The validity of the Big Five personality traits for job performance: Meta-analyses of South African studies

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Previous meta-analyses have established the Big Five personality traits as important predictors of job performance around the globe. The present study extends the international generalizability of Big Five criterion-related validity through systematic review and meta-analyses of personality-performance research conducted in South Africa. We meta-analyzed data from 33 studies and 6,782 individuals to estimate validities of Big Five traits for various job performance criteria. Results showed that the Big Five traits have similar validity for job performance criteria as found in other cultural contexts. Conscientiousness was the strongest predictor across performance criteria, while other traits showed validity for specific criteria or subsamples. Results demonstrate the importance of psychometric meta-analysis for building cumulative knowledge and support applied use of personality assessments in South Africa. Consistency of the results of this study with those of previous meta-analyses in other national contexts supports the argument that personality-performance relations are a cultural universal.

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Over the past three decades, personality traits have emerged as some of the most important predictors of work criteria, and meta-analyses have established the predictive validity of personality traits for job performance and other work outcomes (Barrick, Mount, & Judge, 2001; Ones, Viswesvaran, & Dilchert, 2005). Since Barrick and Mount's (1991) seminal meta-analysis of relations of the Big Five traits with overall job performance, dozens of additional meta-analyses of relations between the Big Five traits and work performance have been published examining relations with

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specific performance criteria (e.g., counterproductive behaviors; Berry, Ones, & Sackett, 2007; leadership; DeRue, Nahrgang, Wellman, & Humphrey, 2011; contextual performance; Chiaburu, Oh, Berry, Li, & Gardner, 2011), as well as the moderating effects of occupation, situational factors, and measurement methods. While personality-performance relations are moderated by criterion dimension, occupation, and, to a lesser extent, measurement and situational factors, the results of these meta-analyses show remarkable consistency. This study extends these findings by presenting the first meta-analysis of Big Five personality–job performance in South Africa.

International Generalizability of Personality Validity

As with most psychological research (Gelfand, Leslie, & Fehr, 2008), the majority of Big Five–performance studies have been conducted in the United States and Canada (Barrick et al., 2001). This limitation is concerning given the myriad of cultural, social, political, and economic differences which may moderate the importance of particular personality traits for performance across national contexts (House, Hanges, Javidan, Dorfman, & Gupta, 2004; ITC, 2005; Ones, Dilchert, et al., 2012). For example, one might expect that interpersonal traits, such as Extraversion and Agreeableness, might be relatively more important in collectivistic (versus individualistic) cultures, or that Conscientiousness may be more predictive in countries where population levels of this trait are low (Bartram, 2013a; Kostal, Wiernik, Ones, & Hazucha, 2014; Mõttus et al., 2012; Terracciano et al., 2005). To address these concerns, researchers have conducted meta-analyses examining Big Five validities in other geographic contexts. Salgado (1997, 1998) examined Big Five–performance validities in Western Europe. He found that both the pattern and magnitudes of Big Five validity coefficients were consistent across U.S. and European studies for overall performance, training performance, and performance in specific occupations. Similarly, Oh (2009) meta-analyzed Big Five–performance studies for five East Asian countries. Compared to U.S. and European samples, Big Five–performance validities were similar for Emotional Stability and Conscientiousness, but somewhat larger for Extraversion and, to a lesser extent, Agreeableness and Openness. Oh attributed these validity differences to cultural differences in the importance ascribed to workplace interpersonal relationships (e.g., many organizations have implicitly mandatory after-work social gatherings).

Personality and Job Performance in South Africa

Heretofore, no comprehensive meta-analytic study has examined the validity of personality traits for job performance in South Africa.[1] The absence of such cumulative research is a great limitation for researchers and practitioners in South Africa and internationally, as this country is characterized by a myriad of cultural, economic, and practical features which may affect the validity of personality measures. Applied psychological research is rapidly expanding in Africa (Connelly, Ones, & Hülsheger, 2017), so a comprehensive review of the state of local workplace personality studies will provide an important foundation and guide for future research. Public sentiment in South Africa toward applied psychological assessment remains somewhat negative because of tests' historical use under apartheid as tools to oppress non-White populations (Claassen, 1997; Kriek & Dowdeswell, 2010; Laher & Cockcroft, 2014; Meiring, 2007); a comprehensive review of South African personality validity research can inform public debate by empirically demonstrating the degree of personality traits' utility for organizational decision-making. In this study, we present the first meta-analytic estimates of Big Five personality trait validities for job performance dimensions in the South African context. Below, we briefly discuss historical, cultural, and practical

[1] Rothmann, Meiring, Van der Walt, and Barrick (2002) presented preliminary meta-analytic results for Big Five traits predicting work criteria. However, this study was never published and combined validity coefficients for a variety of criteria (e.g., performance, satisfaction, burnout, turnover), rather than estimating values for performance specifically. It also did not benefit from more recent advances in meta-analytic methods (Hunter, Schmidt, & Le, 2006; Schmidt, Shaffer, & Oh, 2008) and conceptualizations of the structures of personality traits (Davies, Connelly, Ones, & Birkland, 2015; Hough & Ones, 2001) and job performance (J. P. Campbell & Wiernik, 2015).

factors that may impact personality-performance validities.

Cultural differences. South Africa is part of the Sub-Saharan Africa GLOBE cultural cluster (House et al., 2004). Compared to the United States, South African culture is more collectivistic—South African culture tends to encourage social cohesion, group pride and loyalty, collective action, and collective distribution of resources, both in one's family and organization, and in society at large (Hofstede, 2001; House et al., 2004). This difference suggests that interpersonal traits, such as sociability and Agreeableness, may be more important in South Africa than the U.S. (cf. Oh, 2009). On other cultural dimensions, South African racial groups exhibit divergent cultures. White South African culture is much lower on performance orientation (degree to which societal practices reward individual improvement and excellence) and humane orientation (degree to which society rewards acts of fairness, altruism, generosity, and kindness) compared to the United States (House et al., 2004). These differences suggest that in contexts dominated by White South African culture (e.g., when employees are evaluated by a White supervisor), traits related to industriousness, proactivity, and warmth may be less important than in the U.S. context. By contrast, Black South African culture is somewhat higher on performance orientation and human orientation than the U.S., suggesting that these traits may be more important in organizations reflecting a predominantly Black South African culture. In addition, Black South African culture is higher than the U.S. on future orientation (support for delaying gratification and planning for the future) and uncertainty avoidance (importance of norms and rules for reducing unpredictability), which may increase the importance of planfulness-, dependability- and compliance-related traits. Black South African culture is also lower than the U.S. on power distance (endorsement of authority, power differentials, and status privileges), which may decrease the importance of assertiveness and dominance in this context.[2]

Personality and performance variability. In addition to the cultural factors cited above, several practical factors may also impact the predictive validity of personality measures in South Africa. Social, economic, and legal factors often limit the extent to which organizations can be selective while hiring or dismiss poor performers (e.g., qualified applicants may be few in number, organizations may need to meet demographic quotas; Claassen, 1997). As a result, personality traits may be subject to relatively less range restriction in South Africa compared to other countries. Second, South African organizations are characterized by extremely wide variance in performance criteria. For example, in many organizations, malingering, corruption, theft, and other counterproductive work behaviors occur at much higher rates than are typically observed in other contexts (Grobler, 2011; Sauerman & Ivkovic, 2008). Personality traits will have the greatest predictive validity when there is substantial variability in criterion performance to predict, so rampant poor performance could have an enhancing effect on personality relations (Ones, Viswesvaran, & Schmidt, 2012). Based on these two factors, we might expect personality-performance validities to be relatively stronger in South Africa compared to other countries, especially for Conscientiousness.

