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Using Theory to Evaluate Personality and Job Performance Relations:

A Socioanalytic Perspective

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Abstract

This study uses socioanalytic theory to understand individual differences in peoples' performance at work. Specifically, if predictors and criteria are aligned using theory, then the meta-analytic validity of personality measures exceeds that of atheoretical approaches. As performance assessment moves from general to specific job criteria, all Big-Five personality dimensions more precisely predict relevant criterion variables, with estimated true validities of .43 (Emotional Stability), .35 (Extraversion/Ambition), .34 (Agreeableness), .36 (Conscientiousness), and .34 (Intellect/Openness to Experience).

Using Theory to Evaluate Personality and Job Performance Relations: A Socioanalytic Perspective

Since 1990, meta-analytic reviews show that personality measures are useful predictors of job performance. Although these results represent a substantial revision in how applied psychology views personality assessment (cf. Guion & Gottier, 1965; Locke & Hulin, 1962), there is still no agreed upon theoretical account for the findings. A theory of individual differences in work effectiveness that links assessment to performance would enhance the value of personality measures for forecasting occupational outcomes.

The current study organizes criterion measures into the broad themes of: (a) getting along and getting ahead, and (b) Big-Five personality content categories. The correlations between the criterion measures and the personality predictors are then meta-analyzed and the results are compared with earlier findings. The results suggest there is some practical utility for theory-driven research.

Applying Socioanalytic Theory to Performance at Work

Socioanalytic theory (Hogan, 1983, 1991, 1996) is rooted in interpersonal psychology (Carson, 1969; Leary, 1957; Sullivan, 1953; Wiggins, 1979), and is intended to explain individual differences in career success. The theory is based on two generalizations relevant to organizational behavior: people always live (work) in groups and groups are always structured in terms of status hierarchies. These generalizations suggest the presence of two broad motive patterns that translate into behavior designed to "get along" with other members of the group and to "get ahead" or achieve status vis á vis other members of the group. Getting along and getting ahead are familiar themes in personality psychology (cf. Adler, 1939; Bakan, 1966; Rank, 1945; Wiggins & Trapnell, 1996). Their importance is justified in Darwinian terms: people who

cannot get along with others and who lack status and power have reduced opportunities for reproductive success.

Socioanalytic theory specifies that personality should be defined from the perspectives of the actor and the observer. Personality from the actor's view is a person's identity, which is defined in terms of the strategies a person uses to pursue acceptance and status; identity controls an actor's social behavior. Personality from the observers' view is a person's reputation, and it is defined in terms of trait evaluations—conforming, helpful, talkative, competitive, calm, curious, and so forth. Reputation reflects the observer's view of an actor's characteristic ways of behaving in public. Reputation is the link between the actor's efforts to achieve acceptance and status and how those efforts are evaluated by observers. Reputation describes a person's behavior; identity explains it.

From the lexical perspective (Goldberg, 1981), the Big-Five personality factors represent the structure of observers' ratings based on 75 years of factor analytic research from Thurstone (1934) to Goldberg (1993). These factors are a taxonomy of reputation (cf. Digman, 1990; John, 1990; Saucier & Goldberg, 1996), and are labelled as follows: Factor I, Extraversion or Surgency; Factor II, Agreeableness; Factor III, Conscientiousness; Factor IV, Emotional Stability; and Factor V, Intellect/Openness to Experience (John, 1990). Because reputations are a rough index of the amount of acceptance and status a person enjoys (Foa & Foa, 1974, 1980; Wiggins, 1979), and because reputations are encoded in Big-Five terms (Saucier & Goldberg, 1996), it follows that the Big-Five factors are also evaluations of acceptance and status (Digman, 1997). Digman (1997) concluded that two higher-order factors organize the Big-Five model; he notes that these two broad factors precisely parallel earlier dichotomies such as social interests versus superiority striving (Adler, 1939), communion versus agency (Bakan, 1966; Wiggins,

1991), union versus individualism (Rank, 1945), status versus popularity (Hogan, 1983), and intimacy versus power (McAdams, 1985).

Occupational life consists of episodes (Motowidlo, Borman, & Schmit, 1997) organized according to agendas and roles—what will be done and who will do it. Efforts to get along and get ahead take place during these episodes. Although most people are trying to get along and get ahead while working, there are substantial individual differences in how their efforts are evaluated by others. To get along, people must cooperate and seem compliant, friendly, and positive. When successful, they are evaluated by others as good team players, organizational citizens, and service providers (Mount, Barrick, & Stewart, 1998; Moon, 2001). On the other hand, to get ahead, people must take initiative, seek responsibility, compete, and try to be recognized. When successful, they are described by others as achieving results, providing leadership, communicating a vision, and motivating others toward goals (Conway, 1999).

The foregoing discussion suggests a model for understanding motivation and for assessing individual differences in performance at work. People seek acceptance and status in the workgroup. Their behavior reflects these efforts. Individual differences in performance criteria can be organized in terms of the themes of getting along and getting ahead. The Big-Five factors can also be interpreted in terms of efforts to gain approval and status (cf. Digman, 1997; Wiggins & Trapnell, 1996).

Measurement: Personality Assessment and the Big-Five Factors

There is considerable debate concerning the number of personality factors needed to predict and understand work behavior. Hough and Ones (2001, pp. 233-238) provide a detailed review of this debate, and they make the following points. Tupes and Christal's (1961) analysis of trait ratings is the contemporary foundation for the Big-Five. Substantial research supports

the robustness and generalizability of the five factors across different types of assessments, rating sources, language, and culture. Nevertheless, some researchers have criticized the Big Five factors as an incomplete taxonomy and suggest that important relationships are obscured when analyses are limited to the Big-Five, rather than a seven-factor model. Tellegen and Waller (1987), Hogan and Hogan (1995), Hough (1997), and Saucier and Goldberg (in press) all find seven factors, five of which correspond to the Big-Five and two additional factors. Saucier and Goldberg (in press) conclude that the satisfactoriness of the Big-Five can be questioned in light of new criteria for judging the adequacy of structural models for personality attributes.

Measurement: Assessing Job Performance using Multidimensional Models

The metaconcepts of getting along and getting ahead are latent in such phrases as "instrumental and expressive roles," "initiating structure and providing consideration," "task and socioemotional inputs," "production-oriented versus service-oriented groups," and "task performance versus contextual performance." Consider how the following job performance models reflect, in part, the themes of getting along and getting ahead. Campbell, McHenry, and Wise (1990) proposed that performance in entry level jobs in the U.S. Army can be evaluated in terms of five dimensions: core proficiency, general soldier proficiency, effort and leadership, personal discipline, and physical fitness/military bearing. Campbell, McCloy, Oppler, and Sager (1993) subsequently expanded this taxonomy into a general model of job performance consisting of eight factors for job-specific task proficiency, non-job-specific task proficiency, written and oral communication task proficiency, demonstrating effort, maintaining personal discipline, facilitating peer and team performance, supervision/leadership, and management/administration. In these models, proficiency and leadership concern getting ahead whereas personal discipline and facilitating peer and team performance concern getting along.

