	.81	.02	.59[a]	.19[a]
Dependability–contextual performance	.82	.01	.59[a]	.19[a]
Order–contextual performance	.80	.01	.59[a]	.19[a]
Cautiousness–contextual performance	.81	.03	.59[a]	.19[a]

Note. Global = global conscientiousness; counterproductive = counterproductive work behaviors.
[a] Correlations involving overall job performance, task performance, job dedication, interpersonal facilitation, and contextual performance were corrected for criterion unreliability by using Hurtz and Donovan's (2000) criterion reliability estimate ($M = .59$, $SD = .19$). [b] Correlations involving counterproductive work behaviors were corrected for criterion unreliability by using Salgado's (2002) criterion reliability estimate ($M = .69$, $SD = .09$).

job performance. Although the correlations were generally low, there was considerable residual variability remaining after removal of that associated with artifacts. These findings suggest the presence of moderators in these estimates of true validity.

The first moderator examined was criterion type. Separate meta-analyses were conducted for each of the four performance criteria: task performance, job dedication, interpersonal facilitation, and counterproductive work behaviors. As can be seen in Table 4, the variability in correlations across the four types of performance criteria suggests that type of performance criterion did indeed operate as a moderator of the relationships between the narrow traits of conscientiousness and performance. For task performance, the estimated true score validities ranged from .11 to .25 across narrow traits. The highest validity was for achievement ($\rho = .25$). For job dedication, the estimated true score validities were noticeably higher, ranging from .08 to .46. Here, the highest validity coefficient was for dependability ($\rho = .46$). For interpersonal facilitation, the estimated true score validities ranged from −.02 to .23 across narrow traits. The highest validity was for dependability ($\rho = .23$). Finally, for counterproductive work behaviors, the true

Table 2
Meta-Analysis of Relationships Between Global Conscientiousness and Its Narrow Traits

Intercorrelation	*k*	*N*	Mean *r*	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Global–achievement	32	8,816	.43	.0427	.0024	.0005	.0403	7	.53	.25	.04, 1.00
Global–dependability	16	3,908	.55	.0254	.0020	.0026	.0235	18	.73	.19	.36, 1.00
Global–order	35	9,013	.47	.0276	.0023	.0008	.0253	11	.60	.20	.21, .99
Global–cautiousness	28	7,727	.30	.0384	.0030	.0003	.0354	9	.38	.24	−.08, .85
Achievement–dependability	16	6,696	.45	.0244	.0015	.0017	.0228	13	.60	.19	.22, .98
Achievement–order	26	7,132	.28	.0508	.0031	.0003	.0477	7	.36	.28	−.19, .91
Achievement–cautiousness	18	5,532	.11	.0390	.0032	.0001	.0358	8	.14	.24	−.33, .62
Dependability–order	15	4,915	.30	.0262	.0025	.0010	.0237	13	.40	.19	.01, .78
Dependability–cautiousness	18	6,299	.38	.0167	.0021	.0011	.0146	19	.49	.15	.20, .78
Order–cautiousness	23	6,244	.25	.0110	.0032	.0004	.0078	32	.32	.11	.11, .54

Note. k = number of correlation coefficients; mean r = sample-size weighted mean observed correlation; S_r^2 = total observed variance of mean r; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score correlation; SD_ρ = standard deviation of true score correlation; 95% CI = lower and upper limits of 95% credibility interval for ρ; Global = global conscientiousness.

Table 3
Hierarchical Regression Results of Global Conscientiousness on Its Four Narrow Traits

Narrow trait	β	R^2	ΔR^2
Achievement	.076***	.654***	.654***
Dependability	.548***		
Order	.360***		
Cautiousness	−.011		

*** $p < .001$.

score validity ranged from −.34 to .00. Again, the validity for dependability had the greatest absolute magnitude ($\rho = -.34$).

Although type of performance criterion appears to be an important moderator, considerable variability in observed correlations remained after consideration of this moderator. In an attempt to further explain this variability, we examined occupational type as a potential moderator. Before discussing these additional meta-analyses, however, we present hierarchical regressions examining the incremental validity of narrow traits over global conscientiousness for each of the five job performance criteria.

Incremental Validity for Job Performance Criteria

As a method of testing for incremental validity, we conducted a series of hierarchical regression analyses. A separate regression analysis was performed for each of the four job performance criteria as well as for overall job performance. The results are presented in Table 5. For each of these analyses, global conscientiousness was entered first followed by the set of four narrow traits, entered as a block. The sample sizes (based on averages) used to conduct hierarchical regression analysis for overall performance, task performance, job dedication, interpersonal facilitation, and counterproductive work behaviors were 5,780; 5,454; 5,049; 5,335; and 5,014, respectively.

