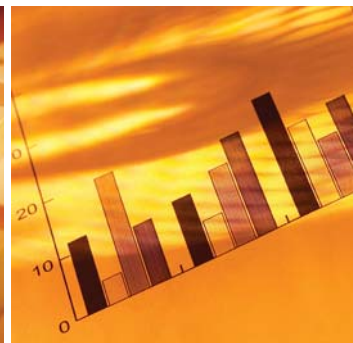
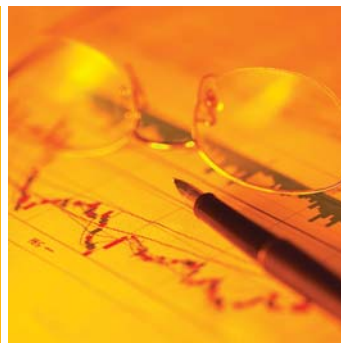


# The Prediction of Risk for Mentally Disordered Offenders: A Quantitative Synthesis

USER REPORT: 2013-01

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# Corrections Research: User Report

## **The Prediction of Risk for Mentally Disordered Offenders: A Quantitative Synthesis**

2013-01

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## **Abstract**

Mentally disordered offenders (MDOs) pose a significant challenge for forensic and correctional staff charged with managing them in a safe and humane manner. As with non-disordered offenders, it is important to recognize that not all MDOs are of equal risk and efforts must be made to differentiate the lower risk MDO from the higher risk MDO. The General Personality and Cognitive Social Learning (GPCSL) perspective of criminal behaviour (Andrews & Bonta, 1994, 2010) has had an important impact on the development of risk/need assessments for general offenders. GPCSL posits eight risk/need domains that are central to the prediction of criminal behaviour: Criminal History, Procriminal Companions, Procriminal Attitudes and Cognitions, Antisocial Personality Pattern, Education/Employment, Family/Marital, Substance Abuse, and Leisure/Recreation. Notably missing in GPCSL are mental health variables which are prominent in clinical models of MDOs. The present meta-analysis evaluated the relative predictive validities of the risk/need domains from GPCSL and variables taken from the clinical perspective. Our general conclusion is that the theoretically informed risk/need factors from GPCSL are more predictive of general and violent recidivism than the clinical factors (the one exception being antisocial personality/psychopathy).

## **Author's Note**

Julie Blais is also at the Department of Psychology, Carleton University and Holly A. Wilson is now at the Department of Psychology, Ryerson University. This report is based on a sub-sample of 126 studies and as such, not all of the analyses are presented here. A complete list of studies included in the meta-analysis is available from the first author.

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## **The Prediction of Risk for Mentally Disordered Offenders: A Quantitative Synthesis**

For many correctional systems, the incarceration and supervision of mentally disordered offenders (MDOs) are significant issues that require substantial resources (Association of State Correctional Administrators, 2012). Acknowledging the difficulties in what defines a mental disorder, prevalence rates for mental illness among prisoners are considerably higher than the rates found among the general population (Fazel & Danesh, 2002). In Canada, the results from a computerized mental health screening inventory found that 38.4% of federal prison admissions reported both a history and current high levels of psychological distress (Stewart et al., 2010). Nowhere has this become a more serious problem than in the United States where the percentage of prison inmates with a “mental condition” has risen from 16% of state prison inmates in 1998 (Ditton, 1999) to 56% of state inmates in 2005 (James & Glaze, 2006). Setting aside substance abuse as a mental health issue (estimated at approximately 55% of state and jail inmates), 15.4% of state prison inmates and 23.9% of jail inmates reported symptoms that met the criteria for a psychotic disorder (James & Glaze, 2006).

A similar picture emerges in community corrections. Summarizing U.S. statistics, Prins and Draper (2009) estimated that between 11% and 19% of probationers and parolees have a serious mental illness. This rate is up to four times the rate found among the general population. Sirdifield’s (2012) review of the literature found rates of mental illness among general probation populations varying widely (11.2% to 53%) depending upon the setting and the methodology used to assess a mental disorder. Nevertheless, the rates of mental illness among probationers were significantly higher than those found among the general population.

The increasing number of MDOs within the correctional system creates a multitude of problems. These offenders may threaten the safety of others (e.g., inmates/patients and staff) and themselves (e.g., suicide). Particularly within *correctional* settings, ensuring that MDOs are appropriately identified and provided with proper care and treatment is a significant challenge (Eno Loudon & Skeem, 2013; Wilper et al., 2009; Zinger, 2012). MDOs with a comorbid substance abuse disorder have higher parole failure rates and recidivism rates compared to the general offender population which adds to the overcrowding found in many prisons (O’Keefe & Schnell, 2007; Swartz et al., 1998).

Assessing who should be supervised more closely, who should receive treatment, and what type of treatment they should receive is fundamentally a task of offender classification and risk assessment. Researchers and administrators of assessments for MDOs may hold markedly different views about the relevance of specific risk factors and risk instruments compared to those whose primary focus is non-disordered offenders. For example, some may argue that the risk assessment of MDOs should include indicators of delusions and depend on clinical judgment whereas this would not be the case with non-disordered offenders. We turn to a brief summary of risk assessment with non-mentally disordered offenders for its instructive value for the assessment of MDOs.

## **Risk Assessment of Non-Mentally Disordered Offenders**

There are two general goals of offender risk assessment: 1) ensure the safety of the offender and others, and 2) maximize the benefits of treatment (Bonta, 2002). Both goals require making predictions of future behaviour. Decisions on who to assign to a maximum security institution, who to segregate from the general population, and who to supervise more closely, are all dependent on the predicted risk an offender poses to himself/herself and others. Although the risk of self-harm is important, the focus of this paper will be on the risk of recidivism in the community. In terms of treatment, offenders may have different treatment needs and, inherent in decisions on treatment placement, is the assumption that addressing a certain need or constellation of needs through planned intervention will reduce the probability of a negative outcome. For example, providing drug abuse treatment may not only reduce substance use but also criminal offending.

Prior to the last 30 years, assessing offenders with respect to their risk to reoffend had been guided, for the most part, by unstructured professional judgment. Clinicians, parole board members, and correctional staff were seen as the experts who could reliably distinguish lower risk offenders from higher risk offenders. Although actuarial-based assessments were evident as early as 1928, with Burgess' parole prediction scale (Burgess, 1929), the wide-spread adoption of actuarial risk scales by correctional agencies did not arise until the late 1970s and the 1980s. This change in practice occurred when it became evident that actuarial-based measures outperformed clinical judgment.

The early actuarial offender risk assessment instruments consisted mainly of static items. For example, the United States Bureau of Prison's Salient Factor Score (Hoffman, 1994) consists of six items, all of which are static (e.g., prior convictions, prior incarceration, current age). Criticisms of static risk assessment instruments have centered on their usefulness for making treatment decisions (Bonta, 1996). Although actuarial static risk instruments predict recidivism outcomes better than professional, clinical judgments (Andrews, Bonta, & Wormith, 2006; Hilton, Harris, & Rice, 2006), they say little about what needs to be done in order to reduce an offender's risk to reoffend. Knowing that the offender has a long criminal history or has never had parole revoked (common static risk factors) does not help the treatment provider in planning an intervention designed to reduce risk.