Imported versus locally-developed measures. The prevailing practice in personality research and assessment in South Africa is to use imported or adapted instruments from the United States or the United Kingdom, such as the NEO PI-R (Costa & McCrae, 1992) or the Occupational Personality Questionnaire (OPQ32; SHL, 2006a). Most studies show equivalent functioning of imported instruments in South Africa (e.g., Heuchert, Parker, Stumpf, & Myburgh, 2000; Hogan Assessment Systems, 2012; Joubert & Venter, 2013; Visser & Viviers, 2010), but challenges with translation (Horn, 2000) and measurement non-invariance across language and racial groups

[2] Black South African culture is also much more gender egalitarian than U.S. culture (House, Hanges, Javidan, Dorfman, & Gupta, 2004). This difference is not likely to contribute to differences in mean performance validity for personality traits, but may affect differential validity of personality scales across genders, as well as fairness of other organizational practices.

(Meiring, Van de Vijver, Rothmann, & Barrick, 2005) are not uncommon. Readability can also be a challenge, as many South African individuals do not read English (the most commonly used language in testing) as their first language (e.g., Abrahams & Mauer, 1999; Meiring, Van de Vijver, & Rothmann, 2006). These factors may lead contribute to lower reliability and weaker criterion relations for imported personality scales in South Africa compared to other countries.

An alternative to importing Western personality instruments is to construct new measures locally. Such measures can be developed using an "etic" approach (Cheung, van de Vijver, & Leong, 2011), where scales are designed to measure constructs discovered in other cultures while attending to local concerns of interpretability, readability, norms, and legal requirements (e.g., the Basic Trait Inventory [BTI]; N. Taylor & De Bruin, 2005; is designed to measure the Big Five traits with short, direct items to enhance readability across South Africa's 11 language groups; cf. Ramsay, Taylor, De Bruin, & Meiring, 2008). Measures can also be developed using a more "emic" approach that which attempts to identify indigenous traits that are particularly relevant within a specific culture. While the general hierarchical structure of personality traits centered around the Big Five is a cultural universal (DeYoung, 2010, 2015; Markon, Krueger, & Watson, 2005; McCrae & Costa, 1997), personality instruments developed in the United States or Western Europe may not adequately assess culture-specific compound traits that are unique or particularly salient in other cultures (e.g., "renqing", "face"; Cheung et al., 2001; "ubuntu"; J. A. Nel et al., 2012; "heroism"; Saucier, Georgiades, Tsaousis, & Goldberg, 2005) and may not reflect culturally-distinct relations among lower-order traits (Heine & Buchtel, 2009). The South African Personality Inventory (SAPI; Fetvadjiev, Meiring, van de Vijver, Nel, & Hill, 2015) was developed using a combined etic-emic approach and includes measures of the Big Five traits and social-relational traits particularly salient in South Africa's Bantu ethnic groups (Valchev et al., 2014). A key benefit of the SAPI is that parallel scales were simultaneously developed in the 11 official South African languages (Hill et al., 2013). Compared to imported instruments, locally-developed personality measures, such as the BTI and SAPI, can often better address local needs and may show enhanced validity (ITC, 2005), but this is not necessarily the case. For example, the first locally-developed personality inventory, the South African Personality Questionnaire, was normed using only a sample of middle-class, educated, White respondents and shows poor functioning with other groups (Retief, 1992; T. R. Taylor & Boeyens, 1991). As with importing instruments, developing local personality scales must ensure that measures function well across groups and that the full range of personality distributions are represented in test norms.

The Present Study

This study presents the results of a comprehensive meta-analysis between the Big Five personality traits and work performance dimensions in South Africa. The hierarchical Big Five model is the most robustly-supported structural model of personality (Goldberg, 1990; John, Naumann, & Soto, 2008; McCrae & Costa, 1997) that most adequately integrates empirical data from questionnaire, lexical, cognitive, behavioral, and biological studies of personality (DeYoung, 2010, 2015; Nettle, 2006). In this structure, the Big Five traits (Extraversion, Openness, Conscientiousness, Agreeableness, and Emotional Stability) occupy a central level and describe broad parameters of individuals' goal-directed behavior (e.g., Extraversion reflects sensistivity to rewards and a tendency to engage in behavioral exploration; DeYoung, 2015). Below the Big Five, narrower aspect and facet traits describe more specific behavioral patterns that covary with the Big Five because they share behaviors that fulfill their psychological functions. Above the Big Five, higher-order metatraits describe extremely broad tendencies for engagement and stability (Chang, Connelly, & Geeza, 2012; Davies, Connelly, Ones, & Birkland, 2015; DeYoung, 2006; Saucier et al., 2014). Compound traits, which reflect interactions between traits from multiple domains, can also be assessed and tend to be especially predictive of workplace criteria (Ones & Viswesvaran, 2001). Since its introduction, the Big Five structure has been

immensely useful for classifying and organizing personality scales across conceptualizations and measures (Hough & Ones, 2001). We adopted the Big Five as the organizing framework for personality measures in our study because of its robust empirical support and its utility for organizing the various personality scales identified during our literature search. Similarly, we organized the performance criteria examined in the analyzed based on contemporary models of job performance (J. P. Campbell & Wiernik, 2015; Viswesvaran & Ones, 2000). This choice recognizes the multidimensional nature of job performance and is in line with current practice in meta-analytic reporting (e.g., Christian, Garza, & Slaughter, 2011; Ng & Feldman, 2015).

Based on the consistency of personality criterion-related validities across meta-analyses from the United States, Europe, and East Asia (Barrick & Mount, 1991; Oh, 2009; Salgado, 1998), we expect to observe personality-performance relations that are generally consistent with previous meta-analyses. However, as discussed above, validities may be larger because of personality and performance range enhancement or be attenuated because of poor transportability for imported measures. Higher levels of cultural collectivism may also contribute to increased validity for interpersonal traits.

Methods

Meta-analytic Database

Search methods. A combination of strategies was used to identify studies for inclusion in the meta-analyses. First, we searched in the African research databases Sabinet, African Digital Repository, Scielo South Africa, EbscoHost, as well as the archives of the *South African Journal of Industrial Psychology, South African Journal of Psychology*, and the *South African Journal of Human Resource Management* for all combinations of the following terms: personality, Big Five, agreeableness, conscientiousness, emotional stability, neuroticism, extraversion, openness to experience, personnel, performance, job performance, and selection. Searches were limited to the period from 1985 to 2015 based on the second author's professional experience that personality research began in Africa during this period. Second, we contacted distributors and publishers of psychological assessments in South Africa for validity studies for personality measures. Third, we contacted all major universities in South Africa for published and unpublished studies and theses examining personality criterion-related validity and searched each university's online institutional repository for the terms listed above. Finally, we reviewed the reference lists of the studies found using the above methods to identify additional studies.

