PREDICTIVE VALIDITY OF THE MMPI-2 PSY-5 SCALES AND FACETS FOR LAW ENFORCEMENT OFFICER EMPLOYMENT OUTCOMES

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Several Minnesota Multiphasic Personality Inventory–2 Personality Psychopathology Five (PSY-5) scales and facets showed small to medium levels of predictive validity in identifying law enforcement officer applicants who would later be forced to leave their agencies (n = 436 still employed, n = 164 forced to leave agency). The PSY-5 measures were moderately to strongly associated with measures of positive impression management (L and K scales), although the direction of these associations sometimes varied for facets of the same PSY-5 scale (e.g., Disconstraint, Introversion/Low Positive Emotionality). The predictive effects of the PSY-5 were often observed only in officers without significant levels of impression management (L ≤ 55T, K ≤ 65T). The PSY-5 scales and facets were not especially useful for predicting on-the-job misconduct.

Keywords: PSY-5; MMPI-2; police; law enforcement; positive impression management

Researchers have studied the ability of psychological test data to aid in the selection of law enforcement personnel for more than 90 years (e.g., Terman & Otis, 1917). In the past 30 years, however, there has been marked growth in research and practice in this area, attributable in large part to the President's Commission on Law Enforcement and the Administration of Justice (1967) recommendation to psychologically screen law enforcement candidates. Since the publication of the commission's report, psychological screening of police candidates has become a standard practice (Ash, Slora, & Briton, 1990; Cochrane, Tett, & Vandecreek, 2003). The Minnesota Multiphasic Personality Inventory–2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) in particular has emerged as the most commonly used and researched personality measure in law enforcement officer selection (Bartol, 1996; Cochrane et al., 2003).

The Americans with Disabilities Act of 1990 (ADA; 1992) has had a major influence on how psychological test data can be used in the hiring process. ADA prohibits the use of a selection criterion that tends to screen out any particular group of individuals with disabilities, including mental disability, unless that criterion is proven necessary for adequate

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job performance. Consequently, the typical candidate selection process is to conduct psychological screening *after a* conditional job offer, thus creating a largely homogenous group of applicants with regard to histories of aberrant behavior. That is, candidates for positions as law enforcement officers may undergo background investigations, employment interviews, drug testing, civil service testing, and polygraph testing prior to any psychological assessment (Cochrane et al., 2003). As a result, current candidate selection procedures render data gathered through most MMPI-2 scales redundant with information obtained through other aspects of the hiring process (Weiss, Davis, Rostow, & Kinsman, 2003). Indeed, those who pass the initial checks and complete psychological measures tend to be largely free of severe psychopathology on measures such as the MMPI-2 (e.g., Chibnall & Detrick, 2003; Detrick, Chibnall, & Rosso, 2001; Hiatt & Hargrave, 1988; Inwald & Brockwell, 1991; Sellbom, Fischler, & Ben-Porath, 2007).

Recent law enforcement officer research has sought to identify nonpathological personality features that are predictive of poor job performance (Black, 2000; Detrick, Chibnall, & Luebbert, 2004). Identifying applicants with extremely high or low levels of more normative personality features may prove to be a useful way to identify problematic applicants in an applicant pool that has already been screened for severe psychopathology (Varela, Boccaccini, Scogin, Stump, & Caputo, 2004). The current study examines whether a recently developed set of MMPI-2 scales designed to measure traitlike personality features (Personality Psychopathology Five [PSY-5]; Harkness, McNulty, Ben-Porath, & Graham, 2002) are useful for predicting law enforcement applicant misconduct and employment outcomes (e.g., being fired). Because the MMPI-2 is the most commonly used measure for evaluating officers, it would be useful if it could provide information about traitlike personality features that were robust predictors of officer performance and employment outcomes.

PSYCHOLOGICAL TESTING AND LAW ENFORCEMENT CANDIDATE SELECTION

Varela et al. (2004) reported findings of a meta-analysis of 78 published and unpublished studies examining the predictive validity of personality testing in law enforcement employment settings. These investigators found an overall correlation coefficient of .13 between individual test scales and all outcome measures, which increased to .22 when corrected for range restriction, predictor unreliability, and discontinuity. This same study found a correlation of .11 for all MMPI scales across all outcome measures, which increased to .21 when corrected for range restriction, predictor unreliability, and discontinuity. The largest correlation coefficients, however, were found for the California Psychological Inventory (CPI), with an observed correlation coefficient of .16, which increased to .25 when corrected for range restriction, predictor unreliability, and discontinuity. These findings are particularly noteworthy in light of the substantive differences between the CPI and MMPI-2. The CPI is a measure of normative personality (Gough, 1975), whereas the MMPI-2 is largely a measure of deviant or maladaptive traits. Furthermore, the CPI was developed for the purpose of predicting interpersonal behavior using well-understood traits (Megargee, 1972; Van Hutton, 1990). Because of the significantly stronger findings for the CPI, Varela et al. (2004) suggested that normative personality traits, rather than pathological traits, may be more useful in identifying unsuitable law enforcement candidates.

The majority of research reviewed by Varela et al. (2004) was based on the original MMPI, which may limit the generalizability to more recent research using the MMPI-2. A great deal

of recent MMPI-2 research has focused on the Restructured Clinical (RC) and PSY-5 scales, which had not been studied in law enforcement samples at the time of the Varela et al. (2004) meta-analysis. A recent study with the RC scales suggests that these more recently developed scales may be promising predictors of law enforcement officer performance (Sellbom et al., 2007). Sellbom et al. (2007) examined 29 indices of law enforcement officer performance and multiple MMPI-2 scales among a sample of male police officers and reported correlations based on observed scores and correlations corrected for range restriction (to account for the impact of initial screening). They found several significant and meaningful correlations, with the highest correlations for the RC scales (up to $r = .29$ for uncorrected correlations and $r = .60$ when corrected for range restriction). Sellbom et al. also calculated relative risk ratios for the RC scales and found that officers with elevated scores ($T \geq 55$ or $T \geq 60$) were often 4 to 15 times more likely to demonstrate problematic behavior than officers with lower scores. Although this research suggests promising effects for the RC scales, no studies have examined the ability of the PSY-5 measures to predict officer outcomes.

PSY-5

The PSY-5 scales are "personality individual difference constructs" that "provide an overview of issues in both normal and abnormal personality" (Harkness et al., 2002, pp. 12, 14). Although the PSY-5 scales were designed to provide measures of personality individual differences for the MMPI-2, the developers clearly state that these scales should not be interpreted as the "MMPI-2 version of the Big-5" (Harkness et al., 2002, p. 5; McNulty & Harkness, 2002). Harkness (1992) developed the PSY-5 model as a general framework for organizing laypersons' groupings of pathological and nonpathological personality traits. Harkness, McNulty, and Ben-Porath (1995) later used a combination of trained layperson ratings, expert judgment, and psychometric performance measures to identify and assign groups of MMPI-2 items to the PSY-5 categories. The PSY-5 scales are Aggressiveness (AGGR), Psychoticism (PSYC), Disconstraint (DISC), Negative Emotionality/Neuroticism (NEGE), and Introversion/Low Positive Emotionality (INTR).

The PSY-5 AGGR and DISC scales may be especially useful for predicting officer performance because they provide measures of personality features that are conceptually related to officer performance. AGGR is a measure of instrumental aggression, used for intimidation or goal attainment, and not of aggression in response to actions by others (Harkness et al., 2002). High AGGR scores are moderately associated (r between .20 and .40) with hostility, a history of being physically abusive, and antisocial personality disorder symptoms and diagnoses (Bagby, Sellbom, Costa, & Widiger, 2008; Harkness et al., 2002; Petroskey, Ben-Porath, & Stafford, 2003; Sharpe & Desai, 2001; Wygant, Sellbom, Graham, & Schenk, 2006). DISC measures risk taking, impulsivity, and a lack of regard for rules and obligations. High DISC scores are associated with many indices of antisocial behavior and substance use (Harkness et al., 2002) and have been found to be more strongly correlated with symptoms and diagnoses of antisocial personality disorder than has AGGR (Bagby et al., 2008; Wygant et al., 2006). Thus, high levels of AGGR and DISC may be associated with the types of behaviors for which officers are terminated, including rule violations and excessive use of force.