Assessment instruments for treatment classification decisions during the 1960s to the 1980s were based on broad measures of personality and cognitive abilities. For example, Megargee and Bohn's (1979) classification system used the Minnesota Multiphasic Personality Inventory to identify ten distinct personality profiles and inmates were assigned to different types of housing according to their profile. However, research on these classification systems has found mixed results in terms of their ability to predict recidivism (Andrews & Bonta, 1994).

Perhaps the most significant advancement in offender assessment arose in the late 1970s with the development of structured assessments of offender needs that were not personality dependent (Andrews, 1982; Baird, Heinz, & Bemus, 1979).

Meta-analytic summaries of the risk/need assessment instruments have demonstrated predictive validities equal to or surpassing that of other offender assessment instruments (Campbell, French, & Gendreau, 2009; Gendreau, Goggin, & Smith, 2002). In addition, treatment service providers can now identify the criminogenic needs that treatment should address in order to reduce offender recidivism (Andrews & Bonta, 2010).

### **Risk Assessment of Mentally Disordered Offenders**

Evidence-based assessments of risk to re-offend can be divided into: 1) purely actuarial, 2) structured professional judgment, and 3) theoretical-actuarial. A good example of the purely actuarial approach is the Violence Risk Appraisal Guide (VRAG; Harris, Rice, & Quinsey, 1993). The VRAG consists of 12 items that were selected based solely on their significant correlations with violent recidivism drawn from a sample of 618 MDOs. Structured professional judgment (SPJ) assessment instruments consist of items drawn from the general literature rather than a specific data sample. In addition, the overall assessment of risk is left to the professional's judgment and not a mechanistic formula (Heilbrun, Yasuhara, & Shah, 2010). An example of a SPJ instrument is the HCR-20 (Webster, Douglas, Eaves, & Hart, 1997). The HCR-20 is comprised of three scales: History (10 items), Clinical (5 items), and Risk Management (5 items). Upon reviewing the 20 items, the professional may rate the individual as low, moderate, or high risk and make subsequent recommendations on the services required.

The third type of evidence-based assessment is the theoretically informed assessment. A major model for the assessment of MDOs is the medical or clinical model (Bartlett, 2010; Otto & Heilbrun, 2002). What is common to many assessment strategies used with MDOs is the prevalence of clinical, psychopathological items. For example, the goal of a forensic interview is often to reach a diagnosis or to assess mood and cognitive function. Some clinical items are also included in SPJ and purely actuarial assessments. To illustrate, the HCR-20 has the items "active symptoms of major mental illness" and "lack of insight" and the VRAG includes a diagnosis of psychopathy.

The usefulness of the clinical model has been called into question for its weakness in both identifying relevant risk factors (Bonta, Law, & Hanson, 1998; Phillips et al., 2005) and informing treatment targets for MDOs that reduce recidivism (Morgan et al., 2012). In an early meta-analysis of risk predictors among MDOs, Bonta et al. (1998) found the presence of a mental disorder to be inversely related to both general and violent recidivism. Subsequent studies of risk factors for MDOs have also found this pattern of results although the evidence is not unequivocal (Burke, 2010; Fitzgerald, Gray, Taylor, & Snowden, 2011). Morgan et al. (2012) reviewed 26 treatment outcome studies that met certain methodological criteria. Twenty-four of the studies targeted psychopathology and only two studies targeted both psychopathology and "criminalness" (e.g., prosocial skill training). Results indicated that although mental health symptoms decreased, there was no reduction in criminal recidivism.

From both a risk prediction and a recidivism reduction perspective, symptoms of mental illness do not appear to play a major role. The reasons for this finding may be many but one possible explanation is that the factors that are a focus in the clinical model are inappropriate for the risk assessment and treatment of MDOs.

### **A General Personality Cognitive Social Learning Approach to Understanding the Risk Factors of MDOs**

In 1994, Andrews and Bonta presented a social learning perspective of criminal behaviour which subsequently developed into a General Personality and Cognitive Social Learning (GPCSL) model of criminal conduct (Andrews & Bonta, 1994; Andrews & Bonta, 2010). There are aspects to GPCSL that set it apart from mainstream criminological theories and clinical perspectives of criminal behaviour. GPCSL proposes that the causes of crime are to be found within the individual and his/her social learning environment. Although clinical models of crime also emphasize person factors, the clinical models and GPCSL differ in the *type* of psychological variables that are deemed important.

GPCSL recognizes that there are many routes to crime but some experiences in life are more influential than others. Proximal to criminal behaviour are the influences of rewards and punishments within the social contexts of education and employment, the family, leisure and recreation, and substance abuse (the use of alcohol and/or drugs). For example, the lack of employment, poor use of leisure time, substance abuse, and having at least one criminal parent have a far greater impact on the likelihood of criminal behaviour relative to one's socioeconomic conditions (although socioeconomic conditions may influence the contingencies governing employment, leisure/recreational activities, etc.). Such situations limit exposure to rewards for prosocial behaviour (e.g., if one does not have a job there is a lost opportunity to be exposed to prosocial models and to be reinforced for prosocial behaviour) and also diminish punishment for rule violating behaviour (e.g., if unemployed there may be little to lose if put in jail). Within GPCSL, the domains of education and employment, family, leisure, and substance abuse are referred to as the Moderate Four risk/need factors.

The most proximal factors influencing criminal behaviour are procriminal companions, attitudes and cognitions supportive of criminal behaviour, an antisocial personality pattern (i.e., poor self-control, early onset and diverse criminal behaviour, callous, hostile emotions, and a restless energy) and, operating in the background, a history of criminal behaviour that reflects the reinforcement history for antisocial behaviour. The GPCSL theoretical perspective views these as major determinants of criminality and they are referred to as the Big Four risk/need factors. All of these factors facilitate the commission of a criminal act but external factors in the immediate situation may also affect the outcome (e.g., an offender prepares to break into a house but a police cruiser drives by setting the offender's plan on a different trajectory).

As already noted, the traditional clinical variables of anxiety, depression, mood, and major psychotic symptoms, are salient in clinical perspectives of criminal behaviour, however, in GPCSL, such variables are minor risk factors. Drawing from GPCSL, the major risk/need factors are what Andrews and Bonta (2010) call the Central Eight risk/need factors. They are: 1) Criminal History, 2) Procriminal Companions, 3) Procriminal Attitudes and Cognitions, 4) Antisocial Personality Pattern, 5) Education/Employment, 6) Family/Marital, 7) Substance Abuse, and 8) Leisure/Recreation. The specificity of risk/need factors in GPCSL also set it apart from other social learning models that emphasize criminal behaviour as a learned behaviour in accordance with the laws of operant, vicarious, and classical conditioning without providing detail on the specific behaviours and cognitions leading to crime.

