A Meta-Analytic Review of Predictors of Job Performance for Salespeople

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This meta-analysis evaluated predictors of both objective and subjective sales performance. Biodata measures and sales ability inventories were good predictors of the ratings criterion, with corrected rs of .52 and .45, respectively. Potency (a subdimension of the Big 5 personality dimension Extraversion) predicted supervisor ratings of performance ($r = .28$) and objective measures of sales ($r = .26$). Achievement (a component of the Conscientiousness dimension) predicted ratings ($r = .25$) and objective sales ($r = .41$). General cognitive ability showed a correlation of .40 with ratings but only .04 with objective sales. Similarly, age predicted ratings ($r = .26$) but not objective sales ($r = -.06$). On the basis of a small number of studies, interest appears to be a promising predictor of sales success.

The sales job is deserving of special attention for its importance, prevalence, and unique characteristics. Effective selling is critical to the success of economic organizations. Improvements in productivity, personnel, product quality, and efficiency would be pointless if the product or service could not be placed in the hands of the consumer. According to the Bureau of Labor Statistics (1997), there were 13,900,000 individuals employed in sales and marketing jobs in the United States in 1992 (a 33% increase from 1983). By 2005, sales jobs are projected to increase by 18%.

There are aspects of the sales job that make unique demands on an employee and may contribute to a pattern of validity coefficients different from other jobs. Most prominent of these demands are both the degree of auton-

omy (Churchill, Ford, & Walker, 1985) and the degree of rejection experienced by many salespersons. Salespeople often operate without close supervision in areas remote from their home bases. It is reasonable to assume that given this level of autonomy, persons in sales must be self-starters, relying on their own initiative and powers of persuasion to see tasks through to completion. Sales occupations also are generally characterized by rejection; salespersons must often deal with a large percentage of "no sales" in proportion to successful sales. Like major league baseball players, even successful salespeople are more likely to go "hitless" than to be successful at any given "at bat." Given these two characteristics of sales jobs, there may be personality dimensions or patterns of dimensions not particularly salient for other jobs that may be useful in predicting sales success. In particular, dimensions that capture personal impact, personal influence, and competency striving may result in higher validity coefficients for sales jobs than for other jobs.

Finally, the potential payoff for selecting successful salespersons may be greater than for other occupations due to the large standard deviation of employee output for sales jobs. Hunter, Schmidt, and Judiesch (1990) examined the standard deviation of employee output as a percentage of mean output (SD_p) for various jobs. They found that SD_p increased as complexity (information-processing demands) increased. The output mean standard deviation for insurance sales applicants was an extremely high 120%; other sales jobs were also comfortably in the high-complexity category (48%). A large increase in

productivity can result from improved selection only if there are large individual differences in performance. The implication is that sales is an occupation in which any improvement in selection can have a major impact on the bottom line.

Thus, it is not surprising that companies want to select good salespeople or improve sales performance. Unfortunately, there has been relatively little research in salesperson selection in recent years. The purpose of the present study is to conduct a meta-analysis of the validity of separate categories of predictors of both subjective (ratings) and objective (sales) salesperson performance.

Early Studies and Reviews

Historically, a wide range of predictors have been used to select salespersons. These predictors range from the conventional (e.g., cognitive ability, personality, and biodata) to the unconventional (e.g., handwriting analysis and the "interaction chronograph"; Chapple & Donald, 1947). Early narrative reviews assessing the validity of predictors of sales success (Cleveland, 1948; Ghiselli & Brown, 1948) were generally inconclusive in that authors found mixed and sometimes contradictory results for various predictors. This is not surprising given the well-documented problems with traditional narrative reviews (Hunter & Schmidt, 1990; see Austin, 1954, for a comprehensive review of the area up to 1950). One finding for which there was a measure of agreement (Cleveland, 1948; Guion, 1965) was that cognitive ability tests were poor predictors of sales performance. This conclusion is interesting in light of more recent findings regarding the substantial validity of these measures across jobs (Schmidt & Hunter, 1981).

Personality and biodata predictors also were analyzed in early reviews. Ghiselli and Barthol (1953) evaluated the validity of personality tests over 8 studies ($N = 1,120$) involving sales clerks and 12 studies ($N = 927$) involving salespersons. For both groups the average r was .36. This study reveals substantial validity coefficients but also illustrates a common shortcoming in many early personality/job-performance studies and meta-analyses. Personality dimensions (e.g., Extraversion, Agreeableness) were lumped together in one category. The result was that validity on one dimension obscured validity on another dimension when two or more validity coefficients were averaged together (Hough, 1992). Despite the promising rs reported in Ghiselli and Barthol (1953), this approach often led to conclusions that personality variables were relatively invalid predictors of job performance (Schmitt, Gooding, Noe, & Kirsch, 1984).

