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Predicting Postprobationary Job Performance of Police Officers Using CPI and MMPI-2-RF Test Data Obtained During Preemployment Psychological Screening

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ABSTRACT

We examined associations between prehire California Psychological Inventory (CPI) and prorated Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF) scores (calculated from MMPI profiles) and supervisor ratings for a sample of 143 male police officers. Substantive scale scores in this sample were meaningfully lower than those obtained by the tests' normative samples in the case of the MMPI-2-RF and meaningfully higher in the case of the CPI (indicating less psychological dysfunction). Test scores from both instruments showed substantial range restriction, consistent with those produced by members of the police candidate comparison groups (Corey & Ben-Porath, 2014; Roberts & Johnson, 2001). After applying a statistical correction for range restriction, we found a number of meaningful associations between both CPI and MMPI-2-RF substantive scale scores and supervisor ratings. For the MMPI-2-RF, findings for scales from the emotional dysfunction and interpersonal functioning domains of the test were particularly strong. For the CPI, findings for scales indicating conformity with social norms, integrity, and tolerance were strong, as were the findings for an index indicating risk of termination. Hierarchical regression analyses showed that MMPI-2-RF and CPI scores complement each other, accounting for incremental variance in the prediction of job-related variables over and above each other. Implications of these findings for assessment science and practice are discussed.

In the United States, law enforcement officers are charged with the important task of upholding the laws of federal and local governments and of ensuring the safety of civilians within their jurisdictions. As a means of enforcing the law and protecting citizens, law enforcement officers are bestowed police powers that give them broad authority to use force and to conduct invasive searches and seizures under certain conditions. When this authority is misused, public safety is compromised and public trust in law enforcement is damaged.

Currently, preemployment screening of police applicants is standard practice nationally (Scharf, 2006). A recent national survey of law enforcement agencies indicates that a psychological evaluation is required by 72% of departments overall and 98% of departments serving at least 25,000 residents (Bureau of Justice Statistics, 2010). Several states have legislated or regulated specific standards for the psychological screening of police candidates, with California having the most comprehensive and detailed standards (Corey & Borum, 2013).

The California Commission on Peace Officers Standards and Training (POST) regulates the screening process for police candidates in the state. POST Regulation 1955, Section (d)(2) mandates that all police candidates "shall be evaluated, at a minimum, against *job-related* psychological constructs" (Spillberg & Corey, 2017, p. 26, italics added). POST's regulations further require that

all police candidates are administered at least two self-report instruments: one designed to assess normal personality features and the other a measure of abnormal functioning (California POST Commission Regulation 1955). California POST procedures are frequently emulated in other states (Corey, 2016).

Corey (2016) surveyed police psychologists nationwide and found that the most frequently administered test of abnormal psychological functioning was the Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF), which was used in over 44% of police candidate evaluations, followed closely by the MMPI-2 at 37%. The most frequently administered test of normal psychological functioning was the California Psychological Inventory (CPI), which was used in over 42% of evaluations. Of the CPIs included in the sample, over 70% were scored as the CPI Police and Public Safety Report (CPI-PPSR), the specialized selection report featured in this article. The MMPI-2-RF as well as the CPI-PPSR are the subject of this investigation and are described next.

The minnesota multiphasic personality inventory-2 restructured form

The MMPI-2-RF (Ben-Porath & Tellegen, 2008/2011) was released in 2008 as an updated version of the MMPI-2.

Development of the test began after release of the Restructured Clinical (RC) Scales (Tellegen et al., 2003), which are psychometrically improved measures of the major distinctive core constructs assessed by the MMPI-2 Clinical Scales. The MMPI-2-RF was designed to provide a measure representative of all clinical constructs potentially assessed by the MMPI-2 item pool, and was developed with updated test construction techniques similar to those used to derive the RC Scales.

Several studies published to date support the utility of MMPI-2-RF scale scores in prehire police officer assessments (see Ben-Porath, Corey, & Tarescavage, 2017, for a detailed review). For example, Sellbom, Fischler, and Ben-Porath (2007) investigated how prehire MMPI-2 scores, including the RC Scales that now form the core of the MMPI-2-RF, predicted posthire integrity problems and misconduct in a group of 291 male police officers. They found statistically significant zero-order correlations ranging in magnitude from .15 to .19 between MMPI-2 Clinical Scale scores and future problems such as deceptiveness, conduct unbecoming, and inappropriate sexual attitudes. Findings for the RC Scales were typically more robust, with statistically significant correlational magnitudes ranging from .15 to .29 with similar problems, as well as citizen complaints, internal affairs complaints, and involuntary departure, among other negative outcomes. One other notable aspect of the Sellbom et al. (2007) study is that these authors described and illustrated how test scores in their study were range restricted insofar as the composition of the hired officer sample was affected by several preselection and selection factors, a study characteristic that attenuated correlation coefficients.

Range restriction is common in the test scores of police candidates as several factors work together to restrict the variance of test scores. This restriction of range is the result of preselection, selection, and attrition factors. Preselection occurs before the police officer candidate undergoes the psychological evaluation, such that individuals are removed from further consideration by way of prescreening mechanisms such as the civil service cognitive test, the physical agility exam, or the preoffer background review. Selection occurs afterward based on the preemployment psychological evaluation and other postoffer mechanisms (e.g., postoffer background check, postoffer polygraph examination, and medical review). Of particular relevance to this investigation, selection factors include the evaluators' partial reliance on psychological test scores (including the MMPI and CPI-480 instruments used at the time of screening) to make decisions regarding candidates' suitability for employment as an officer.

For these reasons, the range of scores in samples available for studies of this type is substantially restricted, which in turn results in correlations between prehire psychological test scores and posthire criteria that are artifactually attenuated (i.e., diminished) insofar as their ability to serve as validity estimates is concerned (cf. Anastasi & Urbina, 1997; see Tarescavage, Fischler, et al., 2015, for an expanded discussion of preselection and selection factors in this setting). Sellbom et al. (2007) applied a formula derived by Hunter and Schmidt (2004) that yields estimates of correlation coefficients disattenuated for

range restriction and found that corrected correlations between RC Scale scores and misconduct ranged from .22 to .60, meaningfully higher than the uncorrected zero-order correlations (ranging from .15–.29).

The CPI police and public safety screening report

The CPI is a self-report questionnaire designed to measure normal-range human behavior. The CPI (Gough, 1957) was originally published as a 480-item test. In subsequent revisions the author did not add items; rather, he only removed items, allowing the CPI-434 to be scored from CPI-480 protocols (Gough & Bradley, 2002).

The CPI-434, which is the basis of the CPI-PPSR (Roberts & Johnson, 2001), consists of 434 true-false items representing concepts that are commonly used to describe and understand human behavior (Gough & Bradley, 2002). The CPI-434 contains 20 folk scales that measure features of individuals and interpersonal functioning (Groth-Marnat, 2009). These include scales measuring constructs highly relevant to psychological domains of the police officer position, including Dominance (Do), Self-Control (Sc), Sociability (Sy), Social Presence (Sp), Independence (In), Empathy (Em), Responsibility (Re), Socialization (So), Tolerance (To), and Achievement via Conformance (Ac; Gough & Bradley, 1996). In addition, the CPI-434 also provides "special-purpose" scales that are also directly relevant to the police officer position including Managerial Potential (Mp), Work Orientation (Wo), Amicability (Ami), Anxiety (Anx), Narcissism (NAR), Leadership (Lp), and Law Enforcement Orientation (Leo; Gough & Bradley, 2002).