Borman and Motowidlo (1993) distinguished between task performance and contextual performance—non-task performance that is important in all jobs. Task performance corresponds to getting ahead and contextual performance corresponds to getting along with others. Similarly, Hunt (1996) proposed a nine-factor model of entry-level job performance, with the factors differentially appropriate for a variety of jobs. Hunt's model highlights the importance of technical proficiency for job success (getting ahead), but it also emphasizes contextual performance, organizational citizenship, and pro-social behavior. These three dimensions are indices of getting along at work. Finally, Tett, Guterman, Bleier, and Murphy (2000) synthesized 12 models of managerial performance including both published and practitioner models. Tett et al. (2000) identify 53 dimensions of performance in managerial jobs. An inspection of these dimensions suggests the presence of the ubiquitous factors of structure and consideration (Bass, 1990; Fiedler, 1967; Fleishman, 1953). Initiating structure concerns trying to help the group get ahead; being considerate of others is the prerequisite for getting along.

Personality-based Meta-analyses

Barrick and Mount (1991) classified personality measures using the Big-Five model and found corrected mean validities for at least two dimensions that were large enough to suggest they are significant predictors of overall job performance. These included Conscientiousness (ρ = .22) and Extraversion (ρ = .13). Tett, Jackson, and Rothstein (1991) found corrected mean validities between the Big-Five factors and job performance ratings ranging from .16 for Extraversion to .33 for Agreeableness. They attributed their larger validities to the use of confirmatory research strategies, job analysis, and published versus unpublished studies. With the exception of Emotional Stability (ρ = .19), Salgado (1997, 1998a) replicated the Barrick and Mount results using data from the European Community. Hurtz and Donovan (2000) estimated

the criterion-related validities of explicit Big-Five measures for predicting overall job performance and contextual performance. Their results for Conscientiousness (ρ = .22) are consistent with those reported by Barrick and Mount, although true validities for Emotional Stability (ρ = .14) and Extraversion (ρ = .09) differed. Other scale validities were equal to or less than .10. The Big-Five dimensions predicted overall performance somewhat better than contextual job performance. Other useful meta-analyses (e.g., Frei & McDaniel, 1998; Mount & Barrick, 1995a; Ones, Hough, & Viswesvaran, 1998; Ones & Viswesvaran, 2000; Ones, Viswesvaran, & Schmidt, 1993; Vinchur, Schippmann, Switzer, & Roth, 1998; Viswesvaran & Ones, 2000) focus on specific occupations or personality construct measures.

Previous meta-analyses of the personality-job performance relationships had four constraints in the source data that may have limited their findings. First, none was based on an explicit model of personality, in part, because there are few personality theories designed to understand occupational performance. Hurtz and Donovan (2000) suggest that future research should match personality constructs and dimensions of job performance on theoretical grounds. Second, it is difficult to classify the scales of various personality inventories into the Big-Five categories because most of the inventories used in earlier analyses were not developed with the Big-Five model in mind. These studies included measures of psychopathology, personality disorders, values, and career interests. In addition, some scale classifications relied on as few as two raters. Two important exceptions are the studies by Hurtz and Donovan (2000), which used only Big-Five inventories, and by Mount, Barrick, and Stewart (1998), which used a single inventory. Third, the earlier reviews define job performance almost exclusively in terms of ratings of overall job performance. Hurtz and Donovan used ratings for both contextual and task performance, and found a pattern of correlations similar to that for overall job performance

criteria. Campbell (1990) and others argue that job performance is multidimensional, but, unfortunately, few studies actually report dimensional correlates. Fourth, with one exception, none of the earlier reviews aligns predictors with criterion measures using the underlying performance constructs, as recommended by Campbell (1990). Hough (1992) aligned predictor and criterion measures and demonstrated the usefulness of measurement alignment for estimating validity. The difficulties faced by earlier meta-analyses probably attenuate validities, restrict the generality of the findings, and reduce the usefulness of results for practitioners.

Current Research

We used socioanalytic theory to define the links between personality and job performance, and we used meta-analysis to evaluate the links. Overall, the analyses investigate four claims:

(1) Experts can classify job criteria reliably in terms of the degree to which they reflect efforts to get along or get ahead. For example, we expect such behavior as coming to work early and staying late reflect attempts to get ahead; we expect assisting a coworker with a deadline reflects attempts to get along. In addition, experts can evaluate the personality-based performance requirements of jobs (see also Raymark, Schmit, & Guion, 1997). Identifying the personality characteristics that underlie dimensions of job performance is necessary to align predictors and criteria using Campbell's (1990) strategy.

(2) The most robust Big-Five predictors of subjective performance criteria (e.g., overall job performance ratings) are Emotional Stability and Conscientiousness. Persons who seem calm, self-confident, and resilient (Emotional Stability), or dependable and disciplined (Conscientiousness) will be evaluated more positively than those who do not seem calm and dependable. Tett et al. (1991) provide evidence for the generalized validity of Emotional

Stability and Conscientiousness measures using data from North America; Salgado (1997, 1998a) provides data from the European Community. Although they used overall job performance as their criteria, we believe that similar results will be obtained when specific indicators of getting along and getting ahead criteria are aggregated. The question of how well the Big-Five predict overall or aggregated performance criteria has not received a definitive answer (i.e., Barrick & Mount, 1991; Hough, 1992; Hurtz & Donovan, 2000; Salgado, 1997; Tett, Jackson, & Rothstein, 1991).

(3) When performance criteria are classified in terms of getting along and getting ahead, we hypothesize that a more nuanced pattern of personality-performance links will emerge. When successful job performance requires getting along, Emotional Stability, Conscientiousness, and Agreeableness should predict performance because persons with elevations on these dimensions are rewarding to deal with—they are positive (i.e., Emotional Stability; Mount, Barrick, & Stewart, 1998; George, 1990; Staw, Sutton, & Pelled, 1994), predictable (i.e., Conscientiousness; Hough, 1992; Parasuraman, Zeithaml, & Berry, 1986), and sensitive to others (i.e., Agreeableness; Barrick, Stewart, & Piotrowski, 2000; Hogan, Hogan, & Busch, 1984). Digman (1997) provides additional justification for this hypothesis. From 14 studies evaluating the Big-Five model, Digman (1997) found two super factors. The first was defined by Emotional Stability, Agreeableness, and Conscientiousness. Digman concluded that this factor: (1) reflected social desirability and the socialization process (impulse restraint and conscience versus hostility, aggression, and neurotic defense); and (2) could be interpreted in socioanalytic terms as a basic human aim "toward peer popularity" (p. 1251).