The results suggest that the degree to which narrow traits contribute to the prediction of performance above and beyond global conscientiousness depends on the particular type of performance criterion in question. The results of the regression analyses indicated statistically significant increases in explained variance

Table 4
Meta-Analysis of Performance Criterion as a Moderator of the Relationship Between Conscientiousness Traits and Performance

Performance criterion	k	N	Mean r	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Overall job performance											
Global conscientiousness[a]	42	7,342	.15	.0148	.0055	.0019	.0074	50	.24	—[b]	—[b]
Achievement	26	3,595	.10	.0108	.0071	.0060	.0036	100	.20	.00	—[c]
Dependability	15	1,748	.13	.0140	.0084	.0097	.0056	100	.25	.00	—[c]
Order	26	3,835	.05	.0114	.0068	.0014	.0046	72	.10	.11	−.11, .31
Cautiousness	22	2,753	−.01	.0168	.0081	.0000	.0087	48	−.01	.18	−.36, .34
Task performance											
Global conscientiousness[a]	12	2,197	.10	.0138	.0054	.0008	.0076	45	.16	—[b]	—[b]
Achievement	26	3,074	.13	.0135	.0082	.0097	.0053	100	.25	.00	—[c]
Dependability	11	934	.09	.0229	.0117	.0042	.0112	69	.17	.16	−.15, .49
Order	26	2,998	.08	.0201	.0086	.0037	.0115	62	.16	.17	−.17, .49
Cautiousness	18	5,921	.06	.0089	.0029	.0020	.0061	54	.11	.12	−.12, .35
Job dedication											
Global conscientiousness[a]	17	3,197	.12	.0203	.0052	.0013	.0139	32	.20	—[b]	—[b]
Achievement	15	2,330	.20	.0326	.0060	.0221	.0266	86	.39	.13	.13, .64
Dependability	7	979	.23	.0112	.0064	.0304	.0048	100	.46	.00	—[c]
Order	13	1,658	.05	.0116	.0079	.0014	.0038	79	.10	.09	−.09, .28
Cautiousness	6	878	.04	.0111	.0069	.0010	.0042	71	.08	.11	−.13, .29
Interpersonal facilitation											
Global conscientiousness[a]	23	4,301	.11	.0083	.0053	.0010	.0020	76	.18	—[b]	—[b]
Achievement	18	3,264	.06	.0124	.0055	.0019	.0069	60	.11	.13	−.15, .37
Dependability	4	627	.11	.0059	.0063	.0061	.0000	100	.23	.00	—[c]
Order	18	3,011	−.01	.0164	.0060	.0000	.0104	37	−.02	.19	−.40, .36
Cautiousness	12	2,187	.00	.0088	.0055	.0000	.0033	63	.00	.11	−.21, .22
Counterproductive work behaviors											
Global conscientiousness[d]	13	6,276	−.16	.0700	—[b]	—[b]	—[b]	92	−.26	.03	—[b]
Achievement	13	1,026	.00	.0139	.0128	.0000	.0000	92	.00	.05	−.11, .10
Dependability	16	2,195	−.21	.0217	.0070	.0241	.0084	71	−.34	.13	−.60, −.09
Order	13	1,311	−.04	.0183	.0100	.0009	.0003	56	−.07	.15	−.35, .22
Cautiousness	14	2,251	−.06	.0157	.0062	.0023	.0008	45	−.11	.15	−.41, .19

Note. k = number of validity coefficients; mean r = sample-size weighted mean observed validity; S_r^2 = total observed variance of mean r; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score validity; SD_ρ = standard deviation of true score validity; 95% CI = lower and upper limits of 95% credibility interval for ρ.

[a] Meta-analytic estimates for global conscientiousness were imported from Hurtz and Donovan (2000). [b] These values are not provided because they were not provided in the original meta-analysis. [c] There is no credibility interval for a corrected correlation with a variance of zero. [d] Meta-analytic estimate for global conscientiousness was imported from Salgado (2002).

Table 5
Hierarchical Regression Results for Job Performance Criterion

Variable	β	R^2	ΔR^2
Overall job performance			
1. Global conscientiousness	.240***	.058***	
2. Global conscientiousness	.150***	.095***	.037***
2. Achievement	.022		
2. Dependability	.224***		
2. Order	−.033*		
2. Cautiousness	−.170***		
Task performance			
1. Global conscientiousness	.160***	.026***	
2. Global conscientiousness	−.025	.072***	.046***
2. Achievement	.238***		
2. Dependability	−.020		
2. Order	.073***		
2. Cautiousness	.072***		
Job dedication			
1. Global conscientiousness	.200***	.040***	
2. Global conscientiousness	−.338***	.299***	.259***
2. Achievement	.189***		
2. Dependability	.657***		
2. Order	.019		
2. Cautiousness	−.145***		
Interpersonal facilitation			
1. Global conscientiousness	.180***	.032***	
2. Global conscientiousness	.153***	.089***	.058***
2. Achievement	−.070***		
2. Dependability	.293***		
2. Order	−.158***		
2. Cautiousness	−.141***		
Counterproductive work behaviors			
1. Global conscientiousness	−.260***	.068***	
2. Global conscientiousness	−.144***	.204***	.136***
2. Achievement	.364***		
2. Dependability	−.546***		
2. Order	.058***		
2. Cautiousness	.143***		

Note. Numbers 1 and 2 indicate Step 1 and Step 2, respectively, of the hierarchical regression analyses. Because the hierarchical regression analyses are based on meta-analytic data, sample sizes are large; therefore, statistical significance of the beta weights is less relevant.
* $p < .05$. *** $p < .001$.