The CPI-PPSR is intended for use as one component of a psychological selection battery for police and other public safety positions. The CPI-PPSR was developed with the support of the CPI's author, Harrison Gough. The CPI-PPSR reports the same scale information as obtained in the standard CPI-434, but in addition provides "comparison profiles" that are based on large normative samples of (a) police officer applicants, and (b) police officer applicants who went on to be hired and who successfully maintained employment from 1 to 30 years or more (Roberts & Johnson, 2001).

In addition to these normative comparison features, the CPI-PPSR introduced the Integrity (Itg) scale (Gough, Bradley, & Roberts, 1998) and eight suitability risk statements (Johnson & Roberts, 2001), which are not included in the standard CPI-434. The Itg scale was developed in a study investigating the criterion of having lied about recent illegal drug use in a sample of police officer applicants to a major Midwestern police department (Gough et al., 1998). The eight empirically derived CPI-PPSR risk statements include Probability of Involuntary Departure, Probability of Being Rated "Poorly Suited" by Psychologists with Expertise in Public Safety Screening, as well as six risk statements devoted to predicting life history problems in the areas of job performance, integrity, anger management, alcohol use, illegal drug use, and substance abuse (Roberts & Johnson, 2001).

The CPI has demonstrated utility in the preemployment psychological evaluation of police candidates. Hargrave and Hiatt (1989) examined associations between prehire CPI-480 profiles and a criterion measure of negative job history. The

results of the study indicate that incumbent officers who did not have serious problems on the job (e.g., illegal behavior, use of excessive force, etc.) scored significantly higher on scales measuring Socialization (So) and Self-Control (Sc; Hargrave & Hiatt, 1989). Effect sizes ranged from medium to large (Cohen, 1988).

Sarchione, Cuttler, Muchinsky, and Nelson-Gray (1998) also examined associations between prehire CPI-434 profiles and dysfunctional job behaviors among law enforcement officers. The authors found that the control group scored significantly higher on scales measuring Responsibility (Re), Socialization (So), and Self-Control (Sc; Sarchione, Cuttler, Muchinsky, & Nelson-Gray, 1998). Effect sizes corrected for range restriction were moderate (Sarchione et al., 1998). Building on this study, Cuttler and Muchinsky (2006) examined associations between prehire CPI-434 profiles and police officer disciplinary actions. They found that officers in the control group scored significantly higher on measures of Responsibility (Re), Socialization (So), and Self-Control (Sc; Cuttler & Muchinsky, 2006). However, effect sizes for each of the three scales were small, even after correction for range restriction (Cuttler & Muchinsky, 2006).

Examining the CPI-PPSR, Fischler (2004) investigated the associations between prehire CPI-PPSR profiles and police officer performance. The author found that sustained internal affairs complaints were associated with lower scores on Self-Control (Sc) and Work Orientation (Wo), and higher risk probability values on the risk indicators Integrity Problems, Involuntary Departure, and Poorly Suited (Fischler, 2004). Citizens' complaints were associated with lower scores on Well Being (Wb), Achievement via Conformance (Ac), and Work Orientation (Wo). "Involuntary departure" or being terminated from the job as an officer was associated with lower scores on Achievement via Conformance (Ac), and Work Orientation (Wo), and higher values on the risk indicators Poorly Suited, and Involuntary Departure (Fischler, 2004).

This study

The literature reviewed thus far supports the utility of the CPI-PPSR and the MMPI-2-RF as measures of normal and abnormal psychological functioning of police candidates, respectively. However, at present there is no research investigating the utility of two measures when used together during prehire psychological assessments of police officers, as required by the California POST and practiced in many jurisdictions. The purpose of this study is twofold. First, we sought to extend prior research on these two tests as independent measures of constructs associated with subsequent officer problem behaviors. To this end, we calculated zero-order correlations between both MMPI-2-RF substantive scale scores and CPI-PPSR substantive scale scores and risk statement values with supervisor ratings of posthire job performance and job problems in this sample. To account for the effect of range restriction described earlier, we also calculated correlations disattenuated for range restriction, as detailed by Hunter and Schmidt (2004) and done in previous studies in similar settings using the MMPI (Sellbom et al., 2007; Tarescavage, Corey, & Ben-Porath, 2015a) and Personality Assessment Inventory (Lowmaster & Morey, 2012). To

examine the practical utility of the correlate results, we also calculated relative risk ratios.

Second, to determine the utility of these tests used in combination, we performed several incremental validity analyses. Specifically, we conducted a series of hierarchical regressions in which the outcome variables were regressed on CPI-PPSR and MMPI-2-RF scores. In half of these regression analyses MMPI-2-RF scores were entered in the first block, whereas in the other half of these analyses the CPI-PPSR scores were entered in the first block. Given the research reviewed earlier on the utility of both tests in this setting and that they measure different ranges of psychological functioning, we expected that these analyses would identify significant incremental contributions of each measure beyond the other in the prediction of criteria.

Method

Participants

The initial sample included 196 police officers (146 men, 50 women) who were employed by a large West Coast police department at the time the criterion data were collected in 1991. These officers were administered the CPI-480 and the original MMPI during the hiring process according to standard procedures. Because of the small number of female officers, we only conducted analyses with the male sample. Two male police officers produced invalid MMPI protocols and were excluded ($CNS > 14$ or $F > 14$; Tarescavage, Corey, & Ben-Porath, 2015b) and one male police officer produced an invalid CPI protocol and was excluded (unanswered items > 24 ; Groth-Marnat, 2009), yielding a final sample of 143 hired male police officers with valid MMPI and CPI protocols. Ages ranged from 19 to 46 years ($M = 26.0$, $SD = 4.3$). Seven individuals did not report their age. A plurality of the sample was White (46.9%), with the remaining individuals reporting Asian (19.6%), African American (10.5%), Hispanic (18.9%), and other (2.8%) ethnicities. Two individuals declined to respond to the ethnicity question (1.4%). The ethnic breakdown in the research sample is consistent with the representation of ethnic groups in the CPI-PPSR's nationwide normative sample. Test administration date data were available for 136 individuals. Based on the test administration date, it is estimated that tenure on the job ranged from 1 year to 7 years ($M = 5.3$, $SD = 2.0$).

Predictor measures

CPI-PPSR

The CPI-PPSR was developed by Roberts and Johnson under a license from the publisher of the CPI, CPP, Inc. The CPI-PPSR, in addition to providing the standard scales available on the CPI-434 that measure features of individuals and interpersonal psychological functioning, includes a scale assessing Integrity (Itg) and eight risk statements (Roberts & Johnson, 2001). The Itg scale was developed in a study investigating the criterion of having lied about recent illegal drug use in a sample of 2,202 police officer applicants to a major Midwestern police department (Gough et al., 1998). A combination of item-level empirical analysis and clinical judgment was utilized to develop

the 46-item scale. A follow-up cross-validation study with a sample of 2,296 recruits indicated minimal shrinkage (Gough et al., 1998).

The eight empirically derived CPI-PPSR risk statements include Probability of Involuntary Departure, Probability of Being Rated "Poorly Suited" by Psychologists with Expertise in Public Safety Screening, as well as six risk statements devoted to predicting life history problems in the areas of job performance, integrity, anger management, alcohol use, illegal drug use, and substance abuse. The equation yielding the predicted risk of involuntary departure was developed by Roberts and Johnson (2001) in a job outcome study with a negative outcome group that included officers who had been terminated or forced to resign during the academy, probationary year, or full employment (Roberts & Johnson, 2001). The Probability of Being Rated "Poorly Suited" by Psychologists with Expertise in Public Safety Screening was developed in a study with a control group of applicants who were rated as suitable for public safety employment and a negative outcome group of those who were rated as "poorly suited" (Roberts & Johnson, 2001). The remaining six risk indicators were developed in a single study with a sample of 37,700 public safety applicants. The risk equations were developed using multiple logistic regression analyses and each dependent variable was constructed to differentiate between applicants who reported a history of the designated problem behaviors versus those who did not (Roberts & Johnson, 2001).