The potential relation between officer performance and PSYC, NEGE, and INTR is less clear. All three of these measures correlate moderately to strongly with measures of negative affect, psychopathology, and personality disorder symptoms and diagnoses (Bagby et al., 2008; Harkness et al., 2002; Wygant et al., 2006). High scores on PSYC and NEGE have

been associated with an unstable work history in persons undergoing forensic evaluations (Petroskey et al., 2003), and combinations of high PSYC and NEGE have been associated with paranoid, schizotypal, and borderline personality disorder symptoms and diagnoses (Bagby et al., 2008; Wygant et al., 2006). The relation of NEGE, PSYC, and INTR with measures of psychopathology suggests that they will be associated with law enforcement outcomes to the same extent as existing MMPI-2 measures of psychopathology. Of the clinical scales, Ma (Hypomania clinical scale [Scale 9]), Pd (Psychopathic Deviate clinical scale [Scale 4]), and Pa (Paranoia clinical scale [Scale 6]) have demonstrated some of the strongest effects for predicting misconduct and termination, with effect sizes in the $r = .20$ to .30 range (Hargrave, Hiatt, & Gaffney, 1988; Hiatt & Hargrave, 1988; Weiss, Serafino, Willson, & Knoll, 1998).

MMPI-2 PSY-5 FACET SCALES

Arnau, Handel, and Archer (2005) recently used principal components analysis to identify facets for each of the PSY-5 scales in a large sample ($N > 4{,}000$) of MMPI-2 protocols scored by NCS Pearson. In 2004, the Minnesota Press produced a brochure describing the facets and providing scoring information for practitioners (Arnau, Handel, & Archer, 2004). Findings from a recent study of the PSY-5 facet scales in a sample of nearly 700 psychiatric patients suggest some potential problems with the facet scales (Quilty & Bagby, 2007). Specifically, the factor analysis suggested poor to questionable fit for the facet models, and correlations between facets within the same PSY-5 scale were, at times, lower than correlations with facets from different PSY-5 scales. However, none of these studies examined the construct validity of the PSY-5 facets in relation to anything other than another MMPI-2 measure. In a recent unpublished study, Jones (2007) examined the relation between a revised set of PSY-5 facet scores and psychiatric symptoms among forensic in-patients and found several significant correlations between the AGGR, NEGE, INTR, PSYC scales and psychiatric symptoms. Although these inconsistent findings raise concerns about the utility of the facet scales, none of the existing studies in this area has examined the relation between the original PSY-5 facets (Arnau et al., 2004, 2005) and non-MMPI-2 criteria. Thus, we opted to examine the facet scales in this study despite legitimate questions about how well they might perform. Although the existence of revised facet scales (e.g., Jones, 2007) raises a question about whether we should examine the original or revised facet scales, we opted to examine the original scales because the research describing the revised scales has not yet been published and existing facet research (e.g., Quilty & Bagby, 2007) also examined the original facet scales. The PSY-5 facet scales and their psychometric properties are described in greater detail in the measures section.

PSY-5 SCALES AND IMPRESSION MANAGEMENT

Because the personality concepts behind the MMPI-2 PSY-5 scales were developed, in part, from laypersons' groupings of personality traits, the meaning of the items composing the PSY-5 scales are apparent to many test takers (see Harkness et al., 2002). In the context of employment screening, the highly face-valid nature of the PSY-5 scales may render them more sensitive to applicants' attempts to present as well adjusted. The obvious nature of the PSY-5 items suggests that law enforcement applicants with high levels of these problematic traits may be able to avoid producing elevations on these scales through a general pattern of underreporting problems and psychopathology. The developers of the MMPI-2 PSY-5

defend this characteristic of the scales by pointing out that the validity scales should be used to detect this type of test-taking approach, not the scales themselves (e.g., L, K; Harkness et al., 2002). Indeed, this position is supported by the modest to strong correlations between the PSY-5 and measures of positive impression management that Harkness et al. (1995) observed in a sample of 328 psychiatric patients. For L and K, respectively, correlations were –.09 and –.30 for AGGR, –.26 and –.60 for PSYC, .34 and .18 for DISC, –.47 and –.77 for NEGE, and .10 and .03 for INTR.

CURRENT STUDY

The current study examined the relation between MMPI-2 PSY-5 scales and facets, measures of positive impression management (L, K), prospective measures of on-the-job misconduct, and long-term employment status in a sample of law enforcement officer applicants. We examined whether the relation between PSY-5 and employment outcomes depended on the applicants' test-taking approach. We expected that PSY-5 scores would be significantly associated with measures of positive impression management (L, K) and that the PSY-5 scales would be associated with employment outcomes only in applicants who responded openly to the test. We expected that high levels of all PSY-5 traits would be associated with poor outcomes in honest responders but that effects would be largest for the AGGR and DISC scales and facets.

METHOD

PARTICIPANTS

Participants for this research were 901 law enforcement officer job applicants evaluated by Matrix, Inc. (hereafter Matrix), a professional police psychology corporation in Baton Rouge, Louisiana. All of the applicants completed the MMPI-2 as part of the standard hiring process, and Matrix used scores from the MMPI-2 (but not PSY-5 scores) to make recommendations to law enforcement agencies. Most of the 901 applicants were male ($n = 813$, 90.2%). Most applicants identified themselves as White ($n = 688$, 76.4%), whereas others identified themselves as Black ($n = 201$, 22.3%), Hispanic ($n = 9$, 1.0%), Asian ($n = 2$, 0.2%), or Other ($n = 1$, 0.1%). More than half of the applicants applied for positions in city departments ($n = 576$, 63.9%), whereas others applied for state positions ($n = 312$, 34.6%) or parish or county positions ($n = 13$, 1.4%).

Employment status. Matrix requires supervisors in each department with which they have a contract to evaluate the job performance of officers using an evaluation form supplied by Matrix (Davis & Rostow, 2002). Matrix collects this information for the purposes of improving their evaluation procedures. In other words, these data are collected as part of their routine practice; they were not collected solely for this study. Matrix asks supervisors to evaluate officers every 6 months for the first 3 years of employment and once every year thereafter. One item on the evaluation form asks about the officer's employment status. The 901 applicants fell into one of five employment status groups: (a) still employed ($n = 436$, 48.4%), (b) fired or resigned at the request of the department ($n = 68$, 7.5%), (c) conditional hiring offer was withdrawn ($n = 96$, 10.7%), (d) resigned because of personal reasons or to

seek outside employment ($n = 218$, 24.2%), or (e) resigned for other law enforcement work ($n = 83$, 9.2%). The trial period for conditional offers varies from agency to agency but typically lasts from 6 months for small agencies to 1 year for larger agencies. Having a conditional hiring offer withdrawn is tantamount to being fired.

This study focuses on differences in personality features for officers who were still employed ($n = 436$) and those who were forced to leave the agency by being fired, being forced to resign, or having their conditional offer withdrawn ($n = 164$).[1] Although voluntary resignations ($n = 301$ in this study) are often undesirable and costly for law enforcement agencies because of the training and resources that are devoted to each hired officer, they represent a distinctly different type of outcome than being fired or forced to resign. Specifically, there is no reason to suspect that officers who voluntarily resign represent a legal liability for the department. These 301 officers were excluded from the study, and the remaining analyses in this research report focus on comparisons between officers who were still with their agencies and those who were forced to leave their agencies.[2]

The amount of time between completion of the MMPI-2 and the last available supervisor rating for officers who were still employed ranged from 168 to 2,741 days ($M = 1175.80$, $SD = 588.95$). Thus all officers had at least 168 days of opportunity to be fired. Because job performance data are not collected after an officer leaves the agency, the amount of follow-up time was significantly shorter for officers who were fired ($M = 567.62$, $SD = 473.49$) or had their conditional offer withdrawn ($M = 150.22$, $SD = 301.99$).

MEASURES

AGGR. AGGR is an 18-item MMPI-2 PSY-5 scale designed to measure instrumental aggression, dominance, and a tendency to intimidate others (Harkness et al., 2002). Internal consistency coefficients (Cronbach's α) for AGGR have ranged from .66 to .73 (Arnau et al., 2005; Harkness et al., 2002). Arnau et al. (2005) identified three AGGR facets: Assertiveness (seven items, $\alpha = .67$ to .68), Physical/Instrumental Aggression (eight items, $\alpha = .62$ to .65), and Grandiosity (three items, $\alpha = .49$ to .50). In the current sample, α was .56 for the AGGR total scale, .34 for Assertiveness, .47 for Physical/Instrumental Aggression, and .56 for Grandiosity.