When successful job performance requires getting ahead, the dimensions of of Emotional Stability, Extraversion (Ambition), and Intellect/Openness to Experience will predict

performance. This is because getting ahead is associated with being confident (i.e., Emotional Stability; Gough, 1990; Stogdill, 1948), ambitious and hardworking (i.e., Extraversion/Surgency; Hogan, Curphy, & Hogan, 1994; McClelland, Atkinson, Clark, & Lowell, 1953; Vinchur, Schippman, Switzer, & Roth, 1998), and curious and eager to learn (i.e., Intellect/Openness to Experience; Barrick & Mount, 1991; Costa & McCrae, 1992; McCrae & Costa, 1997). Digman's (1997) second super factor is defined by Extraversion and Intellect/Openness to Experience. He concluded that this factor: (1) reflected personal growth (versus personal constriction) and surgency; and (2) could be interpreted in socioanalytic terms as a basic human aim "toward status" (p. 1251).

(4) When predictors and performance criteria are aligned using their common personality constructs, mean validities will increase compared with previous meta-analytic studies (Ashton, 1998; Hogan & Roberts, 1996; Paunonen, Rothstein, & Jackson, 1999). Several researchers speculate that criterion specificity may moderate the validity of personality measures (Tett, et al., 1991; Warr & Conner, 1992). Other researchers have interpreted the small validities of personality measures as the result of using global (versus narrow) criteria which masks specific relations (Robertson & Kinder, 1993; Salgado, 1997). We expect that aligning predictors and criteria in terms of underlying constructs will provide evidence for both the convergent and discriminant validity of the personality variables. These analyses should answer the question of whether validity increases as the bandwidth of the criterion measures moves from broad (multiple constructs) to narrow (single construct).

Method

Case Selection

We identified 43 independent samples (total N = 5,242) from published articles, chapters, technical reports, and dissertations between 1980 and 2000 that were catalogued in Hogan Assessment Systems' archive. The studies met the following criteria: (1) they used job analysis to estimate personality-based job requirements; (2) they used a concurrent (k = 41) or predictive (k = 2) validation strategy with working adults; (3) the criteria were content explicit and not just overall job performance; and (4) the predictor variables were scales of the Hogan Personality Inventory (HPI; Hogan & Hogan, 1995). We excluded studies using: (1) clinical patients and therapists; (2) undergraduate or graduate students; (3) self-reported performance criteria; (4) performance criteria other than ratings and objective productivity/personnel measures; (5) only an overall performance criterion; (6) laboratory or assessment center studies; and (7) studies unrelated to work contexts.

Table 1 lists the distribution of studies ($\underline{k}$ = 43) by job title and Holland (1985) occupational type. Most job titles correspond to the Holland Realistic, Social, Enterprising, and Conventional types; no studies involved Investigative and Artistic occupations. Ideally, every Holland type would be present in the analysis, but our sample composition reflects the base rate of occupations in the U.S. economy. Gottfredson and Holland (1989; 1996) report that the majority of occupations are Realistic (66.7%), Conventional (13.4%), and Enterprising (11.1%), and that Social (4.6%), Investigative (3.0%), and Artistic (1.2%) occupations are less common. The jobs in the table represent the most frequent types in the U. S. economy.

Job Analysis

All studies included one or more types of job analyses during the initial stages of the research. Approximately 30% of the studies (k = 13) used the critical incidents method (Flanagan, 1954) to define exceptional behavior (for example, see Hogan & Lesser, 1996). Over half of the studies (k = 27) used worker-oriented methods to determine the knowledge, skills, and abilities required for successful job performance. These job analyses generally followed the Goldstein, Zedeck, and Schneider (1993) method for content validation research (cf. Hogan & Hogan, 1995, p. 75). The remaining studies (k = 18) used the Performance Improvement Characteristics (PIC) job analysis approach (Hogan & Rybicki, 1998). This personality-based job analysis uses a 48-item PIC checklist to profile jobs in terms of the Big-Five factors. Raymark, Schmit, and Guion (1997) describe a similar method for evaluating personality-based job requirements. Although job analysis results are often used to justify predictor measures, these results were used to develop criterion dimensions.

Measures

Predictors. All studies used the HPI; this eliminated the need to classify predictors by construct. The HPI is a 206-item true-false inventory designed to predict occupational performance. The inventory contains seven primary scales that align with the Big-Five as seen in Figure 1. Although there is no universal consensus on the optimal number of personality attributes, the Big-Five is a useful method for organizing the scales on most inventories, including the HPI. Note that the Big-Five extraversion factor splits (conceptually and empirically) into Ambition and Sociability (cf. Hogan & Hogan, 1995, p.11). The Big-Five intellect/openness to experience factor splits into Intellectance—which reflects creativity—and School Success—which reflects achievement orientation. The internal consistency reliability

and test-retest reliability, respectively, for each scale is: Adjustment (.89/.86); Ambition (.86/.83); Sociability (.83/.79); Likeability (.71/.80); Prudence (.78/.74); Intellectance (.78/.83); and School Success (.75/.86).

The HPI is based on the Big-Five personality model; findings using the HPI could generalize to other Big-Five inventories depending on the magnitude of scale to scale correlates. Data are available concerning the relationship between the HPI and the following measures: Goldberg's (1992) Big-Five factor markers (Hogan & Hogan, 1995, p. 24); the NEO-PI-R (Costa & McCrae, 1992, 1995) as reported by Goldberg (2000); the Interpersonal Adjective Scales (R. Hogan & Hogan, 1995, p. 24; Wiggins, 1991); the International Personality Item Pool (Goldberg, 1999); the Personal Characteristics Inventory (Mount & Barrick, 1995b), and Inventario de Personalidad de Cinco Factores (IP/5F; Salgado, 1998b, 1999; Salgado & Moscoso, 1999).

Criteria. Subject matter experts (SMEs) reviewed the criterion variables used in each archived study and made two judgments. First, they classified each performance criterion as getting along or getting ahead. Getting along was defined as "behavior that gains the approval of others, enhances cooperation, and serves to build and maintain relationships." Getting ahead was defined as "behavior that produces results and advances an individual within the group and the group within its competition." SMEs were asked not to classify criteria about whose meaning they were uncertain. Second, SMEs were also asked to identify the HPI personality construct most closely associated with each performance criterion. The seven HPI scale constructs were defined and SMEs were asked to nominate only one scale for each criterion listed. Definitions of each performance criterion came from the original validation study. The results allowed us to align the criteria with the predictors based on their common meaning (Campbell, 1990). Table 2 shows representative variables from each work motive and each personality construct.