MMPI-2-RF

The MMPI-2-RF (Ben-Porath & Tellegen, 2008/2011) is a broadband self-report measure with 338 true-false items. It has 51 scales, 9 of which assess protocol validity concerns including random responding, acquiescent responding, counteracquiescent responding, overreporting, and underreporting. The 40 substantive scales are organized hierarchically in five domains: (a) Emotional Dysfunction, (b) Thought Dysfunction, (c) Behavioral/Externalizing Dysfunction, (d) Somatic/Cognitive Complaints, and (e) Interpersonal Functioning. At the broadest level of the hierarchical structure, the three higher order scales measure emotional, thought, and externalizing dysfunction (broadly defined). At the next level of the hierarchy, the RC Scales measure core psychopathological constructs associated with the MMPI-2 Clinical Scales. Interpretation of the RC Scales is enhanced by the interpretive hierarchy's next level, which includes the MMPI-2-RF's Specific Problems Scales. These scales measure several narrower constructs, most of which are associated with ones assessed by the RC Scales. Rounding out the MMPI-2-RF, the Personality Psychopathology 5 Scales measure broad domains of abnormal personality as delineated by Harkness and McNulty (1994) and recently reviewed by Harkness, Finn, McNulty, and Shields (2012). The test also has two interest scales, which were not included in the analyses.

The MMPI-2-RF and the CPI have 80 identical items and 15 similar items. To some extent, this property of the two instruments would limit the extent to which scores from the tests' scales could account for unique variance in regression analyses. However, it is important to note that scores from the two instruments were derived from two separate test

administrations (i.e., of the MMPI and the CPI). Accordingly, scores from the two instruments do not have shared error variance. Moreover, these identical items might not produce the same meaning when aggregated into different scales that measure different constructs.

Criterion measures

Supervisor rating forms were completed by officers' supervisors, who included sergeants and lieutenants. Behavioral anchors were established for each rated area, and every supervisor and manager completing the ratings was provided face-to-face training in how to use the behavioral anchors to formulate their rating. Each rating criterion employed a Likert-type scale. To promote truthful responding, a trusted member of the department was enlisted to work with the police union and police management to implement a rating system that would provide meaningful criteria, and to ensure that the results would not affect the rated officers' career with the department. See Table S1 for a list of rating criteria and descriptions of the construct measured. In most cases (60%), more than one evaluator rated officers on separate supervisor rating forms. In these cases, the ratings were averaged. Intraclass correlation coefficients for the subset of cases with multiple raters were above .20 for the majority of the criteria (with the relatively low magnitude reflecting the range restriction as discussed earlier). However, the intraclass correlation coefficients approximated zero for some criteria, including illegal drug abuse, excessive disability use, theft, unethical behavior, and favoritism or discrimination. Therefore, these criteria were removed from the analyses.

Procedures

Supervisors completing the supervisor rating forms were limited to those who knew the participant's work quality well. Raters typically supervised seven officers per shift, and had the opportunity to observe them perform their duties in the field. Supervisors who produced the ratings were assigned to all three shifts (day, swing, and midnight) and worked 4 of every 7 days of the week. Ratings were collected from all supervisors who were able to provide ratings for a given participant. As indicated in Table S1, we reverse-coded some of the items from the survey for the purpose of our analyses so that all survey items indicated dysfunctional behavior at the high end.

The CPI-480 protocols used in this study were converted to CPI-PPSR reports, which are based on the CPI-434 instrument. The CPI-434 includes only items included in the CPI-480 and the corresponding scales of the two instruments have been shown empirically to be highly associated (Gough & Bradley, 2002). The original MMPI protocols were used to estimate MMPI-2-RF scale scores using a method developed and validated by Tarescavage, Corey, and Ben-Porath (2016). Briefly, 13 MMPI-2-RF scales have all of their items included in the MMPI booklet. For the remaining scales, these authors used a prorating method to estimate MMPI-2-RF raw scores from MMPI responses.

For example, RC3 (Cynicism) has 15 items, but only 12 of these are included in the MMPI item pool. If an individual in this sample responded to all 12 of these items in the keyed direction (e.g., 100%), their prorated RC3 score would be 15 (15 & 1.00). In this study, we present data for the 13 scales that are completely represented in the MMPI item pool as well as the prorated scales that passed the fidelity checks in the study by Tarescavage, Corey, and Ben-Porath (2016). These authors found that Variable Response Inconsistency (VRIN-r), True Response Inconsistency (TRIN-r), Behavioral/Externalizing Dysfunction (BXD), Cognitive Complaints (COG), Suicidal/Death Ideation (SUI), Helplessness/Hopelessness (HLP), Stress/Worry (STW), Substance Abuse (SUB), and Disaffiliativeness (DSF) did not pass their fidelity checks and were therefore excluded from this study.

Results

Descriptive findings

We first calculated means and standard deviations for the prorated MMPI-2-RF scores as well as the CPI folk scales, CPI research and special-purpose scales, integrity scale, and risk statement scores. We compared this sample's scores on these measures against the normative samples for the tests. Mean differences yielding a moderate effect size according to Cohen's (1988) guidelines were interpreted (Cohen's $d \geq .50$).

MMPI-2-RF

MMPI-2-RF scale descriptive statistics for this sample are presented in Table S2. In comparison to normative sample T scores (which, by definition, have $M = 50$, $SD = 10$), the Uncommon Virtues (L-r) and Adjustment Validity (K-r) underreporting validity scales were meaningfully higher by 8 and 14 T score points, respectively. Accordingly, most of the MMPI-2-RF substantive scales were meaningfully lower (by 5 T score points or more) than the normative sample. The most pronounced differences (of 10T or more) occurred on scales measuring internalizing dysfunction (e.g., Demoralization, Dysfunctional Negative Emotions, and Negative Emotionality/Neuroticism).

CPI

CPI scale descriptive statistics for this sample are presented in Table S3. In comparison to normative sample T scores, the Good Impression (Gi) scale, which is an indicator of a defensive and minimizing response set caused by excessive positive impression management, was meaningfully higher by 19 T score points. Consequently, scales on which lower scores are typically indicative of negative interpersonal functioning had mean scores higher (by 5 T score points or more) than the average normative sample scores (50T for all) for nearly all substantive scales. The most pronounced differences (of 15T or more) occurred on the scales Law Enforcement Orientation, Managerial Potential, and Tough-mindedness. For substantive scales and prediction equations where higher scores are typically negative indicators, mean scores were meaningfully lower than average normative sample scores for all scales and prediction

equations. The most pronounced differences (10T or more) on the substantive scales were observed on the Hostility and Counterproductivity scales.

Correlations

Next, we calculated zero-order correlations between both the MMPI-2-RF and CPI scales with the supervisor rating criteria described in Table S1. We interpreted statistically significant ($p < .05$) and practically meaningful zero-order correlations with $r \geq .15$, the criterion used in a study of the MMPI in police officer selection (Sellbom et al., 2007) as well as a comprehensive MMPI-2 correlate study in an outpatient mental health setting (Graham, Ben-Porath, & McNulty, 1999). Of note in this context, this cutoff was deemed a conservative indicator of practically meaningful findings because our sample produced range restricted scores on the MMPI-2-RF and CPI substantive scales, thus artifactually attenuating the resulting correlations (cf. Tarescavage, Corey, & Ben-Porath, 2016; Sellbom et al., 2007). Moreover, in both studies just mentioned, correlations of this magnitude yield practically meaningful findings. For example, Sellbom and colleagues (2007) reported substantially increased risk for receiving citizen complaints (relative risk ratio = 3.01, $p < .05$) associated with higher scores on RC3, which had a zero-order correlation of .15 with this criterion.