above and beyond global conscientiousness across all job performance criteria. However, the percentage of variance explained by the narrow traits above and beyond global conscientiousness ranged from 3.7% to 25.9%. Specifically, for overall job performance, the variance explained by the narrow traits over and above global conscientiousness was small ($\Delta R^2 = .037$), as was the percentage of variance in task performance explained by the narrow traits above and beyond global conscientiousness ($\Delta R^2 = .046$). In contrast, for job dedication, the narrow traits explained a substantial percentage of criterion variance above and beyond global conscientiousness ($\Delta R^2 = .259$). In particular, dependability appeared to be the optimal predictor of job dedication, demonstrating a considerable beta weight of .657. For interpersonal facilitation, the variance explained by the narrow traits over and above global conscientiousness was small to moderate ($\Delta R^2 = .058$). Finally, for counterproductive work behaviors, the narrow traits explained a substantial percentage of criterion variance above and beyond global conscientiousness ($\Delta R^2 = .136$). Thus, it seems that narrow traits contribute substantially to the prediction of some criteria but not others. We revisit this issue in the Discussion section.

Validity Coefficients by Occupational Type

As was mentioned earlier, in an attempt to explain additional variance in the conscientiousness–performance relationship, we classified studies on the basis of occupational type. Table 6 presents the results of the occupational type moderator analyses of the relationship between the four narrow traits and overall job performance. The occupational types included sales workers, customer service representatives, managers, and skilled and semiskilled workers. For applicants or incumbents in sales positions, the estimated true score validities ranged from −.04 to .28 across narrow traits. The highest validity was for achievement ($\rho = .28$). For customer service representatives, dependability and cautiousness were not examined because two or fewer studies were obtained for these validity coefficients. The estimated true score validities for achievement and order were .22 and .12, respectively. The estimated true score validities ranged from −.12 to .19 for managerial positions. The highest validity was for dependability ($\rho = .19$), and the lowest absolute validity was for cautiousness ($\rho = .01$). Finally, for skilled and semiskilled positions, the estimated true score validities ranged from −.20 to .27. The highest validity was for dependability ($\rho = .27$), and the lowest absolute values were for achievement ($\rho = .20$) and cautiousness ($\rho = -.20$), although these are still greater than the meta-analytic validity found by Hurtz and Donovan (2000) for global conscientiousness.

Incremental Validity for Occupational Type

To examine incremental validity, we conducted a series of hierarchical regression analyses. A separate regression analysis was performed for each of the four occupational types for overall job performance. The results are presented in Table 7. Global conscientiousness was entered first followed by the set of four narrow traits, as follows: achievement, dependability, order, and cautiousness. For customer service positions, the incremental validities of dependability and cautiousness were not examined because two or fewer studies examining these relationships were available. The sample sizes used to conduct hierarchical regression analysis for sales workers, customer service representatives, managers, and skilled and semiskilled workers were 810; 1,054; 945; and 1,177, respectively.

The results suggest that the degree to which narrow traits contribute to the prediction of overall job performance above and beyond global conscientiousness depends on the particular occupational type in question. Across all occupational types, results of the regression analyses indicated statistically significant increases in explained variance provided by one or more of the narrow traits of conscientiousness above and beyond global conscientiousness. However, the percentage of variance explained by the narrow traits above and beyond global conscientiousness ranged from 1.2% to 24.0%. For applicants and job incumbents in customer service positions, the percentage of variance explained by the narrow traits over and above global conscientiousness was small ($\Delta R^2 = .012$). For the other three occupational types, however, the contribution was moderate to substantial. Specifically, for sales positions, the

Table 6
Meta-Analysis of Occupational Type as a Moderator of the Relationship Between Conscientiousness Traits and Overall Job Performance

Occupational type	k	N	Mean r	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Sales											
Global conscientiousness[a]	10	1,369	.18	.0117	.0069	.0026	.0021	82	.29	—[b]	—[b]
Achievement	4	532	.15	.0180	.0072	.0128	.0108	100	.28	.00	—[c]
Dependability	5	592	.13	.0107	.0082	.0099	.0025	100	.26	.00	—[c]
Order	5	849	.10	.0108	.0058	.0055	.0050	100	.19	.00	—[c]
Cautiousness	7	705	−.02	.0263	.0100	.0002	.0163	39	−.04	.25	−.52, .45
Customer service											
Global conscientiousness[a]	12	1,849	.17	.0121	.0062	.0023	.0036	70	.27	—[b]	—[b]
Achievement	5	659	.12	.0126	.0074	.0074	.0051	100	.22	.00	—[c]
Order	5	659	.07	.0089	.0076	.0024	.0014	100	.12	.00	—[c]
Managerial											
Global conscientiousness[a]	4	495	.11	.0451	.0079	.0011	.0361	20	.19	—[b]	—[b]
Achievement	7	1,330	.07	.0054	.0052	.0027	.0002	100	.13	.00	—[c]
Dependability	3	402	.10	.0180	.0074	.0056	.0107	72	.19	.13	−.07, .45
Order	6	1,148	−.06	.0022	.0052	.0021	.0000	100	−.12	.00	—[c]
Cautiousness	7	1,348	.01	.0127	.0052	.0000	.0075	41	.01	.16	−.31, .33
Skilled and semiskilled											
Global conscientiousness[a]	14	3,481	.10	.0147	.0040	.0009	.0098	33	.17	—[b]	—[b]
Achievement	7	766	.11	.0111	.0090	.0060	.0021	100	.20	.00	—[c]
Dependability	3	376	.14	.0130	.0077	.0110	.0053	100	.27	.00	—[c]
Order	8	987	.11	.0034	.0080	.0064	.0000	100	.21	.00	—[c]
Cautiousness	4	273	−.11	.0092	.0145	.0064	.0000	100	−.20	.00	—[c]