Reilly and Chao (1982) reviewed alternatives to cognitive ability tests and found an average r of .50 across five studies ($N = 244$) between biodata and all criteria for

sales jobs. Unfortunately, the sample size for this study was small, and the authors were not able to correct observed correlations for artifacts such as range restriction and measurement unreliability. However, the magnitude of the validity coefficient suggests biodata predictors are very promising and that they deserve further investigation.

Meta-Analyses

Recent meta-analyses of validity coefficients have included examination of predictors of sales performance. Cognitive abilities have been examined by one group of researchers (Hunter & Hunter, 1984; Schmidt & Hunter, 1981). Hunter and Hunter (1984) cited a reanalysis of previous work by Ghiselli (1973) that found that mean cognitive ability – performance correlations were lower for sales clerks than for salespersons. The mean validities for salespersons were .61 for cognitive ability, .40 for general perceptual ability, and .29 for general psychomotor ability (mean rs were corrected for criterion unreliability and range restriction). Corrected mean validities for sales clerks were .27 for cognitive ability, .22 for perceptual ability, and .17 for psychomotor ability.

A second meta-analysis analyzed sales validity coefficients (Schmitt et al., 1984). These researchers found an average uncorrected r of .17 for all types of predictors and criteria for sales jobs (50 studies, $N = 31,732$). This figure also was noticeably lower than validities Schmitt et al. found for professional, managerial, and unskilled labor jobs, but it was partially attributed to the frequent use of turnover as a "difficult to predict" criterion. Unfortunately, more detailed analyses for different types of predictors of sales success were not presented (because they were not relevant to the article's research questions). The same researchers also analyzed all types of jobs and found that cognitive ability tests were associated with lower coefficients than assessment centers, supervisory evaluations, or peer evaluations and that personality predictors had the lowest validity coefficients of any predictor group.

The previous studies seem to indicate that there is conflicting evidence on two issues. Cognitive ability tests appear to be good predictors of salesperson performance in one meta-analysis (Hunter & Hunter, 1984) but not nearly as promising in another (Schmitt et al., 1984). Personality predictors also appear to be poor predictors in one meta-analysis ($r = .15$; Schmitt et al., 1984) but better predictors according to another smaller cumulative review ($r = .36$; Ghiselli & Barthol, 1953).

Personality Theory Meta-Analyses

Recent meta-analyses also have assessed the validity of the Big Five personality dimensions for predicting sales performance (Barrick & Mount, 1991; Mount & Barrick,

1995; Tett, Jackson, & Rothstein, 1991). They made great progress over earlier analyses because they individually analyzed the various dimensions of personality. Although there is some disagreement regarding the names and content of these five dimensions (see Digman, 1990, and Goldberg, 1993, for reviews), they generally can be defined as follows. *Extraversion* (or *Surgency*) is defined by the quantity and intensity of interpersonal interaction, encompassing traits such as assertiveness, sociability, and gregariousness. *Emotional Stability* (or *Neuroticism*) is a measure of lack of adjustment versus emotional stability. Anxiety, anger, depression, and insecurity are examples of traits on the negative pole of this dimension. *Agreeableness* (or *Likability*) is associated with traits such as trust, cooperation, flexibility, tolerance, and "soft-heartedness." An individual's degree of dependability, organization, persistence, and achievement-orientation is termed *Conscientiousness* (or *Will to Achieve*). Finally, imagination, creativity, curiosity, and artistic sensibility are associated with *Openness to Experience* (or *Intellect;* Barrick & Mount, 1991; Costa & McCrae, 1985).

The pioneering work of Barrick and Mount (1991) found that the corrected predictor–criterion relationships for salespersons was .23 for Conscientiousness and .15 for Extraversion. The correlations for Emotional Stability, Agreeableness, and Openness to Experience ($rs = .07$, .00, and $-.02$, respectively) were considerably lower.

The focus of Barrick and Mount (1991) was on a broad view of personality traits and their ties to many types of criteria in several distinct types of jobs. The criteria included training proficiency, job performance, and salary. Results for individual criteria were not reported.