We also calculated correlations disattenuated for range restriction using formulas derived by Hunter and Schmidt (2004). Three pieces of information are needed to apply the formula: (a) the zero-order correlation between the MMPI-2-RF or CPI-PPSR scale score and supervisor rating criterion, (b) the standard deviation of the MMPI-2-RF or CPI-PPSR scale score in this sample, and (c) the standard deviation of the MMPI-2-RF/CPI-PPSR scale score in the general population (i.e., the unrestricted standard deviation). For example, as reported later, the zero-order correlation between MMPI-2-RF Thought Dysfunction and Sick Leave Abuse in this sample was .23. The standard deviation in this sample for Thought Dysfunction (THD) was 6.7 (the restricted standard deviation) and the general population standard deviation is by definition 10T (the unrestricted standard deviation). Inserting these values into the formula derived by Hunter and Schmidt (2004) yields a corrected correlation of .33, which is the best estimate of the validity of THD scores as predictors of sick leave abuse. Normative information has been used in this manner to estimate the unrestricted validities of scale scores in other studies (Sellbom et al., 2007; Tarescavage et al., 2015a).

MMPI-2-RF

Interpreted zero-order and disattenuated correlations between the MMPI-2-RF substantive scales and supervisor ratings are presented in Table 1 and all correlations are presented in Tables S4 through S6. The findings are summarized here by substantive scale measurement domains, which include (a) Emotional Dysfunction, (b) Thought Dysfunction, (c) Externalizing Dysfunction, (e) Interpersonal Dysfunction, and (f) Somatic/Cognitive Dysfunction. Scale names and abbreviations are presented in Table 1.

Several robust associations were observed in the Interpersonal and Externalizing Dysfunction domains. Cynicism (RC3) was positively associated with problems relating to

Table 1. Summary of interpreted correlations with supervisor rating of postprobationary police officer.

Correlates	CPI scale/index (uncorrected <i>r</i> /corrected <i>r</i>)	MMPI-2-RF scale (uncorrected <i>r</i> /corrected <i>r</i>)
Job knowledge	Py – Psychological Mindedness (-.19/- .29) Leo – Law Enforcement Orientation (.17/.23)	IPP – Interpersonal Passivity (-.17/- .24) AGGR-r – Aggressiveness (.20/.27) NEGE-r – Negative Emotionality/Neuroticism (-.17/- .28)
Written communication	To – Tolerance (-.18/- .26) Ai – Achievement via Independence (-.25/- .35) Fx – Flexibility (-.19/- .19)	MLS – Malaise (.19/.40) ANP – Anger Proneness (.17/.34)
Verbal communications	Cs – Capacity for Status (-.28/- .40) To – Tolerance (-.32/- .42) Ai – Achievement via Independence (-.30/- .41) Py – Psychological Mindedness (-.22/- .33) v3 – Ego Integration (-.26/- .34) Mp – Managerial Potential (-.19/- .27) Ami – Amicability (-.23/- .34) Hos – Hostility (.19/.24) Itg – Integrity (-.21/- .27) Anger Problems (.17/.24) Poorly Suited (.17/.28) Involuntary Departure (.24/.52)	RC3 – Cynicism (.18/.19) GIC – Gastrointestinal Complaints (.18/.99) AGG – Aggression (.17/.23) FML – Family Problems (.20/.26) IPP – Interpersonal Passivity (-.22/- .31) AGGR-r – Aggressiveness (.20/.28)
Problem solving/decision making	Cs – Capacity for Status (-.24/- .35) To – Tolerance (-.28/- .38) Ai – Achievement via Independence (-.18/- .26) Py – Psychological Mindedness (-.26/- .38) v3 – Ego Integration (-.20/- .27) Ami – Amicability (-.18/- .28) Hos – Hostility (.17/.22) Itg – Integrity (-.18/- .24) Involuntary Departure (.18/.42) Sc – Self Control (-.18/- .24) Ami – Amicability (-.23/- .34) Poorly Suited (.18/.30) Involuntary Departure (.25/.53)	RC3 – Cynicism (.17/.18) FML – Family Problems (.17/.22) IPP – Interpersonal Passivity (-.23/- .32) AGGR-r – Aggressiveness (.24/.33)
Driving skill	Sc – Self Control (-.18/- .24) Ami – Amicability (-.23/- .34) Poorly Suited (.18/.30) Involuntary Departure (.25/.53)	N/A
Patrol responsibility Officer safety Control of conflict	N/A N/A Do – Dominance (.19/.26) Sy – Sociability (.17/.27) Py – Psychological Mindedness (-.20/- .31) Fx – Flexibility (-.19/- .19) v1 – Internality (-.23/- .27) Nar – Narcissistic Personality (.20/.22) Lp – Leadership Potential (.20/.37) Itg – Integrity (-.25/- .32) Involuntary Departure (.24/.52)	AGG – Aggression (.17/.24) AGG – Aggression (.24/.33) IPP – Interpersonal Passivity (-.22/- .31) AGGR-r – Aggressiveness (.26/.35)
Reliability	Cs – Capacity for Status (-.17/- .26) Nar – Narcissistic Personality (.17/.19) Itg – Integrity (-.18/- .24)	RC3 – Cynicism (.19/.20) AGG – Aggression (.18/.24) IPP – Interpersonal Passivity (-.23/- .32) AGGR-r – Aggressiveness (.26/.35)
General appearance	Do – Dominance (.17/.23) Sy – Sociability (.17/.27) So – Socialization (-.21/- .38) v1 – Internality (-.18/- .21) So3 – Good Memories of Home and Family (-.21/- .29) Itg – Integrity (-.17/- .22) Involuntary Departure (.26/.54)	N/A
Relations with coworkers	In – Independence (.27/.45) So – Socialization (-.18/- .33) Itg – Integrity (-.21/- .27) Involuntary Departure (.25/.53)	IPP – Interpersonal Passivity (-.22/- .30) AGGR-r – Aggressiveness (.26/.35)
Relations with citizens	To – Tolerance (-.20/- .29) Ai – Achievement via Independence (-.18/- .26) Fx – Flexibility (-.25/- .25) Nar – Narcissistic Personality (.17/.19) Hos – Hostility (.19/.24) Itg – Integrity (-.25/- .32) Involuntary Departure (.24/.52)	AGG – Aggression (.18/.25) IPP – Interpersonal Passivity (-.26/- .36) AGGR-r – Aggressiveness (.36/.47)
Excessive/unnecessary force	Do – Dominance (.25/.33) In – Independence (.17/.31) Wb – Well Being (.23/.57) Ac – Achievement via Conformance (.20/.34) Lp – Leadership Potential (.26/.46)	N/A

(Continued on next page)

Table 1. (Continued)