Note. k = number of validity coefficients; mean r = sample-size weighted mean observed validity; S_r^2 = total observed variance of mean r; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score validity; SD_ρ = standard deviation of true score validity; 95% CI = lower and upper limits of 95% credibility interval for ρ.
[a] Meta-analytic estimates for global conscientiousness were imported from Hurtz and Donovan (2000). [b] These values are not provided because they were not provided in the original meta-analysis. [c] There is no credibility interval for a corrected correlation with a variance of zero.

percentage of variance explained by the narrow traits over and above global conscientiousness was 5.4%. For managerial positions, narrow traits explained an additional 9.3% of criterion variance above and beyond global conscientiousness. In particular, order demonstrated a considerable beta weight of −.357 in the prediction of overall performance of managers.[3] Finally, for skilled and semiskilled workers, the variance of overall performance explained by the narrow traits over and above global conscientiousness was substantial ($\Delta R^2 = .240$). Cautiousness and dependability appeared to be the optimal predictors of overall performance for skilled and semiskilled workers, yielding beta weights of −.494 and .599, respectively. Thus, it seems that narrow traits contribute to the prediction of overall performance in some occupations but not others; this issue is revisited in the Discussion section.

Validity Coefficients by Occupational Type and Performance Criterion

We also conducted moderator analyses of the relationship between the narrow traits and job performance across both occupational type and job performance criterion. Because of the small number of correlations for some of the performance criteria types, only two performance criteria were examined, task and contextual performance. Validity coefficients for contextual performance were obtained from studies that examined the criterion of job dedication and/or interpersonal facilitation, two dimensions of contextual performance (see Motowidlo & Van Scotter, 1994). For both task and contextual performance, meta-analytic estimates of dependability's predictive validity could not be derived for the sales, customer service, and managerial occupational types because two or fewer studies examining these relationships were available. Similarly, for sales and customer service jobs, the meta-analytic estimates for cautiousness could not be derived.

As displayed in Table 8, for sales positions, the estimated true score validities for task performance were .26 and .03 for achievement and order, respectively. For customer service positions, the estimated true score validities for achievement and order were .30 and .08, respectively. The estimated true score validities ranged from −.13 to .18 for managerial positions. The highest validity was for achievement ($\rho = .18$). Finally, for skilled and semiskilled positions, the estimated true score validities ranged from .16 to .34. The highest validity was for order ($\rho = .34$).

As shown in Table 9, the estimated true score validities for contextual performance were .39 and −.11 for achievement and order, respectively, for sales positions. For customer service positions, the estimated true score validities for achievement and order were .30 and .04, respectively. The estimated true score validities ranged from −.17 to .05 across narrow traits for managerial positions. The validity for order had the greatest absolute magnitude ($\rho = -.17$). Finally, for skilled and semiskilled positions, the

[3] The sign of this beta weight may be attributable to collinearity, whereby negative values are due to the suppression associated with multicollinear predictors (Cohen & Cohen, 1983).

Table 7
Hierarchical Regression Results for Overall Job Performance by Occupational Type

Variable	β	R^2	ΔR^2
Sales			
1. Global conscientiousness	.290***	.084***	
2. Global conscientiousness	.166***	.138***	.054***
2. Achievement	.107**		
2. Dependability	.156**		
2. Order	.058		
2. Cautiousness	−.214***		
Customer service			
1. Global conscientiousness	.270***	.073***	
2. Global conscientiousness	.256***	.084***	.012***
2. Achievement	.110***		
2. Order	−.074*		
Managerial			
1. Global conscientiousness	.190***	.036***	
2. Global conscientiousness	.345***	.129***	.093***
2. Achievement	.028		
2. Dependability	.090*		
2. Order	−.357***		
2. Cautiousness	−.056		
Skilled and semiskilled			
1. Global conscientiousness	.170***	.029***	
2. Global conscientiousness	−.205***	.268***	.240***
2. Achievement	−.083**		
2. Dependability	.599***		
2. Order	.283***		
2. Cautiousness	−.494***		

Note. Numbers 1 and 2 indicate Step 1 and Step 2, respectively, of the hierarchical regression analyses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

estimated true score validities ranged from −.01 to .31. The highest validity was for dependability ($\rho = .31$). These results suggest that both occupational type and type of job performance criterion operate as moderators of the relationships between the narrow traits of conscientiousness and job performance. Because of the small number of correlations available, the incremental validity of the narrow traits over and above global conscientiousness for specific job performance criteria according to occupational type was not examined. In summary, achievement generally appeared to be the best predictor of task performance across occupational type, whereas for contextual performance, the optimal narrow trait varied.

Discussion

This meta-analysis offers several contributions to the literature and to the debate surrounding the use of broad and narrow traits of conscientiousness. First, we meta-analytically examined the degree to which conscientiousness's narrow traits are intercorrelated. Our results demonstrate that the narrow traits have low to moderate correlations with one another, supporting the narrow trait perspective's assertion that it is valuable to distinguish among narrow traits.

