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Predictors of Sexual Recidivism: An Updated Meta-Analysis

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Abstract

This quantitative review examined the research evidence concerning recidivism risk factors for sexual offenders. A total of 95 different studies were examined, involving more than 31,000 sexual offenders and close to 2000 recidivism predictions. The results confirmed deviant sexual interests and antisocial orientation as important predictors of sexual recidivism. Antisocial orientation (e.g., unstable lifestyle, history of rule violation) was a particularly important predictor of violent non-sexual recidivism and general recidivism. The study also identified a number of new predictor variables, some of which have the potential of being useful targets for intervention (e.g., sexual preoccupations, conflicts in intimate relationships, emotional identification with children, hostility). Actuarial risk instruments were consistently more accurate than unguided clinical opinion in predicting sexual, violent non-sexual and general recidivism. For the prediction of sexual recidivism, there were no significant differences in the predictive accuracy of the various actuarial measures (e.g., SORAG, Static-99). Actuarial measures designed to predict general (any) criminal recidivism were strong predictors of general recidivism among sexual offenders.

Predictors of Sexual Recidivism: An Updated Meta-Analysis

Sex offences are among the crimes that invoke the most public concern. Consequently, it is not surprising that exceptional policies have been directed towards individuals who have committed such offences, including long-term supervision, treatment, civil commitment, community notification and public registries. The effective administration of such policies require evaluation of the offenders' recidivism risk. Approximately 1%- 2% of the adult male population will eventually be convicted of a sexual offence (California Office of the Attorney General, 2003; Marshall, 1997). Not all sexual offenders, however, are equally likely to reoffend. The observed sexual recidivism rate among typical groups of sexual offenders is in the range of 10%-15% after 5 years (Hanson & Bussière, 1998); there are, however, identifiable subgroups whose observed recidivism rates are much higher (Harris et al., 2003). Interventions directed towards the highest risk offenders are most likely to contribute to public safety.

Knowledge concerning sexual offender recidivism risk has advanced considerably during the past 10 years. Prior to the 1990s, evaluators had little empirical guidance concerning the factors that were, or were not, related to recidivism risk. There is now a general consensus that sexual recidivism is associated with at least two broad factors: a) deviant sexual interests, and b) antisocial orientation/lifestyle instability (Hanson & Bussière, 1998; Quinsey, Lalumière, Rice & Harris, 1995; Roberts, Doren & Thornton, 2002). Although all sexual offending is socially deviant, not all offenders have an enduring interest in sexual acts that are illegal (e.g., children, rape) or highly unusual (e.g., fetishism, auto-erotic asphyxia). Sexual recidivism increases when such deviant interests are present, as indicated by self-report, offence history, or specialized testing (Hanson & Bussière, 1998).

Individuals with deviant sexual interest will not commit sexual crimes, however, unless they are willing to hurt others to obtain their goals, can convince themselves that they are not harming their victims, or feel unable to stop themselves. Sexual crimes, like other crimes, are often associated with an antisocial orientation and lifestyle instability (crime-prone personality). Such individuals tend to engage in a range of impulsive, reckless behaviour, such as excessive drinking, frequent moves, fights, and unsafe work practices (Caspi et al., 1995; Gottfredson & Hirschi, 1990). Another element of the crime-prone personality is a hostile, resentful attitude (Andrews & Bonta, 2003; Caspi et al., 1995). Rapists are more likely to have an antisocial orientation than are child molesters (Firestone, Bradford, Greenberg & Serran, 2000; see review by West, 1983), but indicators of hostility and lifestyle instability are associated with sexual recidivism in both groups (Prentky, Knight, Lee & Cerce, 1995; Rice, Quinsey & Harris, 1991).

Despite the progress in recent years, much remains to be known about how to identify and manage potential recidivists. Sexual offenders have many life problems, not all of which are related to offending. In order to reduce recidivism risk, interventions need to address the enduring characteristics associated with recidivism risk, which have been referred to as "criminogenic needs" (Andrews & Bonta, 2003), "stable dynamic risk factors" (Hanson & Harris, 2000b) or "causal psychological risk factors" (Beech & Ward, in press). One route to improving sexual offender risk assessment is to improve our understanding of the processes motivating this behaviour.

A model of sex offence risk

Contemporary theories posit that a variety of factors are associated with sexual offending (Ward & Siegert, 2002; Knight & Sims-Knight, 2003; Malamuth, 2003). These models suggest that the breeding ground for sexual offending is an adverse family environment, characterized by various forms of abuse and neglect. The lack of nurturance and guidance leads to problems in social functioning, such as mistrust, hostility, and insecure attachment, which, in turn are associated with social rejection, loneliness, negative peer associations and delinquent behaviour. The form of sexuality that develops in the context of pervasive intimacy deficits is likely to be impersonal and selfish, and may even be adversarial. Further contributing to the risk of sexual offending are beliefs that permit non-consenting sex. Attitudes allowing non-consenting sex can develop through the individuals' effort to understand their own experiences, and by adopting the attitudes of their significant others (friends, family, abusers).

Such a model suggests that apart from sexual deviancy and lifestyle instability, there may be three additional characteristics of persistent sexual offenders: a) negative family background, b) problems with friends and lovers, and c) attitudes tolerant of sexual assault. Examination of the most commonly used structured rating scales for sexual offenders indicate that these content areas have considerable credibility among those conducting sexual offender evaluations (Beech, Fisher & Thornton, 2003). The Sexual Violence Risk–20 (SVR-20, Boer, Hart, Kropp & Webster, 1997), the Sex Offender Need Assessment Rating (SONAR, Hanson & Harris, 2001), and the Structured Risk Assessment (SRA, Thornton, 2002a) all have sections addressing sexual interests, pro-offending attitudes, intimacy deficits, and general problems with impulsivity and criminality. Of the above rating scales, only the SVR-20 contains an item addressing negative development history, and only one aspect of it - sexually abused as child.

The research evidence concerning some of these content areas, however, is surprisingly weak. For example, Hanson and Bussière's (1996, 1998) meta-analytic review of sex offender recidivism studies found that the average correlation between sexual recidivism and being sexual abused as a child was r = -.01 (based on 5 studies). For deviant sexual attitudes, the studies found different results, and the average relationship with sexual recidivism was small (average r = .09, 4 studies). Apart from marital status, indicators of intimacy problems (e.g., loneliness, negative peer associations) were rarely examined in the recidivism studies available in 1996, the cut-off period for Hanson and Bussière's (1998) review. It is important to remember that the factors associated with becoming a sex offender (initiation factors) need not be the same factors that predict recidivism.

Research evidence is important because some highly plausible factors may not be related to recidivism. For example, three factors commonly considered in risk assessments are a) the seriousness of the index offence (e.g., victim injury, intercourse), b) internalizing psychological problems (e.g., low self-esteem, depression), and c) clinical presentation (e.g., denial, lack of victim empathy, low motivation for treatment). None of these features, however, were related to sexual recidivism risk in Hanson and Bussière's (1998) review. Although such counter-intuitive results require careful scrutiny before they result in changes in applied risk assessment (Lund, 2000), it is nevertheless difficult for evaluators to justify the continued use of risk factors that have no relationship to the outcome they are asked to predict.

Combining risk factors

Even when evaluators consider valid risk factors, it is not clear how the risk factors should be combined into an overall evaluation. Until recently, almost all sex offender risk assessments were based on unguided clinical judgement. In these assessments, experts used their experience and understanding of a specific case to make predictions about future behaviour. Given that the predictive

accuracy of unguided clinical assessments are typically only slightly above chance levels (Hanson & Bussière, 1998), attention has shifted to empirically based methods of risk assessment. In the empirically-guided approach, evaluators are given a list of researched-based risk factors to consider, but the method of combining the factors into an overall evaluation is not specified (e.g., SVR-20; Boer et al., 1997).

In contrast, actuarial approaches not only specify the items to consider, but they provide explicit directions on how to combine the items into an overall risk score (e.g., Violence Risk Appraisal Guide [VRAG], Quinsey, Rice, Harris & Cormier, 1998). Similarly, the adjusted actuarial approach begins with the predictions generated by an actuarial scheme, but then asks whether the actuarial predictions fairly represent the risk of the specific offender after considering characteristics external to the actuarial scheme (e.g., stated intentions to reoffend, debilitating health problems) (Webster, Harris, Rice, Cormier & Quinsey, 1994).

Given that actuarial measures have a known degree of predictive accuracy (in the moderate range), and can be reliably scored from commonly available information (e.g., demographic and criminal history), they have been rapidly adopted by evaluators and decision-makers. Actuarial measures have been recommended as a component of best practices (Beech et al., 2003) and many routine decisions in the criminal justice system (e.g., intensity of treatment, community notification) are now based on actuarial measures.

The actuarial measures most commonly used with sexual offenders are the Minnesota Sex Offender Screening Tool – Revised (MnSOST-R; Epperson, Kaul, & Hesselton, 1998); the Violence Risk Appraisal Guide (VRAG) and the Sex Offender Risk Appraisal Guide (SORAG; Quinsey et al., 1998); the Rapid Risk Assessment for Sex Offence Recidivism (RRASOR; Hanson, 1997) and Static-99 (Hanson & Thornton, 2000). All of these measures contain primarily static, historical factors, such as prior sex offences, prior other offences, and the characteristics of the victims. The VRAG and SORAG are most heavily weighted with psychopathy, early childhood behaviour problems, and other indicators of antisocial orientation. The four items of the RRASOR (age less than 25, prior sex offences, male victims, unrelated victims) are fully included in the 10-item Static-99 (the additional items primarily address non-sexual criminal history).

Considerable research has been conducted in recent years examining the predictive accuracy of actuarial measures. Replication research is important if such instruments are to be used in applied decision making (Campbell, 2000). The existence of multiple instruments has also motivated research comparing the predictive accuracy of the different measures in various samples (e.g., Barbaree, Seto, Langton, & Peacock, 2001; Harris et al., 2003; Nunes, Firestone, Bradford, Greenberg & Broom, 2002; Sjöstedt & Långström, 2002). The predictive accuracies of the measures are typically in the moderate range, and no single measure has been consistently superior across samples. Further analyses are required to determine whether the variability in the predictive accuracy of the measures is more than would be expected by chance.

The need for an updated review

Hanson and Bussière's (1996, 1998) meta-analysis made an important contribution to sexual offender risk assessment by summarizing the available evidence concerning recidivism risk factors. The results of a single study can be interesting, but decision-makers can have increased confidence in research results when the same relationship is found in many studies. Meta-analyses, like any other research, need to be scrutinized and revised in light of new evidence.