Further meta-analytic work extended the findings of Barrick and Mount (1991). Mount and Barrick (1995) found that the fully corrected relationships between Conscientiousness and criteria, such as overall performance ratings or training success scores, were generally in the range of .13 to .51. The meta-analysis also contrasted how well Conscientiousness versus its two dimensions of Dependability and Achievement predicted various criteria. The authors found that the overall Conscientiousness score and both dimensions predicted specific criteria (e.g., effort, quality, employee reliability) better than global criteria (e.g., overall rating of job performance). Furthermore, they found that the Dependability and Achievement dimensions only "outpredicted" the broad trait of Conscientiousness when there were theoretically relevant links between the dimensions and the criteria (e.g., Achievement predicted effort with a fully corrected r of .58).

Further refinement of the work of Barrick and Mount (1991) and Mount and Barrick (1995) could focus on different criteria analyses. A particularly salient distinction is between objective and subjective criteria. This breakdown appears particularly important because objective indexes of sales focus more on outcome-based effectiveness and subjective ratings focus more on the controllable parts of an incumbent's job, such as organizational citizenship behaviors (Campbell, McCloy, Oppler, & Sager, 1993). The results of Barrick and Mount (1991) also could be refined by focusing on only one criterion (e.g., job performance) for the traits of Extraversion, Emotional Stability, Agreeableness, and Openness to Experience. This approach would eliminate some of the "noise" in correlations due to multiple criteria such as salary and training performance.

An alternative set of personality dimensions is offered by Hough and associates (Hough, 1992; Hough, Eaton, Dunnette, Kamp, & McCloy, 1990). The Hough model of nine personality dimensions was developed by examining a large number of existing personality theories and instruments. This model differs in several ways from the Big Five model. Three of the Big Five dimensions are retained: Adjustment (Emotional Stability), Agreeableness, and Intellectance (Openness to Experience). The dimension of Extraversion is divided into two subdimensions of Affiliation (sociability) and Potency (impact, influence, and energy). Conscientiousness is subdivided into Achievement (striving for competence in one's work) and Dependability (reliability, organization, respect for authority). Two other dimensions that do not appear to correspond to Big Five dimensions were added: Rugged Individualism (decisiveness, action-orientation, and lack of sentimentality) and Locus of Control (one's belief in the amount of control one has over rewards and punishments). These two dimensions, along with Potency and Achievement, might be particularly important for salespeople who function independently as they cover their own district.

The Hough model appears to do a good job of predicting job performance in a military setting (Hough et al., 1990). A sampling of their results suggests that Adjustment, Agreeableness, Dependability, and Locus of Control all predicted criteria of effort, leadership, personal discipline, physical fitness, and military bearing.

Much less information is available to test the Hough model for dependent variables of sales effectiveness. There appeared to be only a handful of studies available for such tests. Meta-analytic estimates with five or more studies suggest that Potency was related to sales effectiveness, with an uncorrected correlation of .25, whereas Dependability was only weakly related, with an uncorrected correlation of .06 (Hough, 1992). The results for Potency provide preliminary support for the hypothesis that given the need for salespeople to sustain effort following many negative responses, subdimensions of the Big Five such as Potency and perhaps Achievement may be salient predictors of sales performance.

The validity of biodata to predict sales performance

has received much less attention. Similarly, tests of sales ability have received little meta-analytic attention. These tests are designed to tap the construct of "knowledge of the principles of selling" rather than broader constructs such as embodied in the Big Five. This category of predictor is typified by the Sales Comprehension Test (Bruce, 1953, 1971). We were able to locate only one meta-analysis that directly examined these predictors (Ford, Walker, Churchill, & Hartley, 1987; discussed later).

Sales Meta-Analyses

One meta-analysis examined predictors of sales performance from a marketing perspective (Churchill, Ford, Hartley, & Walker, 1985). These researchers located 116 published and unpublished studies, yielding 1,653 predictor-criterion measures of association. Predictors were classified into six categories. The predictor-criteria weighted mean correlations were .14 for aptitude, .27 for skill, .18 for motivation, .29 for role, .16 for personal factors (demographic factors such as age, sex, etc.), and .10 for organizational–environmental factors. Churchill, Ford, Hartley, et al. (1985) postulated customer type and product type as potential moderators, particularly on the motivation-predictor category.

One limitation of this study is that the classification scheme for predictors collapses across very meaningful categories, which obscures potentially important information. Perhaps the most salient example is the category of aptitude. It includes cognitive ability, personality dimensions, and many non-demographic individual-difference variables. The authors did separate out predictor categories in a follow-up study using the original data (Ford, Walker, Churchill, & Hartley, 1987). They examined 28 categories of predictors and found the personal history category to be by far the most promising predictor (r = .46). None of the other categories accounted for more than 12% of the variance in performance.