As a second contribution, we meta-analytically examined the degree to which narrow traits are correlated with global conscientiousness. Our results demonstrate that the narrow traits have moderate to high correlations with global conscientiousness. Dependability was found to have the highest true score correlation with global conscientiousness measures, suggesting that dependability may be the primary driver of global conscientiousness (at least as it is typically operationalized). Moreover, our regression of global conscientiousness onto the narrow traits supports that the construct of global conscientiousness is broader than or different from the meaning of the aggregate of the narrow traits.

Before we discuss our third contribution, it is also important to revisit a point mentioned in the Results section—namely, that there is a significant degree of unexplained variability in the intertrait correlations. This is a potentially important issue because as an anonymous reviewer pointed out, if intertrait correlations are still highly variable after correcting for artifacts, this may suggest the presence of moderators. Therefore, we investigated the presence of three potential moderators. First, we examined whether the mea-

Table 8
Meta-Analysis of Occupational Type as a Moderator of the Relationship Between Conscientiousness Traits and Task Performance

Occupational type	k	N	Mean r	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Sales											
Achievement	6	588	.14	.0252	.0100	.0105	.0153	81	.26	.13	.01, .52
Order	6	626	.02	.0094	.0100	.0001	.0000	100	.03	.00	—
Customer service											
Achievement	4	415	.16	.0069	.0092	.0142	.0000	100	.30	.00	—
Order	6	804	.04	.0079	.0075	.0010	.0004	100	.08	.00	—
Managerial											
Achievement	4	456	.10	.0086	.0087	.0051	.0000	100	.18	.00	—
Order	4	456	−.07	.0095	.0088	.0027	.0007	100	−.13	.00	—
Cautiousness	4	360	−.05	.0054	.0111	.0015	.0000	100	−.10	.00	—
Skilled and semiskilled											
Achievement	9	1,187	.15	.0146	.0073	.0122	.0073	100	.28	.00	—
Dependability	4	530	.09	.0161	.0075	.0041	.0086	72	.16	.13	−.08, .41
Order	9	1,073	.18	.0177	.0079	.0178	.0098	100	.34	.00	—
Cautiousness	6	875	.10	.0426	.0068	.0059	.0358	30	.20	.33	−.44, .83

Note. Dashes indicate there is no credibility interval for a corrected correlation with a variance of zero. k = number of validity coefficients; mean r = sample size weighted mean observed validity; S_r^2 = total observed variance of mean r; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score validity; SD_ρ = standard deviation of true score validity; 95% CI = lower and upper limits of 95% credibility interval for ρ.

Table 9
Meta-Analysis of Occupational Type as a Moderator of the Relationship Between Conscientiousness Traits and Contextual Performance

Occupational type	k	N	Mean r	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Sales											
Achievement	4	483	.21	.0219	.0073	.0000	.0240	100	.39	.00	—
Order	5	369	−.06	.0056	.0137	.0017	.0000	100	−.11	.00	—
Customer service											
Achievement	7	851	.15	.0214	.0079	.0132	.0135	98	.30	.04	.23, .37
Order	6	804	.02	.0127	.0075	.0003	.0052	61	.04	.13	−.22, .30
Managerial											
Achievement	6	1,167	.01	.0058	.0052	.0000	.0007	89	.01	.05	−.08, .10
Order	6	1,167	−.09	.0133	.0051	.0042	.0083	70	−.17	.12	−.40, .07
Cautiousness	5	968	.03	.0116	.0052	.0004	.0064	48	.05	.15	−.23, .34
Skilled and semiskilled											
Achievement	9	1,187	.11	.0084	.0074	.0070	.0010	100	.21	.00	—
Dependability	4	530	.17	.0052	.0072	.0153	.0000	100	.31	.00	—
Order	9	1,073	.09	.0107	.0083	.0045	.0024	100	.17	.00	—
Cautiousness	7	978	.00	.0100	.0072	.0000	.0025	75	−.01	.09	−.19, .17

Note. Dashes indicate there is no credibility interval for a corrected correlation with a variance of zero. k = number of validity coefficients; mean r = sample size weighted mean observed validity; S_r^2 = total observed variance of mean r; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score validity; SD_ρ = standard deviation of true score validity; 95% CI = lower and upper limits of 95% credibility interval for ρ.

sures used across studies generated different results. Although different studies used different methods, almost all of the studies used self-report, widely available, firmly established measures. As a result, a moderator analysis could not be conducted on this variable.

Two post hoc exploratory moderator analyses were conducted to help explain the unaccounted for variability in the intertrait correlations. First, we compared published and unpublished studies with the idea that there might be systematic differences between the two. The results of this additional moderator analysis are presented in Table 10. In general, published intercorrelations were typically higher than those found for unpublished studies. Results of these analyses also demonstrated that published studies, on average, had lower variance in rho than did unpublished studies. In addition, the variance explained by artifacts was generally higher for published than unpublished studies. Credibility intervals were generally smaller for published than unpublished studies as well.