Some of Hanson and Bussière's (1998) findings were based on sufficiently large numbers of offenders from diverse settings that further research is unlikely to change the results. For example, the positive correlation of r = .19 between prior sex offences and future sex offences was based on 11,294 offenders from 29 different samples (95% confidence interval of .17 - .21). Other factors with strong empirical support included deviant sexual preferences, antisocial personality, diverse sex crimes, never married, victim characteristics (male, unrelated, strangers) and failure to complete treatment (for additional studies on treatment drop-out, see Hanson et al., 2002). Some of Hanson and Bussière's findings, however, were still provisional, being based on small samples sizes (e.g., negative relationship with mother, n = 378, 3 studies), or studies that found conflicting results (e.g., employment instability, $Q = 106.6$, $p < .001$, 6 studies).

The purpose of the current study was to update Hanson and Bussière's (1998) meta-analysis in light of the ongoing research on sexual offender risk assessment. Rather than repeat all the variables from Hanson and Bussière (1998), the current study considered only findings that a) were considered important to applied risk assessment, and b) were weak or controversial (e.g., denial, victim damage) in the earlier review. Whereas Hanson and Bussière (1998) examined primarily static, historical factors, the focus of the current study was on potentially changeable (dynamic) risk factors. It was hoped that there were sufficient studies since the cut-off date of the earlier review (1996) that conclusions could now be drawn about dynamic risk factors (i.e., the risk factors needed for identifying treatment targets and evaluating change). The recent research on actuarial risk assessment with sexual offenders also provided an opportunity to compare different approaches to risk assessment (unstructured clinical, empirically guided, pure actuarial), and to compare the predictive validity of the various actuarial measures.

For the general public, sexual recidivism is highly worrisome, and some risk evaluations are solely concerned with this type of recidivism. It is important, however, to consider other types of recidivism when assessing the risk presented by sexual offenders. Sexual offenders are more likely to reoffend with a non-sexual offence than a sexual offence (Hanson & Bussière, 1998), and policies aimed at public protection should also be concerned with the likelihood of any form of serious recidivism, not just sexual recidivism. In this respect, an important question is whether the predictors of sexual recidivism are substantially different from the predictors of non-sexual recidivism. Consequently, the review examined four different types of recidivism: a) sexual recidivism, b) violent non-sexual recidivism, c) any violent recidivism (sexual and non-sexual), and d) any recidivism (violent and non-violent).

Method

Sample

Computer searches of PsycLIT, the National Criminal Justice Reference Service (USA), and the Library of the Solicitor General of Canada were conducted using the following key terms: child molester, exhibitionism, exhibitionist, failure, frotteur, incest, indecent exposure, paraphilias (c), pedophile, pedophilia, predict (ion), rape, rapist, recidivate, recidivism, recidivist, relapse, reoffend, reoffense, sex (ual) offender, sexual assault, sexual deviant. Articles were also found by reviewing the reference lists of empirical studies and previous reviews, and by scouring recent issues of relevant journals (*e.g., Criminal Justice and Behavior, Sexual Abuse: A Journal of Research and Treatment*). Finally, letters were sent to 34 established researchers in the field of sexual offender recidivism requesting overlooked or as-yet unpublished articles or data.

To be included in the present meta-analysis, the study had to involve an identifiable sample of sex offenders, either adults or adolescents. Studies where the index offence was not a sexual offence were excluded, even if some of the subjects had committed a sexual offence in the past. Studies had to examine sexual, violent or any recidivism that occurred after a specified period of time (e.g., after release from a correctional institution). Excluded were retrospective studies that only included the offenders' criminal history, prior to the index offence. Also excluded were studies that used broad definitions of failure, including, for example, treatment drop-out along with criminal recidivism (Maletzky, 1993). All studies had to provide information concerning one of the characteristics targeted in this review (a complete list is available upon request). Finally, studies needed to provide sufficient statistical information: a) sample size, b) the rate of recidivism, and c) sufficient information to estimate the effect size *d* (see Appendix). In order to reduce the variability associated with very small sample sizes, at least 5 subjects for all marginal totals were required for dichotomous variables.

As of January, 2003, our search yielded 153 usable documents (e.g., published articles, books, government reports, unpublished program evaluations, conference presentations). In 20 cases, the analyses were based on raw data or analyses obtained directly from the original researchers. When the same data set was reported in several articles, all the results from these articles were considered to come from the same study. Consequently, the 153 documents represented 95 different studies (country of origin: 42 United States, 30 Canada, 13 United Kingdom, 3 Austria, 2 Sweden, 2 Australia, and one each from France, Netherlands and Denmark; 49 (51.6%) unpublished; produced between 1943 and 2003, with a median of 1997; average sample size of 332, median of 167, range of 10 to 3185). Thirty-two of the samples were the same as those included in Hanson and Bussière's (1998) review, 12 studies contained updated information (e.g., longer follow-up periods, new analyses), and 51 studies were new.

Most of the studies examined mixed groups of adult sexual offenders (84 mixed offence types, 8 child molesters, 2 rapists, 1 exhibitionists; 79 predominantly adults, 16 adolescents). Most of the offenders were released from institutions (52 institution only, 17 community only, 24 institution and community, and 2 unknown). Thirty-seven samples came from treatment programs, and 56 samples contained a mixture of treated and untreated offenders, or the extent of treatment was unknown. When demographic information was presented, the offenders were predominantly Caucasian (44 of 48 studies). The sexual offenders were almost all males, with the exception of one study of female sexual offenders (Williams & Nicholaichuk, 2001).

The most common sources of recidivism information were national criminal justice records (50), provincial or state records (39), records from treatment programs (21) and self-reports (14). Other sources (e.g., child protection records, parole files) were used in 21 studies. In 36 studies, multiple sources were used. The source of the recidivism information was unknown for 14 studies. The recidivism criteria were conviction in 27 studies and arrest in 28 studies. Thirty-two studies used multiple criteria (e.g., arrest, parole violations, non-criminal justice system reports). In 2 studies, recidivism was assessed solely from self-reports, and in 6 studies the recidivism criteria was unknown. The follow-up period ranged from 12 months to 330 months, with a mean of 73 months (SD = 54.4) and a median of 60 months.

Coding procedure

Each study was coded separately by the two authors using a standard list of variables and explicit coding rules (available upon request). The categories for the predictor variables were designed to be consistent with common usage in the research literature and to limit the repetition of information from the same study. In most cases only one finding of a predictor variable was coded per sample. When multiple findings of the same variable were reported, the finding with the largest sample size was used. If the sample sizes were similar, the finding with the most complete data was selected. If the sample sizes and descriptive detail was equivalent, the median value was used.

There were several broad categories that subsumed specific variables. For example, any deviant sexual interest was a general category that was coded if the type of deviant interest was not specified. It was also coded if either sexual interest in children, sexual interest in rape, sexual interest in sadism or sexual interest in paraphilias were coded. If, for example, two or more of the specific sexual interests were coded, then the median was used when coding deviant sexual interests. When both pre-treatment and post-treatment findings were reported, the post-treatment measure was used, except in cases where the post-treatment finding was based on an insufficient number of cases. Insufficient numbers were defined as less than 30 subjects or if 50% of the subjects were lost when moving from pre to post-treatment data.

Inter-rater reliability was calculated for approximately 10% of the sample (N=10). The agreement was 86.4% (percent correct) for the sample characteristics (e.g., adults or adolescents, treated or not). Using a two-way random effects model intraclass correlation coefficients (type absolute agreement), the inter-rater reliability of the effect sizes was .83 for a single rater and .90 for the average of two raters. The actual agreement would be greater because judges conferred on their final rating. Most errors involved clerical errors or misreadings of the documents, which were simply resolved when the errors were detected. In the 10 reliability studies, Rater 1 identified 134 findings, and Rater 2 identified 131 findings, with agreement on 245 of the 265 findings identified by either rater (92.5%).

Index of predictive accuracy

The effect size indicator used was the standardized mean difference, d, defined as follows:

$d = \frac{(M_1 - M_2)}{S_w}$, where M_1 is the mean of the deviant group, M_2 is the mean of the non-deviant group, and S_w is the pooled within standard deviation (Hasselblad & Hedges, 1995). In other words, d measures the average difference between the recidivists and the non-recidivists, and compares this difference to how much recidivists are different from other recidivists, and how much non-recidivists are different from other non-recidivists.

The d statistic was selected because it is less influenced by recidivism base rates than correlation coefficients – the other statistic commonly used in meta-analyses. Many sexual offender recidivism

studies have base rates less than 10%, which restricts the magnitude of the correlations. Hanson and Bussière (1998) attempted to correct for this statistical artefact by adjusting the observed correlation based on the relative restriction of range (see also Bonta, Law & Hanson, 1998). Although this adjustment can improve the estimate of the average correlation, it can have the undesirable effect of producing large correlations based on few recidivists. Furthermore, the adjusted correlations can appear highly reliable because the variability of correlations is based on the total sample size. For example, when there is only one recidivist in a sample of 400, the variability of the correlation is considered the same as when 200 recidivists are compared with 200 non-recidivists. In contrast, the variability of d increases as the proportion of recidivists decreases, providing a more realistic estimate of the reliability of the reliability of the relationship.

The formula for calculating d from various statistics were collected from diverse sources (see Appendix).

Aggregation of findings

Two methods were used to summarize the findings: median values (Slavin, 1995) and weighted mean values (Hedges & Olkin, 1985). The averaged d value, d., was calculated by weighing each d_i by the inverse of its variance: $d. = \left(\sum_{i=1}^{k} w_i d_i\right) \Big/ \left(\sum_{i=1}^{k} w_i\right)$, where k is the number of findings, $w_i = 1/v_i$, and v_i is the variance of the individual d_i (fixed effect model). The variance of the weighted mean was used to calculate 95% C.I.s: $Var(d.) = 1 \Big/ \left(\sum_{i=1}^{k} w_i\right)$; $95\%C.I. = d. \pm 1.96\sqrt{Var(d.)}$.