SMEs (N = 13) were Ph.D. (n = 7) and M.A. (n = 6) level industrial/organizational psychologists experienced in validation research using the HPI. Criterion classification was based on the absolute level of rater agreement. Classification required 10 of the 13 raters (77%) to agree. Of the 139 criteria, 115 (83%) were classified as either getting along or getting ahead, and 95 (68%) were classified in terms of a single personality construct.

An alternative method for evaluating the correspondence among multiple raters is to compute an index of agreement using Cohen's (1960) Kappa. Based on procedures outlined by Hubert (1977), interrater agreement estimates ranged from $\underline{K}$ = .48 (Big-Five aligned criteria) to $\underline{K}$ = .60 (getting along and getting ahead criteria). Although there are several benchmarks for interpreting Kappa (Altman, 1991; Fleiss, 1981; Landis & Koch, 1977), they all indicate that Kappa values between .40 and .60 indicate moderate to good interrater agreement. Based on percent agreement and the values of Kappa, we considered the raters' judgments to be sufficiently reliable to justify aggregating them to define the criteria and align them with the personality constructs. These results also support the view that SMEs can reliably classify criteria as work motives and personality-based performance requirements.

Meta-Analytic Procedures, Statistical Corrections, and Within-Study Averaging

We used the meta-analytic procedures specified by Hunter and Schmidt (1990) to cumulate results across studies and to assess effect sizes. All studies used zero-order product-moment correlations, which eliminated the need to convert alternative statistics to values of r. Corrections were made for sampling error, unreliability in the measures, and range restriction. Reliability of the personality measures was estimated using within-study coefficient alpha [M = .78; range = .71 (Prudence) to .84 (Adjustment)], rather than relying exclusively on the values reported in the HPI manual. Although some researchers (e.g., Murphy & De Shon, 2000) argue

against the use of rater-based reliability estimates, we followed procedures outlined by Barrick and Mount (1991) and Tett et al. (1991), and used the .508 reliability coefficient proposed by Rothstein (1990) as the estimate of the reliability of supervisory ratings of job performance. For objective criterion data, we (conservatively) assumed perfect reliability, following Salgado's (1997) method. Note that Hunter, Schmidt, and Judiesch (1990) recommend a reliability estimate of .55 for objective criteria. The frequency-weighted mean of the job performance reliability distribution was .59, which is comparable to the value of .56 reported by Barrick and Mount (1991), and the mean square root reliability of .76 corresponds to the value of .778 reported by Tett et al. (1991). We also computed a range restriction index for HPI scales. Following procedures described by Hunter and Schmidt (1990), we divided each HPI scale's within-study standard deviation by the standard deviation reported by Hogan and Hogan (1995). This procedure produced an index of range restriction for each HPI scale [$\underline{M}$ = .87; range = .81 (Ambition) to .94 (School Success)] within each study, and we used this value to correct each predictor scale for range restriction.

Hunter and Schmidt (1990) point out that meta-analytic results can be biased unless each sample contributes about the same number of correlations to the total. To eliminate such bias, we averaged correlations within studies so that each sample contributed only one point estimate per predictor scale. For example, if more than one criterion from any study was classified as getting along, the correlations between each predictor scale and those criteria were averaged to derive a single point estimate of the predictor-criterion relationship. Note that this procedure uses both negative and positive correlations rather than mean absolute values for averaging correlations. This is the major computational difference between the current analyses and those presented by Tett et al. (1991, p. 712). We did not correct correlation coefficients to estimate

validity at the construct level. Although some (e.g., Mount & Barrick, 1995a; Ones, Schmidt, & Viswesvaran, 1994) argue this is an artifact that can be corrected, we believe it is premature to estimate the validity of perfect constructs when there is no agreement regarding what they are. That is, scales on different personality measures that purportedly assess the same construct are nuanced and extend the boundaries of those constructs in directions beyond the central theme.

Results

Table 3 shows the sample-weighted criterion category inter-correlations. The diagonal in the matrix represents the average correlation between different scales classified into the same performance category. In general, Table 3 results support the convergent validity of the criterion categorizations. For example, criteria classified as Getting Along correlated more highly among themselves than with criteria from the remaining performance categories (e.g., Adjustment). The same pattern occurs for all performance categories, with the exception of Getting Ahead- and Ambition-based criteria. Other results in the off-diagonals of the matrix, including generally strong correlations among the various criterion types (e.g., Likeability and Prudence), suggest the criterion categories overlap more than we expected. The median intercorrelations between the criterion categories ranged from .47 to .72 with an average of .60.

Table 4 presents the results for the HPI scales when the criterion themes of getting along and getting ahead are combined as global measures of job performance. As seen in the table, the uncorrected sample weighted validities and estimated true validities for HPI Adjustment, Ambition, and Prudence are .19 (.32), .13 (.22), and .14 (.24), respectively. The estimated validity of the Adjustment scale exceeds previously reported values for the Emotional Stability construct, which are .15 (Neuroticism; Tett et al., 1991) and .09 (Emotional Stability; Hurtz & Donovan, 2000; Salgado, 1997). The Big-Five Extraversion factor is represented by HPI

Ambition and Sociability scales. Similar to results reported by Vinchur et al. (1998), Ambition, not Sociability ($\underline{\rho}$ = .01), predicts the criteria. In previous meta-analyses, the estimated true validity of Extraversion for predicting global performance ranged from .13 (Barrick & Mount, 1991) to .16 (Tett, et al., 1991), but these analyses combine facets of ambition with sociability. The estimated true validity of HPI School Success is less than Tett et al's. finding for Openness ($\underline{\rho}$ = .27), but larger than the reported estimates from other omnibus meta-analyses. Moreover, the results for Sociability, Likeability, and Intellectance do not generalize based on the 90% credibility values, which is consistent with results reported by Hurtz and Donovan (2000) and Tett et al. (1991). Table 4 validities represent the most global level of analysis.

Table 5 presents 14 meta-analyses using HPI scales to predict getting along or getting ahead criteria considered separately. As seen, between 22 (N = 2,553) and 42 (N = 5,017) studies were used in these analyses. Getting along criteria are best predicted by HPI Adjustment, Prudence, and Likeability, with uncorrected sample-weighted validities and estimated true validities of .19 (.34), .14 (.31), and .12 (.23), respectively. HPI Sociability and Intellectance scales are unrelated to criteria for getting along. Getting ahead criteria are best predicted by the HPI Ambition (r_{obs} = 15; $\underline{\rho}$ = .26), Adjustment (r_{obs} = 14; $\underline{\rho}$ = .22), and Prudence (r_{obs} = .12; $\underline{\rho}$ = .20) scales. Again note that Ambition, not Sociability, predicts getting ahead. Validities and the credibility intervals for the HPI Sociability and Likeability scales indicate that they are not practically useful for predicting getting ahead criteria. Although the pattern of variances differ, the results in Table 5 suggest that the HPI Adjustment, Prudence, and Ambition scales are generally valid for predicting criteria that reflect getting along and getting ahead at work.