Inclusion criteria. To be included in our analyses, studies needed to meet several criteria. These criteria mirror those used in meta-analyses of the Big Five personality traits and job performance (cf. Barrick & Mount, 1991; Salgado, 1997). First, studies needed to be conducted in South Africa.[3] Second, studies needed to use a self-report measure of one or more personality traits that could be conceptually mapped to a Big Five trait construct. Third, studies needed to report a correlation between the personality measure(s) and some measure of work or academic performance (e.g., technical performance, overall job performance, training performance, organizational citizenship behaviors) or sufficient information to compute a correlation. Fourth, studies needed to report a sample size or sufficient information to compute a standard error. Finally, to avoid inflation of the meta-analytic results, studies reporting only statistically significant results, studies of laboratory performance, and studies using analysis designs that inflate variation (e.g., extreme contrasted groups designs) were excluded.

Sample. Our search yielded 37 studies for possible inclusion. Seventeen studies did not meet all the inclusion criteria and were excluded. Common issues included only reporting significant results (e.g., Augustyn & De Villiers, 1988; Kotzé &

[3] The first and second authors attempted to locate studies reporting personality criterion-related validity results from other African countries. However, no relevant studies conducted outside of South Africa could be located.

Griessel, 2008) and reporting results for non-performance criteria (e.g., job satisfaction, burnout, job stress). Additionally, the unpublished meta-analytic database from Rothmann et al. (2002) was obtained, and results for several additional samples were added to our database. A total of 33 studies with independent samples and a total of 6,872 individuals were included in the meta-analyses. Details of these studies are shown in Appendix A. Samples include individuals in a variety of jobs and industries—studies in the banking and insurance industries were particularly well-represented. The total sample was 62% male and was 47% White, 41% Black, 4% Indian, 8% Colored/mixed race, and 0.5% from other groups (these are the standard reported racial groups reported in South Africa). Most individual samples were racially heterogeneous.

Analyses

Coding and data preparation. Each study was coded by the first author and verified by the second author; any disagreements were resolved through discussion. Personality measures were classified according the Big Five trait they assessed. Most measured reported results for constructs that directly mapped to the Big Five (e.g., the Basic Traits Inventory; N. Taylor & De Bruin, 2005). For three measures, Big Five results were obtained using composites of validity coefficients for narrow facet trait measures. Composites for the 16PF (Prinsloo, 1992) and the 15FQ+ (Psytech International, 2002) were computed using the Big Five mappings described in their technical manuals. Composites for the Customer Contact Style Questionnaire (SHL, 2006b) and the Occupational Personality Questionnaire (SHL, 2004) were computed using the Big Five mapping from Warr, Bartram, and Martin (2005) and Bartram (2013b), respectively. Composites were computed using scale intercorrelations from the individual samples (if available) or test manuals. The personality measures included in the meta-analyses and their mappings to the Big Five constructs are shown in Appendix B. All but one of the included inventories (the BTI) were imported, rather than locally-developed, personality measures. Most included measures were ipsative, rather than normative or quasi-ipsative (see Salgado & Táuriz, 2014).

Performance measures were classified based on the performance models described by Campbell and Wiernik (2015) and Viswesvaran and Ones (2000) using descriptions from the included studies or the performance measure technical manuals. Performance construct categories are shown in Table 1. Several studies reported multiple measures of the same performance construct. These correlations were combined using composite correlations. When possible, composite correlations were computed using intercorrelations reported in the studies. When performance measure intercorrelations were not reported, meta-analytic estimates of the intercorrelations were taken from Viswesvaran (1993), Viswesvaran, Ones, and Schmidt (1996) or Viswesvaran, Ones, and Schmidt (2005). For Müller (2010), intercorrelations between course grades were estimated as the average ICC for business and economics courses reported by Beatty, Sackett, Kuncel, and Koch (2015). Intercorrelations for the performance facet scales from Rothmann and Coezter (2003) were taken from Bothma and Schepers (1997). For Levy (2012), correlations between objective sales performance and customer satisfaction were taken from Ahearne, Mathieu and Rapp (2005).

Meta-analytic methods. Correlations were combined using psychometric meta-analysis (Schmidt & Hunter, 2015). This method estimates both the mean criterion-related validity across studies and the true variability of these correlations after accounting for sampling error. Additionally, psychometric meta-analysis also corrects for the biasing effects of measurement error and range restriction. These psychometric artefacts systematically attenuate observed correlations between personality scales and performance measures and can artificially inflate observed variability across studies (Schmidt & Hunter, 2015). Correcting for these artefacts leads to less-biased estimates of construct relations. Reliability and range restriction estimates were reported only sporadically, so we corrected for these statistical artefacts using the artefact distribution method. The personality traits

Table 1. *Performance Criterion Constructs Examined in Meta-analyses*

Criterion	**Description**	$k_{r_{xx}}$	$\bar{r}_{xx}$	$SD_{r_{xx}}$	$\overline{\sqrt{r_{xx}}}$	$SD_{\sqrt{r_{xx}}}$
Overall performance	Comprehensive, summative, or global measures of undifferentiated job performance; also includes composites of measures of multiple performance dimensions (e.g., technical performance, leadership, counterproductive work behaviors).	12	.60	.15	.77	.09
	Ratings criteria	10	.57	.12	.75	.07
	Objective criteria	2	.73	.29	.84	.17
Technical performance	Performance of tasks relating to the core functions of the job (e.g., accounting, sales, customer service, administration, communication, productivity ratings)	14	.76	.13	.87	.07
	Ratings criteria	9	.64	.11	.80	.07
	Objective criteria	7	.87	.05	.93	.03
Academic and training performance	Grades or exam scores for workplace training programs; grades for business education courses or MBA programs	8	.82	.11	.90	.06
Contextual performance	Performance behaviors that "support the organizational, social, and psychological environment" in the workplace (Borman & Motowidlo, 1993, p. 73); for the current analyses, this category includes measures of helping behavior, interpersonal cooperation and initiative, and self-development	2	.60	.05	.77	.03
Counterproductive work behavior	"Scalable actions and behaviors that employees engage in that detract from organizational goals or well-being. They include behaviors that bring about undesirable consequences for the organization or its stakeholders" (Ones & Dilchert, 2013, p. 645)	2	.65	.07	.81	.04

Note. In addition to the above dimensions, one study reported results for a measure of hierarchical leadership/management performance. Because only a single study reported results for this dimension, it was not analysed separately; however, this scale was included in the overall performance measure; $k_{r_{xx}}$ = number of criterion reliability coefficients analyzed; $\bar{r}_{xx}$ = mean criterion reliability; $SD_{r_{xx}}$ = standard deviation of criterion reliability coefficients; $\overline{\sqrt{r_{xx}}}$ = mean square root of criterion reliability; $SD_{\sqrt{r_{xx}}}$ = standard deviation of square root of criterion reliability coefficients.

measures under consideration were not used to select employees in any of the samples analyzed, so we corrected for indirect range restriction (Hunter, Schmidt, & Le, 2006). Results were computed using the Taylor Series Approximation methods described by Hunter et al. (2006) and Wiernik (2015a).

For each Big Five trait-criterion pair, we estimated mean validity coefficients and standard deviations of the true validity distribution across settings. We also computed confidence intervals and credibility intervals. Confidence intervals indicate the precision with which the mean correlation is estimated. Credibility intervals indicate the range of true correlations that may be observed across settings. If the credibility interval excludes zero, it can be concluded that the direction of the trait-criterion relation generalizes across settings. We computed two sets of meta-analytic estimates—construct correlations, where we corrected for predictor indirect range restriction and measurement error in the predictor and criterion, and operational validities, where we re-attenuated the construct correlations using the mean predictor reliability. Operational validities provide the best estimate of the predictive value of personality measures for personnel selection in South Africa, but construct correlations provide the best estimate of the contributions of personality *traits* to work performance and should be the focus when developing theories of job performance (Viswesvaran, Ones, Schmidt, Le, & Oh, 2014) contexts. All analyses were run using the Open Psychometric Meta-Analysis software package (Wiernik, 2015b). When interpreting the size of effects observed in this study, we used Paterson and colleagues' (2016) empirical benchmarks for corrected correlations; correlations less than .10 were considered negligible, .10–.26 small, .27–.38 moderate, and .39 and greater large.