The first Central Eight factor, Criminal History, is a static, unchangeable risk factor (one cannot eliminate criminal history, only add to it). The remaining seven factors are dynamic risk factors. That is, they can change in both directions (e.g., one can find employment or lose it). The importance of these dynamic risk factors is that, in addition to being predictive of criminal behaviour, they can serve as targets for treatment programming. Treatments that successfully address these dynamic risk factors or criminogenic needs are associated with reduced recidivism (Andrews & Bonta, 2010; Andrews et al., 1990; Smith, Gendreau, & Swartz, 2009).

A number of meta-analytic reviews have found evidence for the predictive validity of the Central Eight risk/need factors and for the primacy of the Big Four over the Moderate Four risk/need factors among general offenders (Andrews & Bonta, 2010; Andrews et al., 2006; Gendreau, Little, & Goggin, 1996). In all of these reviews, indicators of psychological distress/dysfunction performed relatively poorly compared to the Central Eight (average  $r$  of .03 compared to  $r$ 's ranging from .17 to .26 for the Central Eight as summarized by Andrews & Bonta, 2010). Moreover, the Central Eight risk/need factors appear applicable to youth (Simourd & Andrews, 1994), women offenders (Andrews et al., 2012), Aboriginal offenders (Gutierrez, Wilson, Rugge, & Bonta, 2013), and sex offenders (Hanson, 2009). However, the primacy of the Big Four over the Moderate Four is not well established among these subsets of offenders. For example, in a review of the risk/need factors for women offenders, Andrews and his colleagues (2012) call for a Big Five that includes Substance Abuse. Despite the ongoing debate on the importance of the Big Four, the evidence to date supports the Central Eight risk/need factors as being applicable to a range of offenders.

One offender population on which the validity of the Central Eight has not been fully tested is the MDO population. The results from Bonta et al.'s (1998) meta-analysis of risk factors among MDOs found that clinical factors did not predict recidivism whereas risk/need factors did. They found criminal history and deviant lifestyle (consisting of the Central Eight risk/need factors of employment, family problems, and substance abuse) to be more predictive of both general and violent recidivism compared to clinical variables (psychosis, mood disorder). Based on these findings, the authors called for researchers to consider a social learning perspective in the assessment of MDOs.



## The Present Study

The primary goal of the present review is to test the predictive validity of the Central Eight risk/need factors for general and violent recidivism among MDOs. Our secondary goal is to assess the predictive validity of variables hypothesized to be important by the clinical model. Although GPCSL brings a specific perspective to criminal behaviour, it stems from a general social learning theory of human behaviour. For example, if one wished to predict success on a diet one could consider the Central Eight (e.g., history of success with dieting, attitudes towards dieting, social support for dieting, etc.). Therefore, the Central Eight is expected to generalize to a wide range of behaviours and offenders, including MDOs. Up to this point, reviews of the risk factors for MDOs have been largely atheoretical (Bonta et al., 1998; Phillips et al., 2005).

### Method

#### Study Selection

Studies included in the present meta-analysis were taken from both published and unpublished (e.g., dissertations, government reports) sources dating from January 1959 to the end of June 2011 (published in English only). Computer searches were conducted of the following databases: PsycINFO, Dissertations and Full Theses: Full text, Dissertations and Full Theses: UK and Ireland, National Criminal Justice Reference System (NCJRS), Web of Science, and Criminology. Forensic journals not included in PsycINFO at the time of the original search were searched individually: Psychology, Crime, and Law; International Journal of Comparative and Applied Criminal Justice; Crime and Justice; and Journal of Psychiatry and Law. Finally, the reference lists of accepted studies were searched for any additional studies.

In order to be selected, each study had to adhere to the following four inclusion criteria:

1. used a prospective, longitudinal design
2. sufficient statistical information to calculate the effect size (Cohen's *d*)
3. mentally disordered offender sample (at least two thirds of the total sample was identified as mentally disordered offenders)
4. at least one variable of interest was investigated for its predictive accuracy (an exception was the inclusion of studies reporting recidivism rates for samples of mentally disordered offenders compared to samples of general offenders)

Both general (any recidivism, including violent) and violent recidivism (including sexual) were specified as outcome measures. If type of recidivism was not specified, it was coded as general recidivism. Recidivism referred to any evidence of reoffending (arrests, convictions) including recommitment to a psychiatric facility due to a new (either general or violent) criminal offence.

In some cases, multiple studies reported information on the same sample of mentally disordered offenders or on various subsamples (e.g., isolating data on offenders with a primary diagnosis of schizophrenia). In order to avoid "double counting" predictors presented in multiple studies, the study with the largest sample and longest follow-up

time was chosen as the primary source and only non-overlapping predictors presented in separate studies were coded. One-hundred and twenty-six studies reporting on 96 unique samples met all of the inclusion criteria.

### **Predictor Domains and Measures**

The variables of interest were divided into two broad categories: variables related to the Central Eight risk/need factors and variables stemming from the clinical model. If a study reported two or more separate variables that represented the same underlying concept or predictor, they were aggregated into a factor score (e.g., the individual predictors of *property offence* and *violent offence* were aggregated into the factor *adult crime*). The factor scores relating to the Central Eight risk/need factors were aggregated into the eight separate domains according to the Level of Service/Case Management Inventory (LS/CMI; Andrews, Bonta, & Wormith, 2004; e.g., the factors of *adult crime* and *violent history* were aggregated into the domain *Criminal History*). When calculating factor and/or domain effect sizes, the average effect size and average base rate of all individual predictors or factors was used. See Table 1 for a list of all variables contributing to the analyses of the present study.

### **Procedure**

The task of coding studies was divided between the second and third author. In order to ensure consistent coding, 20 studies representing 23 unique samples were identified for inter-rater reliability. The kappa statistic was used when assessing the reliability of categorical variables and a two-way random effects model intraclass correlation coefficient (ICC; absolute agreement) was used when assessing the reliability of ordinal or continuous variables. Inter-rater agreement for study and sample characteristics was perfect for seven variables ( $k = 1.00$ ; ICC = 1.00; 100% agreement), high for 10 variables ( $k > .86$ ; ICC = .88; higher than 84% agreement), and fair for one variable ( $k = .64$ ). Two variables were excluded from analysis because of poor inter-rater reliability (attrition rate; ICC = .06 and percent of sample refusing to participate; ICC = .46).

Inter-rater reliability for effect sizes of individual predictors and factors was acceptable with ICC values ranging from .70 to 1.00 (83% of ICC values were above .90). All ICC values for the Central Eight domain categories were above .90 (range: .92 – 1.00).