DISC. DISC is a 29-item MMPI-2 PSY-5 scale designed to measure risk taking, impulsivity, and boredom with routine (Harkness et al., 2002). Cronbach's α values for DISC have ranged from .68 to .75 (Arnau et al., 2005; Harkness et al., 2002). Arnau et al. (2005) identified two DISC facets: Antisocial History/Norm Violation (18 items, $\alpha = .74$ in each of three samples) and Impulsivity/Low Harm Avoidance (eight items, $\alpha = .47$ to .48). In the current sample, α was .54 for the DISC total scale, .69 for Antisocial History/Norm Violation, and .42 for Impulsivity/Low Harm Avoidance.

PSYC. PSYC is a 25-item scale designed to measure disconnection from reality as well as unusual beliefs and sensory experiences (Harkness et al., 2002). High scores on PSYC are associated with psychotic symptoms, anxiety, depression, and symptoms of paranoid, schizotypal, and borderline personality disorders (Harkness et al., 2002; Wygant et al., 2006). Cronbach's α values for PSYC have ranged from .74 to .84 (Arnau et al., 2005; Harkness et al., 2002). Arnau et al. (2005) identified three PSYC facets: Psychotic Experiences (11 items,

α = .57 to .58), Paranoia (7 items, α = .60 to .63), and Mistrust/Withdrawal (7 items, α = .57 to .60). In the current sample, α was .71 for the PSYC total scale, .56 for Psychotic Experiences, .40 for Paranoia, and .50 for Mistrust/Withdrawal.

NEGE. NEGE is a 33-item measure of the tendency to worry, be self-critical, and feel guilty (Harkness et al., 2002). High NEGE scores are associated with symptoms of anxiety and depression and symptoms of most personality disorders (Harkness et al., 2002; Wygant et al., 2006). Cronbach's α values for NEGE have ranged from .86 to .88 (Arnau et al., 2005; Harkness et al., 2002). Arnau et al. (2005) identified two NEGE facets. Most of the NEGE items load onto the Irritability/Dysphoria facet (24 items, α = .86 to .87), and a smaller group of items loads onto the Phobias facet (3 items, α = .53 to .58). In the current sample, α was .83 for the NEGE total scale, .81 for Irritability/Dysphoria, and .23 for Phobias.

INTR. INTR is a 34-item measure of peoples' willingness to allow positive experiences into their lives and experience joy (Harkness et al., 2002). High INTR scores are associated with symptoms of avoidant personality disorder, anxiety, and depression (Harkness et al., 2002; Wygant et al., 2006). Cronbach's α values for INTR have ranged from .81 to .86 (Arnau et al., 2005; Harkness et al., 2002). Arnau et al. (2005) identified three INTR facets: Disengagement/Anhedonia (18 items, α = .78 to .80), Low Sociability (8 items, α = .72 to .73), and Low Diligence/Hypomania (3 items, α = .39 to .44). In the current sample, α was .64 for the INTR total scale, .47 for Disengagement/Anhedonia, .69 for Low Sociability, and .42 for Low Diligence/Hypomania.

Positive impression management. The MMPI-2 L and K scales were used as measures of positive impression management. The L scale was designed to identify persons deliberately trying to avoid responding frankly, whereas K was designed as a more subtle measure of denying psychopathology (Graham, 2006). Both L and K are effective at distinguishing between persons given instructions to underreport psychopathology and those responding honestly, although effects are somewhat larger for K than for L (Greene, 2000). Because deviant responses to L scale items are apparent to test takers, L is not ideal for detecting coached and sophisticated attempts at positive impression management (Greene, 2000). Optimal cut scores for distinguishing between honest and dishonest responders vary for both L (range = 48T to 83T) and K (range = 33T to 68T; see Greene, 2000, p. 106), with Graham (2006) arguing that scores of 65T on either scale suggest defensive responding or an attempt at positive self-presentation.

Misconduct. The job performance evaluation form completed by officers' supervisors asks seven questions relating to on-the-job misconduct, for example, "Has this officer demonstrated inappropriate use of any weapon?" and "Has this officer received any formal citizen complaints regarding the excessive use of force?" Supervisors are asked to respond yes or no to each of these questions. Supervisors completed the misconduct questions for 589 of the 600 applicants who were either still employed or were forced to leave their agencies. The seven misconduct categories and the number of officers who were reported to have engaged in each type of misconduct are as follows: inappropriate use of a weapon (n = 13, 2.2%), property damage (n = 46, 7.8%), misuse of a vehicle (n = 42, 7.1%), citizen complaint of excessive force (n = 41, 7.0%), citizen complaint of unprofessional conduct (n = 140, 23.8%), received a reprimand or suspension (n = 181, 30.7%), and complaint of harassment (n = 28, 4.8%).

Of the 589 officers with supervisor ratings, 319 (54.2%) were identified as having at least one misconduct indicator. This dichotomous index of misconduct (any vs. none) was used in the analyses reported in the Results section. We used this dichotomous misconduct grouping instead of a count of the number of incidents of misconduct for two reasons. First, the count variable was highly skewed (skew = 1.43, $Z = 14.17$, $p < .001$). Approximately half (50.7%) of the applicants with misconduct had only one incident of misconduct. Second, there is a clear conceptual distinction between misconduct and no misconduct. A single incident of misconduct may indicate a severe problem or lead to termination. The importance of differences between two and three incidents of misconduct or three and four incidents of misconduct is unclear. Finally, analyses with the dichotomous and count variable (log transformed to minimize skew) yielded virtually identical results, so we opted to simplify the presentation of results by reporting effects for the dichotomous grouping.

PROCEDURE

Matrix maintains a database of officer test scores, supervisor reports of misconduct, and employment status. The applicants included in this study completed the MMPI-2 before scoring for the PSY-5 scales was available to mental health practitioners. The researchers collected data for the study by creating scoring templates for each of the PSY-5 scales. For each officer, the research team located the MMPI-2 response sheet, placed the template over the response sheet, and recorded the PSY-5 items. Item scores were then merged with the Matrix database to allow for an examination of the relation between the PSY-5 scores and applicant employment outcomes.

RESULTS

Table 1 provides descriptive statistics for the PSY-5 and positive-impression-management measures in the sample of 600 officers. The data in Table 1 suggest that few officers produced clear elevations on the PSY-5 scales. The mean *T* score for each of the PSY-5 scales was lower than 50T, the average uniform *T* score in the normative MMPI-2 sample. Scores higher than 50T were relatively rare in the officer sample (<30% of officers) for each of the PSY-5 scales except AGGR (43.7%), and scores higher than 60T (one standard deviation above the mean) were extremely rare for all of the PSY-5 scales (<9% of the sample). In contrast, most officers produced L and K scores at or higher than 50T (76.8% and 80.7%, respectively), and nearly half produced scores at or higher than 60T (48.8% and 51.2%, respectively).

PSY-5 AND MEASURES OF POSITIVE IMPRESSION MANAGEMENT

Table 2 provides correlations between the PSY-5 scales and facets, L, and K. As expected, total scores for most of the original PSY-5 scales were negatively correlated with both measures of positive impression management. These correlations were especially large for K with PSYC ($r = –.63$) and NEGE ($r = –.77$) and were in the medium range for AGGR and DISC measures with L and K (see Table 2). The exception to this pattern of negative correlations was INTR, which showed a small positive correlation with L and K.