Correlates	CPI scale/index (uncorrected <i>r</i> /corrected <i>r</i>)	MMPI-2-RF scale (uncorrected <i>r</i> /corrected <i>r</i>)
Alcohol abuse	So – Socialization (–.18/–.33) So2 – Optimism (–.19/–.26) Substance Abuse (.17/.23) Illegal Drug Use (.25/.39) Integrity Problems (.18/.28)	DISC-r – Disconstraint (.17/.22)
Sexual problems Sick leave abuse	Involuntary Departure (.21/.47) LEO – Law Enforcement Orientation (–.21/–.28)	ANP – Anger Proneness (.19/.37) THD – Thought Dysfunction (.23/.33) RC8 – Aberrant Experiences (.19/.28) GIC – Gastrointestinal Complaints (.24/1.24) SFD – Self Doubt (.17/.34) AXY – Anxiety (.17/.40) PSYC-r – Psychoticism (.24/.33) JCP – Juvenile Conduct Problems (.24/.31)
Dishonesty/lack of integrity	So – Socialization (–.24/–.42) v2 – Norm Favoring (–.18/–.23) So3 – Good Memories of Home and Family (–.22/–.30)	
Personal relationship problems	Ai – Achievement via Independence (–.17/–.25) Cp – Counterproductivity (–.19/–.30) So4 – Interpersonal Awareness and Situational Sensitivity (–.19/–.20) Involuntary Departure (.18/.42)	N/A

Note. All correlates are statistically significant ($p < .05$). Correlations to the left in parentheses are zero-order; correlations to the right are disattenuated for range restriction. CPI = California Personality Inventory; MMPI-2-RF = Minnesota Multiphasic Personality Inventory-2-Restructured Form.

verbal communications, problem solving, and reliability. Family Problems (FML) was positively associated with issues relating to verbal communications and problem solving. Scores on the Interpersonal Passivity (IPP) scale were negatively associated with problems relating to job knowledge, verbal communications, problem solving, control of conflict, reliability, relations with coworkers, and relations with citizens. Among the Externalizing Dysfunction scales, Juvenile Conduct Problems (JCP) was positively associated with dishonesty and lack of integrity. The Aggression (AGG) scale was positively correlated with problems relating to verbal communication, patrol responsibility, officer safety, reliability, and relations with citizens. The Aggressiveness (AGGR-r) scale was positively associated with problems in these areas as well. Finally, Disconstraint (DISC-r) was positively associated with alcohol problems.

Among scales in the Emotional Dysfunction domain, the most prominent associations were found among the Specific Problems Scales. Anger Proneness (ANP) was positively associated with poor written communication and sexual problems. High scores on Anxiety (AXY) were correlated with sick leave abuse, as were high scores on Self-Doubt (SFD). Negative Emotionality/Neuroticism (NEGE-r) was negatively associated with poor job knowledge. In the Thought Dysfunction domain, the higher order scale THD was positively associated with sick leave abuse, as were the Aberrant Experiences scale (RC8) and Psychoticism (PSYC-r). Among the Somatic/Cognitive scales, Malaise (MLS) was positively associated with written communication problems and Gastrointestinal Complaints was positively correlated with both poor verbal communication and sick leave abuse.

CPI

Interpreted zero-order and disattenuated correlations between CPI-PPSR scales, prediction equations, and the rating criteria are presented in Table 1 and all correlations are presented in Tables S7 through S10. The findings generally converged with

expectations but are summarized here for the sake of brevity. The summary of results beginning with the CPI-PPSR prediction equations followed by the standard sequence of CPI-PPSR scale clusters and special-purpose scales is presented next.

Among the CPI-PPSR prediction equations, Probability of Involuntary Departure (PID) had the most robust findings. Meaningful correlations were observed among PID and poor verbal communication, driving skill, control of conflict, general appearance, relations with coworkers, and relations with citizens, as well as with sexual problems and personal relationship problems. Other meaningful correlations included the prediction equation Probability of Having Background Problems Related to Illegal Drug Use (Illegal Drug Use) with alcohol abuse.

Within the Interpersonal Style cluster of CPI folk scales Dominance (Do) and Independence (In) had positive correlations with control of conflict and excessive force problems. Additionally, Capacity for Status (Cs) was associated with poor verbal communication, reliability, and problems with problem solving and decision making. Finally, the vector scale measuring Internality (v1) was associated with poor control of conflict.

The findings of the Normative Orientation cluster included meaningful correlations among Socialization (So) and poor relations with coworkers, alcohol abuse, and dishonesty and lack of integrity. Tolerance (To) was also meaningfully correlated with poor verbal communication, relations with citizens, and problem solving and decision making. Other findings included associations between Favorable Memories of Family and Childhood (So3) and dishonesty and lack of integrity; Interpersonal Awareness and Situational Sensitivity (So4) and personal relationship problems; and Norm-Favoring (v2) and dishonesty and lack of integrity.

Within the group of Special Purpose Scales a number of robust results were observed. Integrity (Itg) showed a strong association with poor verbal communication, reliability, general appearance, relations with coworkers, relations with

citizens, control of conflict, and problem solving and decision making. Other meaningful results included correlations among Amicability (Ami) with poor verbal communication and problem solving and decision making, and Hostility (Hos) with poor verbal communication and relations with citizens.

Relative risk ratios

To investigate the practical utility of estimated MMPI-2-RF scale scores and the CPI-PPSR scores, we next calculated relative risk ratios (RRR) with the criteria. For the MMPI-2-RF, we used cutoffs of $\geq 65T$, $60T$, $55T$, $50T$, and $45T$ for positive correlations (as well as $< 39T$ and $33T$ for negative associations). For the CPI scales, we used cutoffs of $< 60T$, $55T$, $50T$, and $45T$ for negative correlations (as well as $\geq 65T$, $70T$, and $75T$ for positive associations). For CPI-PPSR risk statements we utilized cutoffs of \geq the risk score corresponding to approximately the 80th, 85th, 90th, and 95th percentiles in the police officer applicant comparison group normative sample. The RRR values are calculated by dividing the risk of a negative supervisor rating for individuals who score at or above the cutoff by the risk of a negative supervisor rating for individuals who score below the cutoff. Because these analyses require dichotomous criteria, we recoded as a 1 job performance ratings of 4 (*unacceptable*) and 3 (*needs improvement*), and we recoded as a 0 job performance ratings of 2 (*acceptable*) and 1 (*better than acceptable*). Along the same lines, we recoded as a 1 problem behavior ratings of 2 (*serious indications*) and 1 (*minor indications*), and we recoded as a 0 problem behavior ratings of 0 (*no indications*). We calculated 95% confidence intervals (CIs) for the RRRs, which indicate nonsignificant findings if the range overlaps with 1.0 (meaning one cannot reject the null hypothesis that there is an equal risk of negative

outcome for both groups). We only calculated RRRs for scales that were interpreted (statistically significant associations with $r \geq .15$). Finally, only RRRs that yielded selection ratios between 3% and 20% were calculated to reduce the risk of outliers affecting the results and to decrease the likelihood of false positives, respectively.

Tables 2 and 3 present RRRs for the MMPI-2-RF and CPI-PPSR, respectively, that met the just described selection criteria. To save space, we only provided the statistically significant findings. All RRR findings can be found in Tables S11 (MMPI-2-RF) and S12 (CPI-PPSR). Overall, the RRR analyses yielded significant findings for a number of MMPI-2-RF and CPI-PPSR scales. For the MMPI, significant findings were observed primarily at cutoffs ranging from $55T$ through $65T$. For example, individuals who scored at or above a T score of 55 on AGG were at 5.6 times greater risk to have problems with verbal communications than were officers who scored below the cutoff. Similarly, officers who scored at or above a T score of 65 on RC3 were over 8 times more likely to have problems with verbal communications. For the CPI, significant findings were observed at cutoffs ranging from $45T$ through $55T$ for negative correlations and at $70T$ for positive correlations. For example, individuals who scored at or below a T score of 50 on So (Socialization) were at 7.9 times greater risk to have problems with dishonesty and lack of integrity. Similarly, officers who scored at or above a T score of 70 on Do (Dominance) were 4.4 times more likely to have problems with controlling conflict.