### **Effect Size Calculation**

Findings were summarized using the standardized mean difference between two independent groups, recidivists and non-recidivists. Cohen's  $d$  was chosen over other effect size indices (e.g.,  $r$ ) given that it is less affected by varying base rates. The standard convention for interpreting  $d$  values considers values of .20 to be "small", values of .50 to be "medium", and values larger than .80 to be "large" (Cohen, 1988). If the 95% confidence interval does not contain zero, the  $d$  value is considered to be significant at the .05 level. If the 95% confidence intervals for two separate predictors do not overlap, the effect sizes can be considered significantly different from one another at the .05 level. Only variables with at least three effect sizes were included in the analyses.

When aggregating results, the averaged  $d$  values were calculated by weighting each individual  $d_i$  by the inverse of its variance, giving more weight to studies with larger samples. The variance of the weighted mean was subsequently used to calculate 95% confidence intervals. When calculating  $d_i$  from 2 x 2 tables, Formula 19 from Sánchez-Meca, Marín-Martínez and Chacón-Moscoso (2003) was used to calculate the variance with 0.5 added to each cell in order to avoid empty cells. When  $d_i$  was converted from other statistics (e.g., means, ROC areas,  $t$ ), Formula 3 taken from Hasselbald and Hedges (1995) was used to calculate the variance.

Both fixed-effect and random-effects models were calculated and presented. However, only random-effects are discussed as they provide a more conservative interpretation of the current results. Both the  $Q$  statistic and the  $I^2$  statistic were used to quantify and describe between-study variability. Whereas the  $Q$  statistic provides a measure of the significance of between-study variability, the  $I^2$  statistic provides an indication of the magnitude of this variability.  $I^2$  is presented as a percentage with 25, 50, and 75 indicating small, medium, and large proportions of variability (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006).

When effect sizes contained significant variability (as measured by  $Q$ ), the presence of outliers was considered by examining both the size of individual  $d_i$  values (specifically focusing on extreme  $d_i$  values) compared to the mean weighted effect size and the relative weight each  $d_i$  value was contributing to the mean weighted effect size ( $wss$ ; weighted sum of squares). A study was removed if, by doing so, the total variability ( $Q$ ) was reduced by 50%.

## Results

### Sample

**Descriptive statistics.** The search yielded a total of 126 studies representing 96 unique samples (several studies reported on the same sample) and over 1700 possible effect sizes for analysis (please note that not all of the studies included in the larger project will be presented in this report). The majority of the studies were published (79%) and originated from the United States (49%), followed by the United Kingdom (23%), and Canada (15%). The median year of publication was 1999 with the largest number of studies being published in 2004 ( $k = 12$ ). The average follow-up time was 4.90 years ( $SD = 3.04$ ; five studies did not report the follow-up time). The unweighted base rate was 39% and 23% for general and violent recidivism respectively.

Table 2 displays the results of sample demographics. The average sample size for MDOs was 298 ( $SD = 293$ ; range: 8 – 1175). It is important to note that several studies failed to report on pertinent demographic characteristics. When reported, the average age was 32.7 ( $SD = 5.87$ ) and the majority of the samples contained both men and women (58.1%). The average grade level achieved was 10 and 26 of the 96 samples reported a 47% employment rate. On average, 41.1% of the participants were minority offenders and 88.6% were single.

The majority diagnosis was schizophrenia and 51.6% of offenders had previously been admitted to hospital. Finally, 63% of index offences were violent in nature.

### **Predictive Validity of Domains for General Recidivism**

**Central Eight.** Table 3 displays the results for the Central Eight in predicting general recidivism among MDOs. All domain categories within the Central Eight predicted general recidivism significantly ranging from small effect sizes (e.g., Education/Employment  $d = .28$ , 95% CI = .07, .49) to moderate effect sizes (Substance Abuse  $d = .51$ , 95% CI = .37, .64). Overall, the strongest predictors of general recidivism among the Central Eight were Substance Abuse (past and current), Procriminal Attitudes and Cognitions, and Antisocial Personality Pattern. We did not have a sufficient number of studies to calculate effect sizes for Leisure/Recreation or Procriminal Companions. There were significant  $Q$  values for all Central Eight domains, except Family/Marital and Procriminal Attitudes, indicating large between study variability in effect sizes. A relatively large effect size ( $d = 1.30$ ) originating from the Harris et al. (1993) sample was identified as an outlier for Education/Employment and was subsequently removed substantially reducing the effect size (Table 3). No other studies were identified as outliers for the Central Eight domains.

Individual predictors contributing to the Central Eight domain categories were analyzed separately. Within the Education/Employment domain, problems with employment significantly predicted general recidivism ( $d = .41$ , 95% CI = .09, .72) while educational concerns ( $d = .16$ , 95% CI = -.02, .34) was not significant. Within the Family/Marital domain, both being single and having family problems were significantly predictive of general recidivism. Finally, examining the Substance Abuse domain, drug use was a significantly better predictor of general recidivism ( $d = .60$ , 95% CI = .45, .74) than issues related specifically to alcohol ( $d = .28$ , 95% CI = .12, .44), even though both predictors were significant. In cases where the type of substance abuse was not specified, having a substance abuse problem was moderately and significantly related to general recidivism ( $d = .57$ , 95% CI = .36, .78).

**Clinical model.** Results for variables stemming from the clinical model are presented in Table 4. The majority of these variables were not significant predictors of general recidivism (e.g., psychosis, mood disorder, prior admissions, psychiatric treatment). One exception was having an intellectual impairment which, after removing an outlying study, demonstrated a small positive relationship with recidivism ( $d = .26$ , 95% CI = .04, .47). Only two variables were moderately and significantly predictive of general recidivism: personality disorders (unspecified) and antisocial personality/psychopathy. In fact, across all individual predictors, having an antisocial personality disorder/psychopathic disorder was among the strongest predictors of general recidivism ( $d = .54$ , 95% CI = .43, .65). Although considered under the clinical model, antisocial personality was also aggregated into the antisocial personality pattern domain in keeping with the underlying theory of the Central Eight risk/need factors.

The relationship between mental illness and recidivism was also examined by comparing recidivism rates between MDOs versus general offenders. The presence of any mental disorder did not significantly predict general recidivism ( $d = -.09$ , 95% CI =  $-.29, .10$ ).

### **Predictive Validity of Domains for Violent Recidivism**

**Central Eight.** Table 5 displays the results for the Central Eight risk/need factors in predicting violent recidivism among MDOs. Consistent with the results for general recidivism, all domains that could be examined within the Central Eight predicted violent recidivism; the strongest predictors were Antisocial Personality Pattern ( $d = .57$ , 95% CI =  $.48, .67$ ), Procriminal Attitudes and Cognitions ( $d = .51$ , 95% CI =  $.37, .65$ ), and Criminal History ( $d = .50$ , 95% CI =  $.41, .59$ ). There were not enough studies to calculate individual effect sizes for Leisure/Recreation and Procriminal Companions. Significant between study variability was also identified for all of the Central Eight domains analyzed. Examining individual predictors within the Education/Employment domain identified problems with employment as a significant predictor of violent recidivism ( $d = .16$ , 95% CI =  $.03, .29$ ) while level of education was not significant. Within the Family/Marital domain, both marital status (i.e., single;  $d = .44$ , 95% CI =  $.30, .58$ ) and family problems ( $d = .24$ , 95% CI =  $.10, .37$ ) were moderate predictors of violent recidivism. Finally, within the Substance Abuse domain, alcohol use ( $d = .22$ , 95% CI =  $.06, .38$ ) and unspecified substance abuse ( $d = .28$ , 95% CI =  $.11, .44$ ) were significant predictors of violent recidivism while drug use was not.