Although the study by Churchill, Ford, Hartley, et al. (1985) and its follow-up Ford et al. (1987) were carefully done and were important studies for their time, recent developments in meta-analytic techniques indicate that they had a number of limitations. For example, their analysis is limited due to lack of correction for unreliability and range restriction, and the authors noted that there was no attempt to correct for these research artifacts. It also appears that not all of the correlations were based on independent samples within each category. Examination of Churchill's reference list suggests that not all of the 1,653 correlations analyzed by Churchill, Ford, Hartley, et al. (1985) or the subset of 1,386 correlations examined by Ford et al. (1987) were independent.

The Present Study

With this article we hope to add value to the prediction of sales performance in several ways. First, the sample of sales coefficients was larger than in previous analyses (e.g., Hough, 1992), and all coefficients were independent. Second, personality dimensions were analyzed separately to avoid averaging out validity across dimensions. Third, the links between personality dimensions and job performance need to be clarified by reporting only measures of job performance and dividing the analyses into objective and subjective indicators of performance. Fourth, the disagreement over the validity for cognitive ability tests was addressed with a large sample, correcting for research artifacts. Fifth, the intriguingly high validities for biodata were examined. Sixth, the validity of tests specifically designed to predict sales success was examined.

Method

Literature Searches

Both computer-based and manual searches of published empirical studies investigating the prediction of sales criteria were conducted. The computer databases PsycLIT (1974–1996), PsycINFO (1967–1990), Trade and Industry Index (1981–1990), GPO Monthly Catalog (1976–1990), Sociological Abstracts (1963–1990), and ABI/INFORM (1971–1990) were used to identify articles, dissertations, and book chapters.

The manual review included three steps. First, an article-by-article search of the Journal of Applied Psychology and Personnel Psychology was conducted from the year 1940 through April 1997. This effort revealed a number of studies designed to investigate other topics that included predictor–criterion correlations for sales. Second, test manuals for a number of psychological tests were reviewed for validity information. Third, authors of previous reviews (e.g., Churchill, Ford, Hartley et al., 1985) were contacted for their reference lists.

We attempted to avoid the "file drawer" problem by locating unpublished studies. To identify unpublished work, the senior authors of articles containing sales validity information published over the last 20 years were contacted by letter. Of the 34 authors identified, 28 could be located. In addition, 20 industrial psychologists working in relevant business settings were contacted by telephone.

Development of Predictor and Criterion Taxonomies

Predictors were divided into three groups: (a) the Big Five personality dimensions; (b) Big Five subdimensions Affiliation, Potency, Achievement, and Dependability from the Hough model; and (c) other predictors: (1) overall cognitive ability (an omnibus category that included measures of a general factor of mental ability [g], verbal ability, and quantitative ability); (2) general cognitive ability (tests designed to capture g); (3) verbal ability; (4) quantitative ability; (5) Rugged Individual-

ism; (6) sales ability; (7) biodata; (8) age; and (9) interest. Sales ability measures were generally tests designed to measure knowledge of selling techniques. These tests ranged from broad commercially available instruments (e.g., the Sales Comprehension Test; Bruce, 1971) to tests designed specifically for a particular type of sales job in a single organization. Biodata was a heterogeneous category that tapped a number of varied constructs, including those assessed in whole or part by other predictors (e.g., age). Measures in this category included personal-history-type inventories assessing a variety of information such as grades, years of education, previous work history (including sales experience), and club membership. The more dated measures often included questions no longer legally advisable (e.g., marital status, age, number of dependents) or relevant (e.g., telephone ownership). Also included in this category were carefully constructed and validated inventories (e.g., the Aptitude Index Battery; Brown, 1981). The Strong Vocational Interest Test (Strong, 1934) and its successors were typical of the interest inventories used in the meta-analysis.

Our initial intent was to group criterion measures into categories based on the work of Campbell et al. (1993). Unfortunately, we were constrained by the small number of studies using criteria other than objective sales volume or managerial ratings of salesperson performance. Therefore, only these two categories of criteria were used.

Criteria for Including Coefficients

Correlations had to meet three criteria for inclusion. First, only coefficients that used job performance as the dependent variable were included in the analyses. No correlations for training proficiency, turnover, or salary were included. This ensured that only the link to job performance was examined and not other dependent variables. Second, there was no evidence of criterion contamination in the studies included in this analysis. Third, correlations had to be independent of each other. Two measures of the same category of variable (e.g., Extraversion) using the same participants were a potential problem. These coefficients were averaged if articles or test manuals defined the variable in a similar way. If not, one coefficient was randomly chosen.