Incremental validity analyses

Finally, we conducted a series of hierarchical regressions in which the supervisor ratings were regressed on CPI-PPSR and MMPI-2-RF scores. The results of these analyses are summa-

Table 2. Male officer estimated Minnesota Multiphasic Personality Inventory-2-Restructured Form statistically significant relative risk ratios with job performance and problem behaviors.

Scale	Cutoff (\geq)	SR	BR	Criterion	Risk if elevated	Risk if not elevated	RRR	95% CI
THD	55T	8.5%	9.2%	Sick leave abuse	25.0%	7.7%	3.250*	[1.03, 10.23]
RC3	65T	4.9%	7.0%	Verbal communications	42.9%	5.2%	8.265*	[2.70, 25.31]
RC3	65T	4.9%	9.8%	Problem solving/decisions	42.9%	8.1%	5.299*	[1.90, 14.78]
RC3	60T	9.2%	7.0%	Verbal communications	23.1%	5.4%	4.253*	[1.25, 14.50]
RC3	60T	9.1%	9.8%	Problem solving/decisions	30.8%	7.7%	4.000*	[1.46, 10.98]
RC3	50T	16.2%	7.0%	Verbal communications	17.4%	5.0%	3.449*	[1.06, 11.27]
RC8	55T	7.0%	9.2%	Sick leave abuse	30.0%	7.6%	3.960*	[1.29, 12.12]
SFD	60T	2.8%	9.2%	Sick leave abuse	50.0%	8.0%	6.273*	[2.02, 19.46]
ANP	50T	2.1%	2.8%	Sexual problems	33.3%	2.2%	15.444*	[2.19, 108.87]
AGG	60T	2.2%	4.3%	Officer safety	33.3%	3.7%	9.067*	[1.47, 55.78]
AGG	55T	10.6%	7.0%	Verbal communications	26.7%	4.7%	5.644*	[1.79, 17.76]
AGG	55T	10.5%	11.9%	Reliability	33.3%	9.4%	3.556*	[1.45, 8.71]
AGG	50T	10.6%	7.0%	Verbal communications	26.7%	4.7%	5.644*	[1.79, 17.76]
AGG	50T	10.5%	11.9%	Reliability	33.3%	9.4%	3.556*	[1.45, 8.71]
FML	55T	7.0%	7.0%	Verbal communications	30.0%	5.3%	5.657*	[1.72, 18.59]
IPP	39T	8.4%	9.8%	Problem solving/decisions	33.3%	7.6%	4.367*	[1.61, 11.84]
IPP	39T	7.9%	7.9%	Control of conflict	36.4%	5.4%	6.701*	[2.31, 19.4]
AGGR	60T	12.6%	9.8%	Relations with citizens	27.8%	7.2%	3.858*	[1.45, 10.23]
AGGR	55T	2.1%	9.8%	Relations with citizens	33.3%	9.3%	3.590*	[0.67, 19.30]
PSYC	55T	7.7%	9.2%	Sick leave abuse	36.4%	6.9%	5.293*	[1.94, 14.45]

Note. $N = 143$. Table presents the 20 statistically significant relative risk ratios (60 total); SR = selection ratio; BR = base rate; RRR = relative risk ratio (RRR); CI = confidence interval; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; RC3 = Cynicism; RC8 = Aberrant Experiences; MLS = Malaise; SFD = Self-Doubt; AXI = Anxiety; ANP = Anger Proneness; JCP = Juvenile Conduct Problems; AGG = Aggression; FML = Family Problems; IPP = Interpersonal Passivity; AGGR = Aggressiveness-Revised; PSYC-r = Psychoticism-Revised; DISC-r = Disconstraint-Revised.

*Statistically significant at $p < .05$.

Table 3. Male officer CPI-434 folk scales, research and special purpose scales, and PPSR prediction equations statistically significant relative risk ratios with job performance and problem behaviors.

Scale	Cutoff	SR	BR	Criterion	Risk if elevated	Risk if not elevated	RRR	95% CI
Do	≥ 70T	7.9%	7.9%	Control of conflict	27.3%	6.2%	4.398*	[1.36, 14.25]
Cs	≥ 50T	11.3%	7.0%	Verbal communications	25.0%	4.8%	5.250*	[1.66, 16.63]
So	≥ 50T	9.1%	8.4%	Relations with coworkers	30.8%	6.2%	5.000*	[1.74, 14.38]
So	≥ 50T	9.2%	6.3%	Dishonesty	30.8%	3.9%	7.938*	[2.43, 25.95]
To	≥ 50T	7.7%	7.0%	Verbal communications	27.3%	5.3%	5.104*	[1.53, 17.02]
To	≥ 55T	18.3%	7.0%	Verbal communications	19.2%	4.3%	4.462*	[1.39, 14.29]
To	≥ 50T	7.7%	9.8%	Problem solving/decisions	36.4%	7.6%	4.800*	[1.8, 12.83]
Ai	≥ 50T	4.9%	7.0%	Verbal communications	42.9%	5.2%	8.265*	[2.7, 25.31]
Ai	≥ 55T	14.8%	7.0%	Verbal communications	23.8%	4.1%	5.762*	[1.82, 18.19]
Py	≥ 50T	4.9%	7.0%	Verbal communications	28.6%	5.9%	4.821*	[1.25, 18.61]
Mp	≥ 50T	2.8%	7.0%	Verbal communications	50.0%	5.8%	8.625*	[2.63, 28.31]
Wo	≥ 55T	3.5%	7.0%	Verbal communications	40.0%	5.8%	6.850*	[1.93, 24.31]
Lp	≥ 70T	9.9%	16.9%	Excessive force	42.9%	14.1%	3.048*	[1.45, 6.39]
Itg	≥ 45T	3.6%	7.9%	Control of conflict	40.0%	6.7%	6.000*	[1.73, 20.84]
Itg	≥ 50T	10.0%	7.9%	Control of conflict	28.6%	5.6%	5.143*	[1.72, 15.41]
Itg	≥ 45T	4.2%	2.1%	General appearance	16.7%	1.5%	11.417*	[1.19, 109.08]
Itg	≥ 45T	4.2%	8.4%	Relations with coworkers	33.3%	7.3%	4.567*	[1.27, 16.41]
Itg	≥ 45T	4.2%	9.8%	Relations with citizens	50.0%	8.0%	6.227*	[2.34, 16.6]
Itg	≥ 50T	10.5%	9.8%	Relations with citizens	26.7%	7.8%	3.413*	[1.22, 9.55]
So3	≥ 45T	2.8%	2.1%	General appearance	25.0%	1.4%	17.375*	[1.95, 154.47]
So3	≥ 50T	14.1%	6.3%	Dishonesty	20.0%	4.1%	4.880*	[1.43, 16.64]
Ang	≥ 60%	9.9%	7.0%	Verbal communications	21.4%	5.5%	3.918*	[1.14, 13.47]
PID	≥ 17%	16.2%	7.0%	Verbal communications	17.4%	5.0%	3.449*	[1.06, 11.27]
PID	≥ 17%	15.8%	6.0%	Driving skills	19.0%	3.6%	5.333*	[1.45, 19.67]
PID	≥ 18%	12.0%	6.0%	Driving skills	18.8%	4.3%	4.388*	[1.16, 16.63]
PID	≥ 19%	11.2%	9.8%	Relations with citizens	25.0%	7.9%	3.175*	[1.13, 8.95]
PID	≥ 20%	9.8%	9.8%	Relations with citizens	28.6%	7.8%	3.686*	[1.33, 10.22]

Note. *N* = 143. SR = selection ratio; BR = base rate; RRR = relative risk ratio; CI = confidence interval; Do = Dominance; Cs = Capacity for Status; Sy = Sociability; In = Independence; So = Socialization; To = Tolerance; Ac = Achievement via Conformance; Ai = Achievement via Independence; Py = Psychological Mindedness; Fx = Flexibility; v1 = Self-Discipline; v3 = Ego Integration; LEO = Law Enforcement Orientation; Mp = Managerial Potential; Wo = Work Orientation; Lp = Leadership; Ami = Amicability; Itg = Integrity; So2 = Optimism; So3 = Good Memories of Home and Family; SA = Substance Abuse Proclivity; Ill = Illegal Drug Use Problems; Alc = Alcohol Problems; Ang = Anger Problems; Int = Integrity Problems; PF = Probability of Being Rated Poorly Suited by Expert Psychologists; PID = Probability of Involuntary Departure.