**Clinical model.** The results for variables under the clinical model are displayed in Table 6. Consistent with the results for general recidivism, the majority of these variables were non-significant. Once again, the only exceptions were personality disorders (unspecified) and antisocial personality/psychopathy, which were both moderate predictors of violent recidivism ( $d = .41$ , 95% CI =  $.26, .57$  and  $d = .66$ , 95% CI =  $.52, .80$  respectively). Consistent with previous results, having any mental disorder was not predictive of violent recidivism ( $d = -.16$ , 95% CI =  $-.40, .09$ ).

## **Discussion**

The major purpose of the present meta-analysis was to test the validity of the theoretically derived Central Eight risk/need factors as applied to MDOs. This involved calculating predictive validity estimates for the Central Eight and contrasting these estimates to the predictive validity of risk factors derived from a clinical perspective of criminal behaviour. In general, the Central Eight risk/need factors were better predictors of both general and violent recidivism than the clinical factors.

### **The Central Eight Risk/Need Factors and the Prediction of Recidivism**

There were sufficient studies to test the predictive validity of six of the Central Eight risk/need factors for general and violent recidivism. There were only two studies that investigated the relationship between Procriminal Companions and general recidivism and they produced very different effect size estimates ( $d = .54$ ; Gagliardi, Lovell,

Peterson, & Jemelka, 2004 and  $d = .06$ ; Lindsay, Elliot, & Astell, 2004). No studies examining this relationship with violent recidivism were available. Although the Gagliardi et al. (2004) result was in the expected direction, the effect size from Lindsay et al. (2004) did not indicate a significant relationship between Procriminal Companions and recidivism. The latter finding may have been due to the highly specialized nature of the sample. The sample in the Lindsay et al. (2004) study consisted of 52 offenders with *intellectual* disabilities (mean IQ of 64), with approximately one-third suffering from a major mental illness (i.e., schizophrenia, manic-depression, or psychotic depression; Lindsay, Steele, Smith, Quinn, & Allan, 2006). No studies were identified for Leisure/Recreation for either general or violent recidivism. The six Central Eight risk/need factors that could be tested all demonstrated significant effect sizes for both types of outcomes.

Contrary to established findings among general offenders (Andrews & Bonta, 2010; Andrews et al., 2006; Gendreau et al., 1996), we did not find the Big Four as standing apart from the other Central Eight risk/need factors, at least in the prediction of general recidivism; all of the confidence intervals (CIs) for the six risk/needs factors overlapped. Similar results have been reported for women (Andrews et al., 2012) and Aboriginal offenders (Gutierrez et al., 2013). In the prediction of violent recidivism, there appeared to be a separation between three of the Big Four (Criminal History, Procriminal Attitudes and Cognitions, and Antisocial Personality Pattern) and the three Moderate Four that could be tested (Education/Employment, Family/Marital, and Substance Abuse). The CIs for Education/Employment and Substance Abuse did not overlap with the Big Four risk/need factors of Criminal History, Antisocial Personality Pattern, and Procriminal Attitudes and Cognitions. However, Family/Marital evidenced a small overlap in CIs with Criminal History and Procriminal Attitudes and Cognitions. The overlap in the case of Family/Marital may be due to the item of marital status. When we removed marital status from the Family/Marital domain, leaving only family problems, a significantly lower predictive validity was found (see Table 5). Taken together, these results suggest that the primary status of the Big Four may be more important to the prediction of violent recidivism compared to the prediction of general recidivism among MDOs. We do, however, make these observations with caution given the considerable variability in many of our findings.

The formulation of the Central Eight risk/need factors by Andrews and Bonta (2010) includes three broad risk/need factors that can be broken down further. However, validity assessments of these three broad factors (Family/Marital, Education/ Employment, and Substance Abuse) have always been reported in their combined form without analysis of their subcomponents. In the present study, we were able to examine the contributions of factors that make up the broader domains. We have already commented on the Family/Marital domain. Education/Employment can be separated into education only and employment only. When these risk/need factors were examined at the sub-component level, similar predictive validity estimates were found for general and violent recidivism.

When we separated alcohol and drug abuse for Substance Abuse we found that drug abuse was a significantly better predictor of general recidivism than alcohol abuse

(non-overlapping CIs). The differential importance of drug abuse as a risk/need factor may be traced to a number of factors. First, although we could not be certain from the information provided in the studies, the use of drugs likely involved illicit drugs. This situation increases the probability of contact with the criminal justice system. Illegal drug use among offender populations is estimated to be as high as 70% (Zhang, 2003). Drug possession and drug trafficking offences would be categorized as non-violent offences and this may explain why there was no differential predictive validity in effect sizes found for violent recidivism.

Second, alcohol and drug abuse are both highly prevalent among those with personality disorders, with drug abuse being more common. In a U. S. national survey, 47.7% of those with a personality disorder also had a drug use disorder compared to 28.6% with an alcohol disorder (Grant et al., 2004). Not surprisingly, personality disorders, and particularly antisocial personality disorder, are well represented in offender populations (Motiuk & Porporino, 1991; Wormith & McKeague, 1996). In an international survey of 12 countries, 47% of inmates met the criteria for a diagnosis of antisocial personality disorder (Fazel & Danesh, 2002). As we will see in the next section, antisocial personality disorder was the one clinical factor predictive of recidivism and it may be due, in part, to the correlation between drug use and antisocial personality disorder.

When we examined the subcomponents of Substance Abuse in relationship to violent recidivism we found the opposite to the results for general recidivism. Only alcohol abuse predicted violent recidivism. There is a considerable body of experimental evidence showing a causal link between alcohol intake and aggressive behaviour (Bushman & Cooper, 1990). There is also evidence, albeit correlational, that alcohol use may facilitate a wide range of antisocially violent behaviours ranging from sexual violence (Abbey, 2011) to intimate partner violence (Field, Caetano, & Nelson, 2004) and, in the extreme case, to murder (Rossow, 2004). The mechanisms underlying the alcohol-violence link are yet to be well understood and explanations include cultural norms around drinking and alcohol availability (Graham, 2011). From a psychological perspective, Norström and Pape (2010) have argued that a causal link between alcohol use and aggression may apply only to those who suppress angry feelings. MDOs may harbor hostile and angry feelings as suggested by the high prevalence rates of antisocial personality disorder, and may thus explain the significant correlation between alcohol abuse and violent recidivism observed in this review.