Table 6 presents validity results for HPI scales aligned by construct-classified criteria. Forty-two meta-analyses were computed; there were too few studies with criteria categorized as

Sociability-related to compute meta-analyses for the HPI Sociability scale. However, there were sufficient studies to compute meaningful analyses for the other scales. The sample weighted mean correlations and the estimated true validities across scales are consistently larger than validities associated with the more global criteria of getting along and getting ahead. The estimated true validities range from .25 (HPI School Success; $r_{obs} = .15$) to .43 (HPI Adjustment; $r_{obs} = .25$). These findings support Campbell's (1990) strategy of organizing the predictor and criterion domains based on their latent structure. In fact, aligning predictors and criteria increases the sample-weighted validities over the aggregate performance index [$\underline{M}$ = 43%; range = 24% (Adjustment) to 75% (Intellectance)], Getting Along criteria [$\underline{M}$ = 47%; range = 24% (Adjustment) to 90% (Intellectance)], and Getting Ahead criteria [$\underline{M}$ = 47%; range = 25% (Ambition) to 65% (Intellectance)]. The lower bound credibility intervals are all greater than .20, except for School Success, which suggests that scale validity generalizes across samples when criteria are classified by construct. In every case, the credibility intervals support the targeted validity coefficients.

Table 6 also shows the convergent and discriminant validity of the HPI scales. For each dimension except HPI School Success, the correlations are highest between personality scales and the aligned, construct-specific criterion variables, indicating convergence. The estimated true validity for HPI Adjustment (.43) is the largest in the table. Similarly, validity coefficients are smallest for the personality scales that are not aligned with specific constructs. For example, HPI Intellectance is unrelated to Adjustment, Likeability, and Prudence criteria; HPI Sociability predicts none of the construct-based criteria. This pattern of lower correlations for the off-diagonal scales supports discriminant validity. Another index of discriminant validity comes from the overlap of the credibility values among scales. Except for HPI School Success, no

lower bound credibility values for construct-aligned measures overlap any other scale, which suggests independence. This pattern of findings further supports the discriminant validity of the predictor scales.

The off-diagonal correlations in Table 6 show the magnitude of relations between Adjustment, Prudence and, to a lesser extent, Ambition with non-aligned performance criteria. Adjustment's estimated true validity meets or exceeds .20 across 80% of the criterion dimensions with the exception of the Intellectance-based criteria. Although the magnitude of the relations between Adjustment and non-aligned criteria exceed previous estimates for the Emotional Stability construct, the generally consistent pattern corresponds to some previous results (cf. Hurtz & Donovan, 2001). The HPI Prudence scale is related to Adjustment (.32) and Likeability (.21) criteria. Prudence, Adjustment, and Likeability concern interpersonal aspects of work (Hurtz & Donovan, 2000), which may account for the circular predictive pattern among these scales. Finally, the Ambition scale predicts criteria classified into the Intellectance (.23) and School Success (.27) categories; this is sensible because the Intellectance criteria reflect intellectual striving and the School Success criteria reflect aacademic achievement.

Discussion

This study extends previous personality meta-analyses in three ways. First, it uses a theory of personality to organize the variables and to interpret the results. From this perspective, personality scale scores capture elements of individual reputation. Criterion ratings are observers' evaluations of an incumbent's reputation. Reputation provides the conceptual link between personality and job performance. This supports Guion and Gottier's (1965) advice to use theory to align personality and job performance criteria.

Second, we eliminated the problem of classifying predictor scales into the correct Big-Five dimensions by using a single inventory to assess personality. Although this is a methodological strength, it is also a potential limitation because, one might argue, the meta-analysis results concern a particular instrument and not construct measures. However, Figure 2 shows that the HPI scales and other Big-Five measures converge; although not perfect, the correlations between many scales are sufficient to suggest that results from one construct measure will generalize to another of the same construct. Moreover, some influential meta-analyses are based on a single test. For example, Hunter's (1980; Hunter & Hunter, 1984) meta-analysis of cognitive ability and job performance is based entirely on the General Aptitude Test Battery and Mount, Barrick, and Stewart's (1998) meta-analysis of personality and performance in jobs requiring interpersonal skill is based entirely on the Personal Characteristics Inventory.

Third, the reliability of the criterion classifications was determined empirically, and the classifications used multi-rater judgments, as opposed to consensus based on a few (usually two) SMEs (e.g., Tett, et al., 1991; Hurtz & Donovan, 2000).

This study provides insight into some persistent methodological questions. For example, these data strongly support the utility of Campbell's (1990) strategy of aligning predictors and criteria using the underlying construct. Concerning the fidelity-bandwidth debate (see Spector, 1996), our results support the Hogan and Roberts (1996), Mount and Barrick (1995a), and Schneider, Hough, and Dunnette (1996) view that validity is enhanced when the bandwidth of predictors and criteria are matched—broadband predictors assess global criteria better than specific criteria and vice versa (also see Erez & Judge, 2001). Finally, if predictors and criteria are matched for construct and bandwidth, then personality measures (both predictors and criteria) should show convergent and discriminant validity. The results in Table 6 support this claim.

The results of this study also support our claim that the Big Five dimensions of Extraversion and Intellect/Openness to Experience are too broad. When developing the HPI, we believed that Extraversion and Ambition were components of the larger construct of Surgency. We knew lazy extraverts and ambitious introverts, and we consistently found that Ambition and Extraversion only correlated about .30 (R. Hogan & Hogan, 1995, p. 18). The current meta-analytic results show that it is the Ambition, not the Sociability, component of Surgency that predicts performance. This may account for the discrepancies between our results and those reported by Tett et al. (1991) and by Hurtz and Donovan (2000). Interestingly, several researchers have noted the inconsistent validity of Extraversion measures. Hough (1992) found that, when Extraversion was split into potency and affiliation, only potency ($r = .08$) was related to teamwork. Barrick and Mount (1993) reported that Extraversion was uncorrelated with performance as a wholesale sales representative. Stewart and Carson (1995) found an inverse relation between Extraversion and performance in service jobs. Salgado (1997, p. 34) reports that Extraversion was the only personality factor in his meta-analysis for which the unexplained variance was greater than the explained variance in overall job performance. Mount, Barrick, and Stewart (1998, p. 150-151) conclude that Extraversion inconsistently predicts performance, even for jobs involving substantial interpersonal interaction. Finally, Vinchur et al. (1998) found that Big-Five subdimensions of potency and achievement substantially outperformed the affiliation subdimension for predicting both objective and subjective sales criteria. The distinction between Ambition and Extraversion is conceptually and empirically important.