Artefact distributions. Attenuation due to measurement error in the personality predictors was corrected using Cronbach's α values reported in the studies included in the current meta-analyses. For studies using composite correlations of multiple facet scales, Mosier reliability coefficients were computed as estimates of the composite scale reliability. Artefact distribution values for Big Five measures in the present studies are presented in Table 2. Contrary to our expectations that personality measures might suffer from low reliability due to linguistic challenges in test transportability, internal consistency reliability estimates for the analyzed studies are very similar to those in the comprehensive reliability distributions reported by Davies, Connelly, Ones, and Birkland (2015) for normative personality scales and by Salgado and Táuriz (2014) for ipsative and quasi-ipsative personality scales (see Table 2).

None of the analyzed studies provided estimates of personality scale variability in both restricted (i.e., incumbent employees) and unrestricted (i.e., job applicant) samples. Accordingly, we computed *u* values using the population norm standard deviations reported in the personality test manuals (cf. Salgado & Táuriz, 2014). This approach is not generally problematic, as national population samples (which are typically reported in test manuals) are usually only slightly more variable than applicant pools, resulting in negligibly different corrections (Ones & Viswesvaran, 2003). South African norm data was not available for most of the inventories used in the analyzed studies; in these cases, *u* values were computed using available norms for the United States or United Kingdom.[4]

The analyzed studies used a wide variety of performance criteria, including supervisor ratings, customer ratings, training grades, and objective performance measures. No self-report criteria were used. Following the recommendations of

[4] This approach is potentially problematic, as countries differ meaningfully in their personality distributions (Kostal, Wiernik, Ones, & Hazucha, 2014). However, the *u* value distributions computed in this manner (shown in Table 2) showed similar levels of range restriction as observed in previous Big Five-job performance meta-analyses (cf. Salgado, 2003; Salgado & Táuriz, 2014). Emotional Stability showed somewhat less range restriction; we re-ran the meta-analyses using range restriction distributions for normative and ipsative Big Five scales reported by Salgado (2003) and Salgado and Táuriz (2014), respectively. Results for these sensitivity analyses were not substantively different from results based on the distribution from the included studies.

Table 2. Personality Measure Reliability Artefact Distributions

	Present study[a]								Previous meta-analyses: Normative scales[b]							Previous meta-analyses: Ipsative scales[c]				
Construct	k_α	$\bar{\alpha}$	SD_α	$\overline{\sqrt{\alpha}}$	$SD_{\sqrt{\alpha}}$	k_u	$\bar{u}$	SD_u	k_α	$\bar{\alpha}$	SD_α	$\overline{\sqrt{\alpha}}$	$SD_{\sqrt{\alpha}}$	$\bar{u}$	SD_u	k_α	$\bar{\alpha}$	SD_α	$\bar{u}$	SD_u
Agreeableness	10	.77	.12	.88	.07	12	.90	.15	161	.77	.07	.88	.04	.82	.26	8	.80	.08	.90	.14
Conscientiousness	11	.83	.11	.90	.06	12	.85	.22	205	.80	.07	.89	.04	.83	.21	11	.72	.12	.88	.17
Emotional Stability	10	.80	.13	.89	.07	12	.93	.18	220	.82	.07	.90	.04	.81	.23	10	.73	.09	.87	.16
Extraversion	10	.82	.09	.90	.05	12	.89	.21	199	.81	.06	.90	.04	.86	.21	6	.75	.13	.90	.14
Openness	11	.76	.18	.87	.12	13	.86	.16	150	.75	.08	.87	.05	.85	.29	4	.81	.12	.92	.13

Note. k_α = number of α coefficients analyzed; $\bar{\alpha}$ = mean α; SD_α = standard deviation of α coefficients; $\overline{\sqrt{\alpha}}$ = mean square root of α; $SD_{\sqrt{\alpha}}$ = standard deviation of $\sqrt{\alpha}$; k_u = number of range restriction *u* values analyzed; $\bar{u}$ = mean range restriction *u* value; SD_u = standard deviation of *u* values; [a] *u* values computed for De Bruin et al. (2005) were extremely high, especially for Emotional Stability (u = 1.77), and the test norms were computed on a small sample (N = 340), so these *u* values were excluded from the distribution; [b] α values from Davies, Connelly, Ones, & Birkland (2015) and *u* values from Salgado (2003); [c] values from Salgado and Táuriz (2014); values for the square root of α used to correct correlations for attenuation due to measurement error.

Wilmot, Wiernik, and Kostal (2014), reliabilities of performance measures were estimated using a combination of information reported in the individual studies and meta-analytic estimates. No studies using ratings criteria reported interrater reliability estimates. For supervisor ratings of overall performance or single performance dimensions, the values reported by Viswesvaran et al. (1996, 2005) were used. For supervisor ratings of multiple performance dimensions, reliabilities for the composite measures were computed as Mosier reliabilities using the interrater reliabilities reported by Viswesvaran et al. (1996) and the between-source intercorrelations reported by Viswesvaran (1993) and Viswesvaran et al. (2005). Reliabilities for the objective performance and training criteria used by Coetzee (2003), De Bruin et al. (2005), Farrington (2012), and SHL (2002a, 2002b) were estimated as Cronbach's α computed from the study correlation matrices. Reliability for the composite course grades measure used by Müller (2010) was estimated as Cronbach's α computed using the course grade intercorrelations reported by Beatty et al. (2015). For Nagdee (2011), we used Beatty et al.'s (2015) mean estimate for overall grade point average. Artefact distributions used for each criterion are shown in Table 1.

Results

Technical Performance

Meta-analytic estimates of Big Five validities for technical performance are shown in Table 3. Results for both operational validities and construct correlations are reported; we will focus our discussion on the construct correlations. Consistent with meta-analytic findings in other contexts, Conscientiousness showed moderate and generalizable relations with technical performance (ρ = .22, 80% credibility interval [CV] .02, .42). Emotional Stability also showed a small positive mean correlation with technical performance (ρ = .11, CV -.04, .26). These values are comparable to validities found in other countries. Many of the jobs sampled in the current analyses included managerial, sales, customer service, and other interpersonal components, so, consistent with previous meta-analyses of interpersonal jobs (Barrick et al., 2001), we also observed a substantial positive mean correlation between Extraversion and technical performance (ρ = .15, CV -.04, .35). This higher relation than observed in U.S. samples may also stem from higher levels of cultural collectivism in the South African context (Hofstede, 2001; House et al., 2004). Agreeableness and Openness showed negligible mean correlations with technical performance, but relations were somewhat variable across samples.