Our general finding that Substance Abuse was predictive of recidivism is also relevant to the treatment of MDOs. Within the GPCSL perspective, Substance Abuse is a criminogenic need and therefore a promising target for treatment. However, in a meta-analysis of 26 treatment studies for mentally ill offenders, Morgan and his colleagues (2012) found that the goals of treatment ranged from increasing insight to symptom reduction. Only two studies addressed substance abuse and neither measured recidivism as an outcome. Similarly, in another meta-analytic review of 25 studies (Martin, Dorken, Wamboldt, & Wooten, 2012), only four studies targeted substance abuse. Both reviews suggest that targeting this risk/need factor in treatment occurs infrequently while our findings emphasize that substance abuse is an important treatment target to consider.

### The Role of Clinical Variables

The predictive validity estimates of the Central Eight risk/need factors are in direct contrast to those of the clinical variables, which were substantially lower. In the meta-analytic review by Bonta et al. (1998), psychosis showed no relationship with general recidivism and a very small inverse relationship with violent recidivism. In the present expanded review, psychosis was unrelated to either type of recidivism. Bonta and his colleagues (1998) did not report specifically on schizophrenia as it was subsumed under their general variable of psychosis. We also included schizophrenia under psychosis in this review but we conducted a post hoc analysis that separated schizophrenia from our psychosis variable and found no difference in effect sizes ( $d = .01$ , CI =  $-.31, .33$ ,  $k = 9$  for schizophrenia and  $d = .00$ , CI =  $-.18, .19$ ,  $k = 13$  for non-schizophrenic psychotic disorders). There was also no difference in the prediction of violent recidivism ( $d = .04$ , CI =  $-.28, .36$ ,  $k = 6$  for schizophrenia and  $d = .05$ , CI =  $-.17, .28$ ,  $k = 9$  for non-schizophrenic psychotic disorders). Although there are certainly cases when a crime is committed during a psychotic state, the presence of psychosis cannot be viewed as a useful predictor of recidivism. The reasons for this may be because psychosis is transitory (as in the finding of NGRI, which was also not predictive of recidivism) and amenable to treatment. These results leave us to conclude that major mental illnesses are unreliable predictors of general and violent recidivism.

The major psychiatric diagnoses of schizophrenia and mood disorder showed no relationship with general or violent recidivism (CIs included zero; Table 4 and Table 6). Although both diagnoses displayed significant heterogeneity, removal of study 37 (Tennant & Way, 1984) for the factor schizophrenia eliminated the variability in this finding for general recidivism. Tennant and Way's (1984) study yielded a large effect size for schizophrenia ( $d = 1.05$ ), with 16.4% of the recidivists having a diagnosis of schizophrenia compared to only 3.2% of the non-recidivists. The remaining studies displayed effect sizes between  $-1.03$  and  $.265$ . The participants in the Tennant and Way (1984) study were drawn from male admissions to English special hospitals that housed the criminally dangerous between 1961 and 1965. The majority of the patients had both previous psychiatric hospitalizations and extensive histories of criminal convictions. A combination of frequent psychiatric hospitalizations and lengthy histories may account for why this study was identified as an outlier.

The only clinical variables that predicted recidivism were intelligence for general recidivism and antisocial personality/psychopathy for both types of recidivism. Intelligence, after removal of an outlier (study 59; Gray, Fitzgerald, Taylor, MacCulloch, & Snowdon, 2007), produced a  $d$  value of 0.26. Gray et al. (2007) was the only study that showed that lower intelligence was significantly predictive of *less* crime. However, the sample consisted of 145 mild to severely mentally retarded offenders representing an extreme end of the intelligence continuum. It has been known for some time that intelligence and crime are moderately correlated (Glueck & Glueck, 1950). Among general offenders, Gendreau et al. (1996) found a  $d$  value of 0.14 (converted from their reported  $r$  of 0.07) and Cullen, Gendreau, Jarjoura, and Wright (1997) reported a  $d$  of 0.35 (converted from  $R^2 = .030$ ).



Our findings fall between these two points but within the 95% CI. Thus, from the available evidence, intelligence, as a general risk factor for MDOs, appears to be of a similar magnitude as with non-disordered offenders.

Antisocial personality and psychopathy were the only other clinical variables that predicted recidivism. From our GPCSL perspective, this finding was expected as these variables include factors covered under Antisocial Personality Pattern (e.g., antisocial personality features such as impulsivity, failure on parole, criminal history). From a forensic risk assessment perspective, assessments of antisocial personality or psychopathy are the only relevant clinical risk factors. The other clinical variables (e.g., psychosis, schizophrenia, mood disorders) are important for identifying the individual symptomology and personal suffering that occurs and what needs to be addressed before targeting criminogenic needs in the treatment of MDOs.

In our review, we found that, for offenders, having a mental disorder was no more predictive of recidivism than not having a mental disorder. Bonta et al. (1998) reported that non-mentally disordered offenders were more likely to recidivate than MDOs. The difference in findings may be due to the larger number of effect sizes available in the present review compared to the Bonta et al. (1998) meta-analysis. However, there remained very high variability in the findings and further research needs to be conducted to understand why some studies vary in their results on this topic.

### **Conclusions**

The Central Eight risk/need factors identified by a GPCSL perspective of criminal behaviour are just as relevant for MDOs as they are for non-disordered offenders. Although we found no support for prioritizing the Big Four in the prediction of general recidivism and mild support in the prediction of violent recidivism, more research is needed before we can reach a final conclusion. In order to better evaluate the primacy of the Big Four, and in fact all of the Central Eight, studies are needed of the risk/need factors that we could not examine (i.e., Leisure/Recreation and Procriminal Companions).

Analyses of the clinical variables showed that, with the exception of antisocial personality/psychopathy, these factors were not predictive of recidivism. This result further demonstrates the limitation of the clinical model for risk assessment and for treatments intended to reduce the likelihood of criminal behaviour. The validity of the Central Eight for risk assessment also suggests that targeting these risk/need factors in treatment would lead to reduced recidivism. Certainly, if the clinical variables, with the exception of antisocial personality/psychopathy (which are easily incorporated in the GPCSL theory), do not predict recidivism, we should not expect that targeting them in treatment would reduce recidivism. There is a large general offender treatment literature showing that targeting the risk/need factors proposed by GPCSL theory reduces recidivism. We now need to extend this treatment research to the study of MDOs.