Second, we compared studies that provided information on predictor reliability with studies that did not include this information with the idea being that this might be a reflection of the methodological rigor of the study. The results of this additional moderator analysis are presented in Table 11. The results suggest that the studies that provided information on predictor reliability demonstrated higher sample-size weighted mean observed correlations than studies that did not provide this information. On average, the mean observed correlation increased by .14. Further, in general, the observed variance in the intertrait correlations and the amount of unexplained variance in the correlations were different when taking into account whether or not a study provided psychometric information.

These exploratory moderator analyses suggest that some of the unexplained variance in the intertrait correlations can be attributed to whether the correlations obtained were from unpublished or published studies and whether or not the studies provided psychometric information. Yet, unexplained variance in the intertrait correlations still exists.

Another potential explanation for this unexplained variability is that different measures purporting to measure a given narrow trait actually measure different constructs. Although one could argue that measures assessing a specific narrow trait are more likely to be substantively similar than are the measures included in previous meta-analyses (e.g., Barrick & Mount, 1991; Tett et al., 1991), which used measures assessing the construct of global conscientiousness, the opposite argument could also be made. Correlations between global measures purportedly assessing the same construct may be more homogeneous than correlations between narrow trait scales purportedly assessing the same construct.[4] Specifically, narrow trait scales were designed to measure narrow traits; hence, subtle differences between items (e.g., content, format) on scales that measure the same narrow trait may result in lower, less homogeneous intertrait correlations. In contrast, global measures may be more resistant to idiosyncratic item differences because of their broad, encompassing nature; thus, one may find fairly homogeneous correlations across different forms of more global measures. This may be one clue as to why a significant degree of unexplained variability exists in our intertrait correlations.

However, we suggest there is no particular reason to suspect that unexplained variability in the intertrait correlations is due to the measurement of substantially different constructs (i.e., a lack of convergent construct validity of the measures of any given narrow trait). We base this assertion on several additional findings. First, we compared within-trait, between-instrument correlations from our data set and from various test manuals with our between-trait, between-instrument correlations. The sample-size weighted average within-trait, between-instrument correlation was .524 (variance = .019); this average correlation is considerably larger than the sample-size weighted average between-trait, between-instrument correlation (r = .295, variance = .014), which suggests

[4] We thank an anonymous reviewer for suggesting the inclusion of this point.

Table 10
Meta-Analysis of the Source of Study as a Moderator of the Relationships Between Conscientiousness and Its Narrow Traits

Intercorrelation	*k*	*N*	Mean *r*	S_r^2	S_e^2	S_{meas}^2	S_{res}^2	% VE	ρ	SD_ρ	95% CI
Global–achievement	18	6,700	.45	.0521	.0017	.0013	.0504	6	.57	.28	.02, 1.00
	(14)	(2,116)	(.35)	(.0130)	(.0052)	(.0000)	(.0078)	(40)	(.43)	(.11)	(.22, .65)
Global–dependability	13	3,364	.58	.0228	.0017	.0033	.0211	22	.78	.18	.43, 1.00
	(3)	(544)	(.37)	(.0418)	(.0041)	(.0002)	(.0376)	(10)	(.47)	(.25)	(−.01, .95)
Global–order	21	6,896	.48	.0274	.0018	.0021	.0256	14	.62	.20	.23, 1.00
	(14)	(2,117)	(.45)	(.0283)	(.0042)	(.0001)	(.0241)	(15)	(.57)	(.19)	(.18, .95)
Global–cautiousness	20	6,552	.34	.0364	.0024	.0006	.0340	8	.43	.23	−.03, .88
	(8)	(1,175)	(.12)	(.0491)	(.0067)	(.0000)	(.0425)	(14)	(.15)	(.07)	(−.36, .65)
Achievement–dependability	11	5,738	.42	.0192	.0013	.0019	.0179	17	.58	.17	.24, .92
	(5)	(958)	(.60)	(.0554)	(.0022)	(.0008)	(.0532)	(5)	(.77)	(.29)	(.19, 1.00)
Achievement–order	9	4,245	.19	.0496	.0020	.0004	.0476	5	.26	.30	−.33, .86
	(17)	(2,887)	(.41)	(.0525)	(.0041)	(.0001)	(.0484)	(8)	(.52)	(.28)	(−.02, 1.00)
Achievement–cautiousness	10	4,357	.15	.0360	.0022	.0002	.0339	7	.21	.25	−.28, .69
	(8)	(1,175)	(−.05)	(.0501)	(.0068)	(.0000)	(.0433)	(14)	(−.06)	(.26)	(−.57, .44)
Dependability–order	9	3,897	.24	.0153	.0020	.0009	.0132	19	.32	.15	.03, .61
	(6)	(1,018)	(.51)	(.0680)	(.0032)	(.0022)	(.0648)	(8)	(.68)	(.11)	(.03, 1.00)
Dependability–cautiousness	14	5,665	.40	.0125	.0017	.0011	.0108	23	.52	.13	.27, .76
	(4)	(634)	(.19)	(.0535)	(.0059)	(.0003)	(.0475)	(12)	(.24)	(.28)	(−.32, .80)
Order–cautiousness	14	4,979	.27	.0078	.0024	.0007	.0054	40	.35	.09	.18, .52
	(9)	(1,265)	(.18)	(.0237)	(.0067)	(.0001)	(.0170)	(29)	(.23)	(.16)	(−.09, .55)