Coding

Categorization of validity coefficients into predictor categories was done independently by Andrew J. Vinchur and Jeffery S. Schippmann. In many cases, this involved a fair amount of detective work, as a number of the tests used as predictors were out of print. Initial level of agreement across all categories was 82% across all independent validity coefficients. Disagreements in categorization were resolved through discussion and further investigation.

Meta-Analysis Procedures

The data were analyzed using the Schmidt–Hunter approach to meta-analysis (Hunter & Schmidt, 1990; Law, Schmidt, & Hunter, 1994; Schmidt, Gast-Rosenberg, & Hunter, 1980; Schmidt & Hunter, 1977). The effects of criterion unreliability

and range restriction were assessed using the Law et al. (1994) approach, which uses the mean correlation instead of the individual correlations.

The corrections for criterion unreliability were individually applied to each type of criterion. Analyses involving job performance ratings were corrected using the distribution of interrater reliability coefficients by Viswesvaran, Ones, and Schmidt (1996). This distribution offers the most comprehensive and least biased data for meta-analytic corrections (Viswesvaran et al., 1996). The mean level of interrater reliability was .52. Objective measures of sales performance were not corrected for unreliability because there would be few reasons for random measurement error.

There was not sufficient information reported in the studies to directly correct for range restriction. As a result, we used the assumed range restriction distribution from Schmidt and Hunter (1977). Researchers have found this distribution to be accurate (Alexander, Carson, Alliger, & Cronshaw, 1989).

The observed correlations were not adjusted for predictor reliability. Our primary interest was to determine how well the various predictors might work in real world settings. Thus, one might argue that the reliability of the selection device is an important characteristic of the device and that tests should not be corrected. In addition, no moderator analyses were performed within criterion type because of sample size limitations.

Results and Discussion

Sample Description

The literature search yielded 129 independent samples obtained from 98 articles, books, dissertations, technical reports, test manuals, and consultants' file drawers. Of the 98 sources, 82 were published and 16 were unpublished,[1] Studies were conducted from 1918 through 1996 and covered a wide range of sales jobs, with insurance sales being the most common (32 samples). A concurrent validation strategy was used in 85 samples, a predictive strategy in 20; the remaining 24 samples had insufficient information given to determine the validation strategy. Sample sizes ranged from 11 to 16,230, with a mean of 356.15 ($SD =$ 1787.02) and a total sample of 45,944 separate individuals. To ensure independence, no participant appeared more than once in any predictor–criterion category (although individual participants could appear in separate categories without violating the independence assumption).

Outlier Analysis

Outlier analysis was somewhat complex. The ideal situation would have allowed outlier analysis for each cell of the experimental design (e.g., Conscientiousness predictor and ratings of job performance criterion). However,

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[1] The author of an unpublished validation study of entry-level sales associates wished to remain anonymous. Information about the study can be obtained from Jeffery S. Schippmann.

the small size of many cells precluded this strategy. Instead, outlier analyses were performed for each class of predictors and criteria (e.g., one analysis for personality and ratings, one analysis for personality and sales figures, etc.)

The sample-adjusted meta-analytic deviancy (SAMD) statistic was used for outlier analysis (Huffcutt & Arthur, 1995). Based on a class of bivariate regression outlier techniques termed *influence statistics*, the SAMD statistic takes into account each study's sample size in determining deviant correlations. Use of this statistic resulted in deleting one coefficient (all with absolute values greater than .50) from the following studies: Bagozzi (1980); Barling, Kelloway, and Cheung (1996); Bass (1957); Cook and Manson (1926); Freyd (1926); Tobolski and Kerr (1952); and Weaver (1969).

Meta-Analysis Results

Meta-analysis results are reported by type of predictor for both rating criteria and objective sales criteria (see Tables 1 and 2). Unless otherwise noted, we will focus on corrected correlations in the following discussion.