The effect of positive impression management was inconsistent across the facet scores for some of the PSY-5 scales. For DISC and INTR, some facets showed statistically significant

TABLE 1: Descriptive Statistics for MMPI-2 PSY-5 and Positive-Impression-Management Scales

MMPI-2 Scale	M	SD	*% Above 50T*	*% Above 60T*
Aggressiveness (AGGR)	49.71	7.07	43.7	8.0
Assertiveness	5.91	1.06		
Instrumental Aggression	1.04	1.08		
Grandiosity	1.21	1.01		
Disconstraint (DISC)	46.11	6.98	25.7	6.2
Norm Violation/Antisocial	4.19	2.76		
Impulsivity/Low Harm Avoidance	6.44	1.37		
Psychoticism (PSYC)	45.06	9.06	25.0	6.8
Psychotic Experiences	0.74	1.12		
Paranoia	0.26	0.59		
Mistrust/Withdrawal	1.28	1.23		
Negative Emotionality/Neuroticism (NEGE)	41.02	7.73	11.7	3.0
Irritability/Dysphoria	4.02	3.57		
Phobias	0.09	0.33		
Introversion/Low Positive Emotionality (INTR)	44.06	7.43	27.8	1.8
Disengagement/Anhedonia	1.21	1.39		
Low Sociability	3.56	2.10		
Low Diligence/Hypomania	1.50	1.00		
L	59.81	12.43	76.8	48.8
K	58.01	9.11	80.7	51.2

Note. MMPI-2 = Minnesota Multiphasic Personality Inventory–2 (Butcher et al., 1989); PSY-5 = Personality Psychopathology Five (Harkness et al., 1995). $N = 600$. Means and standard deviations are based on *T* scores for total scales and raw scores for the facets.

positive correlations with L and K, whereas others showed statistically significant negative correlations. For example, there were large significant negative correlations between the DISC Norm Violation facet and L and K ($r = –.56$ and $–.52$, respectively) and small to medium-sized significant positive correlations between the DISC Impulsivity/Harm Avoidance facet and L and K ($r = .11$ and $.34$, respectively). Thus, applicants who engaged in a positive-impression-management approach to the test attempted to minimize characteristics that might suggest an antisocial history but were somewhat more likely to endorse items suggesting that they were willing to take risks and be impulsive. For AGGR, the negative correlations were strongest for Instrumental Aggression and Grandiosity (range: $r = –.15$ to $–.54$) and smaller and positive for Assertiveness ($r = .05$ and $.06$). This pattern suggests that applicants adopting a positive-impression-management approach to the MMPI-2 may have seen Assertiveness items as reflecting somewhat desirable officer characteristics that did not need to be minimized but viewed Instrumental Aggression and Grandiosity items as undesirable characteristics.

The overall pattern of correlations between the PSY-5 scales and positive-impression-management measures has several implications for the predictive validity of the PSY-5 scales. First, all of the PSY-5 scales contain facets that were moderately to strongly influenced by a positive-impression-management approach to the test, supporting the need to account for the influence of positive impression management when examining the predictive validity of these scales. Second, the pattern of correlations suggests that predictive validity will not be influenced in the same way for every facet of every scale. The predictive validity of the scales and facets that were most strongly associated with L and K will likely be attenuated when L and K are not taken into consideration. Finally, the variability in the size and direction of the relation between positive impression management indices and the PSY-5 facet scores

TABLE 2: Correlations Between the PSY-5, Positive-Impression-Management Measures, and Officer Outcomes

			r_{pb} *Uncorrected and Corrected (Restricted Range)*			
			Employment Status[a]		*On-the-Job Misconduct*[b]	
MMPI-2 Scale	*L*	*K*				
Aggressiveness (AGGR)	–.24**	–.49**	.18**	(.25**)	.00	(.00)
Assertiveness	.06	.05	.00	(.00)	.14**	(.22**)
Instrumental Aggression	–.38**	–.47**	.13**	(.19**)	–.06	(–.09)
Grandiosity	–.15**	–.54**	.16**	(.16**)	.00	(.00)
Disconstraint (DISC)	–.44**	–.29**	.08	(.10)	–.04	(–.05)
Norm Violation/Antisocial	–.56**	–.52**	.12*	(.14**)	–.09	(–.10)
Impulsivity/Low Harm Avoidance	.11*	.34**	–.10	(.11)	.19**	(.21**)
Psychoticism (PSYC)	–.24**	–.63**	.21**	(.24**)	–.08	(–.09)
Psychotic Experiences	–.15**	–.43**	.14**	(.17**)	–.10	(–.13**)
Paranoia	–.13*	–.40**	.20**	(.25**)	–.05	(–.06)
Mistrust/Withdrawal	–.24**	–.61**	.19**	(.23**)	–.04	(–.05)
Negative Emotionality/ Neuroticism (NEGE)	–.47**	–.77**	.14**	(.18**)	–.11*	(.14**)
Irritability/Dysphoria	–.45**	–.78**	.16**	(.20**)	–.10	(–.13**)
Phobias	–.01	–.17**	.05	(.09)	–.10	(–.17**)
Introversion/Low Positive Emotionality (INTR)	.15**	.16**	.00	(.00)	–.01	(–.01)
Disengagement/Anhedonia	–.15**	–.36**	.16**	(.28**)	–.10	(–.18**)
Low Sociability	.26**	.19**	–.06	(–.06)	.04	(.04)
Low Diligence/Hypomania	.08	.43**	–.04	(–.04)	.00	(.00)
L	—	.49**	.10	(.10)	.03	(.03)
K	—	—	–.12**	(–.13**)	.06	(.07)

Note. MMPI-2 = Minnesota Multiphasic Personality Inventory–2 (Butcher et al., 1989); PSY-5 = Personality Psychopathology Five (Harkness et al., 1995). $N = 600$ for all correlations except those for misconduct ($N = 589$ because of missing supervisor data for 11 officers). Correlations in parentheses have been corrected for restricted range in PSY–5 scores.
a. Dichotomous variable: 0 = still employed, 1= fired or conditional offer withdrawn.
b. Dichotomous variable: 0 = no on-the-job problems reported by supervisor, 1 = on-the-job problems reported by supervisor.
*$p < .01$. **$p < .001$.

suggests that the predictive ability of the PSY-5 total scores may be attenuated and that they may be less useful than the facet scores for predicting officer performance. Facets are especially likely to show stronger effects than total scores for the AGGR, DISC, and INTR scales because of their varied relations with L and K.

PREDICTIVE VALIDITY OF THE PSY-5 SCALES

Table 2 provides point-biserial correlations between the PSY-5 measures and prospective employment outcomes. Because few applicants reported high scores on the PSY-5 measures, we also calculated correlations that were corrected for range restriction in the PSY-5 measures using the formula provided by Cohen, Cohen, West, and Aiken (2003, p. 58). The main component of the correction formula is the standard deviation value, which is smaller in range-restricted samples than in nonrestricted samples. We used standard deviation values for the PSY-5 measures in the MMPI-2 normative sample (Arnau et al., 2004; Harkness et al., 2002) to calculate the correlations corrected for range restriction.

The point-biserial correlations in Table 2 represent the predictive ability of the PSY-5 measures when positive-impression management has not been taken into account. Overall, the PSY-5 measures were better at identifying officers who were forced to leave the agency than identifying officers engaging in on-the-job misconduct, although even the strongest effects were small in size (i.e., $r < .30$; Cohen, 1992). Correlations corrected for range restriction tended to be somewhat larger than the uncorrected correlations, although only a few were noticeably different (e.g., Disengagement/Anhedonia facet for employment status changed from .16 to .28). The reason the PSY-5 measures were more strongly related with employment status is unclear. Although one might expect employment status and on-the-job misconduct to be highly correlated, they were only minimally correlated (Phi = –.07, $p > .05$).

Given the large sample and adequate statistical power, we used the criterion of $p < .01$ (two-tailed test) to identify statistically significant effects. PSYC was the only scale for which all of the facets were significantly associated with being forced to leave the agency. Statistically significant effects for being forced to leave the agency were also observed for DISC, NEGE, and AGGR. For AGGR, there was a small, but statistically significant, correlation with employment status ($r_{pb} = .18$, $p < .001$), indicating that higher scores were associated with being forced to leave the agency. Correlations for the AGGR facet scores suggest that this effect was carried by the Instrumental Aggression ($r_{pb} = .13$, $p < .001$) and Grandiosity facets ($r_{pb} = .16$, $p < .001$) as opposed to Assertiveness ($r_{pb} = .00$, *ns*). The earlier finding that the Instrumental Aggression and Grandiosity facets were significantly associated with a positive-impression-management approach to the MMPI-2 suggests that these predictive validity coefficients may be attenuated and should increase when the officers' test-taking approach is taken into account. In contrast, the only AGGR measure that was a statistically significant predictor of job misconduct was the Assertiveness facet ($r_{pb} = .14$, $p < .001$). Given that this facet was not associated with a positive impression management approach, we do not expect that its predictive validity will depend on the officers' test-taking approach.