We examined measurement method and purpose as moderators of personality validity for technical performance personality validity. Supervisor and customer ratings showed consistently stronger relations with personality traits than did objective performance measures, even after accounting for differential reliability across measurement methods. This pattern of results likely stems from the broader range of performance behaviors typically considered by ratings, compared to the relatively narrow array of behaviors and outcomes that can be captured by an objective criterion (e.g., number of emails processed). Additionally, the objective performance criteria included may not have been fully under individual control (e.g., financial performance), limiting their potential relations with personality traits (cf. J. P. Campbell & Wiernik, 2015). The exception to this pattern is Extraversion, which showed stronger and invariant relations with objective criteria compared with ratings. This effect is also likely attributable to the concentration of sales criteria in these analyses.

Among studies using ratings criteria, Conscientiousness showed much stronger validity when the criteria were assessed specifically for research purposes (ρ = .43, CV.20, .66), compared to ratings that were also used for administrative decision making (ρ = .21, CV .10, .32). In contrast, Emotional Stability and Extraversion showed somewhat stronger relations with administrative ratings than with research ratings. These results are consistent with research showing the susceptibility of administrative performance management ratings to impression management and other interpersonal biases (DeNisi & Sonesh, 2011).

Table 3. *Criterion-related Validity Estimates for Technical Performance*

Big Five trait	N	k	$\bar{r}$	SD_r	ρ_{op}	$SD_{\rho_{op}}$	ρ	SD_ρ	**90% conf. int.**	**80% cred. int.**
Agreeableness	2,114	13	-.02	.14	**-.03**	.15	**-.04**	.18	-.14, .07	-.26, .19
Supervisor/customer ratings	1,460	9	.00	.12	**.01**	.14	**.01**	.16	-.12, .14	-.20, .21
Administrative ratings	892	5	.01	.14	**.01**	.17	**.01**	.19	-.21, .23	-.24, .26
Research ratings	568	4	.00	.10	**.00**	.07	**.00**	.08	-.20, .19	-.11, .10
Objective measures	1,012	6	-.06	.14	**-.07**	.15	**-.08**	.17	-.25, .08	-.30, .13
Conscientiousness	1,612	11	.14	.14	**.20**	.14	**.22**	.16	.10, .34	.02, .42
Supervisor/customer ratings	1,254	8	.18	.15	**.28**	.16	**.31**	.18	.14, .48	.08, .54
Administrative ratings	686	4	.12	.10	**.19**	.08	**.21**	.09	.00, .42	.10, .32
Research ratings	568	4	.25	.16	**.39**	.16	**.43**	.18	.09, .72	.20, .66
Objective measures	716	5	.06	.09	**.09**	.01	**.10**	.01	-.03, .22	.09, .11
Emotional Stability	1,718	11	.08	.12	**.10**	.11	**.11**	.12	.02, .20	-.04, .26
Supervisor/customer ratings	1,426	9	.08	.12	**.11**	.13	**.12**	.14	.00, .24	-.06, .31
Administrative ratings	892	5	.10	.14	**.14**	.16	**.16**	.18	-.05, .36	-.07, .39
Research ratings	534	4	.04	.08	**.06**	.00	**.07**	.00	-.08, .21	.07, .07
Objective measures	614	4	.04	.05	**.05**	.00	**.05**	.00	-.03, .14	.05, .05
Extraversion	2,114	13	.10	.13	**.14**	.13	**.15**	.15	.06, .25	-.04, .35
Supervisor/customer ratings	1,460	9	.09	.14	**.14**	.17	**.16**	.19	.01, .30	-.08, .39
Administrative ratings	892	5	.11	.13	**.17**	.15	**.18**	.17	-.02, .39	-.03, .40
Research ratings	568	4	.07	.15	**.10**	.18	**.11**	.20	-.18, .40	-.15, .37
Objective measures	1,012	6	.14	.08	**.18**	.00	**.20**	.00	.10, .30	.20, .20
Openness	2,114	13	.01	.10	**.02**	.08	**.02**	.09	-.06, .10	-.10, .14
Supervisor/customer ratings	1,460	9	.05	.09	**.08**	.07	**.10**	.08	-.01, .20	-.01, .20
Administrative ratings	892	5	.04	.08	**.07**	.03	**.08**	.03	-.06, .22	.04, .12
Research ratings	568	4	.07	.11	**.11**	.11	**.13**	.12	-.12, .36	-.03, .28
Objective measures	1,012	6	.01	.10	**.01**	.08	**.01**	.09	-.11, .14	-.11, .14

Note. N = total sample size; k = number of studies included in the analysis; $\bar{r}$ = mean observed correlation; SD_r = observed standard deviation of correlations; ρ_{op} = mean operational validity (corrected for indirect personality range restriction, criterion unreliability); $SD_{\rho_{op}}$ = true standard deviation of operational validities; ρ = mean construct correlation (corrected for indirect personality range restriction, personality unreliability, criterion unreliability); SD_ρ = true standard deviation of construct correlations; 90% conf. int. = 90% confidence interval around ρ; 80% cred. int. = 80% credibility interval around ρ.

Table 4. *Criterion-related Validity Estimates for Academic and Training Performance*

Big Five trait	N	k	$\bar{r}$	SD_r	ρ_{op}	$SD_{\rho_{op}}$	ρ	SD_ρ	**90% conf. int.**	**80% cred. int.**
Agreeableness	1,989	6	-.04	.05	**-.05**	.00	**-.06**	.00	-.13, .00	-.06, -.06
Workplace training	511	2	-.04	.02	-.06	.00	-.07	.00	-.21, .08	-.07, -.07
Business school GPA	1,478	4	-.04	.06	-.05	.03	-.06	.04	-.16, .04	-.11, -.01
Conscientiousness	1,975	6	.17	.07	**.24**	.00	**.27**	.00	.18, .35	.27, .27
Workplace training	511	2	.16	.02	.22	.00	.25	.00	.11, .38	.25, .25
Business school GPA	1,464	4	.18	.08	.25	.00	.28	.00	.14, .41	.28, .28
Emotional Stability	2,409	7	.04	.11	**.05**	.11	**.06**	.13	-.05, .17	-.10, .22
Workplace training	931	3	.15	.09	.18	.08	.20	.09	-.02, .42	.09, .31
Business school GPA	1,478	4	-.02	.05	-.02	.00	-.03	.00	-.10, .05	-.03, -.03
Extraversion	2,411	7	-.13	.19	**-.17**	.24	**-.19**	.26	-.39, .02	-.53, .15
Workplace training	931	3	.08	.07	.11	.04	.12	.04	-.05, .29	.07, .17
Business school GPA	1,480	4	-.26	.12	-.34	.08	-.38	.09	-.56, -.18	-.49, -.27
Openness	2,095	7	-.03	.06	**-.04**	.03	**-.05**	.03	-.12, .03	-.09, -.01
Workplace training	619	3	-.03	.02	-.04	.00	-.04	.00	-.10, .02	-.04, -.04
Business school GPA	1,476	4	-.03	.07	-.04	.07	-.05	.08	-.19, .09	-.15, .06

Note. GPA = grade point average; N = total sample size; k = number of studies included in the analysis; $\bar{r}$ = mean observed correlation; SD_r = observed standard deviation of correlations; ρ_{op} = mean operational validity (corrected for indirect personality range restriction, criterion unreliability); $SD_{\rho_{op}}$ = true standard deviation of operational validities; ρ = mean construct correlation (corrected for indirect personality range restriction, personality unreliability, criterion unreliability); SD_ρ = true standard deviation of construct correlations; 90% conf. int. = 90% confidence interval around ρ; 80% cred. int. = 80% credibility interval around ρ.