When d_i was calculated from 2 by 2 tables, the variance of d_i was estimated using Formula 6 from Hasselblad and Hedges (1995): $Var(d_i) = \frac{3}{\pi^2}\left(\frac{1}{a+.5} + \frac{1}{b+.5} + \frac{1}{c+.5} + \frac{1}{d+.5}\right)$. When d_i was calculated from other statistics (t, ROC areas, means, etc.), the variance of d_i was estimated using $Var(d_i) = \left[\frac{N_1 + N_2}{N_1 N_2} + \frac{{d_i}^2}{2(N_1 + N_2)}\right]$ (Formula 3; Hasselblad & Hedges, 1995).

To test the generalizability of effects across studies, Hedges and Olkin's (1985) Q statistic was used: $Q = \sum_{i=1}^{k} w_i (d_i - d.)^2$. The Q statistic is distributed as a χ^2 with k-1 degrees of freedom (k is the number of studies). A significant Q statistic indicates that there is more variability across studies than would be expected by chance. An individual finding (d_i) was considered to be an outlier if a) it was an extreme value (highest or lowest), b) the Q statistic was significant, and c) the single finding accounted for more than 50% of the value of the Q statistic. When an outlier was detected, the results were reported with and without the exceptional case(s).

Results

The 95 studies produced 1,974 effect sizes on a combined sample of 31,216 sexual offenders (750 effects for sexual recidivism, 307 for violent non-sexual recidivism, 412 for violent recidivism and 505 for any recidivism). On average, the observed sexual recidivism rate was 13.7% (n = 20,440, 84 studies), the violent non-sexual recidivism rate was 14.0% (n = 7,444, 27 studies), the violent recidivism rate (including sexual and non-sexual violence) was 25.0% (n = 12,542, 34 studies) and the general (any) recidivism rate was 36.9% (n = 13,196, 56 studies). Studies that used artificial base rates (e.g., Dempster, 1998) were excluded from the rate calculations. The average follow-up time was 5-6 years. These figures should be considered to underestimate the real recidivism rates because not all offences are detected.

How to read the tables

Table 1 provides a broad comparison of the main categories of risk factors, followed by detailed presentations of the individual risk factors for each type of recidivism: sexual recidivism (Table 2), violent non-sexual recidivism (Table 3), any violent recidivism (sexual and non-sexual; Table 4) and general (any) recidivism (Table 5). Only predictor variables examined in at least three studies are presented. Table 6 provides a key to the studies used in the meta-analysis.

The primary consideration when estimating the importance of a risk predictor is the size of its relationship with recidivism, as indicated by the median d values and the weighted average (d.). According to Cohen (1988), d values of .20 are considered "small", values of .50 are considered "medium", and values of .80 are considered "large". The value of d is approximately twice as large as the correlation coefficient calculated from the same data.

The most reliable findings are those with low variability across studies. If Q is significant, the variability is greater than would be expected by chance. With large samples sizes (greater than 1,000), even small differences between studies will be statistically significant. Another indicator of variability is the similarity between the weighted average, d., and the median. When the median and the mean suggest substantially different interpretations, then neither should be considered reliable.

When the confidence interval does not contain zero, it is equivalent to being statistically significant at $p < .05$. When the confidence intervals for two predictor variables do not overlap, then they can be considered statistically different from each other.

Comparison across categories of risk predictors

The broad comparison in Table 1 included all the individual variables in the detailed tables (Tables 2 through 5 are at the back) as well as relevant individual variables examined in less than three studies. When studies included multiple indicators of a larger category, the median value was selected (and the median variance). The values in Table 1 were, on average, based on 18 studies each (range 5 to 65 studies). Outliers were excluded from each category using the usual criteria (an extreme value accounting for more than 50% of the total variance).

As can be seen in the Table 1, the strongest predictors of sexual recidivism were sexual deviancy (d. = .30) and antisocial orientation (.23). The general categories of sexual attitudes (d. = .16) and intimacy deficits (d. = .15) also significantly predicted sexual recidivism, but there was substantial variation in the predictive accuracy of the subcomponents of these categories (see Table 2). The general categories of adverse childhood environment (d. = .09), general psychological problems (d. = .02) and clinical presentation (d. = -.02) had little or no relationship with sexual recidivism.

Table 1. The predictive accuracy of the main categories of risk factors

Category	Type of Recidivism			
	Sexual	Violent non-sexual	Violent	Any
Sexual Deviancy	.30 ±.08	-.05 ±.17	.19 ±.08	.04 ±.08
Antisocial Orientation	.23 ±.04	.51 ±.07	.54 ±.05	.52 ±.04
Sexual Attitudes	.16 ±.12	.17 ±.22	.14 ±.11	.24 ±.10
Intimacy Deficits	.15 ±.11	.12 ±.21	.12 ±.12	.10 ±.10
Adverse Childhood Environment	.09 ±.08	-.02 ±.17	.14 ±.08	.11 ±.07
General Psychological Problems	.02 ±.10	.21 ±.14	.00 ±.10	-.04 ±.11
Clinical Presentation	-.02 ±.09	.16 ±.20	.09 ±.09	.12 ±.08

Antisocial orientation (antisocial personality, antisocial traits, history of rule violation) was the major predictor of violent non-sexual recidivism (d. = .51), violent (including sexual) recidivism (d. = .54) and any recidivism (d. = .52). Although other categories were sometimes significantly related to non-sexual recidivism, the effects were much smaller that those observed for category of antisocial orientation; the next largest effect was d. = .24 for the association of sexual attitudes and any recidivism. Sexual deviancy was unrelated to violent non-sexual recidivism (d. = -.05) and general (any) recidivism (d. = .04).

Predictors of sexual recidivism

As can be seen in Table 2 (at the back), the measures of deviant sexual interests were all significantly associated with sexual recidivism: any deviant sexual interest (d. = .31), sexual interest in children (d. = .33), and paraphilic interests (d. = .21). Sexual preoccupations (paraphilic or non-paraphilic) were also significantly related to sexual recidivism (d. = .39), as were high (feminine) scores on the Masculinity-Femininity scale of the Minnesota Multiphasic Personality Inventory (MMPI) (d. = .42).

Mixed results were found for phallometric assessment measures, which involve the direct monitoring of penile response when presented with various forms of erotic stimuli (Launay, 1999). Sexual interest in children was a significant predictor of sexual recidivism (d. = 33) as was the general category of any deviant sexual interest (d. = .24). Phallometric assessments of sexual interest in rape/violence was not significantly related to sexual recidivism, nor was the narrow category of sexual interest in boys, although the later finding was based on only 306 offenders from three studies.

Sexual recidivism was significantly predicted by almost all the indicators of antisocial orientation (antisocial personality, antisocial traits and history of rule violation). Specifically, sexual recidivism was predicted by the Hare Psychopathy Checklist (PCL-R, Hare et al., 1990, d. = .29, 13 studies), the MMPI Psychopathic deviate scale (d. = .43, 4 studies) and by other measures of antisocial personality (e.g., psychiatric diagnoses, responses to questionnaires, d. = .21, 12 studies). The general category of

"any personality disorder" was also significantly related to sexual recidivism. The findings for "any personality disorder" showed more variability than would be expected by chance ($Q = 45.32$, $p < .001$), with one large study ($n = 1,214$; Långström, Sjöstedt & Grann, in press) finding an atypically strong relationship ($d = 1.24$). When this outlier was removed, the average d. was .36, and the amount of variability was no more than would be expected by chance ($Q = 8.85$, $p > .05$). Any personality disorder was grouped with measures of antisocial personality because antisocial personality was by far the most common personality disorder diagnosed among sexual offenders.

Most of the antisocial traits were related to sexual recidivism, although, as expected, the predictive accuracy of the individual traits tended to be smaller than the predictive accuracy of the general category (antisocial personality). Offenders with general self-regulation problems were more likely than offenders with stable lifestyles to sexually recidivate (d. = .37). Included among general self-regulation problems were measures of lifestyle instability, impulsivity, as well as Factor 2 from the PCL-R (Hare et al., 1990). Other antisocial traits that were significantly correlated with sexual recidivism included employment instability (d. = 22), any substance abuse (d. = .12), intoxicated during offence (d. = .11), and hostility (d. = .17).

All of the indices of rule violation were significantly related to sexual recidivism. The strongest single indicators of sexual recidivism were a) non-compliance with supervision (d. = .62), and b) violation of conditional release (d. = .50). Readers should be cautioned, however, that these effects were based on a limited number of studies and that extreme values tend to regress towards the mean (i.e., the biggest values tend to become smaller when additional data is collected).

Indicators of adverse childhood environment had very weak relationships with sexual recidivism. Notably, being sexually abused as a child was not significantly related to sexual recidivism, with a d. of .09, 95% confidence interval of -.01 to .18, based on 5,711 offenders from 17 different samples. Having been separated from biological parents was associated with increased sexual recidivism, but the effect was small (d. = .16, 95% confidence interval of .05 to .28, based on 4,145 offenders from 13 studies).

Some measures of intimacy deficits predicted sexual recidivism, whereas others did not. There was no evidence that sexual recidivism was predicted by social skills deficits (d. = -.07) or loneliness (d = .03). In contrast, sexual recidivism was predicted by emotional identification with children (having children as friends, child oriented lifestyle, d = .42) and conflicts with intimate partners (d. = .36).

The general category of "Attitudes tolerant of sexual crime" was significantly related to sexual recidivism, although the effect was small (d. = .22, 95% confidence interval of .05 to .38). The effects were not significant for child molester attitudes, low sex knowledge, or other deviant sexual attitudes (e.g., prudish attitudes toward masturbation).

None of the indicators of general psychological problems were significantly related to sexual recidivism, except in one study (Långström et al., in press). In all the other studies, sexual recidivism was unrelated to severe psychological dysfunction (psychosis) or internalizing disorders such as anxiety, and depression. On average, low self-esteem was unrelated to sexual recidivism (d. = .04) and the amount of variability was no more than would be expected by chance ($Q = 10.12$, $p > .25$).

The degree of force used in the sexual offences was significantly related to the probability of sexual recidivism, although the size of the effects was tiny (d. = .09, 95% confidence interval of .02 to .16, based on 7,221 offenders from 25 studies) and the median effect was zero. On average, the difference in recidivism rates between those who did or did not use weapons or physically injure their victims

would be trivial (less than 5%). The degree of sexual intrusiveness was negatively related to sexual recidivism (d. = -.17). Those who committed non-contact sexual offences were more likely to recidivate than those who sexually touched or penetrated their victims. There was considerable variability, however, among the studies examining sexual intrusiveness, suggesting that some features of the sexual offence may be related to recidivism risk for some offenders.