Note. For each intercorrelation, the first row of statistics provided corresponds to the published studies examined, and the second row of statistics provided, in parentheses, corresponds to the unpublished studies examined. *k* = number of correlation coefficients; mean *r* = sample-size weighted mean observed correlation; S_r^2 = total observed variance of mean *r*; S_e^2 = variance due to sampling error; S_{meas}^2 = variance due to measurement artifacts; S_{res}^2 = residual variance; % VE = percentage of variance accounted for by sampling error and measurement artifacts; ρ = true score correlation; SD_ρ = standard deviation of true score correlation; 95% CI = lower and upper limits of 95% credibility interval for ρ; Global = global conscientiousness.

that the different instruments do measure traits in a similar manner. We also compared narrow trait definitions and item generation and validation procedures of the most commonly used measures in this meta-analysis and found comparable trait descriptors, scale development, and validation procedures across measures. On the basis of this additional information, we suggest the possibility that various measures of a given narrow trait are assessing substantially different constructs is less of a concern.

Returning to our discussion of the contributions of this meta-analysis, a third contribution is the examination of whether the nature and magnitude of the narrow trait–job performance relationships vary depending on the combination of performance dimension and occupational type. Further, our meta-analytic estimates of criterion-related validities of the narrow traits provide insight into the debate surrounding the use of narrow and broad traits in the prediction of performance. We found when collapsing across all occupational types, the magnitudes of the narrow trait validity coefficients were generally comparable to or larger than prior meta-analytic estimates for global conscientiousness (i.e., Hurtz & Donovan, 2000) in the prediction of all job performance dimensions except overall job performance.

Next, we compared the validity coefficients of the four narrow traits and global conscientiousness, within performance dimension and occupational type. In regards to overall job performance, for the most part our validity coefficients for the narrow traits of conscientiousness were comparable to or smaller than that of the meta-analytic estimates for global conscientiousness, except for the skilled and semiskilled occupational type in which dependability was greater than the global conscientiousness meta-analytic estimate. As mentioned previously, we were unable to examine optimal predictor breadth (i.e., narrow vs. broad trait) for task and contextual performance within occupational type. We were, however, able to compare the magnitudes of the narrow trait validity coefficients for all three performance criteria. In general, it appears that dependability and/or achievement drives the relationship between conscientiousness and overall, task, and contextual performance, across occupational type. However, the narrow trait with the highest criterion-related validity does vary across occupational type. One notable finding concerns task performance for the skilled and semiskilled occupational type and contextual performance for managers. For both, order appears to be a dominant predictor, although dependability could not be examined for the managerial group. For the remaining occupations, achievement or dependability serves as a dominant predictor of task or contextual performance.

Our final contribution to the literature answers recent calls in the literature to go beyond the examination of bivariate correlations (e.g., Avis et al., 2002; Clevenger et al., 2001; Cortina et al., 2000). We examined the incremental validity of conscientiousness's four narrow traits above and beyond global conscientiousness in the prediction of performance. To our knowledge, this is the first meta-analysis to examine the incremental validity of the narrow traits. The results of these analyses suggest that the degree to which narrow traits contribute to the prediction of performance above and beyond global conscientiousness depends on the particular type of performance criterion and occupational type in question.

In regards to type of performance criterion, the narrow traits did not contribute substantial incremental validity in the prediction of overall or task performance. However, they did contribute sub-

Table 11
Meta-Analysis of the Provision of Psychometric Information as a Moderator of the Relationships Between Conscientiousness and Its Narrow Traits

	Studies providing predictor reliability						Studies not providing predictor reliability					
Intercorrelation	*k*	*N*	Mean *r*	S_r^2	SD_r	S_{res}^2	*k*	*N*	Mean *r*	S_r^2	SD_r	S_{res}^2
Global–achievement	18	4,676	.51	.0412	.20	.0391	14	4,140	.33	.0445	.21	.0411
Global–dependability	7	2,773	.59	.0248	.16	.0237	9	1,135	.45	.0271	.16	.0191
Global–order	18	3,594	.54	.0249	.16	.0227	19	5,419	.43	.0294	.17	.0259
Global–cautiousness	13	3,671	.37	.0587	.24	.0560	15	4,056	.24	.0200	.14	.0163
Achievement–dependability	10	3,090	.52	.0268	.16	.0251	6	3,606	.38	.0223	.15	.0206
Achievement–order	16	3,802	.40	.0396	.20	.0366	10	3,330	.15	.0636	.25	.0610
Achievement–cautiousness	11	2,715	.16	.0425	.21	.0386	6	2,817	.07	.0357	.19	.0332
Dependability–order	10	2,808	.39	.0261	.16	.0235	4	2,107	.18	.0264	.16	.0240
Dependability–cautiousness	12	3,974	.42	.0150	.12	.0129	5	2,325	.32	.0195	.14	.0170
Order–cautiousness	13	2,912	.29	.0135	.12	.0095	9	3,332	.22	.0088	.09	.0058

Note. *k* = number of correlation coefficients; mean *r* = sample-size weighted mean observed correlation; S_r^2 = total observed variance of mean *r*; SD_r = standard deviation of mean observed correlation; S_{res}^2 = residual variance; Global = global conscientiousness.