Training and Academic Performance

Meta-analytic results for training and academic performance are shown in Table 4. Again consistent with previous meta-analytic findings from around the world, Conscientiousness showed moderate and invariant relations with learning criteria (ρ = .27, no true variability). Extraversion was negatively related to business school academic criteria (ρ = -.38, CV -.49, -.27). Other trait domains showed negligible or inconsistent relations with training or lacked sufficient studies to allow precise estimates of criterion relations.

Contextual and Counterproductive Performance

Meta-analytic results for contextual performance and counterproductive work behaviors are shown in Table 5. Only two small samples estimated personality validities for each of these criteria with small total sample size, so mean correlation estimates showed very wide confidence intervals. The small size of these samples precludes stable parameter estimation, so results of these analyses should be regarded as tentative (cf. Valentine, Pigott, & Rothstein, 2010). From these preliminary results, it appears that contextual performance is moderately to strongly related each of the Big Five, particularly Emotional Stability (ρ = .30), Extraversion (ρ = .32), and Openness (ρ = .43). These values are larger than observed in other cultural contexts (Chiaburu et al., 2011), but because of the very small total sample size and wide confidence intervals, we cannot rule out second-order sampling error as an explanation. Counterproductive work behaviors showed unexpected correlations with personality—moderate to strong negative relations with Agreeableness (ρ = -.19) and Openness (ρ = -.32), but small to moderate *positive relations* with Conscientiousness (ρ = .21) and Emotional Stability (ρ = .11), indicating that conscientious, stable employees tend to perform *more* negative behaviors. Again, however, total sample size was too small to draw firm conclusions or rule out second-order sampling error as an explanation for these unexpected results.

More studies of these criteria in the South African context are needed. The need for high-quality research in this area is especially great given the high rates of employee misbehavior and corruption that are present in many South African organizations (Claassen, 1997).

Overall Work Performance

Meta-analytic results for studies of overall work performance are shown in Table 6. Importantly, recall that we use the term "overall work performance" to refer specifically to general, undifferentiated measures of performance or to composites capturing multiple performance dimensions besides technical performance (i.e., composites of specific performance dimensions were included in the above analyses; cf. Viswesvaran et al., 1996). In contrast to previous meta-analytic findings, Conscientiousness was unrelated to overall job performance (ρ = .08, CV .00, .16). This difference could stem from South Africa's higher levels of cultural collectivism and lower cultural performance orientation (for the White population) compared to the United States (House et al., 2004). In this context, employees' levels of dependability and achievement-striving may be less important for informing supervisors' overall impressions than other factors, such as congeniality and contributions to group climate (cf. validities for Extraversion [ρ = .16] and Emotional Stability [ρ = .21]). However, we caution against overinterpreting this null result. Conscientiousness showed much stronger validities for focused measures of technical, training, counterproductive, and contextual performance, so we suspect that its weak correlation with overall performance is primarily an artefact of the performance measures used in these studies. Nearly all the studies in this analysis measured performance using single-rater, single-item summative performance evaluations completed for administrative purposes. These measures are among the least construct-valid and most prone to interpersonal biases (J. P. Campbell & Wiernik, 2015; DeNisi & Sonesh, 2011; Schmidt & Zimmerman, 2004; Wilmot et al., 2014), so it is not surprising that Conscientiousness had little influence on scores (cf. validities for Japan observed by Oh, 2009). By comparison, Conscientiousness validities were larger for studies

Table 5. *Criterion-related Validity Estimates for Contextual and Counterproductive Performance*

Big Five trait	***N***	***k***	$\bar{r}$	SD_r	ρ_{op}	$SD_{\rho_{op}}$	**ρ**	SD_ρ	**90% conf. int.**	**80% cred. int.**
Contextual performance										
Agreeableness	248	2	.11	.01	**.16**	.00	**.18**	.00	.13, .24	.18, .18
Conscientiousness	248	2	.09	.02	**.16**	.00	**.17**	.00	-.01, .35	.17, .17
Emotional Stability	248	2	.18	.05	**.26**	.00	**.30**	.00	-.07, .64	.30, .30
Extraversion	248	2	.19	.04	**.29**	.00	**.32**	.00	-.02, .63	.32, .32
Openness	248	2	.23	.04	**.38**	.00	**.43**	.00	.09, .73	.43, .43
Counterproductive work behavior										
Agreeableness	168	2	-.12	.03	**-.17**	.00	**-.19**	.00	-.42, .05	-.19, -.19
Conscientiousness	168	2	.12	.14	**.19**	.12	**.21**	.13	-.79, 1.0	.05, .38
Emotional Stability	168	2	.07	.13	**.10**	.10	**.11**	.11	-.77, .96	-.03, .26
Extraversion	168	2	-.03	.05	**-.05**	.00	**-.06**	.00	-.43, .32	-.06, -.06
Openness	168	2	-.18	.09	**-.28**	.00	**-.32**	.00	-.89, .38	-.32, -.32

Note. *N* = total sample size; *k* = number of studies included in the analysis; $\bar{r}$ = mean observed correlation; SD_r = observed standard deviation of correlations; ρ_{op} = mean operational validity (corrected for indirect personality range restriction, criterion unreliability); $SD_{\rho_{op}}$ = true standard deviation of operational validities; ρ = mean construct correlation (corrected for indirect personality range restriction, personality unreliability, criterion unreliability); SD_ρ = true standard deviation of construct correlations; 90% conf. int. = 90% confidence interval around ρ; 80% cred. int. = 80% credibility interval around ρ; high scores on counterproductive work behavior indicate more CWB.

Table 6. *Criterion-related Validity Estimates for Overall Performance Measures*

Big Five trait	N	k	$\bar{r}$	SD_r	ρ_{op}	$SD_{\rho_{op}}$	ρ	SD_ρ	**90% conf. int.**	**80% cred. int.**
Agreeableness	2,212	10	.00	.09	**.00**	.10	**.00**	.12	-.09, .10	-.14, .15
Supervisor ratings	1,457	8	-.01	.11	-.01	.13	-.01	.15	-.15, .12	-.20, .17
Administrative ratings	1,298	7	-.03	.09	-.05	.09	-.06	.10	-.18, .07	-.18, .07
Research ratings	159	1	.18		.25		.28		.05, .52	
Objective measures	755	2	.02	.05	.03	.00	.04	.00	-.29, .36	.04, .04
Conscientiousness	2,313	11	.04	.08	**.07**	.06	**.08**	.07	.00, .16	.00, .16
Supervisor ratings	1,558	9	.02	.08	.04	.02	.04	.03	-.05, .14	.01, .08
Administrative ratings	1,399	8	.01	.08	.02	.03	.03	.03	-.07, .13	-.01, .07
Research ratings	159	1	.10		.15		.16		-.09, .42	
Objective measures	755	2	.09	.07	.13	.02	.14	.02	-.34, .60	.12, .17
Emotional Stability	2,317	10	.13	.08	**.19**	.04	**.21**	.04	.14, .29	.16, .27
Supervisor ratings	1,562	8	.14	.10	.21	.08	.23	.09	.12, .34	.12, .34
Administrative ratings	1,403	7	.13	.10	.19	.08	.21	.09	.09, .33	.10, .32
Research ratings	159	1	.24		.31		.35		.14, .56	
Objective measures	755	2	.12	.01	.15	.00	.17	.00	.08, .27	.17, .17
Extraversion	2,523	12	.09	.07	**.14**	.00	**.16**	.00	.09, .23	.16, .16
Supervisor ratings	1,768	10	.09	.09	.14	.05	.15	.05	.06, .24	.09, .22
Administrative ratings	1,609	9	.07	.08	.11	.00	.13	.00	.04, .21	.13, .13
Research ratings	159	1	.23		.31		.35		.12, .57	
Objective measures	755	2	.11	.03	.16	.00	.17	.00	-.02, .37	.17, .17
Openness	2,212	10	.11	.17	**.18**	.26	**.20**	.30	.01, .39	-.18, .58
Supervisor ratings	1,457	8	.10	.21	.18	.32	.20	.37	-.07, .46	-.27, .68
Administrative ratings	1,298	7	.08	.20	.14	.32	.16	.37	-.14, .44	-.32, .63
Research ratings	159	1	.30		.44		.50		.27, .74	
Objective measures	755	2	.11	.09	.17	.08	.19	.10	-.48, .79	.07, .32