THE IMPACT OF POSITIVE IMPRESSION MANAGEMENT

We considered the merits of several analytic approaches for examining the influence of positive impression management on the predictive validity of the PSY-5 measures. These approaches included examining continuous variable interaction terms in logistic regression (see Edens & Ruiz, 2006), survival analysis, receiver operating characteristics, or risk ratios for potentially meaningful cut scores (see Sellbom et al., 2007). Ultimately, we decided on a combined approach in which we first used logistic regression to determine whether the relation between PSY-5 scores and study outcomes was moderated by positive impression management (see Edens & Ruiz, 2006, which used the same analytic approach). Because these analyses required a total of 64 regression models (18 PSY-5 scales × 2 outcome variables × 2 positive-impression-management scales), we report results from only one set of 18 regression analyses to consider whether the moderation effects are present. We then use a series of point-biserial correlations to highlight the pattern of moderation present in the data. Because results from the regression and point-biserial analyses lead to similar substantive conclusions, we focus on the results from the point-biserial analyses to examine the extent to which prediction depends on positive impression management. Finally, we present relative risk ratios for PSY-5 measures that are the most promising predictors of officer applicant outcomes.

Table 3 provides results from the logistic regression analyses examining whether L scores moderated the relation between PSY-5 scores and employment status. For each PSY-5 scale, moderation is indicated when the two-way interaction between the PSY-5 scale and L is a statistically significant predictor of the outcome measure. All predictors (validity scales, PSY-5 scales, and interaction terms) were centered prior to being entered into the logistic regression equations.

There was a statistically significant two-way interaction between L and four of the five PSY-5 total scale scores (AGGR, DISC, PSYC, and NEGE). In addition, there was a statistically significant interaction for at least one facet within each PSY-5 area.

We used point-biserial correlations to examine whether the pattern of effects underlying the statistically significant interactions were consistent with our hypotheses: that PSY-5 scores would predict study outcomes only for officers who did not engage in positive impression management. For the point-biserial analyses, we divided officers into groups of impression-management and non-impression-management (honest) responders and then examined point-biserial correlations between the PSY-5 measures and dichotomous job performance indices. Our rationale for this approach was that it was an efficient way to communicate a great deal of information in a relatively straightforward manner and that it is consistent with how practitioners use validity information from validity scale measures (e.g., valid vs. invalid).

Tables 4 and 5 present results for the predictive validity of the PSY-5 scales and facets in groups of officers separated by cut scores of 55 for L and 65 for K. We also examined correlations for groups based on other L and K cut scores ($T \geq 50, 55, 60, 65, 70$) but found that those based on cut scores of L ≥ 55 and K ≥ 65 were most useful for highlighting differences between honest and impression-management officers (i.e., highlighting the moderation effects indicated by the logistic regression results).

Employment status. As can be seen in Tables 4 and 5, correlations between the PSY-5 measures and being forced to leave the agency were, as expected, consistently larger in the honest respondent groups than in the positive-impression-management groups. Differences between the correlations for the two groups were somewhat more pronounced for L ≥ 55T than for K ≥ 65T. For L ≥ 55T, correlations between several of the PSY-5 measures and being forced to leave the agency were in the medium-sized range for officer applicants in the honest respondent group, whereas the correlations were near zero for officers in the positive-impression-management group. For K ≥ 65T, a somewhat different pattern emerged in that negative correlations (as opposed to small positive correlations) were observed for some of the PSY-5 measures in the positive-impression-management group (DISC total, DISC Norm Violation, AGGR Instrumental Aggression).

Across both the L and K groupings, the predictive validity of AGGR and DISC were most consistently associated with positive impression management, although certain facets were more affected than others. For AGGR, the Instrumental Aggression and Grandiosity facets were significantly more predictive in the honest respondent groups than in the positive-impression-management groups (see Tables 4 and 5). The effects for the AGGR Assertiveness facet were not significantly different from zero in the positive-impression-management group for either L or K. For DISC, the Norm Violation facet was a significant predictor of being forced to leave the agency in the honest respondent groups ($r_{pb} = .30$, $p < .001$, for L and $r_{pb} = .18$, $p < .001$ for K), whereas the DISC Impulsivity facet tended to be negatively associated with being forced to leave the agency in the honest respondent groups ($r_{pb} = -.18$, $p < .01$, for L and $r_{pb} = -.11$, *ns*, for K).

TABLE 3: Logistic Regression Results Examining Whether L Scores Moderate the Relation Between PSY-5 Scale Scores and Employment Status

Predictor	B	SE B	*Wald*	*Odds Ratio*	*95% CI*	*Model* χ^2
AGGR Total	.061**	.014	19.11	1.06	1.03 to 1.09	
L scale	.027**	.008	11.56	1.03	1.01 to 1.04	
AGGR × L interaction	−.003*	.001	5.81	0.99	0.99 to 1.00	37.17**
AGGR-A: Assertiveness	−.006	.088	0.01	0.99	0.84 to 1.18	
L scale	.017	.007	5.54	1.02	1.00 to 1.03	
AGGR-A × L interaction	−.004	.007	0.27	1.00	0.98 to 1.01	5.89
AGGR-I: Instrumental	.301**	.100	9.01	1.35	1.11 to 1.65	
L scale	.025**	.009	8.50	1.03	1.01 to 1.04	
AGGR-I × L interaction	−.025**	.007	11.20	0.98	0.96 to 0.99	36.38**
AGGR-G: Grandiosity	.414**	.095	18.80	1.51	1.25 to 1.82	
L scale	.023**	.008	9.39	1.02	1.01 to 1.04	
AGGR-G × L interaction	−.014*	.007	3.72	0.99	0.97 to 1.00	27.18**
DISC	.041**	.016	6.81	1.04	1.01 to 1.07	
L scale	.026**	.009	8.94	1.03	1.01 to 1.04	
DISC × L interaction	−.003*	.001	5.79	1.00	0.99 to 1.00	23.37**
DISC-A: Antisocial	.186**	.044	18.30	1.21	1.11 to 1.31	
L scale	.038**	.010	15.48	1.04	1.02 to 1.06	
DISC-A × L interaction	−.007**	.003	6.87	0.99	0.99 to 1.00	39.36**
DISC-I: Impulsivity	−.175**	.066	7.02	0.84	0.74 to 0.96	
L scale	.020**	.007	7.45	1.02	1.01 to 1.04	
DISC-I × L interaction	.004	.005	0.62	1.00	0.99 to 1.01	13.04**
PSYC	.060**	.011	30.33	1.06	1.04 to 1.09	
L scale	.030**	.008	14.48	1.03	1.01 to 1.05	
PSYC × L interaction	−.002*	.001	5.74	1.00	1.00 to 1.00	46.46**
PSYC-PE: Psychotic Experience	.270**	.085	10.13	1.31	1.11 to 1.55	
L scale	.022**	.007	8.71	1.02	1.01 to 1.04	
PSYC-PE × L interaction	−.019**	.007	7.73	0.98	0.97 to 0.99	28.15**
PSYC-PA: Paranoia	.739**	.159	21.73	2.09	1.54 to 2.86	
L scale	.023**	.008	9.11	1.02	1.01 to 1.04	
PSYC-PA × L interaction	−.005	.015	0.10	0.99	0.97 to 1.03	30.65**
PSYC-M: Mistrust	.406**	.079	26.40	1.50	1.29 to 1.75	
L scale	.029**	.008	13.69	1.03	1.01 to 1.05	
PSYC-M × L interaction	−.012*	.006	3.81	0.99	0.98 to 1.00	38.30**
NEGE	.057**	.014	15.76	1.06	1.03 to 1.09	
L scale	.032**	.009	12.61	1.03	1.01 to 1.05	
NEGE × L interaction	−.003**	.001	7.45	1.00	1.00 to 1.00	39.38**
NEGE-I: Irritability	.126**	.032	16.09	1.14	1.07 to 1.21	
L scale	.033**	.009	13.56	1.03	1.02 to 1.05	
NEGE-I × L interaction	−.006*	.002	6.44	0.99	0.99 to 1.00	42.32**
NEGE-P: Phobias	.319	.271	1.39	1.38	0.81 to 2.34	
L scale	.017*	.007	5.27	1.02	1.00 to 1.03	
NEGE-P × L interaction	.014	.019	0.566	1.01	0.98 to 1.05	7.87*
INTR	−.007	.013	0.33	0.99	0.97 to 1.02	
L scale	.017	.007	4.99	1.02	1.00 to 1.03	
INTR × L interaction	.001	.001	1.58	1.00	1.00 to 1.00	7.31
INTR-D: Disengagement	.270**	.065	17.03	1.31	1.15 to 1.50	
L scale	.024**	.008	10.14	1.02	1.01 to 1.04	
INTR-D × L interaction	−.007	.005	2.55	0.99	0.98 to 1.00	26.59**
INTR-LS: Low Sociability	−.105*	.049	4.68	0.90	0.82 to 0.99	
L scale	.022**	.008	7.48	1.02	1.01 to 1.04	
INTR-LS × L interaction	.013**	.004	12.71	1.01	1.01 to 1.02	23.57**
INTR-LD: Low Diligence	−.099	.093	1.13	0.91	0.73 to 1.09	
L scale	.018*	.007	5.97	1.02	1.00 to 1.03	
INTR-LD × L interaction	.001	.007	0.01	1.00	0.99 to 1.02	6.76