stantially in the prediction of extrarole behaviors, including job dedication, counterproductive work behaviors, and interpersonal facilitation. In regards to occupational type, the narrow traits did not contribute substantial incremental validity in the prediction of overall performance for customer service workers. However, narrow traits did contribute moderate to substantial incremental validity in the prediction of overall performance for sales personnel, managers, and skilled and semiskilled workers. An important point to note is that, although narrow traits did not contribute substantial incremental validity in the prediction of overall performance when all occupations were included in the analyses, when broken down by occupational type, narrow traits appear to be important to consider in the prediction of overall performance. Together, these results suggest that, in a selection context, it may be valuable to consider the narrow traits when the goal is to optimally predict contextual performance or when the goal is to optimally predict overall job performance for a specific occupation.

As a side note, it is important to mention that the beta weights we report in our incremental validity analyses are not representative of the weights that should be attached to narrow traits in an operational selection program. Instead, these beta weights represent the unique contribution of narrow traits relative to global conscientiousness. In contrast, the zero-order validities reported between narrow traits and performance dimensions offer a more meaningful picture of the relative weights that specific narrow traits might receive in an operational selection program.

Limitations

There are limitations to the current meta-analysis. First, some of our occupational type moderator analyses were based on a relatively small number of correlations. Thus, the conclusions drawn from these analyses are tentative. Further, for the relationships for two narrow traits, dependability and cautiousness, several analyses could not be conducted for job performance across occupational type.

The second limitation of this meta-analysis could be the way in which we classified job performance criteria. We used Hurtz and Donovan's (2000) classification, with the addition of another job performance criterion, counterproductive work behaviors. As Hurtz and Donovan suggested, this classification could be criticized because it combines several different job criteria into broader job criterion categories. As such, the true validities of the predictor–criterion relationships may be masked.

Similar to the previous limitation could be the way in which we classified personality measures into the narrow traits of conscientiousness by using Hough and Ones's (2001) taxonomy. Some researchers may disagree with some of their scale classifications or suggest that conscientiousness is composed of either a greater or a lesser number of narrow traits than we examined (e.g., Costa & McCrae, 1992). However, we feel that the use of Hough and Ones's taxonomy is a strength of this research because they developed this taxonomy to provide a common framework for conducting and summarizing future research. It is also important to note, as pointed out by an anonymous reviewer, that narrow and broad are relative. Some researchers argue that the Big Five itself is too narrow (e.g., Eysenck, 1991), whereas others assert that the Big Five is too broad (e.g., Schneider et al., 1996). Some may even call the traits we describe as narrow in this article (i.e., achievement, dependability, order, and cautiousness) broad. Hence, we do not assert that the narrow traits used in this research represent the best or only way of looking at conscientiousness. Instead, we suggest that looking at these four narrow traits will enhance understanding of the relationship between conscientiousness and job performance.

Implications and Directions for Future Research

The results of this study provide insight into the importance of narrow traits in the prediction and explanation of job performance. Moreover, we believe our results suggest several valuable directions for future research. We encourage researchers and practitioners who use narrow trait measures of conscientiousness to explore the potential differential and incremental validity of the narrow traits across a more diverse set of job performance criteria and occupational types. In addition, future research should investigate why narrow traits are useful for the prediction of some criteria and some occupations but not others. Another avenue for future re-

search is to examine how the stage of employee tenure may moderate the relationships between the narrow traits of conscientiousness and job performance. Keil and Cortina (2001) showed evidence that the relationship between cognitive ability and performance changed over time in a nonlinear fashion and that this pattern occurred across different types of cognitive ability and different types of tasks. In the personality domain, a similar phenomenon might emerge for personality. For example, G. L. Stewart (1999) demonstrated that order is a more valid predictor of performance at the early transition stage of employee tenure, whereas achievement is a more valid predictor at the maintenance stage. Research is needed to understand how employee tenure may moderate the relationships between various specific job performance criteria and all four of the narrow traits of conscientiousness.

Last, the present study focused on one of the Big Five. Yet, each of the Big Five is recognized as having narrow traits, the consideration of which might be useful in explaining variance in workplace outcomes. For example, there is some evidence to suggest that the different narrow traits of extraversion might be differentially related to criterion constructs. In a study by Hough (1992), two separate narrow traits of extraversion, affiliation and potency, differentially predicted a set of job performance criteria. More specifically, potency was a more valid predictor of overall job proficiency, sales effectiveness, and irresponsible work behavior, whereas affiliation was a stronger predictor of technical proficiency. As such, we suggest that future research explore the interrelationships among the narrow traits of other Big Five global dimensions and these narrow traits' usefulness in predicting various job performance criteria.

In conclusion, in this research we have demonstrated that the narrow traits of conscientiousness are beneficial for prediction, but their value for personnel selection requires a careful match of the particular narrow trait or traits to the occupation and job performance criterion in question. This research, however, is only the first step to building a framework that explicates how the relationships among global conscientiousness, its narrow traits, and job performance may be moderated by contextual factors (e.g., performance criterion type and occupational type). Future research at the individual study level is needed to enhance understanding of personality's role in predicting work behaviors.

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Received June 4, 2003
Revision received January 22, 2005
Accepted January 27, 2005 ■