None of the clinical presentation features were significantly related to sexual recidivism: lack of victim empathy (d. = -.08), denial of sex crime (d. = .02), minimization (d. = .06), and lack of motivation for treatment (assessed pre-treatment) (d. = -.08). For those who completed treatment, poor progress in treatment (d. = .14) was, on average, not significantly related to sexual recidivism. Comparisons between treatment drop-out and completers were not considered in the current review. For the above measures, the amount of variability across studies was no more than would be expected by chance.

The accuracy of sexual recidivism risk assessments

Unstructured clinical assessments predicted sexual recidivism (d. = .40, 95% confidence interval of .24 to .56), but were less accurate than actuarial risk scales specifically designed for this task (d. = .61, 95% confidence interval of .54 to .69). Although the confidence intervals overlapped, the test of the difference in predictive accuracy was statistically significant ($\chi^2 = 5.46$, df = 1, $p < .05$). The predictive accuracy of the empirically guided approach to risk assessment ranged from d. = .41 to d. = .51, depending on whether or not to include one study with an atypically large d value of 1.30 (de Vogel, de Ruiter, van Beek & Mead, 2002). On average, the actuarial risk scales designed to predict general (any) criminal recidivism were moderate to large predictors of sexual recidivism (d. = .71, with the exception of Bonta & Hanson, 1995).

The average effect size for the unvalidated objective risk scales was large (d. = 1.06). This category included statistical risk scales developed and tested on the same sample (e.g., unreplicated multiple regression equations). Consequently, this represents the maximum predictive accuracy possible with the variables used in each study, along with a bit of luck. The predictive accuracy of these statistical risk scales would be expected to be lower when cross-validated in other samples.

The average predictive accuracy of all the individual risk scales were in the moderate to large range: VRAG (d. = .52), SORAG (d. = .48), Static-99 (d. = .63), RRASOR (d. = .59), MnSOST-R (d. = .66), and SVR-20 (d. = .77). For the other sex offender risk scales, the average d value was .66. The Statistical Information on Recidivism (SIR; Bonta, Harman, Hann & Cormier, 1996; Nuffield, 1982), developed for predicting general criminal recidivism, also predicted sexual recidivism among sexual offenders (d. = .77, or d = .52 if the atypically weak relationship in Bonta & Hanson, 1995, was included). The confidence intervals for all the risk scales overlapped, meaning that their predictive accuracies were not significantly different from each other. There was significant variability in the predictive accuracy across studies for the Static-99 ($Q = 44.17$, $p < .01$, 21 studies), RRASOR ($Q = 55.84$, $p < .001$, 18 studies) and the SVR-20 ($Q = 19.01$, $p < .01$, 6 studies). The variability of these studies could not be attributed to any single exceptional study (outlier).

Predictors of violent non-sexual recidivism

The major predictor of violent non-sexual recidivism was antisocial orientation (see Table 3). Few of the variables in the other categories (e.g., deviant sexual interests, adverse childhood environment, general psychological problems) were significantly related to violent non-sexual recidivism.

Violent non-sexual recidivism was significantly predicted by all the individual indicators of antisocial orientation (with the exception of the MMPI Pd scale). The strongest relationships were found for a

history of violent crime (d. = .68), general self-regulation problems (d. = .62), and the PCL-R (d. = .57). Many of the other antisocial traits also showed effect sizes in the .40 to .50 range (e.g., employment instability, d. = .41; substance abuse, d. = .47; history of non-sexual crime, d. = .51).

None of the indicators of adverse childhood environment were significantly related to violent non-sexual recidivism. A negative relationship with father showed the strongest relationship (d. = .29), but the confidence interval was large (-.03 to .61) due to the small sample size (341, 3 studies).

Relatively few researchers have examined the relationship between intimacy deficits and violent non-sexual recidivism. Only two variables were examined in three or more studies (general people problems, negative social influences) and the confidence intervals for these variables included zero (i.e., not statistically significant). The broad category "General Psychological Functioning" was significantly related to violent non-sexual recidivism, but this result is difficult to interpret because none of the subcomponents of this category (e.g., depression, anxiety, low self-esteem) were related to violent non-sexual recidivism.

Violent non-sexual recidivism was significantly related to the degree of force used in the index sexual offence (d. = .35) and sexual intrusiveness (d. = 36). Clinical presentation variables showed weak relationships with violent non-sexual recidivism: lack of victim empathy (d. = .19, 95% confidence interval of .03 to .35), minimization (d. = .03, 95% confidence interval of -.31 to .37) and low motivation for treatment (d. = .24, 95% confidence interval of -.02 to .50). All of the above results were based on only three studies.

<u>The accuracy of predicting violent non-sexual recidivism</u>

The structured approaches to risk assessment showed higher predictive accuracy than the unstructured approaches. The lowest accuracy was found for clinical assessments (d. = .24), followed by empirically guided risk assessments (d. = .34), actuarial risk scales designed for sexual recidivism (d. = .44), and actuarial risk scales designed for general criminal recidivism (d. = .77). The confidence interval for the criminal recidivism risk scales (.58 to .96) did not overlap with the confidence intervals for the other approaches to risk assessment, indicating that the general criminal risk scales were more accurate in predicting violent non-sexual recidivism than the other approaches.

The individual risk scales with the strongest association with violent non-sexual recidivism were the SORAG (d. = .77) and the SIR scale (d. = .77). The Static-99 (d. = .44), RRASOR (d. = .18), and SVR-20 (d. = .35) were all significantly related to violent non-sexual recidivism, although the magnitude of their relationships were less than observed for the SORAG and SIR.

<u>Any violent recidivism (sexual or non-sexual)</u>

As can be seen in Table 4, measures of sexual deviance showed small, but statistically significant relationships to any violence recidivism: Any deviant sexual preferences (d. =.18), sexual preoccupations (d. = .28), and phallometrically assessed sexual interest in rape/violence (d. = .15), children (d. = .18) or any deviant sexual interest (d. = .19).

The major predictors of violent recidivism were indicators of antisocial orientation. All the indicators of antisocial personality, antisocial traits, and history of rule violation were significantly related with violent recidivism (with the exception of poor cognitive problem solving). The strongest predictors were a history of non-sexual crime (d. = .58), psychopathy (PCL-R, d. = .58) and general problems with self-regulation (d. = .52).

The indicators of adverse child environment tended to the have small relationships with violent recidivism. Any violent recidivism was significantly related to separation from parents (d. = .19) and the global category of "Childhood neglect, physical or emotional abuse" (d. = .25). Childhood sexual abuse was unrelated to violent recidivism (d. = -.05, 95% confidence interval of -.13 to .04).

With regard to intimacy deficits, there was evidence that violent recidivism was associated with "General people problems" (d. = .31) and negative social influences (d. = 29). Violent recidivism was unrelated to social skills deficits (d. = .03).

Attitudes tolerant of sex crime was not significantly related to violent recidivism, nor was low sex knowledge. None of the indicators of general psychological problems were significantly related to violent recidivism: the effect sizes ranged from -.09 for anxiety to .07 for depression. The degree of force used in the sexual offence predicted violent recidivism (d. = .22). Violent recidivism was also significantly predicted by non-contact sexual offences, although the effect was tiny (d. = .11) and there was significant variability across studies (Q = 33.08, $p < .001$). None of the clinical presentation variables (e.g., lack of victim empathy, minimization) significantly predicted violent recidivism.

The accuracy of predicting violent recidivism

The findings comparing different approaches to risk assessment showed considerable variability across studies. The average d value for clinical prediction was .38, but increased to .58 when the atypically low accuracy (d = .07) in Langton (2003a) was excluded. The average predictive accuracy of the sex offender risk scales was .58, with significant variability across studies (Q = 53.83, $p < .001$, 15 studies). The predictive accuracy of empirically guided assessments ranged was .31, but increased to .52 when an outlier was excluded (Langton, 2003a; d = .11). The three studies that examined scales designed to predict general recidivism (e.g., SIR scale) found high levels of predictive accuracy (d. = .79, 95% confidence interval of .60 to .97) with little variability across studies (Q = 1.42, $p > .50$).

All the sex offender risk scales showed considerable variability across studies. For the VRAG and SORAG, the variability could be attributed to an atypically high relationship reported by Dempster (1998). Even when this outlier was excluded, the VRAG (d. = 80) and SORAG (d. =75) showed large relationships with violent recidivism, and were significantly better predictors than the Static-99 (d. = 57; $\chi^2 = 6.00$, df = 1, $p < .01$), which, in turn was a better predictor than the RRASOR (d. = .34).

Predictors of general (any) recidivism

The pattern of results for general recidivism were very similar to the results for any violent recidivism: the most consistent predictors were measures of antisocial personality, antisocial traits and history or rule violation.

The measures of deviant sexual interest showed mixed results. Three of the four phallometric measures of deviant sexual interest significantly predicted general recidivism (any deviant sexual interest, interest in rape/violence, interest in children), but the effects were small. The general category of "Deviant sexual interest" was only significant (d. = .19) when one atypically large effect was included (Sturup, 1953). Sexual preoccupation, on the other hand, was a significant (d. = .37, 95% confidence interval of .23 to .51) and consistent (Q = 5.19, $p > .25$) predictor of general recidivism.

All of the indicators of antisocial orientation were significantly related with general recidivism, and most of the relationships were moderate to large. Among the strongest individual predictors were general problems with self-regulation (d. = .75), violation of conditional release (d. =.74), a history of

non-violent crime (d. = .68), psychopathy (PCL-R, d. = .67), and a history of non-sexual crime (d. = .63).

Measures of adverse childhood environment showed small relationships with general recidivism, with significant relationships observed for separation from parents (d. = .27), negative relationship with mother (d. = .22), and the general category of "Childhood neglect, physical or emotional abuse" (d. = .14).

As was found for violent recidivism, the two social characteristics that were associated with general recidivism were negative social influences (d. = .24) and general people problems (d. = .17). Loneliness had no relationship with general recidivism (d. = .00, 95% confidence interval of -.11 to .11, 4 studies).

Offenders who expressed attitudes tolerant of sexual crime were at increased risk for general recidivism (d. = .29) as were those with low sexual knowledge (d. = .16). Those offenders who expressed other forms of deviant sexual attitudes (e.g., prudish attitudes towards masturbation) were at decreased risk for general recidivism (d. = -.18, 95% confidence interval of -.34 to -.02), but the finding was based on diverse measures from only three studies (n = 683). None of the measures of general psychological problems were significantly associated with general (any) recidivism: effect sizes ranged from -.08 for the general category of poor psychological functioning to .12 for severe psychological dysfunction (e.g., psychosis).