Note. N = total sample size; k = number of studies included in the analysis; $\bar{r}$ = mean observed correlation; SD_r = observed standard deviation of correlations; ρ_{op} = mean operational validity (corrected for indirect personality range restriction, criterion unreliability); $SD_{\rho_{op}}$ = true standard deviation of operational validities; ρ = mean construct correlation (corrected for indirect personality range restriction, personality unreliability, criterion unreliability); SD_ρ = true standard deviation of construct correlations; 90% conf. int. = 90% confidence interval around ρ; 80% cred. int. = 80% credibility interval around ρ.

Table 7. *Regression and Dominance Analyses for Technical Performance and Training Performance*

	Technical performance			Training Performance (overall)			Training: Workplace training			Training: Business school GPA		
Big Five trait	**β**	**DW**	**%**	**β**	**DW**	**%**	**β**	**DW**	**%**	**β**	**DW**	**%**
Agreeableness	-.18	.01	16	-.18	.02	10	-.24	.03	20	-.15	.01	04
Conscientiousness	.26	.05	56	.37	.09	58	.29	.06	47	.42	.11	39
Extraversion	.13	.02	20	-.24	.04	28	.10	.01	08	-.45	.16	54
Emotional Stability	.04	.01	07	.06	.00	03	.16	.03	23	-.01	.00	01
Openness	-.02	.00	01	.02	.00	01	-.07	.00	03	.08	.00	01
R^2	.09		100	.16		100	.13		100	.30		100
R	.30			.40			.37			.54		

Note. β = standardized regression coefficient; DW = general dominance weights (Azen & Budescu, 2003); % = percent of accounted-for criterion variance attributable to trait (rescaled general dominance weights).

that used objective measures (ρ = .14) or research ratings (ρ = .16) to assess overall performance.

Combined Influence of Big Five Traits

Table 7 presents multiple regression and dominance analyses (Azen & Budescu, 2003) for the Big Five with technical performance and training criteria. For these analyses, we used Davies et al.'s (2015) fully-corrected within-inventories values for the Big Five intercorrelations. Results generally conform to those for single-trait validity. The Big Five as a set correlated $R = .30$ with technical performance, with Conscientiousness (rescaled general dominance weight = 56%), Extraversion (20%), and low Agreeableness (16%) contributing most to the prediction. As a set, the Big Five correlated $R = .37$ with workplace training performance, with Conscientiousness (47%), Emotional Stability (23%), and low Agreeableness (20%) making the largest contributions to the prediction. The Big Five combined correlated $R = .54$ with business school GPA, with low Extraversion (54%) and high Conscientiousness (39%) as the most important predictors.

Discussion

This study presents the first comprehensive meta-analyses of Big Five–job performance validities in South Africa. The results of this study are largely comparable with those found in other international contexts (Barrick & Mount, 1991; Oh, 2009; Salgado, 1998), with Conscientiousness and, to a lesser extent, Emotional Stability, emerging as the strongest predictors of technical performance and training. Extraversion was also a prominent predictor of these criteria, likely due to the interpersonal nature of most of the included occupations and high levels of cultural collectivism in South Africa. Extraversion also emerged as a strong *negative* predictor of business school academic performance, which may reflect that Extraversion may promote socializing and other procrastination behaviors over studying (Furnham, Chamorro-Premuzic, & McDougall, 2003). Magnitudes for most of these relations were in the range of $|\rho| = .12$ to .25, though some relations were larger. Validities were stronger when performance was measured using supervisor ratings gathered specifically for research purposes than when measured using objective indicators or ratings made for administrative decision-making.

Results support the cross-cultural generalizability of personality–performance relations. Nearly all included studies used an imported personality instruments, so the strength of the operational validities observed in this study suggest little support for our hypothesis that readability and interpretability issues would attenuate the validities of imported measures. In contrast, the very strong relation between Conscientiousness and research-based supervisor ratings of technical performance (ρ = .43) and the preliminary results for contextual performance suggest that personality scales may be even better predictors of performance in South Africa compared to other contexts. Overall, this study provides further evidence that personality traits, especially Conscientiousness, are powerful predictors of work performance across international contexts. Personality-job performance validity, like personality structure and development (McCrae, Terracciano, & 78 members of the Personality Profiles of Cultures Project, 2005), divergence between self- and other-ratings (Allik et al., 2010), and contributions of personality to romantic success (Schmitt et al., 2004), appears to be a cultural universal that will be observed in all countries around the globe.

Limitations and Future Directions for Personality Research

This study established generalizable validity of personality measures for job performance criteria in South Africa. However, it is characterized by several limitations that should be addressed in future research.

Measuring performance. First, our results for overall work performance, which included undifferentiated measures of performance or composites of multiple dimensions, were at odds with findings from previous meta-analyses. Specifically, Conscientiousness showed negligible validity while Extraversion, Openness, and

Emotional Stability showed moderate positive validity. We believe the most likely explanation for these discrepancies to the administrative ratings used as criteria in these studies, which were likely contaminated by impression management, interpersonal bias, and other factors (DeNisi & Sonesh, 2011). Future research on personality-performance relations in South Africa should focus on estimating validity of personality measures for performance criteria gathered specifically for test validation purposes to reduce the influence of these irrelevant sources of variance. Administrative ratings tend to be strongly biased by factors unrelated to employee behavior; these measures can provide little information about the predictive validity of assessments for performance (versus supervisor biases; J. P. Campbell & Wiernik, 2015). Studies based on flawed measures of performance will inevitably yield flawed results and biased estimates of predictor validity. Heretofore, organizational research in South Africa has been based largely on data that were gathered for purposes other than test validation. Going forward, the development of industrial psychology as a true science in South Africa will depend on researchers carefully conceptualizing and measuring their criteria, rather than relying on whatever measures happen to be available for analysis. By assessing performance specifically to examine predictive validity, criterion measures can be tailored to the specific performance constructs personality scales are designed to measure and reduce the impacts of criterion contamination and deficiency on validity estimates. In predictive validity studies, researchers must also emphasize the importance of the ratings and accountability to ensure rater buy-in and data quality (cf. C. H. Campbell et al., 1990). Future research should also examine a wider range of performance constructs, such as specific components of technical performance, leadership, and effort (J. P. Campbell & Wiernik, 2015), as well as emerging performance dimensions, such as innovation (Harari, Reaves, & Viswesvaran, 2016) and environmentally-sustainable behaviors (Ones & Dilchert, 2012).