Certain dimensions of personality were useful predictors of both criteria. Two measures from the Big Five were particularly useful. Extraversion predicted ratings with a validity coefficient of .18 and sales measures with

Table 1
Validity Coefficients for the Ratings Criterion

Measure	r	r_{cr}	$r_{cr,rr}$	80% CI	K	N
Personality—Big Five						
Extraversion	.09	.11	.18	.09–.25	27	3,112
Emotional Stability	.05	.06	.10	−.07–.25	24	3,134
Agreeableness	.03	.03	.06	−.12–.23	23	2,342
Conscientiousness	.11	.12	.21	.11–.34	19	2,186
Openness to						
Experience	.06	.07	.11	.01–.23	8	804
Big Five subdimensions						
Affiliation	.06	.07	.12	.02–.17	18	2,389
Potency	.15	.17	.28	.19–.34	25	2,907
Achievement	.14	.15	.25	.17–.35	8	1,319
Dependability	.10	.11	.18	.07–.32	15	1,702
Other predictors						
Overall cognitive						
ability	.18	.19	.31	.20–.46	25	1,770
General cognitive (g)	.23	.25	.40	.27–.53	22	1,231
Verbal ability	.08	.08	.14	.08–.37	4	597
Quantitative ability	.06	.07	.12	.06–.24	6	783
Rugged						
Individualism	.11	.12	.20	.06–.42	5	811
Sales ability	.26	.28	.45	.35–.54	28	2,710
Biodata	.31	.33	.52	.30–.80	8	575
Age	.14	.16	.26	.03–.41	9	1,245
Interest	.30	.32	.50	−.12–.65	5	355

Note. r_{cr} = the validity coefficient corrected for criterion unreliability; $r_{cr,rr}$ = validity coefficient corrected for criterion unreliability and range restriction; 80% CI = the credibility interval; K = number of studies.

Table 2
Validity Coefficients for the Sales Criterion

Measure	r	r_{cr}	80% CI	K	N
Personality—Big Five					
Extraversion	.12	.22	.13–.29	18	2,629
Emotional Stability	−.07	−.12	−.23–.09	14	2,157
Agreeableness	−.02	−.03	−.15–.10	12	918
Conscientiousness	.17	.31	.19–.40	15	1,774
Openness to					
Experience	.03	.06	−.19–.20	6	951
Big Five subdimensions					
Affiliation	.08	.15	−.19–.45	4	279
Potency	.15	.26	.18–.32	14	2,278
Achievement	.23	.41	.30–.48	10	1,269
Dependability	.10	.18	.08–.31	5	359
Other predictors					
Overall cognitive					
ability	−.02	−.03	−.21–.13	18	1,876
General cognitive (g)	.02	.04	−.12–.24	12	1,310
Verbal	−.17	−.28	−.54–.05	5	501
Quantitative ability	.02	.04	−.15–.27	5	545
Rugged Individualism[a]	—	—	—	—	—
Sales ability	.21	.37	.22–.61	14	1,613
Biodata	.17	.28	.18–.40	18	34,005
Age	−.03	−.06	−.12–.12	11	3,637
Interest	.33	.50	.30–.62	10	860

Note. r_{cr} = the validity coefficient corrected for range restriction; 80% CI = the credibility interval; K = number of studies.
[a] Too few studies to report.

a validity coefficient of .22. Conscientiousness predicted ratings and sales with validity coefficients of .21 and .31, respectively. Thus, this analysis agrees with those of Barrick and Mount (1991) and Mount and Barrick (1995) for the variable of Conscientiousness. Beyond Barrick and Mount (1991), we found validity coefficients for Extraversion that were higher than the .15 previously reported (and this study did not correct for predictor reliability, as did previous analyses).

The subdimensions Potency and Achievement were particularly strong predictors of sales success. Potency validity coefficients were .28 and .26 for ratings and sales, respectively, whereas Achievement coefficients were .25 and .41. These results shed further light on the Big Five results. It appears that Potency would be classified as a component of Extraversion in the Big Five because it applies to assertiveness and the intensity of interpersonal interactions. The higher validity coefficients for Potency and lower coefficients of .12 and .15 for Affiliation (also a part of Extraversion) suggest that Potency may be the more important part of Extraversion that is associated with higher sales performance. Likewise, the higher validities for Achievement (.25 and .41) than for Dependability (.18 and .18) suggest it may be more predictive of sales performance. Given the degree of autonomy inherent in many sales jobs, it is not surprising that Potency (capturing influence and energy) and Achievement (competence striving) were useful predictors of sales success. It is

worthwhile to note that Openness to Experience had validity coefficients of .11 and .06, although sample sizes were quite small. On the basis of only five studies, Rugged Individualism showed promise as a predictor of ratings with an average r of .20.