As was found for violent non-sexual recidivism, general recidivism was associated with the degree of force used in the sexual offence, and the degree of sexual intrusiveness. The clinical presentation variables showed weak associations with general recidivism. Small, significant associations were found for lack of victim empathy (d. = .12), denial (d. = .12) and poor progress in treatment (d. = .18).

Accuracy of predictions of general recidivism

The sex offender actuarial risk scales (d. = .52) were more accurate in predicting general recidivism than were unstructured clinical assessments (d. = .23) or empirically guided risk assessments (d. = .27). The most accurate method for predicting general recidivism used actuarial risk scales designed to predict general recidivism, such as the SIR scale (d. = 1.03).

The sex offender risk scale that was most strongly related to general recidivism was the SORAG (d. = .79), which was a significantly better predictor than the Static-99 (d. = .52) or SVR-20 (d. = .52). The RRASOR significantly predicted general recidivism (d. = .26), although it was a poorer predictor than the other scales (their confidence intervals did not overlap).

Discussion

The current study confirmed deviant sexual interests and antisocial orientation as important recidivism predictors for sexual offenders, and added new empirically established risk factors, including a number of factors that are potentially amenable to change (e.g., conflicts in intimate relationships, hostility). Another highlight of the review was the strong evidence for the validity of actuarial risk assessment instruments for the prediction of sexual, violent and general recidivism.

The observed recidivism rates in the current study were very similar to Hanson and Bussière's (1998) previous review. In the current study, the observed sexual recidivism rate was 13.7% after approximately 5 years (compared to 13.8% in Hanson & Bussière, 1998) and in both studies, sexual offenders were more likely to recidivate with a non-sexual offence than a sexual offence. The observed rates underestimate the actual rates because many offences remain undetected. Nevertheless, the results are consistent with other studies indicating that the overall recidivism rate of sexual offenders is lower than that observed in other samples of offenders (Langan, Schmitt & Durose, 2003; Bonta & Hanson, 1995)

Those individuals with identifiable interests in deviant sexual activities were among those most likely to continue sexual offending. The evidence was strongest for sexual interest in children and for general paraphilias (e.g., exhibitionism, voyeurism, cross-dressing). Phallometric assessments of sexual interest in rape, however, were not significantly related to sexual recidivism. The lack of relationship is somewhat surprising considering that men who have committed rape are more likely than non-rapists to respond to phallometric assessments of rape (Lalumière & Quinsey, 1994). Sexual interest in rape would have been included in the general category of "deviant sexual interests" (which was related to sexual recidivism), but our search did not find enough studies that specifically examined paraphilic rape (other than the phallometric studies) to justify separate analyses. It may be that deviant sexual motivation is more important for child molesters than for rapists, but further research is required before any strong conclusion can be made about the validity of paraphilic rape as a predictor of sexual recidivism.

One interesting risk predictor was sexual preoccupations (high rates of sexual interests and activities), which significantly predicted sexual, violent, and general recidivism. Kafka (1997) found high rates of masturbation, pornography use, and impersonal sex among sexual offenders referred to his clinic. There are several possible connections between sexual preoccupations and sexual offending, including a general lack of self-control (common among young people and general criminals), specific problems controlling sexual impulses, and a tendency to overvalue sex in the pursuit of happiness. Kanin (1967), for example, found that adolescent males who believed that sexual activities were important for gaining peer status were at increased risk for committing rape. Kafka (2003) has proposed that the sexual activation of sexual offenders may be linked to monoaminergic neuro-regulatory mechanisms, but a biological basis for the sexual preoccupations of sexual offenders has yet to be established (Haake et al., 2003).

As in previous reviews, all forms of recidivism were predicted by an unstable, antisocial lifestyle, characterized by rule violations, poor employment history and reckless, impulsive behaviour (Bonta et al., 1998; Gendreau, Little & Goggin, 1996; Quinsey et al., 1995). Antisocial orientation was a particularly important predictor of violent and general recidivism, but indicators of antisocial orientation were also among the largest predictors of sexual recidivism (e.g., non-compliance with supervision, violation of conditional release). Lack of self-control may directly lead to a wide range of criminal behaviour (e.g., Gottfredson & Hirschi, 1990), and it could also be specifically linked to recidivism because high levels of self-regulation are required to change dysfunctional habits.

The review identified some new predictor variables that may be of interest to those attempting to change sexual offenders' recidivism risk. Previous research has established that lack of an intimate partner was associated with increased risk for sexual recidivism (Hanson & Bussière, 1998). In the current review, the importance of intimate relationships was further reinforced by the finding that sexual recidivism was also associated with conflicts in intimate relationships. Another intimacy variable associated with sexual recidivism was emotional identification with children. This pattern, most commonly found among extrafamilial child molesters, describes individuals who feel emotionally closer to children than adults, and who have children as friends. They may also have child oriented lifestyles, and feel like children themselves (Wilson, 1999).

The association between intimacy deficits and persistent sexual offending is consistent with several current explanations for sexual offending (Malamuth, 2003; Ward, Hudson, Marshall & Siegert, 1995). How intimacy deficits influence offending, however, remains an important research question. One hypothesis is that child molesters turn to child sexual partners because they lack the skills to relate to adults and, consequently, feel lonely. Although low social skills and loneliness are common among sex offenders (Seidman, Marshall, Hudson & Robertson, 1994), neither of these factors were associated with increased risk for sexual recidivism in the current review. It is possible that social inadequacy and rejection are less important to offending than are the strategies used to address such problems (e.g., turning to children).

A similar explanation could apply to the observations that general psychological problems (e.g., depression, anxiety) are common among sexual offenders (Raymond, Coleman, Ohlerking, Christensen & Miner, 1999), but that general psychological problems have little or no relationship to recidivism. Many suffer with psychological distress, but sexual offenders are more likely than other groups to respond to stress through sexual acts and fantasies (deviant or otherwise) (Cortoni & Marshall, 2001). Although chronic negative mood is unrelated to recidivism, acute deterioration of mood is associated with increases in deviant fantasies among sexual offenders (McKibben, Proulx, & Lusignan, 1994) and may signal the time period when offending is most likely (Hanson & Harris, 2000b). Again, it is not the distress itself, but the attempted solution that is the problem.

It is also possible that the factors associated with becoming a sexual offender are different from the factors associated with persistence. The personal histories of sexual offenders are frequently marked by physical, sexual and emotional abuse (Lee, Jackson, Pattison & Ward, 2002; Smallbone & Dadds, 1998). Indices of an aversive childhood environment, however, had minimal relationships with sexual or non-sexual recidivism in the current review. The most promising developmental predictor was separation from parents, but this factor can partly be considered a consequence of early behaviour problems (e.g., placement in juvenile detention).

Attitudes tolerant of sexual assault showed a small, but statistically significant, relationship with sexual recidivism. Although consistent with theory, the utility of attitudes as a risk predictor in applied settings needs to be considered with caution. There was significant variability across studies and the four studies that specifically examined attitudes tolerant of adult-child sex did not find a significant relationship to sexual recidivism (95% confidence interval of -.16 to .33). The typical attitude measures (self-report or interviews) are highly influenced by the context of the assessment. It may be that attitudes expressed within relationships of trust (e.g., in treatment) are more reliable risk indicators than those expressed in adversarial contexts (e.g., civil commitment hearings). It will be interesting to know whether significant associations with recidivism will be found for attitudes assessed using difficult-to-fake measures, such as the implicit attitude test (Gray, MacCulloch, Smith

& Snowdon, 2002; Greenwald, McGhee & Schwartz, 1998) or the Stroop task (Smith & Waterman, in press).

The clinical presentation variables (e.g., denial, low victim empathy, low motivation for treatment) had little or no relationship with sexual or non-sexual recidivism. As with pro-offending attitudes, it may be difficult to assess sincere remorse in criminal justice settings. It is also possible that evaluators looking for risk factors have little to gain from listening to offenders' attempt to justify their transgressions. Psychotherapists often consider full disclosure desirable, and courts are lenient towards those who show remorse; few of us, however, are inclined to completely reveal our faults and transgressions. Research has also suggested that full disclosure of negative personal characteristics is associated with negative social outcomes, including poor progress in psychotherapy (Kelly, 2000). Consequently, resistance to being labelled a sexual offender may not be associated with increased recidivism risk, even though it does create barriers to engagement in treatment. Offenders who minimize their crimes are at least indicating that sexual offending is wrong.

None of the individual risk factors were sufficiently prognostic to be used in isolation; consequently, prudent evaluators need to consider a variety of factors. There were three common approaches to combining individual risk factors into an overall assessment: a) unguided professional judgement (based on expertise and unique features of the case), b) empirically-guided professional judgements (structured around empirically established risk factors), and c) pure actuarial prediction (the risk factors and the method of combining the factors being determined in advance).

Risk assessments were most likely to be accurate when they were constrained by empirical evidence. Unstructured clinical assessments were significantly related to recidivism, but their accuracy was consistently less than that of actuarial measures. The predictive accuracy of clinical assessments was slightly higher in the current review ($d. = .40$; $k = 9$) than in Hanson and Bussière's earlier review ($r = .10$; $d \approx .20$, $k = 10$), although the difference was not statistically significant (their confidence intervals overlap). Part of the improvement involved inclusion of a recent study in which clinical assessment did quite well (Hood, Shute, Feilzer & Wilcox, 2002), and removing to a separate category post-treatment assessments of "benefit from treatment". The extent to which recent advances in research knowledge have improved routine clinical assessments remains unknown.

Empirically-guided professional judgements showed predictive accuracies that were intermediate between the values observed for clinical assessments and pure actuarial approaches. The same pattern of results applied to the prediction of sexual recidivism, violent non-sexual recidivism, and general (any) recidivism. There were no sex offender recidivism studies that examined the accuracy of risk assessments in which judges were presented with actuarial results and then allowed to adjust their overall predictions based on external risk factors (Webster et al., 1994). Future research should consider such adjusted actuarial risk assessments because this approach has proven the most accurate in other domains (e.g., weather forecasting; Swets, Dawes & Monahan, 2000).

For sexual recidivism, the predictive accuracies of the actuarial risk scales were in the moderate to large range. There were no significant differences among the sex offender specific measures (e.g., SORAG, Static-99, RRASOR). Although based on few studies, it appeared that the measures designed to predict general criminal recidivism (e.g., SIR, Bonta et al., 1996) predicted sexual recidivism as well as did the measures specifically designed for sexual or violent recidivism (e.g.,

SORAG, Static-99). Some relationship between general criminality and sexual recidivism would be expected, given that antisocial orientation is a well-established risk marker.