*Statistically significant at *p* < .05.

rized in Table 4 and reported in full in Tables S13 through S36. In the first set of analyses, we investigated the incremental validity of select CPI-PPSR scores (entered in the second blocks of the regressions) to select MMPI-2-RF scores (entered in the first blocks of the regressions) in the prediction of the 12 criteria that had interpretable correlates with scales from both tests (see Table 1). Along the same lines, in the second set of analyses, we examined the incremental validity of select MMPI-2-RF scores to select CPI-PPSR scores in the prediction of these 12 criteria. For each test, only the top four predictors (based on the magnitude of the zero-order correlates) were selected. The rationale for limiting the analyses to the top four predictors from each test is that this was the highest possible number of predictors that yielded a power value of at least .80 to detect small-to-medium incremental change in variance explained (the typical effect size seen in this literature).

In the analyses examining the incremental validity of CPI-PPSR scores to MMPI-2-RF scores, we found that the MMPI-2-RF predictors produced statistically significant adjusted *R*² values in 11 of the 12 regressions (adjusted *R*² range: .028-.116). The CPI-PPSR scores added significant incremental variance to MMPI-2-RF predictions in four of the regressions, with statistical trends being observed in an additional two regressions. In these six cases, the incremental amount of variance explained ranged from .030 to .117. For example, select MMPI-2-RF scale scores accounted for 4.2% of the variance in supervisor ratings of verbal communication problems, and the

CPI-PPSR predictors accounted for 11.7% of additional variance in the prediction of this criterion.

In the regressions examining the incremental validity of MMPI-2-RF scores to CPI-PPSR scores, we found that the CPI-PPSR predictors produced statistically significant adjusted *R*² values in 12 of the 12 regressions (adjusted *R*² range = .039-.117). The MMPI-2-RF scores added significant incremental variance to CPI-PPSR predictions in four of the regressions, with statistical trends observed in an additional three regressions. In these seven cases, the incremental amount of variance explained ranged from .018 to .073. For example, select CPI-PPSR scale scores accounted for 3.9% of the variance in supervisor ratings of sick leave abuse, and the MMPI-2-RF predictors accounted for 7.3% of additional variance.

Discussion

The purpose of this study was to investigate the criterion validity and practical utility of the CPI-PPSR and MMPI-2-RF in police candidate assessments. To this end, we reported descriptive statistics, correlations with job performance and job problem ratings, RRRs, and hierarchical regressions with both CPI-PPSR and MMPI-2-RF scales. The findings indicated that the hired police candidates in this sample produced scores that suggested less dysfunction as well as meaningfully less variability. After correcting for attenuation due to range restriction, a number of moderate to large correlations were observed

Table 4. Summary of Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) and California Personality Inventory (CPI) hierarchical regression analyses.

Criterion	First regression block	R ² _{adj}	Second regression block	R ² _{change}
Incremental validity of CPI to MMPI-2-RF				
Job knowledge	IPP, AGGR-r, NEGE-r(-)	.074	Leo(-), Py(-)	.033 ⁺
Written communications	MLS, ANP	.042	To, Ai(-), Fx(-)	.039
Verbal communications	RC3(-), FML, IPP(-), AGGR-r(-)	.042	To(-), Ai(-), Cs(-), v3	.117
Problem solving/decision making	RC3(-), FML, IPP(-), AGGR-r	.052	Cs(-), To(-), Py(-), v3(-)	.082
Control of conflict	IPP, AGGR-r	.054	Itg, PID, v1, Lp	.063 ⁺
Reliability	RC3, AGG, IPP, AGGR-r	.084	Cs(-), Nar(-), Itg(-)	.009
Relations with coworkers	IPP, AGGR-r	.055	In, So(-), Itg(-), PID	.104
Relations with citizens	AGG, IPP, AGGR-r	.116	Fx, To(-), Itg, PID	.027
Alcohol abuse	DISC-r	.020	So(-), So2, Ill, Int(-)	.042
Sexual problems	ANP	.028	PID	.030
Sick leave abuse	GIC, RC8, THD, PSYC-r	.077	Leo(-)	.016
Dishonesty/lack of integrity	JCP	.050	So(-), v2(-), So3(-)	.032
Incremental validity of MMPI-2-RF to CPI				
Job knowledge	Leo, Py(-)	.041	IPP, AGGR-r, NEGE-r(-)	.072
Written communications	To, Ai(-), Fx(-)	.046	MLS, ANP	.028
Verbal communications	To(-), Ai(-), Cs(-), v3	.103	RC3(-), FML, IPP(-), AGGR-r(-)	.067
Problem solving/decision making	Cs(-), To(-), Py(-), v3	.096	RC3(-), FML, IPP(-), AGGR-r	.040
Control of conflict	Itg, PID, v1, Lp	.078	IPP, AGGR-r	.026
Reliability	Cs(-), Nar(-), Itg(-)	.040	RC3, AGG, IPP, AGGR-r	.033
Relations with coworkers	In, So(-), Itg(-), PID	.117	IPP, AGGR-r	.031 ⁺
Relations with citizens	Fx, To(-), Itg, PID	.070	AGG, IPP, AGGR-r	.065
Alcohol abuse	So(-), So2, Ill, Int(-)	.040	DISC-r	.002
Sexual problems	PID	.038	ANP	.019 ⁺
Sick leave abuse	Leo(-)	.039	GIC, RC8, THD, PSYC-r	.073
Dishonesty/lack of integrity	So(-), v2(-), So3(-)	.051	JCP	.018 ⁺

Note. Scales shown in bold were significant predictors in the final model ($p < .05$). - = predictors had a negative standardized beta coefficients in final model. *Ns* range from 142 to 143. See Tables S13 through S36 for full results. THD = Thought Dysfunction; RC3 = Cynicism; RC8 = Aberrant Experiences; MLS = Malaise; GIC = Gastrointestinal Complaints; ANP = Anger Proneness; JCP = Juvenile Conduct Problems; AGG = Aggression; FML = Family Problems; IPP = Interpersonal Passivity; AGGR-r = Aggressiveness; PSYC-r = Psychoticism; DISC-r = Disconstraint; NEGE-r = Negative Emotionality/Neuroticism; Leo = Law Enforcement Orientation; Py = Psychological Mindedness; To = Tolerance; Ai = Achievement via Independence; Fx = Flexibility; Cs = Capacity for Status; v3 = Ego Integration; Itg = Integrity; PID = Probability of Involuntary Departure; v1 = Internality; Lp = Leadership; Nar = Narcissism; In = Independence; So = Socialization; So2 = Self-Discipline; Ill = Illegal Drug Use Problems; Int = Integrity Problems; v2 = Norm-Favoring; So3 = Good Memories of Family and Childhood.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

between the CPI-PPSR substantive scales as well as the MMPI-2-RF substantive scales, and job performance and job problem criteria assessed by the supervisor rating form. Regression analyses demonstrated the incremental utility of the two measures to one another. The practical implications of many of these correlations were quantified by RRR analyses indicating the extent that individuals scoring above or below given cutoffs had substantially increased risk of job problems and poor job performance. Several aspects of these findings warrant further discussion.