Similarly, the Big-Five Intellect/Openness to Experience factor combines creativity, curiosity, cultural taste, achievement orientation, and desire for knowledge. In developing the HPI, this factor split into an intellect component and a component defined by interest in learning

and achievement. We called the former component "Intellectance" and the latter "School Success." Except for the results presented by Tett et al. (1991), the meta-analytic validities for the Intellect/Openness to Experience are weak. Although some researchers consider Intellect/Openness to Experience as the Big-Five dimension that is the least important for predicting occupational outcomes, we disagree. Again, the results in Table 6 show the predictive utility of separating Intellectance from School Success. Judge and Bono (2000) show that Intellect/Openness predicts ratings for transformational leadership which, in turn, predicted effectiveness, at r = .20. When the criteria are appropriate, HPI Intellectance and School Success scales yield zero order correlations in the .30 range (Driskell, Hogan, Salas, & Hoskins, 1994; Gregory, 1992). The need to predict criteria involving continuous learning may provide the test bed for new performance models that include both cognitive ability and personality components.

The foregoing observations concern methodological issues. We also believe the paper makes three useful conceptual contributions. The first concerns the fact that raters can reliably sort performance criteria in term of personality constructs, including getting along and getting ahead, the dimensions of the Big-Five Model, or the 7 scales of the HPI. Sorting criteria in terms of the underlying personality constructs represents a methodological advance that should inform and improve subsequent research in this area.

Second, correlations between predictor variables and criterion data steadily increase as the criterion data become more specific, moving from ratings for overall performance, to ratings for getting along and getting ahead, to ratings defined in terms of more specific, job-relevant personality constructs. This finding should also inform subsequent research on this topic.

Third, these analyses suggest that measures of Emotional Stability—e.g., the HPI Adjustment scale—are much more potent and general predictors of occupational performance

than previously realized. Judge and his colleagues (Erez & Judge, 2001; Judge & Bono, 2001; Judge, Locke, & Durham, 1997) have made precisely this argument with regard to what they call core self-evaluations, a construct that seems quite similar to the construct underlying the HPI Adjustment scale. Consistent with our findings, Erez and Judge (2001) report a correlation of .42 between core self-evaluations and a composite measure of job performance. These findings are an important qualification to the view (cf. Schmidt & Hunter, 1992) that conscientiousness is the personality variable of greatest practical importance in applied psychology. The broad domain of neuroticism, widely studied in clinical psychology, may also prove useful for understanding such occupational outcomes as job satisfaction, commitment, and productivity.

In closing, it is important to note what we are not saying. We are not saying that all motivation or personality may be represented by two factors, getting along and getting ahead, nor are we saying that all performance may be represented by these two factors. Factors such as interests, values, mental ability, hand/eye coordination, health, and opportunity are also obviously important determinants of occupational performance. But measures of personality, in general, and the Emotional Stability construct, in particular, are important predictors of a surprising variety of outcomes.

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* denotes study used in meta-analysis.

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Table 1

Distribution of Studies Based on Holland Code and Job Title

Holland Codes		DOT Code	DOT Job Title	# Studies
Conventional 10 Studies	CES	239.367-010	Customer Service Representative	5
	CSE	211.362-010	Cashier I	1
	CSE	209.362-010	Clerk, General	3
	CSE	243.367-014	Post Office Clerk	1
Enterprising 16 Studies	ECS	369.467-010	Manager, Branch Store	2
	ERS	250.357-022	Sales Representative	3
	ERS	239.167-014	Telephone/Telegraph Dispatcher	1
	ESA	189.167-022	Manager, Department	6
	ESC	299.357-014	Telephone Solicitor	1
	ESR	187.117-010	Administrator, Hospital	1
	ESR	189.117-022	Manager, Industrial Organization	1
	ESR	184.167-114	Manager, Warehouse	1
Realistic 10 Studies	RCS	905.663-014	Truck Driver, Heavy	3
	REI	891.684-010	Dock Hand	1
	REI	590.382-010	Operator, Automated Process	2
	RES	913.463-010	Bus Driver	1
	RES	910.363-014	Locomotive Engineer	1
	RIE	019.061-022	Ordnance Engineer	1
	RSE	962.362-010	Communications Technician	1
Social 7 Studies	SEC	193.262-014	Dispatcher, Governmental Services	1
	SER	372.667-018	Corrections Officer	1
	SER	377.677-018	Deputy Sheriff, Civil Division	1
	SER	355.674-014	Nurse Aide	1
	SER	375.263-014	Police Officer I	2
	SIE	168.267-014	Claims Examiner, Insurance	1

Note. Classifications based on work by Gottfredson and Holland (1989; 1996).

Table 2

Example Criteria Representing Getting Along, Getting Ahead, and Personality Constructs

Theme/Construct	Sample Criteria[1]
Getting Along	Demonstrates Interpersonal skill
	Works with Others
	Shows Positive Attitude
	Shares Credit
Getting Ahead	Works with Energy
	Exhibits Effort
	Values Productivity
	Shows Concern for Quality
Adjustment	Remains Even Tempered
	Manages People, Crisis, & Stress
	Shows Resiliency
	Demonstrates Patience
Ambition	Exhibits Leadership
	Demonstrates Effectiveness
	Takes Initiative
	Generates New Monthly Accounts
Likeability	Shows Interpersonal Skill
	Exhibits Capacity to Compromise
	Demonstrates Tactfulness & Sensitivity
	Shares Credit
Prudence	Stays Organized
	Works With Integrity
	Abides by Rules
	Follows Safety Procedures
Intellectance	Achieves quality with information
	Analyzes Finances/Operations
	Seems Market Savvy
	Displays Good Judgment
School Success	Capitalizes on Training
	Exhibits Technical Skill
	Makes Progress in Training
	Possesses Job Knowledge

[1] All example criteria are ratings except for "Generates New Monthly Accounts"

Table 3

Sample-Weighted Correlation Coefficients Among Criterion Classifications Across Studies

	GAL	GAH	ADJ	AMB	LIK	PRU	INT	SCH
Getting Along	**.68** (3,065)							
Getting Ahead	.54 (2,641)	**.69** (2,737)						
Adjustment	.67 (1,479)	.66 (1,736)	**.70** (2,732)					
Ambition	.65 (1,218)	.72 (1,820)	.65 (1,281)	**.79** (2,878)				
Likeability	.67 (2,120)	.60 (1,303)	.61 (1,297)	.59 (985)	**.68** (2,899)			
Prudence	.63 (1,875)	.62 (1,077)	.55 (1,002)	.60 (716)	.59 (1,851)	**.69** (1,858)		
Intellectance	.64 (295)	.68 (659)	.55 (314)	.57 (260)	.64 (211)	.66 (211)	**.66** (1,731)	
School Success	.54 (617)	.67 (874)	.58 (849)	.70 (874)	.48 (411)	.47 (337)	NA	**.66** (944)

Note. All values reported in the table reflect sample-weighted average correlations among criteria classified into each performance category. The number of studies ranges from 3 (HPI Prudence and School Success) to 20 (Getting Along and Getting Along). Sample sizes presented in parentheses. GAL = Getting Along; GAH = Getting Ahead; ADJ = HPI Adjustment; AMB = HPI Ambition; LIK = HPI Likeability; PRU = HPI Prudence; INT = HPI Intellectance; and SCH = HPI School Success.