For the prediction of general recidivism, the general criminal risk scales were superior (d. = 1.03) to measures designed to predict sexual recidivism (d. = .52). The general criminal risk scales were also as good at predicting any violent recidivism (d. = 79) as the scales specifically designed to assess violent recidivism among sexual offenders (SORAG, d. = .75/.81). Further research is required to determine whether the specific sexual offender risk scales provide useful information that is not already captured in the general criminal risk scales.

Since Hanson and Bussière's (1998) previous review, researchers have increasingly focussed on risk factors that are, in theory, changeable. The current review found that a number of these potentially dynamic risk factors were significantly related to sexual recidivism (e.g., sexual preoccupations, conflicts in intimate relationships, hostility, emotional identification with children, attitudes tolerant of sexual assault). What remains unknown is whether changes on such factors are associated with reductions in recidivism risk. In general, evaluations of treatment progress showed little relationship to recidivism, with an average d. of .14. Nevertheless, there were some recent examples in which ratings of progress in treatment were significantly related to recidivism (Beech, Erikson, Friendship & Ditchfield, 2001, d = .50; Marques, Day, Wiederanders & Nelson, 2002, d = .55). Both of these studies used highly structured approaches to evaluating treatment gains, and were informed by empirical research concerning relevant risk factors.

Readers familiar with Hanson and Bussière's (1998) earlier review will observe many minor differences between the earlier results and the current results. For example, deviant sexual interest in children as measured by phallometry was the largest single predictor of sexual recidivism in the earlier review (average r = .32, d ≈ .60, k = 7), whereas the effect was smaller in the current review (d. = .32, k = 10). Similarly, employment instability significantly predicted sexual recidivism in the current review (d. = .22, k = 15) but the effect was not significant in the previous review (average r = .07, d. ≈ .15, k = 5). Some of the changes would be due to the inclusion of additional research studies and the use of different (hopefully better) statistics. As research accumulates, it is possible to further examine the boundary conditions of specific risk factors (e.g., variations across samples, assessment methods). It is worth remembering, however, that even with large sample sizes, random variation is expected. Three studies was the minimum for inclusion in this meta-analysis, but it is far from the minimum required to obtain immutable results.

Meta-analyses provide broad overviews, and can easily neglect potentially important differences between studies. The definitions of constructs varied across studies, as did the samples. The current study focussed on mixed groups of sexual offenders, and there was no effort to identify distinct predictors for specific subgroups (e.g., rapists, exhibitionists). Nevertheless, the findings were remarkably consistent. For 70% of the findings, the amount of variability across studies was no more than would be expected by chance ($p < .05$). Furthermore, there was substantial consistency within many of the categories of predictors, with almost all of the variables being significant (e.g., sexual deviancy, history or rule violation) or non-significant (e.g., general psychological problems, clinical presentation). There is still substantial variability across studies that remains to be explained, but it appears that research is getting closer to identifying the constructs that are, and are not, related to recidivism among sexual offenders.

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Table 1
Predictors of sexual recidivism

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Sexual Deviancy								
Any deviant sexual interest	.36	.31	.21	.42	21.91	16	2,769	5, 6, 19, 31, 32, 43.2, 59.2, 63, 74.3, 76, 81, 82, 84, 86, 89, 91.1
Sexual interests in children	.34	.33	.10	.57	2.82	4	438	43.2, 63, 82, 91.1
Paraphilic interests	.32	.21	.01	.41	6.71	4	477	32, 63, 89, 91.1
Sexual preoccupations	.51	.39	.23	.56	8.31	6	1,119	14, 27, 42.2, 59.2, 62m, 67
MMPI 5 – Masculinity – Femininity	.46	.42	.16	.68	0.86	4	617	22, 27, 36, 47
Phallometric Assessment								
Any deviant sexual preference	.40	.24	.12	.35	12.65	13	2,180	2, 27, 35, 43.3, 44, 48.2, 56.2, 57, 57.1, 62m, 71, 73.1, 81
Sexual interest in rape/violence	.33	.12	-.06	.29	3.96	7	1,140	27, 35, 43.1, 48, 62m, 71, 73.1
Sexual interest in children	.37	.32	.16	.47	11.52	10	1,278	27, 35, 42.1, 43.2, 48, 57, 57.1, 62m, 71, 73.1
Sexual interest in boys	.30	.20	-.10	.51	1.26	3	306	27, 35, 42.1
Antisocial Orientation								
Antisocial Personality								
Antisocial personality disorder	.29	.21	.11	.31	13.01	12	3,267	20, 21, 22, 27, 35, 36, 42.2, 47, 56.1, 59, 81, 82
PCL-R	.25	.29	.20	.38	14.36	13	2,783	43.3, 44, 48.2, 56.3, 62m, 64, 65, 68.2, 74.1, 80, 81, 84, 89.1
MMPI 4 – Psychopathic deviate	.46	.43	.18	.69	0.35	4	617	22, 27, 36, 47
Any personality disorder	.33	.36	.18	.53	8.85	5	770	9, 35, 43.3, 44, 82
With outlier	.36	.66	.52	.80	45.32***	6	1,985	66.1
Antisocial Traits								
General self-regulation problems	.34	.37	.26	.48	22.85	15	2,411	13, 19, 42.2, 47, 56.3, 59.1, 62m, 63, 65, 73.1, 74.1, 80, 82, 84, 91.1
Impulsivity, recklessness	.25	.25	.06	.43	5.35	6	775	13, 42.2, 58, 59.2, 63, 91.1
Poor problem solving	.37	.14	-.09	.37	3.53	3	475	42.2, 59.2, 74.3
Employment instability	.15	.22	.13	.30	20.88	15	5,357	1, 8, 18, 19, 27, 43.3, 50, 52, 54, 64, 74.3, 78, 86, 88, 89

Table 1 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Antisocial traits continued								
MMPI 9 – Hypomania	.08	.16	-.09	.42	9.33*	4	617	22, 27, 36, 47
Any substance abuse	.12	.12	.05	.18	52.22**	31	9,166	5, 6, 8, 9, 18, 19, 21, 27, 29, 35, 36, 37, 42.2, 44, 45, 46, 47, 50, 55, 59.2, 62m, 63, 64, 66.1, 74.3, 78, 81, 82, 86, 89, 90
Intoxicated during offence	.04	.11	.02	.20	19.73*	10	5,276	8, 18, 22, 27, 29, 42.2, 50, 62.9, 88, 90
Hostility	.16	.17	.04	.31	12.69	9	1,960	22, 27, 35, 36, 42.2, 59, 62m, 73.1, 76
Procriminal attitudes	.42	.18	-.05	.40	2.85	3	393	59.2, 68.1, 81
History of Rule Violation								
Childhood behaviour problems	.17	.30	.16	.43	7.11	8	1,996	5, 6, 29, 44, 59.2, 64, 81, 90
Childhood criminality	.32	.24	.12	.37	12.91	16	2,849	5, 6, 8, 11, 14, 29, 34, 42.2, 45, 50, 59, 63, 64.1, 67, 81, 87
Any prior criminal history	.30	.32	.27	.37	76.56***	31	14,800	8, 9, 18, 19, 22, 24.1, 27, 30.2, 31, 35, 36, 39, 41.1, 42.2, 43.3, 44, 50, 51, 54, 55, 62m, 63, 66, 71, 74.3, 77, 78, 83, 89, 90
History of non-sexual crime	.29	.26	.18	.34	13.87	12	8,151	8, 12.2, 20, 30.2, 35, 36, 43.3, 50, 52, 59.2, 86, 92
History of violent crime	.19	.18	.12	.25	43.21**	19	7,448	8, 18, 19, 22, 31, 35, 39, 42.2, 43.3, 44, 52, 59.2, 62m, 64.1, 66, 71, 74.3, 83, 90
History of non-violent crime	.11	.16	.08	.25	21.34*	10	3,706	6, 8, 22, 35, 39, 43.3, 44, 74.3, 83, 90
With outlier	.10	.09	.01	.17	48.57***	11	4,084	81
Non-compliance with supervision	.73	.62	.45	.79	5.86	3	2,159	78, 86, 88
Violation of conditional release	.44	.50	.34	.65	16.55***	4	2,151	39, 44, 74.3, 90
Adverse Childhood Environment								
Separation from parents	.16	.16	.05	.28	11.74	13	4,145	18, 29, 34, 42.2, 43.3, 44, 56.1, 59.2, 62m, 71, 76, 90, 92
Childhood neglect, physical or emotional abuse	.00	.10	.01	.20	27.43	18	5,490	5, 6, 8, 18, 27, 29, 42.2, 50, 56.1, 59, 62m, 71, 74.3, 78, 81, 87, 90, 92
Childhood sexual abuse	.02	.09	-.01	.18	24.44	17	5,711	6, 8, 18, 22, 27, 42.2, 45, 50, 55, 59, 62m, 71, 78, 81, 90, 91.1, 92
Negative relation with father	.05	.07	-.18	.32	2.53	4	572	22, 36, 55, 59.2
Negative relation with mother	.10	.09	-.16	.34	1.37	4	565	22, 36, 55, 59.2