Cognitive ability measures appeared to predict rating criteria fairly well and sales criteria rather poorly. Measures of cognitive ability (g) showed a validity coefficient of .40 for ratings but a range-restriction-corrected validity of only .04 for the sales criterion. Validities for verbal and quantitative ability were low or negative for both criteria. However, the sample sizes for these two categories were small (four to six studies), and results were probably relatively unstable (Switzer, Paese, & Drasgow, 1992). The magnitude of overall measures of cognitive ability were somewhat lower than previous estimates in another meta-analyses for the ratings criterion and much lower for the sales criterion (Hunter, 1986; Hunter & Hunter, 1984).

The finding that cognitive ability predicts ratings well and objective sales poorly is somewhat puzzling, as one would expect objective sales to be a major component of a manager's rating of salespersons' performance. It may be, however, that the two criteria are sufficiently different for sales jobs to account for our results for cognitive ability. Bommer, Johnson, Rich, Podsakoff, and MacKenzie (1995) conducted a meta-analysis of objective and subjective measures of employee performance. They hypothesized that the relationship between these two criteria should be stronger for sales than nonsales jobs given that (a) sales managers' salaries are often contingent on employees' performance; (b) salespeople are traditionally evaluated on output; and (c) objective sales measures are easy to assess. Their hypothesis was not supported, however. The average r of .41 accounted for less than 17% of the variance. Bommer et al. concluded that "subjective measures should not be used as proxies for objective measures . . ." (p. 599). Our results for cognitive ability are consistent with this conclusion.

Tests designed specifically to predict sales performance predicted both types of criteria very well. Ratings were predicted more strongly (.45) than sales (.37). The broad and varied category of biodata items also performed well. The average validity coefficient was .52 for ratings and .28 for sales. However, the small sample size ($K = 8$, $N = 575$) for ratings does limit interpretation of this finding. Interest in sales also appeared to be related to ratings (.50) and the sales criterion (.50). Again, the size of both samples was rather small, and the results could be somewhat unstable. Perhaps the most curious findings involve using age as a predictor. Age predicted the rating criterion ($r = .26$) but not actual sales ($r = -.06$). Perhaps raters had an implicit personality theory that older salespeople did a better overall job, or perhaps the older

salespeople engaged in more organizational citizenship behaviors that were captured in ratings. This finding for ratings is in contrast to McEvoy and Cascio's (1989) result for ratings in their age-performance meta-analysis. They found age to be a poor predictor of both productivity and ratings across a wide cross-section of jobs.

The issue of incremental validity is worthy of discussion. Selection of salespersons is likely to involve use of multiple predictors; therefore, how these predictors operate in combination is of particular interest. Given the standard regression model, we would want to avoid multicollinearity of predictors. The most promising predictors of both objective and subjective sales success were the personality dimensions Potency and Achievement, sales ability tests, interest inventories, and biodata inventories. In addition, cognitive ability was a good predictor of the ratings criterion. To obtain relatively stable results for the following analysis, we included only those predictors with an N of at least 1,000 for a single predictor-criterion category. This eliminated interest inventories from both criteria and biodata from the ratings criteria. Examination of the published sales studies yielded only a handful of relevant intercorrelations among these variables; predictor intercorrelations were either not reported or, for single predictor studies, not relevant. Gray and Rosen (1956) reported an r of .41 and Johnson (1940) reported an r of .36 between biodata and cognitive ability. Cotham (1968) found an r of .30 between a sales ability test and cognitive ability; Gray and Rosen (1956) found a correlation of .47 between these variables. Cotham (1968) also reported an r of $-.07$ between Potency and cognitive ability. Examination of test manuals was somewhat more fruitful. Bruce (1971), for example, reviewed four studies in which his Sales Comprehension Test was correlated with measures of cognitive ability. Noting the near-zero rs, he concluded his test was measuring something other than cognitive ability. Schippmann (personal communication, August 27, 1997) reported rs between a proprietary sales ability test and "Influence" (Potency) of .44 ($N = 214$) and between sales ability and Achievement of .60 ($N = 215$). Although we were unable to locate correlations between biodata and Achievement and between cognitive ability and Achievement in a sales sample, a recent review by Schmitt, Roger, Chan, Shepard, and Jennings (1997) found an average r of .00 between cognitive ability and Achievement's parent dimension, Conscientiousness (based on mean values from two studies), and an average r of .10 between cognitive ability and biodata (based on mean rs from three studies). We were unable to locate a correlation between Potency and biodata measures.