MMPI-2-RF Findings

As reflected in correlational findings reported in Table 1, and RRR analyses in Table 2, MMPI-2-RF scores were substantially associated with a number of negative outcomes. For example, focusing on the RRR analyses in Table 2 (where specific cutoffs are reported), candidates with higher THD, Aberrant Experiences (RC8), Self-Doubt (SFD), and Psychoticism-Revised (PSYC-r) T scores at the preemployment assessment were at greater risk for subsequently being rated by supervisors as abusing sick leave. Of note, the associations between MMPI-2-RF measures of thought dysfunction and problem behaviors converge with past research in this area (Tarescavage, Fischler, et al., 2015). Thought dysfunction related scores in the range observed in this study are associated with alienation and low achievement orientation (Ben-Porath, 2012), which might account for the associations with problem behaviors such as

sick leave abuse. Higher RC3 scores were associated with increased risk for verbal communications and problem-solving and decision-making problems, consistent with past research indicating cynicism is a risk factor for poor outcomes among police officers (Tarescavage, Fischler, et al., 2015).

The findings just noted and the many additional correlations reported in Table 1 are largely consistent with a growing body of literature on the job-relevant correlates of preemployment MMPI-2-RF scores of police candidates, which have been incorporated by Corey and Ben-Porath (2014) in the *MMPI-2-RF Police Candidate Interpretive Report*. Based on the RRRs presented in this study, cutoffs of 55T and 60T on scales related to problem behaviors appear to have the most utility. Some of the criteria available for this investigation (e.g., sexual behavior problems and sick leave abuse) were not included in previous investigations, thus expanding the range of empirical correlates that can be applied in police candidate assessments. Overall, these findings add to the growing literature establishing job-relevance of MMPI-2-RF scores in these assessments.

CPI findings

As with the MMPI-2-RF findings, the CPI-PPSR correlational (Table 1) and RRR analyses (Table 3) indicate that CPI-PPSR scale and prediction equation scores are substantially associated with negative outcomes. For example, as noted in the RRR analyses displayed in Table 3, candidates with higher scores on Dominance (Do) were at greater risk for subsequently being

rated by supervisors as having control of conflict problems. This finding aligns with descriptions of individuals with very high Do scores ($> 70T$) as controlling, domineering, and aggressive in the literature (McAllister, 1996). Lower Socialization (So) scores were associated with increased risk for problems relating with coworkers and with dishonesty. This finding converges with past research on law enforcement candidates indicating that low So scores are associated with being disciplined for behaviors such as insubordination, supervisory problems, and embezzlement of property (Cuttler & Muchinsky, 2006).

These findings as well as the other RRR and correlational findings presented in Tables 1 and 3 add to the body of literature supporting the use of the CPI in police candidate assessments. Additionally, this study investigates new criteria not used in any prior study of the CPI and provides additional utility in police officer assessments for both the standard CPI scales as well as the specific features of the CPI-PPSR. Based on the RRRs presented in this study, cutoffs of 50T, where low scores are associated with negative outcomes, and 70T, where high scores are associated with negative outcomes, appear to have the most utility.

Incremental validity findings

The incremental validity analyses reported in Table 3 establish that the CPI-PPSR and MMPI-2-RF provide unique, complementary information in preemployment assessments of police candidates. Scores on both tests predicted as much as 12% of additional variance in our study criteria (verbal communications problems in the case of the CPI-PPSR adding to the MMPI-2-RF, and citizen relationship problems in the case of the MMPI-2-RF adding to the CPI-PPSR). These results provide support for use of both a measure of abnormal and normal personality functioning in preemployment assessments of police candidates and specifically the MMPI-2-RF and CPI-PPSR. This practice is consistent with the requirements of the California Commission on POST, which, as noted earlier, are frequently emulated in other jurisdictions.

Practical implications and limitations

There are several practical implications of this study. The RRR analyses support the interpretation of scale scores in the moderate range as indicative of negative outcomes. For example, the CPI-PPSR analyses yielded only two interpretable RRRs with a cutoff more than 10T from the population mean of the general population. Along the same lines, the most interpretable MMPI-2-RF findings occurred at cutoffs of 55T and 60T. These results are likely a by-product of a high-stakes demand as well as the significant range restriction produced by selection and preselection factors. Despite the fact that applicants' T scores are generally within the moderate range, robust associations between CPI-PPSR and MMPI-2-RF scores and negative outcomes were observed. Given the distribution of scores observed in the police candidate context, these empirical results are useful for establishing interpretative guidelines. This study adds to the existing published research supporting the use of MMPI-2-RF and CPI-PPSR scales in public safety selection. This study also demonstrates the utility of

considering results from both instruments when formulating selection recommendations.

Notwithstanding these practical implications, this study has limitations that warrant discussion. We did not have sufficient numbers of female police candidates so analyses were conducted on a male-only sample. This could limit the generalizability of these findings to female police candidates, although approximately 85% of police candidates nationally are male (Langton, 2010). We also did not include some job performance problems and job problem criteria in the RRR analyses because of low base rates. Because of the relatively small sample size, including these variables might have skewed our results. Some of the variables that were not included because of the low base rates would have been particularly informative, as they involved more egregious problems such as illegal drug abuse and theft. For these reasons, future research should investigate predictors of these low-base-rate behaviors in larger samples.

Another limitation of the study is that it uses prorated MMPI-2-RF scores calculated from MMPI profiles. Statistical findings based on prorated scores from the MMPI are not directly equivalent to those calculated from MMPI-2-RF protocols; however, Taescavage, Corey, and Ben-Porath (2016) determined that prorated scores that passed their fidelity checks, and were consequently used in this study, were highly correlated with MMPI-2-RF scales ($r > .90$) and had a mean and standard deviation within 2T score points of the MMPI-2-RF scales in three different samples. Therefore, the prorated MMPI-2-RF scores used in this study are likely to be reasonable approximations of the constructs measured by the full MMPI-2-RF scales. The CPI was developed using a number of items from the MMPI, resulting in substantial item overlap. This overlap could serve to attenuate the incremental validity findings presented in this article. However, the results presented in this article indicate that the two instruments provide complementary information in spite of this overlap. Finally, this study uses archival data obtained from a longitudinal study completed in 1991. Use of older data might limit generalizability to current cohorts of police candidates; however, research conducted by Taescavage, Corey, et al. (2015a, 2015b) has shown comparable patterns of associations across data collections in the early 1990s and early 2010s.

In conclusion, for reasons detailed in the introduction, identification of candidates for law enforcement positions who represent an increased risk for adverse outcomes has long been the focus of police psychologists and this function has even greater significance in the current era. The research reported here provides empirical evidence of the utility and complementarity of the CPI-PPSR and MMPI-2-RF as normal and abnormal personality functioning measures for this task. It is important to note that test scores, although necessary, are not the sole (nor sufficient) source of information for the assessment and selection of police candidates. Corey and Ben-Porath (2018) described a comprehensive process for public safety candidate assessment that includes consideration of background, clinical interview, and test data. These authors noted that because they are the source with the greatest empirical validation, test results

should be afforded the most weight in these evaluations. This investigation builds on and adds to this empirical literature and makes its most important contribution in supporting the practice of relying on two assessment instruments when assessing law enforcement candidates.

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