Future studies must also examine relations of the Big Five with counterproductive work behaviors and contextual performance. The results of the present analyses are based on only two studies with small total sample size. Given the prominence of these performance dimensions in contemporary models of work behavior (Rotundo & Sackett, 2002) and especially the pervasiveness of deviant behaviors in South African organizations, the absence of more studies in these domains is a glaring omission. Future research must inform human resource management practice in South Africa by providing robust estimates of the magnitudes of predictive validity of personality traits for these important performance domains.

Personality assessment in South Africa. Most personality assessments used by psychologists and organizations in South Africa have been imported and adapted for South African use. Previous research indicates that these measures may not be completely free from biases and linguistic misinterpretations when used with contemporary South Africa samples. Ideally, the current study would have compared the relative validities of imported versus locally-developed personality measures. However, only one sample used a locally-developed measure, so this moderator could not be examined.

There is a clear need for continued efforts to assess the measurement properties of imported instruments and to develop personality measures specifically for use in South Africa. The SAPI project (Fetvadjiev et al., 2015) provides an excellent example of the kind of culturally- and contextually-aware research that has the potential to greatly enhance the science and practice of personality assessment in South Africa. Given ongoing negative public sentiment toward psychological assessment in South Africa (Kriek & Dowdeswell, 2010; Laher & Cockcroft, 2014), future research might also focus on examining whether personality measures show differential validity across racial, ethnic, language, and socioeconomic groups.

In addition, we recommend that personality research and practice in South Africa move away from the ipsative measures that currently dominate personality assessment and toward normative (non-ipsative) personality scales. Forced-choice ipsative personality scales are typically adopted as

a countermeasure to perceived risk of faking and impression management by applicants. However, research has consistently demonstrated that impression management behaviors do not affect the predictive validity of personality scales (Ones, Viswesvaran, & Reiss, 1996) and that ipsative personality measures have weaker validity than normative scales (Salgado & Táuriz, 2014). If forced-choice personality measures are used, item response theory-based statistical scoring methods must be used to recover normative trait scores (Brown & Maydeu-Olivares, 2013; Stark, Chernyshenko, & Drasgow, 2005).

Research reporting practices. Future organizational researchers must also responsibly report the results of their studies and ensure that sufficient data are available for inclusion in future meta-analyses. This includes reporting descriptive statistics and zero-order correlation for all measures, not only statistically significant findings, and providing complete descriptions of the samples and contexts in which research is conducted. When space for complete reporting is limited, alternative methods for data dissemination, such as including an addendum or online supplement, should be used. Researchers, practitioners, and test publishers must be informed about the reporting requirements for a study to be usable in meta-analyses, and reviewers and journal editors must ensure that these guidelines are followed for the benefit of cumulative scientific research, as well as for the benefit of society at large through increased transparency in organizational HRM practices and compliance with legal requirements for staffing.

Practical Implications

The meta-analytic evidence provided by the current study confirms that the Big Five personality traits have an important role for predicting job performance in South Africa. Human resource practitioners, industrial psychologists, and managers should adopt personality assessments and incorporate them into their decision-making systems for personnel selection, as well as for other applications, such as career development, coaching, succession planning, and development interventions. To maximize validity, test scores should be interpreted with respect to South African norms for the jobs under consideration using mechanical decision rules (Kuncel, Klieger, Connelly, & Ones, 2013).

Evidence from South Africa and abroad supports the universal validity of Conscientiousness and Emotional Stability for a wide variety of job performance criteria. Measures of these traits or compound traits incorporating variance from these domains, such as integrity tests (Ones, 1993), should have a central place in organizational decision-making systems. Furthermore, the convergence of the findings of this meta-analytic study with those of meta-analyses conducted in other cultural contexts supports the conclusion that empirical findings from studies conducted internationally tend to generalize to the South African setting; researchers and practitioners should approach international applied psychological research with the perspective that convergence may be more typical that divergence across cultures (Ones, Dilchert, et al., 2012).

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Appendix

Table A1. *Studies Contributing to Meta-analyses*

Authors	Industry	Job
Blignaut (2011)	Finance	Customer service call center workers
Byers (2006)	Food and beverage manufacturing	Brand ambassador/salesman
Coetzee (2003)	Finance	Credit controllers
De Bruin et al. (2005)	Domestic service	Unskilled workers
Dijkman (2009)	Military	Enlisted soldiers
Farrington (2012)	Service and retail	Entrepreneurs
Fertig (2009)	Finance	Managers
Geldenhuys et al. (2001)	Law enforcement	Traffic controllers
Hillowitz (2003)	Insurance	Fund administrators
La Grange & Roodt (2001)	Insurance	Brokers
Müller (2010)	University	Undergraduate business students
Müller (2002)	Finance	Managers
Nagdee (2011)	University	MBA students
Nicholls et al. (2009)	Communications	Call center consultants
Nzama et al. (2008)	Retail	Managers
Rothmann & Coezter (2003)	Pharmaceutical	Pharmacists and non-pharmacists
SHL (2002a)	Insurance	Broker consultants
SHL (2002b)	University	MBA students
Sutherland et al. (2007)	Finance	Service engineers
Levy (2012)	Automotive	Sales managers
Alves (1997)	Mobile communications	Sales consultants
Strauss (1998)	Finance	Junior managers
Nell (2002)	Correctional services	Prison wardens
Esterhuizen (1997)	Mining	Security officers
Nel (1986)	Mixed	Mixed
Rothman et al. (2002)		
Study 1 (1989)	Mixed	Entrepreneurs
Study 2 (1997)	Finance	Loan application evaluators
Study 3 (1998)	Insurance	Computer programmers
Study 4 (1999)	Government	Administrative clerks
Study 5 (1999)	Law enforcement	Police officers
Study 6 (2000)	Law enforcement	Police officers
Study 7 (2000)	Insurance	Call center consultants
Study 8 (2001)	University	MBA students

Table A2. *Personality Measures Included in Meta-analyses*

Personality measure (Source of Big Five classification)	**Conscientiousness**	**Emotional stability**	**Agreeableness**	**Extraversion**	**Openness**
15 Factor Questionnaire (15FQ+) (Technical manual—Global factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness
16PF: Sixteen Personality Factor Questionnaire (Technical manual—Global factors)		Emotional Stability	Agreeableness	Extraversion	Openness
Big Five Inventory (Reports Big Five factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness
Basic Traits Inventory (Reports Big Five Factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness
Customer Contact Style Questionnaire (Warr et al., 2005)	Competitive, Results, Energetic, Structured, Detail Conscious, Conscientious	Resilience	Empathic, Modest, Participative	Persuasive, Sociable	Analytical, Innovative, Flexible
Five Factor Nonverbal Personality Questionnaire (Reports Big Five factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness
Myers-Briggs Type Indicator (McCrae & Costa, 1989)			Feeling	Extraversion	Intuition
NEO PI-R/FFI (Reports Big Five factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness
Occupational Personality Questionnaire Bartram (2013b)	Achieving, Conscientious, Decisive, Detail Conscious, Forward Thinking, Vigorous	Optimistic, Relaxed, Socially Confident, Tough Minded, Worrying	Caring, Competitive, Democratic, Independent Minded	Affiliative, Controlling, Outgoing, Persuasive	Behavioral, Conceptual, Conventional, Innovative, Variety Seeking
Ten Item Personality Inventory (Reports Big Five factors)	Conscientiousness	Emotional Stability	Agreeableness	Extraversion	Openness