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Table 1. *Individual Factors Contributing to the Central Eight and Clinical Variables*

Domain	Factors
Central Eight	
Criminal History	Adult crime, early antisocial behaviour, escape history, length of time in correctional setting, history of property offences, previous failure on parole/probation, adjustment problems in prison/hospital, general history of sexual dysfunction/offences (excludes variables related to index sexual offences), history of violent behaviour
Antisocial Personality Pattern	Early antisocial behaviour, antisocial personality pattern, antisocial attitudes, escape history, previous failure on parole/probation, history of violent behaviour, financial problems
Procriminal Attitudes and Cognitions	Procriminal attitudes and cognitions
Procriminal Companions	Antisocial companions
Family/Marital	Generalized family dysfunction (past or present), marital status
Education/Employment	Level of education, employment status (includes work maladjustment)
Substance Abuse	Past or present substance abuse involving alcohol, past or present substance abuse involving drugs, general substance abuse (not specified)
Leisure/recreation	Any predictor concerning how leisure time is spent
Clinical model	Time in psychiatric setting, prior psychiatric hospital, mood disorder, psychosis (includes schizophrenia, hallucination), treatment history, personality disorder (unspecified), Antisocial Personality Disorder or psychopathy, mentally disordered offender versus general offender



Table 2. *Sample Characteristics*

Variable	$k_{sample}$	$M$	$SD$	Range
Sample Characteristics				
Age (years)	86	32.7	5.87	14.6 – 51.6
Gender (%)	93			
Men		41.9		
Women		0		
Both		58.1		
Grade level	28	10.0	1.58	7 – 12
Employed (%)	26	47.0		
Minority (%)	62	41.1		
Single (%)	35	88.6		
Majority diagnosis (%)	78			
Schizophrenia		47.4		
Bipolar/ Affective disorder		12.8		
Other <sup>a</sup>		39.7		
Previous hospital admission (%)	29	51.60		
Index Offense (%)	59			
Violent (excl. sexual index)		62.7		
Property		16.9		
Narcotics		3.4		
Sexual		13.6		
Other		3.4		

*Note:*  $k_{sample}$  column denotes the number of samples that reported the sample characteristic

<sup>a</sup>Majority of other category comprised of comorbid disorders and personality disorders

Table 3. *Central Eight Predictors of General Recidivism*

Risk Factor	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Criminal History	.32	.27, .37	.34	.21, .47	223.35***	83.88	37	8312	4, 9, 11, 14, 19, 19.01, 20, 22, 23, 24, 26, 27, 29, 31, 34, 35, 37, 38, 40, 45, 53, 54, 55, 59, 68, 70, 71, 72, 75, 76, 81, 82, 88, 92, 93, 94, 96
Procriminal Attitudes	.37	.22, .51	.37	.22, .51	3.08	2.67	4	976	22, 35, 42, 54
Antisocial Personality Pattern	.42	.36, .47	.41	.29, .54	107.71***	73.08	30	5578	4, 9, 11, 14, 22, 23, 26, 27, 29, 32, 35, 37, 40, 42, 46, 53, 54, 55, 57, 58, 59, 68, 69, 75, 77, 81, 82, 83, 84, 94
Education/Employment	.42	.31, .53	.41	.09, .73	69.17***	86.99	10	1521	4, 9, 22, 23, 27, 53, 55, 81, 93, 96
minus 22	.25	.13, .37	.28	.07, .49	21.66**	63.06	9	1268	4, 9, 23, 27, 53, 55, 81, 93, 96
Education only	.15	.03, .27	.16	-.02, .34	14.00	49.99	8	1440	4, 9, 22.6, 23.1, 55, 81, 93, 96
Employment only	.92	.75, 1.08	.74	-.04, 1.53	122.19***	95.09	7	937	4, 9, 22.6, 23.1, 27, 53, 55
minus 22.6	.38	.19, .58	.41	.09, .72	11.81*	57.65	6	684	4, 9, 23.1, 27, 53, 55

Table 3 Continued

	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Family/Marital	.31	.22, .40	.38	.24, .52	17.69	43.46	11	2205	4, 9, 22, 23, 27, 35, 59, 68, 71, 81, 93
Marital status (single)	.35	.21, .49	.39	.16, .61	14.20*	50.70	8	1149	4, 22.3, 23, 27, 59.3, 68, 81, 93
Family problems	.26	.16, .37	.33	.09, .58	21.32**	71.86	7	1579	4, 9, 22, 23.1, 35, 68, 71
Substance Abuse	.48	.42, .54	.51	.37, .64	84.86***	75.25	22	4991	9, 22, 27, 29, 33, 34, 35, 37, 39, 40, 46, 47, 52, 53, 55, 59, 71, 75, 82, 88, 91, 93
Alcohol only	.24	.13, .35	.28	.12, .44	14.65	38.56	10	2223	9, 22, 27, 29, 35, 37, 53, 55, 59.4, 75
Drug only	.61	.49, .72	.60	.45, .74	11.46	21.50	10	1839	9, 27, 29, 35, 40, 47, 55, 59.4, 75, 82
Substance abuse (unspecified)	.60	.47, .72	.57	.36, .78	20.57**	61.11	9	2259	33, 34, 39, 46, 52, 71, 88, 91, 93

Notes: Criminal History includes previous deviant sexual behaviour/offences and excludes violent/sexual index offence. Antisocial Personality Pattern excludes violent/sexual index offence; insufficient *k* to calculate effect size for Leisure/Recreation and Procriminal Companions.

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Table 4. *Clinical Predictors of General Recidivism*

	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Psychosis	.04	-.06, .13	.03	-.17, .23	61.26***	73.88	17	3003	4, 9, 14, 22.2, 23.1, 24, 33, 37, 38.1, 46, 50, 54, 55, 62, 78, 82, 93
Schizophrenia	-.03	-.18, .11	.01	-.33, .35	38.67***	79.31	9	1849	22.2, 24, 33, 37, 38.1, 55, 62, 82, 93
minus 37	-.17	-.33, -.02	-.14	-.35, .07	11.16	37.25	8	1232	22.2, 24, 33, 38.1, 55, 62, 82, 93
Mood disorder	-.14	-.24, -.04	-.16	-.48, .16	61.08***	85.26	10	2341	29, 33, 37, 38.1, 50, 54, 55, 62, 81, 93
Intelligence	.15	.01, .28	.15	-.14, .45	21.38**	71.94	7	2409	4, 22.5, 32, 33, 37, 59, 93
minus 59	.25	.11, .40	.26	.04, .47	7.80	35.90	6	1268	4, 22.5, 32, 33, 37, 93
Prior admissions	.09	.00, .18	.12	-.11, .35	46.05***	80.46	10	2660	4, 19, 19.01, 22.4, 23, 34, 55, 59.3, 71, 81
Length of hospitalization	-.06	-.15, .03	-.11	-.47, .25	138.75***	92.79	11	2352	4, 11, 19, 19.01, 22.2, 26, 34, 37, 53, 82, 94
minus 34	-.28	-.38, -.18	-.24	-.41, -.08	18.62*	51.66	10	1986	4, 11, 19, 19.01, 22.2, 26, 37, 53, 82, 94