Note. PSY-5 = Personality Psychopathology Five (Harkness et al., 1995); CI = confidence interval; AGGR = Aggressiveness; PSYC = Psychoticism; DISC = Disconstraint; NEGE = Negative Emotionality/Neuroticism; INTR = Introversion/Low Positive Emotionality. The dependent measure of employment status was coded 0 = still employed, 1 = fired or conditional offer withdrawn. All predictors were centered before being entered into the regression models.
*$p < .05$. **$p < .01$.

TABLE 4: Point-Biserial Correlations Between PSY-5 Scales and Facets and Employment Outcomes for Officers Grouped According to their Scores on L (Cut Score ≥ 55T)

	Employment Status[a]		*On-the-Job Misconduct*[b]	
MMPI-2 Scale	*L < 55 (n = 226)*	*L ≥ 55 (n = 374)*	*L < 55 (n = 224)*	*L ≥ 55 (n = 365)*
Aggressiveness (AGGR)	.25**	.14*	.01	.00
Assertiveness	–.05	.04	.07	.15*
Instrumental Aggression	**.27****	**.04**	.02	–.04
Grandiosity	.22**	.12	.03	–.03
Disconstraint (DISC)	**.20***	**.03**	.01	.02
Norm violation/Antisocial	**.30****	**.04**	–.04	–.02
Impulsivity/Low Harm Avoidance	–.18*	–.05	.14	.14*
Psychoticism (PSYC)	.29**	.18**	–.13	–.04
Psychotic Experiences	.21**	.10	–.13	–.07
Paranoia	.25**	.17**	–.12	.00
Mistrust/Withdrawal	.24**	.17**	–.05	–.02
Negative Emotionality/Neuroticism (NEGE)	**.29****	**.06**	–.12	–.09
Irritability/Dysphoria	**.31****	**.08**	–.12	–.08
Phobias	.05	.06	–.18*	–.05
Introversion/Low Positive Emotionality (INTR)	–.04	.02	–.01	–.02
Disengagement/Anhedonia	.22**	.13	–.09	–.10
Low Sociability	**–.17***	**.00**	.07	.01
Low Diligence/Hypomania	–.04	–.03	–.02	.01

Note. MMPI-2 = Minnesota Multiphasic Personality Inventory–2 (Butcher et al., 1989); PSY-5 = Personality Psychopathology Five (Harkness et al., 1995). Pairs of correlation coefficients in the same row are in bold differ significantly at the $p < .05$ (two-tailed test) level.
a. Employment status: 0 = still employed, 1= fired or conditional offer withdrawn.
b. Misconduct: 0 = no misconduct, 1 = misconduct.
*$p < .01$. **$p < .001$.

Positive-impression-management effects also varied by facet for NEGE and INTR. The NEGE Irritability/Dysphoria facet was a significant predictor of being forced to leave the agency in both of the honest respondent groups ($r_{pb} = .31$, $p < .001$, for L and $r_{pb} = .20$, $p < .001$, for K). For INTR, the Disengagement/Anhedonia facet tended to be positively correlated with being forced to leave the agency in the honest respondent groups ($r_{pb} = .22$, $p < .001$, for L; $r_{pb} = .19$, $p < .001$, for K), whereas the Low Sociability facet was associated with still being employed in the honest respondent groups ($r_{pb} = –.17$, $p < .01$, for L; $r_{pb} = –.08$, *ns*, for K). Although these effects are small in size, their difference in direction suggests that the INTR total score represents a combination of these opposing effects.

The PSYC total and facet scores were all significant predictors of being forced to leave the agency in the honest respondent groups. The effects were smaller in the positive-impression-management groups for each of the PSYC facets, although the difference in the size of the effect between the honest and positive impression management groups was never large enough to reach statistical significance (see Table 4 and 5).

With respect to the predictive validity of the PSY-5 total scores, the AGGR, PSYC, and NEGE total scores performed as well as their strongest individual facets in predicting being forced to leave the agency. The DISC and INTR total scores consistently demonstrated smaller effects than their facets because they contained facets that were both positively and negatively associated with being forced to leave the agency.

On-the-job misconduct. Separating officers into honest and positive-impression-management groups had little impact on the relation between the PSY-5 scores and on-the-job misconduct.[3]

TABLE 5: Point-Biserial Correlations Between PSY-5 Scales and Facets and Employment Outcomes for Officers Grouped According to their Scores on K (Cut Score ≥ 65T)

	Employment Status[a]		*On-the-Job Misconduct*[b]	
MMPI-2 Scale	*K* < 65 (n = 451)	*K* ≥ 65 (n = 149)	*K* < 65 (n = 446)	*K* ≥ 65 (n = 143)
Aggressiveness (AGGR)	**.23****	**–.04**	.01	–.06
AGGR: Assertiveness	.00	.01	.14*	.01
AGGR: Instrumental Aggression	**.18****	**–.11**	–.03	–.06
AGGR: Grandiosity	**.21****	**–.04**	.00	–.07
Disconstraint (DISC)	**.14***	**–.14**	–.02	.08
DISC: Norm Violation/Antisocial	**.18****	**–.13**	–.08	.10
DISC: Impulsivity/Low Harm Avoidance	–.11	–.06	**.17***	**–.04**
Psychoticism (PSYC)	.25**	.13	–.11	.01
PSYC: Psychotic Experiences	.17**	.01	–.11	–.04
PSYC: Paranoia	.21**	.20*	**–.08**	**.12**
PSYC: Mistrust/Withdrawal	.23**	.12	–.06	.02
Negative Emotionality/Neuroticism (NEGE)	.18**	.02	–.13*	–.13
NEGE: Irritability/Dysphoria	**.20****	**.01**	–.13*	–.08
NEGE: Phobias	.03	.14	**–.14***	**.07**
Introversion/Low Positive Emotionality (INTR)	.00	.02	–.05	.09
INTR: Disengagement/Anhedonia	.19**	.07	–.13*	.00
INTR: Low Sociability	–.08	.00	.04	.06
INTR: Low Diligence/Hypomania	–.02	–.06	–.02	.07

Note. MMPI-2 = Minnesota Multiphasic Personality Inventory–2 (Butcher et al., 1989); PSY-5 = Personality Psychopathology Five (Harkness et al., 1995). Pairs of correlation coefficients in the same row are in bold differ significantly at the $p < .05$ (two-tailed test) level.
a. Employment status: 0 = still employed, 1= fired or conditional offer withdrawn.
b. Misconduct: 0 = no misconduct, 1 = misconduct.
*$p < .01$. **$p < .001$.

For L, two of the measures showed small significant correlations with on-the-job misconduct but only in the positive-impression-management group ($r_{pb} = .15$, $p < .01$, for AGGR Instrumental Aggression; $r_{pb} = .14$, $p < .01$, for DISC Impulsivity). For K, DISC Impulsivity again showed a small but statistically significant correlation with misconduct, but this time the effect was observed in the honest respondent group ($r_{pb} = .17$, $p < .01$). AGGR Assertiveness was also a small significant predictor of misconduct in the honest respondent group for K ($r_{pb} = .14$, $p < .01$).