Table 4

Meta-Analysis Results Across Getting Along and Getting Ahead Criteria Combined

	1	2	3	4	5	6	7	8	9	10
	k	N	avg N	r obs	SD_r	ρ_v	ρ	SD ρ	%VE	90% CV
Adjustment	43	5,242	122	.19	.147	.28	.32	.191	35	.08
Ambition	43	5,242	122	.13	.129	.20	.22	.153	48	.02
Sociability	43	5,242	122	.00	.122	.00	.01	.134	55	-.16
Likeability	43	5,242	122	.09	.128	.13	.17	.156	50	-.03
Prudence	43	5,242	122	.14	.132	.20	.24	.168	45	.03
Intellectance	43	5,242	122	.05	.101	.08	.08	.070	80	-.01
School Success	33	4,222	128	.09	.095	.12	.14	.061	85	.06

Note. k = number of studies; N = total number of participants across k studies; average N = average number of participants within each study; r obs = mean observed validity; SD_r = SD of observed correlations; ρ_v = operational validity (corrected for range restriction and criterion unreliability only); ρ = true validity at scale level (corrected for range restriction and predictor/criterion reliability); SD ρ = SD of true validity; %VE = percentage of variance explained; 90% CV = credibility value.

Table 5

Meta-Analysis Results for Getting Along and Getting Ahead Criteria Separated

	1	2	3	4	5	6	7	8	9	10
Getting Along	k	N	avg N	r obs	SD_r	ρ_v	ρ	SD ρ	%VE	90% CV
Adjustment	26	2,949	113	.19	.093	.31	.34	.034	92	.30
Ambition	26	2,949	113	.10	.101	.15	.17	.060	89	.09
Sociability	26	2,949	113	.01	.099	.01	.01	.047	93	-.05
Likeability	26	2,949	113	.12	.088	.19	.23	.000	115	.23
Prudence	26	2,949	113	.14	.105	.21	.31	.106	72	.18
Intellectance	26	2,949	113	.02	.098	.03	.03	.038	95	-.02
School Success	22	2,553	116	.08	.096	.12	.12	.024	98	.09
Getting Ahead										
Adjustment	42	5,017	129	.14	.138	.20	.22	.167	42	.01
Ambition	42	5,017	129	.15	.130	.23	.26	.155	47	.06
Sociability	42	5,017	129	.02	.123	.04	.04	.132	56	-.13
Likeability	42	5,017	129	.07	.127	.09	.11	.000	52	.11
Prudence	42	5,017	129	.12	.138	.17	.20	.177	43	-.03
Intellectance	42	5,017	129	.07	.105	.11	.12	.081	75	.02
School Success	32	4,211	132	.09	.095	.13	.15	.060	83	.07

Note. k = number of studies; N = total number of participants across k studies; average N = average number of participants within each study; r obs = mean observed validity; SD_r = SD of observed correlations; ρ_v = operational validity (corrected for range restriction and criterion reliability only); ρ = true validity at scale level (corrected for range restriction and predictor/criterion reliability); SD ρ = SD of true validity; %VE = percentage of variance explained; 90% CV = credibility value.

Table 6

Meta-Analysis Results for Criteria Aligned by Personality Construct

	1	2	3	4	5	6	7	8	9	10
Adjustment	k	N	avg N	r obs	SD_r	ρ_v	ρ	SD ρ	%VE	90% CV
Adjustment	**24**	**2,573**	**107**	**.25**	**.114**	**.37**	**.43**	**.117**	**62**	**.28**
Ambition	24	2,573	107	.08	.153	.13	.16	.201	39	-.10
Sociability	24	2,573	107	-.06	.131	-.08	-.10	.151	53	-.29
Likeability	24	2,573	107	.09	.081	.13	.16	.000	136	.16
Prudence	24	2,573	107	.18	.114	.27	.32	.109	69	.18
Intellectance	24	2,573	107	-.00	.132	-.00	-.00	.150	51	-.19
School Success	21	2,311	110	.08	.091	.13	.14	.000	108	.14
Ambition										
Adjustment	28	3,698	132	.11	.115	.18	.20	.130	53	.03
Ambition	**28**	**3,698**	**132**	**.20**	**.077**	**.31**	**.35**	**.000**	**119**	**.35**
Sociability	28	3,698	132	.04	.106	.07	.08	.096	71	-.04
Likeability	28	3,698	132	.06	.069	.09	.10	.000	170	.10
Prudence	28	3,698	132	.10	.105	.15	.17	.112	63	.03
Intellectance	28	3,698	132	.07	.076	.11	.12	.000	121	.12
School Success	25	3,448	138	.09	.080	.14	.15	.000	109	.15

Table Continues

Table 6 Continued

	1	2	3	4	5	6	7	8	9	10
Likeability	k	N	avg N	r obs	SD_r	ρ_v	ρ	SD ρ	%VE	90% CV
Adjustment	17	2,500	147	.16	.101	.23	.28	.114	59	.14
Ambition	17	2,500	147	.07	.095	.09	.11	.086	77	-.00
Sociability	17	2,500	147	.05	.081	.06	.08	.000	108	.08
Likeability	**17**	**2,500**	**147**	**.18**	**.094**	**.25**	**.34**	**.100**	**68**	**.21**
Prudence	17	2,500	147	.12	.087	.17	.21	.040	93	.16
Intellectance	17	2,500	147	-.00	.067	-.00	-.00	.000	156	-.00
School Success	15	2,399	150	.06	.237	.08	.10	.390	11	-.40
Prudence										
Adjustment	26	3,379	130	.18	.130	.24	.28	.158	41	.08
Ambition	26	3,379	130	.07	.133	.08	.10	.159	45	-.10
Sociability	26	3,379	130	-.04	.098	-.07	-.07	.062	84	-.15
Likeability	26	3,379	130	.09	.141	.12	.17	.184	40	-.07
Prudence	**26**	**3,379**	**130**	**.22**	**.113**	**.31**	**.36**	**.125**	**55**	**.20**
Intellectance	26	3,379	130	-.01	.120	-.03	-.02	.125	56	-.18
School Success	20	2,603	130	.07	.108	.09	.10	.096	69	-.02