Table 3 presents the uncorrected rs between each predictor and the two criteria, along with the single or average weighted intercorrelations among the predictors (we used the uncorrected validity coefficients because, as far as

Table 3
Uncorrected Validity Coefficients and Predictor Intercorrelations

Measure	Biodata		Sales ability		Cognitive ability		Potency[a]		Achievement	
	r	No. of rs	r	No. of rs	r	No. of rs	r	No. of rs	r	No. of rs[b]
Ratings	.31	8	.26	28	.23	22	.15	25	.14	8
Sales	.17	18	.21	14	.02	12	.15	14	.23	10
Biodata	—		.20	1	.38	2			.47	
Sales ability			—		-.07	6	.42	2	.60	1
Cognitive ability					—		-.07	1	.00	
Potency							—		.39	1

[a] Blank cells indicate no correlations located. [b] Blank cells indicate mean correlations taken from Schmitt et al. (1997).

we can tell, the intercorrelations were uncorrected for unreliability or range restriction). These data were used to construct Table 4, the multiple Rs of predictors with the ratings and sales criteria. Analyses were conducted with correlations of .00, .30, and .50 for biodata–Potency (the missing cell), resulting in virtually identical Rs. Although conclusions should be drawn very cautiously because of the paucity of information available regarding intercorrelations and the elimination of small N predictors, examination of Table 4 indicates that for predicting ratings, sales ability and cognitive ability together seem most promising. For the sales criterion, it appears the other predictors add little to the use of the personality construct Achievement. It is important to reiterate, however, that (a) we were unable to correct these correlations for statistical artifacts, therefore they are likely to be underestimates of the population values; (b) the results are based on a small number of intercorrelations; and (c) because of small Ns, interest inventories were not included and biodata was excluded from the ratings category.

Table 4
Correlations for Predictor Combinations

Predictors	R
Ratings criterion	
Sales ability	.26
Sales ability, cognitive ability	.36
Sales ability, cognitive ability, potency	.36
Sales ability, cognitive ability, potency, achievement	.37
Objective sales criterion	
Achievement	.23
Achievement, sales ability	.25
Achievement, sales ability, biodata	.26
Achievement, sales, biodata, potency	.27
Achievement, sales, biodata, potency, cognitive ability	.27

Note. Correlations are not corrected for unreliability or restriction of range.

There are several potential applications of the overall meta-analysis results. The results of summarizing the large and diverse literature on sales predictors can assist practitioners in building selection systems, training programs, and other personnel functions. For example, when constructing or choosing instruments for salesperson selection, tools that have demonstrated success in the past are a good starting point. In particular, the Big Five facet results may serve as guideposts for creating test plans and item construction budgets. Finally, many jobs have some aspects of sales jobs without being labeled as "sales." The results of this meta-analysis may be useful in increasing the incremental validity of predictor batteries for these jobs.

This study has three potential limitations. First, there was little information in the primary studies describing range restriction. Thus, we relied on an assumed distribution. Second, we had some cells with small sample sizes. Cells with less than seven to eight primary studies may provide only tentative estimates of validity. Third, we were not able to conduct moderator analyses with cells of our design. It would have been interesting to examine the impact of variables such as time of publication or type of sales job on validity information.

There are a number of ideas for future research suggested by this meta-analysis. Primary studies are needed to help increase the sample sizes of various cells for future meta-analyses. Examples include more studies of Achievement, Rugged Individualism, Locus of Control, biodata (in particular the various facets of this diverse category), and interest in sales. When sufficient primary studies are available, future meta-analyses might examine the relationships among sales predictors and criteria other than ratings and objective sales performance. Criteria such as training success, organizational citizenship behaviors, salary, promotions, turnover, and different categories of objective sales information would help researchers and practitioners understand the network of predictor–crite-

rion relationships in the realm of sales. In addition, analyses using type of sales job as a moderating variable could be informative. And finally, research is needed in the area of incremental validity; that is, how do these predictors, successful singly, work in combination with one another?

Summary

There were several classes of predictors of sales success that yielded sizable validity coefficients. The Big Five personality dimensions Extraversion and Conscientiousness predicted sales success for both types of criteria. Potency (which includes assertiveness) appeared to be the key part of Extraversion that predicted sales performance. Achievement may be the key part of Conscientiousness that predicted objective sales success.

Overall cognitive ability appeared to predict rating criteria quite well. Unfortunately, it did not predict sales volume criteria. This pattern of results may help explain past divergent findings on the usefulness of cognitive ability. Results appeared to depend on the criterion type. In a similar manner, age was a good predictor of the ratings criterion but a poor predictor of objective sales.

Tests designed specifically for predicting sales success and general biodata measures exhibited promising validities. Interest measures and measures of Rugged Individualism, though based on a small number of studies, appeared worthy of further investigation.

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