RELATIVE RISK RATIOS FOR THE MOST PROMISING PSY-5 MEASURES

We calculated relative risk ratios for four PSY-5 measures to help translate the correlation findings into a metric that may be more useful for practice. We focused on three PSY-5 total scores for these analyses (e.g., AGGR, NEGE, PSYC) because these measures showed some of the strongest effects in this study, and scores for the total scales are more widely available to practitioners (via computer scoring programs) than scores from the facets. We also calculated risk ratios for the DISC Norm Violation/Antisocial facet because it was one of the strongest predictors in the study. Because predictive effects were notably stronger in the honest responders than in the positive-impression-management responders, we report risk information for honest responders only (using groups based on the L < 55T cut score). All of the risk ratios focus on predicting being forced to leave the agency, because no PSY-5 measure was a noteworthy predictor of on-the-job misconduct.

TABLE 6: Relative Risk for PSY-5 Measures in Honest Responders (L < 55T) for Predicting Being Forced to Leave the Agency

PSY-5 Scale (Cut Score)	*Risk if Elevated (%)*	*Risk if Not Elevated (%)*	*Relative Risk Ratio*	*95% Confidence Interval*
AGGR (≥ 55T)	41.5	21.4	1.94	1.26 to 2.98
AGGR (≥ 60T)	62.1	20.8	2.98	2.01 to 4.42
PSYC (≥ 55T)	47.7	20.9	2.29	1.50 to 3.48
PSYC (≥ 60T)	55.6	23.6	2.36	1.46 to 3.81
NEGE (≥ 55T)	45.8	23.8	1.93	1.17 to 3.18
NEGE (≥ 60T)	38.5	25.3	1.52	0.74 to 3.13
DISC:N (≥ 9)	42.1	22.9	1.84	1.17 to 2.90
DISC:N (≥ 11)	63.6	24.2	2.63	1.59 to 4.36

Note. PSY-5 = Personality Psychopathology Five (Harkness et al., 1995); AGGR = Aggressiveness; PSYC = Psychoticism; NEGE = Negative Emotionality/Neuroticism; DISC = Disconstraint; DISC:N = DISC Norm Violation/Antisocial facet. $N = 226$.

Relative risk ratios are reported in Table 6. We calculated relative risk information for PSY-5 cut scores of 55T and 60T to facilitate comparisons with Sellbom et al.'s (2007) relative risk ratios for the RC scales. The raw scores selected for the DISC Norm Violation/Antisocial facet were based on *T*-score equivalents reported by Arnua et al. (2004). In the context of this study, the relative risk ratio provides information about how much more likely applicants scoring at or above the PSY-5 measure cut score were to be forced to leave the agency than those scoring below the PSY-5 cut score. For example, 41.5% of applicants scoring at or above 55T on AGGR were eventually forced to leave their agencies, compared to 21.4% of those scoring below 55T. The relative risk ratio for AGGR ≥ 55T is 1.94, which is equal to 41.5 divided by 21.4.

Nearly all of the relative risk ratios were in the 2.00 range, indicating that applicants with scores above the cut were about twice as likely to be forced to leave the agency compared to those with lower scores (see Table 6 for specific risk ratio values). For several PSY-5 measures, more than half of the applicants scoring above the cut score ended up being forced to leave the agency (e.g., AGGR ≥ 60T, PSYC ≥ 60T, DISC Norm Violation/Antisocial ≥ 11). Although these values are impressive, relatively few applicants scored this high ($n = 29$, 23, and 11, respectively). Together, these findings indicate that evaluators should not expect to see high scores on these measures among applicants; however, when they do, the applicant may be at a high risk for being forced to leave the agency.

DISCUSSION

PREDICTIVE VALIDITY AND POSITIVE-IMPRESSION MANAGEMENT

Several MMPI-2 PSY-5 scales and facet scores demonstrated small to medium levels of predictive validity for identifying law enforcement officers who would eventually be forced to leave their agencies. However, many of the PSY-5 measures were moderately to strongly associated with measures of positive impression management, and the predictive effects for the PSY-5 measures were often apparent only among officers who responded openly to the MMPI-2. Although we expected DISC and AGGR scores and facets to be the strongest predictors of officer employment outcomes, effects for these measures were similar to those for PSYC and NEGE for predicting being forced to leave the agency among those classified as

honest according to L and/or K. In the sample as a whole, the DISC Assertiveness facet and DISC Impulsivity/Low Harm Avoidance were the strongest predictors (absolute value) of on-the-job misconduct, but these effects were small in size (uncorrected $r_{pb} < .20$). Overall, the PSY-5 scales and facets were not especially useful for predicting on-the-job misconduct.

The strongest predictive effects for the PSY-5 measures in this study were for applicants who scored below 55T on the L scale. However, fewer than 38% (226 of 600) of the applicants scored below 55T. Together, these findings suggest that the PSY-5 scales may be of only limited value in the officer hiring process. Specifically, they suggest that PSY-5 scores should be considered only when applicants did not engage in positive impression management (as measured by L < 55).

Although researchers and practitioners expect positive impression management in many testing situations (Graham, 2006; Greene, 2000; Varela et al., 2004), published studies rarely examine how positive impression management is associated with predictive validity (see Edens & Ruiz, 2006, for one example). Findings from the current study suggest that effects from existing MMPI-2 and law enforcement studies may be misleading because of the failure to account for positive impression management. It is possible, however, that the attenuated predictive validity that was observed in the current study is a characteristic of the PSY-5 measures in law enforcement hiring samples rather than of the MMPI-2 as a whole. For example, it may be that other MMPI-2 scales, such as the RC scales, are less susceptible to positive impression management and would not show the same pattern of moderated effects we observed in this study. We encourage future researchers in this area to examine the extent to which positive impression management may moderate the relation between personality test scores and officer outcomes.

The reason the PSY-5 scales appear to be especially prone to positive impression management is not entirely clear. It may be that the PSY-5 measures possess a high degree of face validity. Therefore, it is very clear to most job applicants when items on these measures are asking about traits or behaviors that would make them unfavorable candidates for employment. Another possible explanation is that the high correlations are attributable to extensive item overlap between the PSY-5 and positive-impression-management measures. There are five NEGE items (all on the Irritability facet) that also scored on K, which may help explain the –.77 correlation between K and NEGE and the –.78 correlation between K and the Irritability facet. However, none of the other PSY-5 scales or facets contains a notable number of L or K items. None of the L and K items overlaps with PSYC. The DISC Antisocial History facet and the NEGE Irritability facet both include one item that is also scored on L, and the AGGR Grandiosity facet and the DISC Antisocial facet both include one item that is also scored on K. The INTR scale includes three items scored on K (two on the Low Diligence facet, one that is not scored on a facet). Nearly all of these item overlaps would lead to negative correlations between the PSY-5 and positive-impression-management scales. The only exception is for INTR and K, in which the item overlap would lead to a positive correlation. Thus, item overlap appears to account for some, but not all, of the covariance between the PSY-5 and positive impression management measures.

CONSTRUCT VALIDITY OF THE PSY-5 FACETS

The current study is the first study we know of that has examined the predictive validity of the Arnau et al. (2005) PSY-5 facet scales in any context. Findings from the current study do suggest that the PSY-5 facet scores may be more informative than total scores, at least

in law enforcement officer samples. In the current study, separating the PSY-5 scores into facet scores was especially useful for DISC and INTR. DISC and INTR both contained facets that were positively correlated with being forced to leave the agency and facets that were negatively correlated with being forced to leave the agency. They also both contained facets that were positively associated with positive impression management and other facets that were negatively associated with positive impression management.

PSYC was the only PSY-5 measure in which all of the facets were associated with being forced to leave the agency and all of the correlations were in the same direction (i.e., positive). AGGR and NEGE both contained facets that were and were not predictive of positive impression management and being forced to leave the agency. However, the total scores for these measures appeared to be as predictive as their strongest facets, which was not true for DISC and INTR.