Table Continues

Table 6 Continued

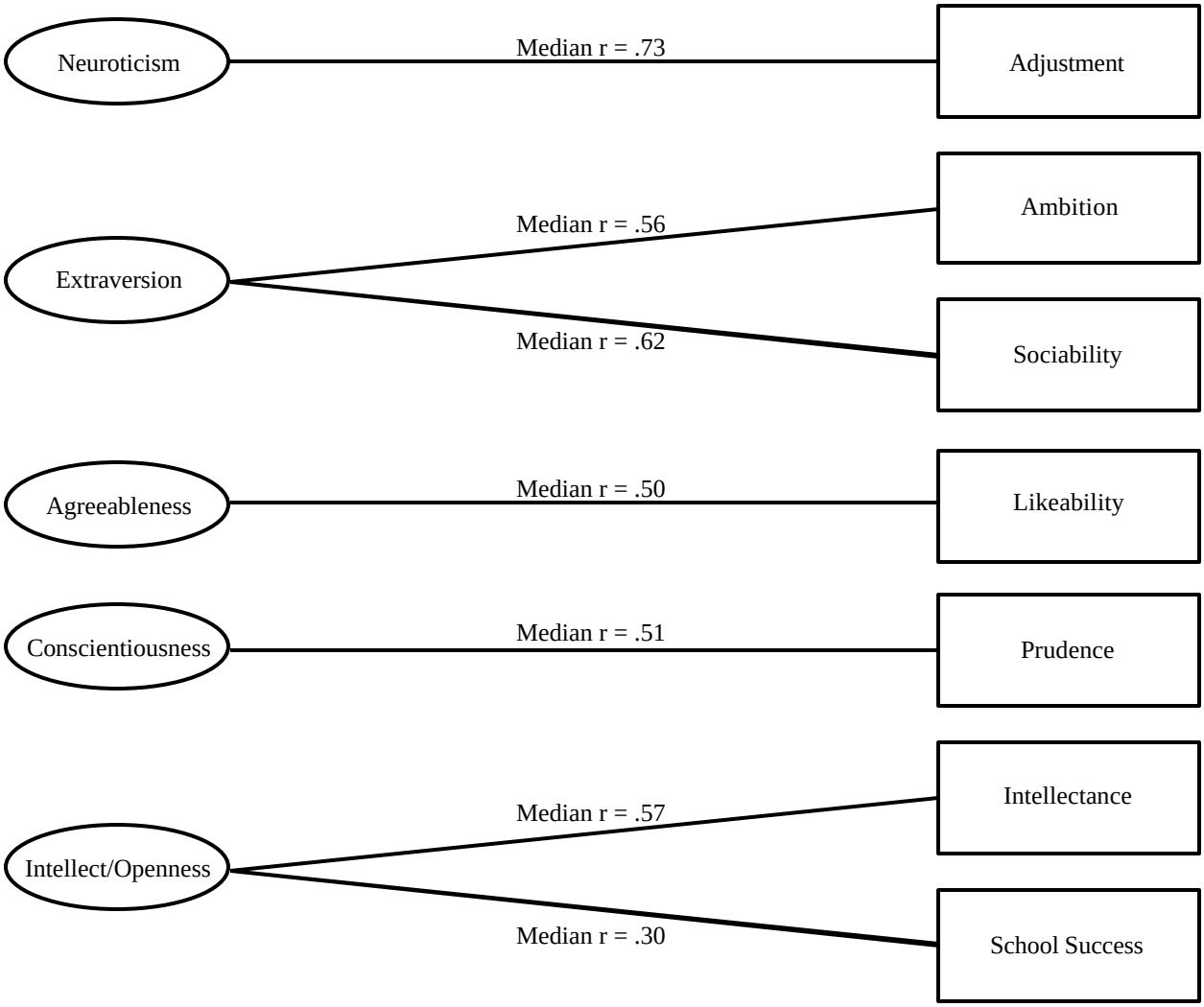
	1	2	3	4	5	6	7	8	9	10
Intellectance	k	N	avg N	r obs	SD_r	ρ_v	ρ	SD ρ	%VE	90% CV
Adjustment	7	1,190	170	.05	.116	.07	.08	.150	44	-.11
Ambition	7	1,190	170	.13	.082	.20	.23	.046	90	.17
Sociability	7	1,190	170	.06	.132	.09	.11	.191	34	-.14
Likeability	7	1,190	170	-.02	.073	-.03	-.03	.000	113	-.03
Prudence	7	1,190	170	-.03	.078	-.04	-.05	.000	100	-.05
Intellectance	**7**	**1,190**	**170**	**.20**	**.037**	**.29**	**.34**	**.000**	**357**	**.34**
School Success	3	643	214	.10	.017	.14	.17	.000	1667	.17
School Success										
Adjustment	9	1,366	152	.11	.103	.17	.20	.119	57	.05
Ambition	9	1,366	152	.14	.098	.22	.27	.110	63	.13
Sociability	9	1,366	152	.02	.102	.03	.03	.103	67	-.10
Likeability	9	1,366	152	.04	.076	.07	.07	.000	121	.07
Prudence	9	1,366	152	.09	.096	.14	.17	.107	65	.03
Intellectance	9	1,366	152	.03	.083	.05	.05	.000	101	.05
School Success	**9**	**1,366**	**152**	**.15**	**.132**	**.22**	**.25**	**.184**	**34**	**.01**

Note. k = number of studies; N = total number of participants across k studies; average n = average number of participants within each study; r obs = mean observed validity; SD_r = SD of observed correlations; ρ_v = operational validity (corrected for range restriction and criterion reliability only); ρ = true validity at scale level (corrected for range restriction and predictor/criterion reliability); SD ρ = SD of true validity; %VE = percentage of variance explained; 90% CV = credibility value.

Figure Caption

Figure 1. Links between dimensions of the Big-Five and the Hogan Personality Inventory.

Note. Median correlation coefficients summarize HPI relations with the NEO PI-R (Goldberg, 2000), Goldberg's (1992) Big-Five Markers (R. Hogan & Hogan, 1995), Personal Characteristics Inventory (Mount & Barrick, 1995b), and the Inventario de Personalidad de Cinco Factores (Salgado & Moscoso, 1999). The ranges of correlates are as follows: Adjustment/Emotional Stability/Neuroticism (.66 to .81); Ambition/Extraversion/Surgency (.39 to .60); Sociability/Extraversion/Surgency (.44 to .64); Likeability/Agreeableness (.22 to .61); Prudence/Conscientiousness (.36 to .59); Intellectance/Openness/Intellect (.33 to .69); and School Success/Openness/Intellect (.05 to .35).


Neuroticism
Median r = .73
Adjustment
Extraversion
Median r = .56
Ambition
Median r = .62
Sociability
Agreeableness
Median r = .50
Likeability
Conscientiousness
Median r = .51
Prudence
Intellect/Openness
Median r = .57
Intellectance
Median r = .30
School Success

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