Table 4 Continued

	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Psychiatric treatment history	-.19	-.26, -.11	-.23	-.48, .02	213.25***	88.28	26	4142	4, 6, 23, 27, 32, 33, 35, 38, 40.1, 41, 45, 47, 53, 56, 62, 67, 68, 72, 80, 81, 82, 87, 89, 91.1, 92, 96
Mentally disordered vs. Non-mentally disordered	-.19	-.24, -.14	-.09	-.29, .10	275.75***	90.57	27	9504	2, 2.01, 3, 7, 10, 12, 13, 14.1, 16, 18, 19, 21, 21.01, 22.6, 27, 28, 29, 30, 43, 50.1, 52, 64, 66, 73, 78, 79, 85
NGRI vs. Non-mentally disordered	-.14	-.27, -.01	.01	-.26, .27	14.40*	58.34	7	1838	2, 3, 10, 13, 14.1, 16, 66
Personality disorders (unspecified)	.44	.32, .55	.44	.32, .56	8.40	4.71	9	1765	22.4, 24, 37, 43, 53, 55, 59.3, 82, 93
Antisocial Personality or Psychopathy	.54	.46, .62	.54	.43, .65	26.52*	43.45	16	3742	4, 22.6, 29, 32, 37, 42, 46, 54, 57, 58, 59.6, 69, 75, 77, 83, 84

Notes: Psychosis includes diagnosis of schizophrenia or a psychotic disorder and/or presence of hallucinations/delusions; having a mental disorder was coded as the risk factor for the variable mentally disordered vs. non-mentally disordered

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Table 5. *Central Eight Predictors of Violent Recidivism*

Risk Factor	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Criminal History	.50	.43, .56	.50	.41, .59	30.32*	37.34	20	5337	1, 5, 5.01, 8, 9, 15, 22, 25, 37, 39, 40, 44, 53, 54, 60, 61, 63, 65, 75, 76.1
Antisocial Personality Pattern	.56	.50, .62	.57	.48, .67	57.05***	56.18	26	6760	1, 5, 5.01, 8, 9, 15, 22, 37, 39, 40, 43, 44, 46, 53, 54, 57, 58, 60, 61, 63, 65, 69, 75, 76.1, 77, 83
Procriminal Attitudes	.51	.37, .65	.51	.37, .65	0.16	0.00	3	1216	22, 54, 76.1
Education/Employment	.17	.08, .25	.14	.01, .28	19.57*	54.01	10	2881	5, 5.01, 9, 22, 44, 53, 55, 60, 61, 76.1
Education only	.18	.07, .29	.11	-.13, .34	18.15**	77.96	5	1660	5, 5.01, 9, 22, 61
minus 22	.04	-.09, .17	.02	-.19, .23	7.07	57.59	4	1042	5, 5.01, 9, 61
Employment only	.17	.07, .26	.16	.03, .29	15.43	41.67	10	2881	5.01, 5, 9, 22, 44, 53, 55, 60, 61, 76.1
Family/Marital	.26	.17, .35	.25	.09, .41	21.57**	62.91	9	2741	5, 5.01, 9, 22, 44, 60, 61, 65, 76.1
Marital status (single)	.38	.25, .51	.33	.07, .60	9.42*	68.14	4	1724	22, 44, 61, 65
minus 65	.44	.30, .58	.44	.30, .58	0.85	0.00	3	1512	22, 44, 61
Family problems	.23	.13, .33	.24	.10, .37	10.04	40.27	7	1972	5.01, 5, 9, 22, 60, 61, 76.1

Table 5 Continued

	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	n	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Substance Abuse	.20	.13, .27	.20	.09, .31	26.66*	54.99	13	4134	5, 9, 22, 37, 39, 40, 46, 53, 55, 60, 61, 75, 76.1
Alcohol only	.33	.24, .43	.31	.08, .54	38.75***	81.94	8	2897	9, 22, 37, 53, 55, 61, 75, 76.1
minus 75	.21	.10, .31	.22	.06, .38	12.13	50.52	7	2178	9, 22, 37, 53, 55, 61, 76.1
Drug only	.21	.08, .34	.19	-.16, .54	19.87***	84.90	4	1433	9, 40, 55, 75
minus 40	.34	.19, .49	.32	-.02, .65	8.58*	76.69	3	1100	9, 55, 75
Substance abuse (unspecified)	.28	.11, .44	.28	.11, .44	2.10	0.00	4	877	5.1, 39, 46, 60

Notes: Criminal History includes previous deviant sexual behaviour/offences and excludes violent index offence. Antisocial Personality Pattern excludes violent/sexual index offence; insufficient *k* to calculate effect size for Leisure/Recreation and Procriminal Companions.

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Table 6. *Clinical Predictors of Violent Recidivism*

	Fixed		Random		<i>Q</i>	<i>I</i> <sup>2</sup>	<i>k</i>	<i>n</i>	Study ID
	Mean <i>d</i>	95% CI	Mean <i>d</i>	95% CI					
Psychosis	.04	-.04, .12	.09	-.07, .26	55.30***	74.68	15	4366	5.01, 8, 9, 22, 25, 37, 44, 46, 49, 54, 55, 60, 61, 65, 90
Schizophrenia	-.11	-.23, .01	.04	-.28, .36	32.25***	84.50	6	2507	8, 22, 37, 44, 49, 55
Mood disorder	.00	-.11, .11	.04	-.24, .31	23.96***	79.13	6	2417	5.10, 8, 37, 54, 55, 61
minus 54	-.11	-.24, .01	-.08	-.29, .13	8.87	54.88	5	1920	5.10, 8, 37, 55, 61
Intelligence	.04	-.07, .15	.00	-.21, .21	15.35**	67.42	6	3418	5.01, 8, 22, 37, 59, 61
Prior admissions	.05	-.06, .15	.10	-.15, .35	21.37***	81.28	5	1792	5.01, 5, 22, 55, 61
Length of hospitalization	-.46	-.62, -.30	-.20	-.92, .52	30.38***	93.42	3	913	22.2, 37, 53
Psychiatric treatment history	.10	-.08, .29	.23	-.23, .69	22.70***	82.38	5	801	49, 53, 61, 76.1, 95
minus 95	-.04	-.24, .16	.00	-.33, .33	7.44	59.66	4	685	49, 53, 61, 76.1
Mentally disordered vs. Non-mentally disordered	.44	.37, .51	-.06	-.47, .35	380.36***	96.32	15	49367	1, 12, 16, 19, 21, 21.01, 22.6, 29, 40, 43, 48, 74, 79, 85, 95
minus 74	-.07	-.16, .02	-.16	-.40, .09	78.62**	83.47	14	15036	1, 12, 16, 19, 21, 21.01, 22.6, 29, 40, 43, 48, 79, 85, 95
Personality disorders (unspecified)	.43	.33, .52	.41	.26, .57	24.04*	54.25	12	3513	8, 22, 37, 43, 53, 55, 60, 61, 63, 65, 76.1, 90
Antisocial Personality or Psychopathy	.64	.56, .72	.66	.52, .80	33.77**	61.50	14	4280	22, 37, 43, 46, 54, 57, 58, 60, 61, 63, 69, 75, 77, 83

Notes: Psychosis includes diagnosis of schizophrenia or a psychotic disorder and/or presence of hallucinations/delusions; having a mental disorder was coded as the risk factor for the variable mentally disordered vs. non-mentally disordered

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001