Although findings from the current study provide some support for using the PSY-5 facets in law enforcement screening, they also highlight some potential problems with the reliability of the facets. Of the 13 facet scores, only one had an internal consistency value greater than .80 (.81 for Irritability/Dysphoria). Moreover, internal consistency values were .50 or lower for 8 of the 13 facets. These internal consistency values were much lower than those reported in the facet scale development samples (Arnau et al., 2005) and also lower than those reported by cross-validation researchers who have been critical of the psychometric properties of the facets (Quilty & Bagby, 2007). However, the internal consistency values for the original PSY-5 scales were also much lower than those reported in previous research (Harkness et al., 2002). Internal consistency values were lower than .70 for three of the five PSY-5 scales (AGGR, DISC, INTR) and greater than .80 for only one (NEGE). One factor that likely contributed to these low internal consistency values is range restriction. The standard deviation values for each of the PSY-5 scales and 11 of the 13 facets were lower in this study than they were in the MMPI-2 normative sample (e.g., Arnau et al., 2004; Harkness et al., 2002). Because range restriction attenuates correlations and internal consistency is a function of the average correlation between items and the number of items, the internal consistency values in this sample should be lower than those in the normative sample.

Regardless of the reason why internal consistency for the PSY-5 measures was often poor in this sample, it is important to recognize that the low levels of internal consistency limit the extent to which we can expect the measures to predict any criterion. Although it is possible for a set of uncorrelated items to all predict the same thing, this is unlikely. The relation between reliability coefficients and validity coefficients is well known in classical test theory, and it is possible to correct correlations for unreliability. However, as Schmitt (1996) has pointed out, the impact of unreliability on the size of validity coefficients is not as large as people sometimes assume. For example, using a measure with an internal consistency value of .49, the upper limit of the validity coefficient is still large ($r = .70$; Schmitt, 1996). Although strong internal consistency is a desirable property of most measures, low reliability may not be "a major impediment" to a measure's use if it "has other desirable properties, such as meaningful content coverage of some domain" (Schmitt, 1996, p. 352). Thus, the low levels of internal consistency in this study are cause for concern, but it is still possible for measures with these low values to be useful. Indeed, one of the stronger predictors of employment status in this study was the AGGR Instrumental Aggression facet ($r = .27$ for L < 55T), despite its low level of internal consistency ($\alpha = .47$).

LIMITATIONS AND FUTURE RESEARCH

Perhaps the biggest limitation of the current study is that that we were not able to examine the performance of several MMPI-2 measures that may be useful for predicting law enforcement officer hiring outcomes. For example, Sellbom et al. (2007) recently found that several RC scales were useful for predicting several types of officer misconduct. It would have been useful to compare the performance of the PSY-5 to the RC scales in this sample, especially to consider whether the RC scales were less susceptible to positive impression management and were able to predict outcomes among applicants with elevated L and K scores. Likewise, we were not able to examine whether the Superlative Self-Presentation (S) scale, a positive-impression-management measure of "extreme virtue and absence of psychopathology" (Butcher & Han, 1995, p. 28) was a more useful indicator of positive impression management than L and K. Butcher and Han (1995) developed the S scale specifically for hiring contexts (using data from airline pilots). Although S correlates very highly with K (r = .81 for men, .92 for women) in the MMPI-2 normative sample, S may prove to be more effective than L and K for identifying positive impression management in employment samples. Unfortunately, the data available for this study did not allow us to score the S or RC scales for officer applicants.

A second limitation of the study is that we have no information about the reliability of the supervisor reports of officer misconduct. Perhaps the most important goal of the employment screening process for law enforcement officers is to identify officers who are at risk for engaging in behaviors that could lead to social or financial liability for the agency (Davis & Rostow, 2002). The failure of the PSY-5 measures to identify officers at risk for misconduct in this study suggests that they may be of only limited utility for law enforcement officer screening. Indeed, Sellbom et al. (2007) were able to predict some types of officer misconduct, such as citizen complaints, rude behavior, abuse of authority, and missing court appearances. Although the PSY-5 may not be related to officer misconduct, it is possible that the absence of statistically significant predictive effects for officer misconduct in this study was attributable to unreliability of the supervisor reports of misconduct. For example, the supervisor reports may have been incorrect because they confused officers with one another or forgot incidents of misconduct for some officers. This is a common limitation of law enforcement officer research. For example, Varela et al. (2004) found that more than half of the studies included in their meta-analysis of law enforcement officer performance used subjective ratings of officer performance as a criterion measure. However, nearly all of these studies failed to report information about the reliability of the supervisor reports, a trend that is also evident in more recent research in this area (see, e.g., Sellbom et al., 2007). Although the absence of information about the reliability of subjective job performance evaluations suggests that effects of using this type of criterion may be attenuated because of low levels of reliability, Varela et al. (2004) found that effects from studies using subjective ratings were not significantly different from those objective measures of performance.

A related limitation that was also present in this study was range restriction in personality measure scores, which is a common characteristic of law enforcement officer hiring studies (Chibnall & Detrick, 2003; Hiatt & Hargrave, 1988; Inwald & Brockwell, 1991; Sellbom et al, 2007). When we corrected correlations for range restriction in the PSY-5 measures, they tended to be, as expected, somewhat stronger predictors of employment outcomes than noncorrected correlations. We did not correct correlations for

range restriction in the positive-impression-management groups because the purpose of those analyses was to show that PSY-5 measures should not be expected to predict outcomes for applicants who intentionally limit the range of symptoms they report (i.e., those who engage in positive impression management). Our analyses comparing the correlations between officers in the positive-impression-management and honest responders groups are one way to gauge the practical importance of range restriction, because they show that elevated scores may be predictive of outcomes in subgroups of applicants whose scores do not show a significant amount of range restriction (i.e., subgroup of applicants who do not engage in positive impression management).

A final limitation is that the PSY-5 facets examined in this study (Arnau et al., 2004, 2005) may be replaced by a revised set of facet scores. Arnau and colleagues are working on a revised set of facet scales (R. Arnau, personal communication, April 9, 2009), although their research describing the development of the revised scales has not yet been published. It may be that these revised facet scales will prove to have stronger psychometric properties than the original facets. If that is the case, the revised facets may turn out to be more useful predictors of officer employment outcomes than the original facets.

CONCLUSION

The modest predictive effects for the most effective PSY-5 scales and facets in the honest responder (non-impression-management) officer groups were similar in size to effects found in previous law enforcement officer research with existing MMPI-2 measures (O'Brien, 1996; Varela et al., 2004). Although the PSY-5 measures were statistically significant predictors of being forced to leave the agency, they were not meaningful predictors of the types of on-the-job misconduct that are of greatest concern to law enforcement agencies (Davis & Rostow, 2002). In addition, they were significant predictors of being forced to leave the agency only for the subset of officers who do not engage in positive impression management.

Our rationale for examining the predictive validity of the PSY-5 for predicting law enforcement officer applicant outcomes was that the effects for most existing MMPI-2 scales in this area were small because of the fact that few of those undergoing testing are likely to exhibit the types of severe psychopathology that the commonly used scales were designed to detect. The relatively small effect sizes for the PSY-5 in this research, as well as their susceptibility to positive impression management, suggest that the PSY-5 do not represent a clearly significant advance for predicting law enforcement officer performance. Recent research with the RC scales suggests that they, as opposed to the PSY-5, may represent an important advance in this area (see Sellbom et al., 2007), although future research is needed to examine the extent to which the effects for RC scales are moderated by positive impression management.

NOTES

1. Officers who were fired or forced to resign and those whose conditional hiring offers were withdrawn were collapsed into a single group of officers who were forced to leave the agency because of the similarity of their Personality Psychopathology Five (PSY-5; Harkness et al., 1995) scores: Cohen's $d = .07$ (Aggressiveness [AGGR]), .32 (Psychoticism [PSYC]), .02 (Disconstraint [DISC]), .25 (Negative Emotionality/Neuroticism [NEGE]), and .13 (Introversion/Low Positive Emotionality [INTR]).

2. The PSY-5 scores of officers who resigned were very similar to those of officers who were still employed: Cohen's $d = .14$ (AGGR), .10 (PSYC), .01 (DISC), .11 (NEGE), and .07 (INTR).

3. Possible explanations for the small effects observed for on-the-job misconduct are that (a) effects would be stronger if we had used the number of incidents of misconduct as the performance measure, rather than any versus no misconduct, and (b) there may be predictive effects for certain types of misconduct but not for others. We examined these possibilities and found that the PSY-5 measures were not associated with misconduct, regardless of how we defined it.

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