Table 1 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Intimacy Deficits								
General people problems	.02	.15	-.05	.36	9.72	9	860	14, 18, 27, 35, 47, 59, 63, 64, 67
Social skill deficits	-.24	-.07	-.27	.13	8.11	6	965	6, 36, 42.2, 47, 59.2, 76
Negative social influences	.21	.22	-.01	.45	2.36	6	938	18, 27, 29, 34, 59.2, 78
Conflicts in intimate relationship	.42	.36	.05	.66	2.08	4	298	8, 35, 46, 74.3
Emotional identification with children	.63	.42	.16	.69	4.32	3	419	20, 63, 73.1
Loneliness	.02	.03	-.10	.17	5.79	6	1,810	5, 6, 27, 59.2, 73.1, 76
Sexual Attitudes								
Attitudes tolerant of sexual crime	.21	.22	.05	.38	14.53*	9	1,617	1, 5, 6, 31, 59.2, 62m, 73.1, 74.3, 76
Child molester attitudes	.04	.09	-.16	.33	7.67	4	832	1, 35, 62m, 76
Other deviant sex attitudes	-.08	-.04	-.28	.19	4.60	3	683	5, 22, 62m
Low sex knowledge	.25	.11	-.06	.27	3.49	5	1,364	6, 27, 36, 42.2, 62m
General Psychological Problems								
General psychological functioning	.13	.12	-.05	.30	5.77	8	1,403	18, 22, 35, 62m, 62.9, 71, 73.1, 76
With outlier	.19	.30	.16	.44	16.74*	9	2,618	66.1
Anxiety	.06	.07	-.18	.31	0.57	6	667	22, 27, 35, 36, 76, 82
Depression	-.17	-.13	-.34	.08	6.90	7	850	5, 22, 27, 35, 36, 59, 76
MMPI 2 – Depression	.18	.09	-.17	.34	2.37	4	617	22, 27, 36, 47
Low self-esteem	.03	.04	-.12	.20	10.12	10	1,424	5, 22, 27, 36, 42.2, 47, 55, 59, 73.1, 76
Severe psychological dysfunction	.00	-.03	-.19	.12	0.73	8	1,268	5, 20, 27, 35, 44, 56.1, 59.2, 74.3
With outlier	.00	.24	.11	.38	41.06**	9	2,783	66.1
Seriousness of Sex Offence								
Degree of force used	.00	.09	.02	.16	29.28	25	7,221	5, 6, 8, 18, 19, 24.2, 27, 29, 36, 42.2, 43.3, 44, 50, 56.1, 57, 57.1, 59.2, 62.2, 64.1, 74.3, 81, 86, 87, 89, 90
Degree of sexual intrusiveness	-.10	-.17	-.29	-.05	29.51**	15	2,500	5, 6, 18, 19, 20, 24, 29, 30, 42.2, 50, 57.1, 62.2, 64.1, 81, 87
Any non-contact sexual offences	.37	.31	.24	.38	42.07**	22	10,238	5, 12.1, 21, 22, 24.1, 31, 33, 37, 38, 44, 50, 51, 52, 53, 54, 55, 59.2, 64.1, 66, 76, 85, 93
With outlier	.37	.43	.36	.49	188.90***	23	11,612	90

Table 1 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Clinical Presentation								
Lack of victim empathy	-.01	-.08	-.21	.06	0.92	5	1,745	5, 6, 27, 31, 36
Denial of sexual crime	-.02	.02	-.15	.19	11.72	9	1,780	5, 6, 29, 50, 57, 59.2, 62.6, 64.2, 74.3
Minimizing culpability	.00	.06	-.18	.30	4.04	6	768	5, 6, 27, 29, 36, 59.2
Low motivation for treatment at intake	-.04	-.08	-.21	.06	13.83	12	1,786	1, 5, 6, 19, 27, 28, 31, 36, 40, 49, 78, 81
Poor progress in treatment (post)	.11	.14	-.03	.30	9.35	7	1,118	27.2, 36, 42.2, 43.2, 49, 56.4, 75
Approaches to Risk Assessment								
Clinical assessment	.34	.40	.24	.56	7.18	9	1,679	3, 5, 6, 23, 26, 27.1, 28, 36, 56.3
Empirically guided	.31	.41	.26	.55	9.56	9	1,270	31, 56.3, 59.2, 65, 68.2, 73, 74m, 79, 89
With outlier	.34	.51	.37	.65	26.20**	10	1,391	84.1
Actuarial risk scale: sex	.64	.61	.54	.69	70.36***	33	6,792	2m, 3, 7, 14, 19, 31, 43.4, 44, 50, 56.3, 58, 59.2, 62.7, 65, 66.2, 67, 68.1, 69, 70, 71, 72, 73.1, 74m, 75.1, 76, 77, 79, 80, 84.1, 85, 86.1, 89.2, 95
Actuarial risk scale: criminal	.79	.71	.47	.94	4.14	4	497	18, 59.2, 68.1, 83
With outlier	.64	.51	.33	.69	10.92*	5	813	39
Unvalidated objective risk assessment scheme	1.08	1.06	.91	1.19	12.08	14	3,093	1, 5, 22.1, 29, 57, 59.2, 61, 62.9, 63, 64, 75.1, 86, 89.1, 90
With outlier	1.08	.93	.82	1.05	30.27**	15	3,381	43.4
Risk Scales								
VRAG	.44	.52	.38	.67	8.05	5	1,147	43.5, 44, 56.3, 65, 74.1
SORAG	.55	.48	.33	.63	4.21	5	1,348	7, 44, 56.3, 79, 86.1
With outlier	.56	.55	.41	.69	16.67**	6	1,421	74.1
STATIC-99	.70	.63	.54	.72	44.17**	21	5,103	2.2, 3, 19, 31, 44, 50, 56.3, 59.2, 62.7, 66.2, 68.1, 69, 70, 71, 73.1, 74.2, 75.1, 79, 84.1, 86.1, 95
RRASOR	.86	.59	.50	.67	55.84***	18	5,266	2.0, 2.1, 19, 44, 50, 56.3, 59.2, 65, 66.2, 70, 71, 74.1, 76, 77, 80, 86.1, 89.2
MnSOST-R	.58	.66	.46	.86	4.76	4	813	56.3, 74.2, 86.1, 89.2
SVR-20	.48	.77	.58	.95	19.01**	6	819	56.3, 65, 68.2, 74.1, 79, 84.1
Other sex risk scales	.59	.66	.56	.76	13.04	8	2,751	19, 27.2, 52, 56.3, 58, 68.2, 86, 89.2
SIR	.94	.77	.52	1.02	2.51	3	420	18, 68.1, 83
With outlier	.79	.52	.34	.71	10.61*	4	736	39

*p<05, **p<.01, ***p<.001
Note: C.I. – confidence interval, k is the number of studies.

Table 2
Predictors of violent non-sexual recidivism

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Sexual Deviancy								
Any deviant sexual interest	-.15	-.04	-.25	.18	4.61	5	619	31, 59.2, 63, 84, 91.1
MMPI 5 – Masculinity - femininity	-.22	-.19	-.43	.06	1.32	4	713	22, 25, 27, 36
Antisocial Orientation								
Antisocial Personality								
Antisocial personality disorder	.60	.49	.26	.72	5.61	6	756	22, 27, 35, 36, 59, 82
PCL-R	.56	.57	.30	.84	1.13	4	263	65, 68.2, 74.1, 84
MMPI 4 – Psychopathic deviate	.17	.24	-.01	.48	3.72	4	713	22, 25, 27, 36
Antisocial Traits								
General self-regulation problems	.68	.62	.44	.80	4.28	8	725	13, 59.2, 63, 65, 74.1, 82, 84, 91.1
Impulsivity, recklessness	.37	.45	.20	.70	1.44	4	428	13, 59.2, 63, 91.1
Employment instability	.37	.41	.30	.52	8.77	5	3,532	18, 27, 50, 52, 88
MMPI 9 – Hypomania	.57	.47	.23	.72	6.99	4	713	22, 25, 27, 36
Any substance abuse	.40	.47	.33	.60	6.42	7	2,436	18, 27, 35, 36, 50, 59.2, 66.1
With outlier	.41	.42	.28	.55	14.48*	8	2,549	63
Intoxicated during offence	.11	.29	.11	.46	1.90	3	1,569	22, 27, 50
With outlier	.24	.46	.30	.63	28.11***	4	1,773	18
History of Rule Violation								
Childhood criminality	.59	.43	.27	.59	10.26	6	1,395	11, 34, 50, 59, 63, 64.1
Any prior criminal history	.56	.50	.41	.59	21.66*	10	4,090	18, 22, 27, 31, 35, 36, 39, 50, 52, 63
History of non-sexual crime	.68	.51	.37	.64	11.45*	5	1,945	35, 36, 50, 52, 59.2
History of violent crime	.70	.68	.59	.78	22.85**	10	3,637	18, 22, 25, 31, 35, 39, 52, 59.2, 64.1, 66
History of non-violent crime	.31	.32	.16	.48	2.79	4	1,043	22, 25, 35, 39
Adverse Childhood Environment								
Childhood neglect, physical or emotional abuse	.08	-.03	-.23	.17	5.06	4	1,897	18, 27, 50, 59
Childhood sexual abuse	.02	-.07	-.28	.14	7.84	5	1,900	18, 22, 27, 50, 91.1
With outlier	.13	.08	-.10	.26	16.22**	6	2,048	59
Negative relation with father	.17	.29	-.03	.61	2.57	3	341	22, 36, 59.2
Negative relation with mother	-.01	.12	-.20	.43	2.32	3	348	22, 36, 59.2

Table 2 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Intimacy Deficits								
General people problems	.30	.21	-.01	.44	2.61	5	645	18, 27, 35, 59, 63
Negative social influences	.71	.24	-.05	.54	41.78***	3	411	18, 27, 59.2
General Psychological Problems								
General psychological functioning	.43	.38	.21	.54	1.94	3	1,528	18, 35, 66.1
With outlier	.29	.31	.15	.47	11.18*	4	1,605	22
Anxiety	-.42	-.31	-.65	.03	2.44	5	465	22, 27, 35, 36, 82
Depression	-.12	-.11	-.38	.16	9.03	5	629	22, 27, 35, 36, 59
MMPI 2 – Depression	.10	.10	-.16	.37	5.08	3	636	25, 27, 36
With outlier	-.11	-.04	-.29	.20	12.72*	4	713	22
Low self-esteem	-.34	-.28	-.69	.14	2.34	3	288	22, 27, 36
With outlier	-.18	.13	-.16	.42	9.56*	4	415	59
Severe psychological dysfunction	.24	.12	-.06	.29	1.09	4	1,450	27, 35, 59.2, 66.1
Seriousness of Sex Offence								
Degree of force used	.33	.35	.22	.47	8.37	6	2,501	18, 27, 36, 50, 59.2, 64.1
Degree of sexual intrusiveness	.42	.36	.17	.55	1.29	3	956	18, 50, 64.1
Any non-contact sexual offences	-.02	-.03	-.22	.16	13.57*	7	1,889	22, 31, 50, 52, 59.2, 64.1, 85
Clinical Presentation								
Lack of victim empathy	.17	.19	.03	.35	1.42	3	1,435	27, 31, 36
Minimizing culpability	.02	.03	-.31	.37	0.13	3	364	27, 36, 59.2
Low motivation for treatment at intake	.24	.24	-.02	.50	0.48	3	488	27, 31, 36
Approaches to Risk Assessment								
Clinical assessment	.23	.24	-.09	.57	0.10	3	552	25, 26, 36
Empirically guided	.33	.34	.16	.52	2.89	7	611	31, 59.2, 65, 68.2, 74m, 79, 84.1
Actuarial risk scale: sex	.45	.44	.33	.55	13.91	10	2,712	31, 50, 59.2, 65, 66.2, 68.1, 74.2, 79, 84.1, 86.1
Actuarial risk scale: criminal	.75	.77	.58	.96	0.67	4	639	18, 39, 59.2, 68.1

Table 2 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Risk Scales								
SORAG	.75	.77	.53	1.01	0.07	3	415	74.1, 79, 86.1
STATIC-99	.38	.44	.26	.54	8.11	8	1,440	31, 50, 59.2, 68.1, 74.2, 79, 84.1, 86.1
With outlier	.46	.55	.44	.66	20.94*	9	2,743	66.2
RRASOR	.18	.22	.09	.34	5.63	6	2,223	50, 59.2, 65, 66.2, 74.1, 86.1
SVR-20	.25	.35	.12	.57	1.81	5	375	65, 68.2, 74.1, 79, 84.1
SIR	.76	.77	.57	.97	0.66	3	562	18, 39, 68.1

*p<05, **p<.01, ***p<.001
Note: C.I. – confidence interval, k is the number of studies.

Table 3
Predictors of any violent recidivism (sexual or non-sexual)

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Sexual Deviancy								
Any deviant sexual interest	.20	.18	.04	.32	5.41	7	1,076	19, 31, 59.2, 63, 74.3, 81, 84
Sexual preoccupations	.30	.28	.13	.42	0.46	4	1,047	27, 42.2, 59.2, 62m
MMPI 5 – Masculinity – Femininity	.14	.16	-.06	.38	1.27	3	559	22, 27, 36
Phallometric Assessment								
Any deviant sexual preference	.25	.19	.08	.29	8.21	8	1,768	27, 35, 43.3, 44, 48.2, 56.2, 62m, 81
Sexual interest in rape/violence	.46	.15	.00	.31	8.49	5	1,038	27, 35, 43.1, 48, 62m
Sexual interest in children	.19	.18	.03	.34	0.96	5	992	27, 35, 43.0, 48, 62m
Antisocial Orientation								
Antisocial Personality								
Antisocial personality disorder	.38	.37	.23	.51	3.46	7	1,319	4, 22, 27, 35, 36, 42.2, 81
PCL-R	.67	.58	.49	.67	9.63	9	2,446	4, 43.3, 44, 48.2, 56.3, 62m, 74.1, 81, 84
MMPI 4 – Psychopathic deviate	.16	.28	.06	.50	2.61	3	559	22, 27, 36
Any personality disorder	.25	.40	.23	.56	6.84**	3	628	35, 43.3, 44
Antisocial Traits								
General self-regulation problems	.99	.52	.42	.63	28.36***	8	1,810	19, 42.2, 56.3, 59.1, 62m, 63, 74.1, 84
Impulsivity, recklessness	.47	.34	.15	.54	0.84	3	497	42.2, 59.2, 63
Poor problem solving	.41	.13	-.06	.33	4.46	3	476	42.2, 59.2, 74.3
Employment instability	.32	.35	.26	.43	6.89	6	3,705	18, 19, 27, 50, 52, 88
With outlier	.33	.37	.29	.45	15.86*	7	3,800	74.3
MMPI 9 – Hypomania	.32	.44	.22	.67	4.49	3	559	22, 27, 36
Any substance abuse	.35	.38	.30	.45	29.80**	14	4,306	18, 19, 27, 35, 36, 42.2, 44, 50, 59.2, 62m, 63, 74.3, 81, 90
Intoxicated during offence	.19	.22	.13	.31	7.08	6	3,463	22, 27, 42.2, 50, 62.9, 90
With outlier	.27	.28	.20	.37	55.73***	7	3,667	18
Hostility	.15	.21	.08	.34	5.10	6	1,494	22, 27, 35, 36, 42.2, 62m
History of Rule Violation								
Childhood behaviour problems	.43	.48	.35	.61	0.66	4	1,591	44, 59.2, 81, 90
Childhood criminality	.46	.45	.31	.59	3.84	6	1,518	34, 42.2, 50, 59.2, 63, 81
Any prior criminal history	.48	.48	.43	.53	41.26**	19	8,946	18, 19, 22, 27, 31, 35, 36, 39, 41.1, 42.2, 43.3, 44, 50, 52, 62m, 63, 66, 74.3, 90

Table 3 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
History of rule violation continued								
History of non-sexual crime	.52	.58	.51	.66	30.75***	7	4,170	12.2, 35, 36, 43.3, 50, 52, 59.2
History of violent crime	.49	.48	.42	.54	52.77***	16	6,807	18, 19, 22, 31, 35, 39, 41.3, 42.2, 43.3, 44, 52, 59.2, 62m, 66, 74.3, 90
History of non-violent crime	.39	.36	.28	.44	86.91***	8	3,377	22, 35, 37, 43.3, 44, 74.3, 81, 90
Violation of conditional release	.37	.42	.27	.56	1.39	3	2,080	39, 44, 90
With outlier	.81	.48	.35	.62	10.01*	4	2,175	74.3
Adverse Childhood Environment								
Separation from parents	.21	.19	.10	.29	1.28	7	2,934	18, 42.2, 43.3, 44, 59.2, 62m, 90
Childhood neglect, physical or emotional abuse	.33	.25	.16	.35	26.42***	9	4,184	18, 27, 42.2, 50, 59.2, 62m, 74.3, 81, 90
Childhood sexual abuse	.02	-.05	-.13	.04	12.32	10	6,557	18, 22, 27, 42.2, 50, 59.2, 62m, 81, 90, 91.1
Negative relation with father	.14	.21	-.06	.47	0.89	3	341	22, 36, 59.2
Negative relation with mother	.19	.19	-.08	.45	1.71	3	348	22, 36, 59.2
Intimacy Deficits								
General people problems	.36	.31	.10	.53	2.88	5	621	18, 27, 35, 59.1, 63
Social skill deficits	.02	.03	-.16	.23	4.62	3	561	36, 42.2, 59.2
Negative social influences	.35	.29	.06	.52	7.65*	3	413	18, 27, 59.2
Sexual Attitudes								
Attitudes tolerant of sexual crime	.17	.14	-.03	.31	3.56	4	849	31, 59.2, 62m, 74.3
Low sex knowledge	.15	.10	-.05	.24	3.08	4	1,144	27, 36, 42.2, 62m
General Psychological Problems								
General psychological functioning	.05	.07	-.09	.23	1.58	5	1,004	18, 22, 35, 62m, 62.9
Anxiety	-.13	-.07	-.35	.16	1.19	4	405	22, 27, 35, 36
Depression	.28	.07	-.17	.31	8.93*	4	497	27, 35, 36, 59.2
Low self-esteem	-.14	-.06	-.23	.12	0.60	5	671	22, 27, 36, 42.2, 59.2
Severe psychological dysfunction	.02	-.06	-.21	.10	2.66	5	726	27, 35, 44, 59.2, 74.3

Table 3 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Seriousness of Sex Offence								
Degree of force used	.23	.22	.15	.29	9.21	12	4,920	18, 19, 27, 36, 42.2, 44, 50, 59.2, 62.2, 74.3, 81, 90
Degree of sexual intrusiveness	.08	.05	-.07	.18	8.06	6	1,488	18, 19, 42.2, 50, 62.2, 81
Any non-contact sexual offences	.02	.11	.04	.18	33.08***	9	7,141	12.1, 22, 31, 44, 50, 52, 59.2, 66, 90
Clinical Presentation								
Lack of victim empathy	.01	.03	-.10	.15	0.80	3	1,435	27, 31, 36
Denial of sexual crime	.10	.13	-.03	.29	8.93	5	1,294	3, 50, 59.2, 62m, 74.3
Minimizing culpability	.04	.02	-.26	.29	2.90	3	364	27, 36, 59.2
Low motivation for treatment at intake	.08	.11	-.04	.26	5.79	5	963	19, 27, 31, 36, 81
Poor progress in treatment (post)	.03	.02	-.14	.19	0.29	3	719	36, 42.2, 56.4
Approaches to Risk Assessment								
Clinical assessment	.53	.58	.36	.80	8.25*	4	956	3, 16, 26, 36
With outlier	.31	.33	.17	.48	18.19**	5	1,363	56.3
Empirically guided	.53	.52	.30	.75	6.85*	3	373	31, 59.2, 74.1
With outlier	.40	.31	.15	.47	13.52**	4	780	56.3
Actuarial risk scale: sex	.64	.58	.50	.65	53.83***	15	4,807	2m, 3, 19, 31, 43.5, 44, 50, 56.3, 59.2, 62.7, 66, 70, 74.1, 84.1, 86.1
Actuarial risk scale: criminal	.73	.79	.60	.97	1.42	3	567	18, 39, 59.2
Unvalidated objective risk assessment scheme	.79	.77	.58	.95	0.54	4	1,220	43.4, 62.9, 63, 90
Risk Scales								
VRAG	.87	.80	.66	.93	5.42	3	1,023	43.5, 44, 56.3
With outlier	.91	.85	.72	.98	12.68**	4	1,118	74
SORAG	.72	.75	.62	.88	3.21	4	1,308	44, 56.3, 62.7, 86.1
With outlier	.74	.81	.69	.94	17.47**	5	1,403	74.1
STATIC-99	.51	.57	.49	.64	48.01***	13	4,428	2.2, 3, 19, 31, 44, 50, 56.3, 59.2, 62.7, 66, 70, 84.1, 86.1
RRASOR	.28	.34	.26	.42	38.16**	10	3,603	2.2, 19, 44, 50, 56.3, 59.2, 66, 70, 74.1, 86.1
Other sex risk scales	.58	.55	.44	.66	3.24	4	1,820	19, 52, 56.3, 86

*p<05, **p<.01, ***p<.001
Note: C.I. – confidence interval, k is the number of studies.

Table 4
Predictors of general (any) recidivism

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Sexual Deviancy								
Any deviant sexual interest	.03	-.10	-.20	.01	34.79***	8	2,207	5, 6, 31, 59.2, 62.1, 81, 84, 86
With outlier	.05	.19	.11	.28	193.68***	9	5,392	30
Sexual preoccupations	.33	.37	.23	.51	5.19	5	875	14, 27, 59.2, 62m, 67
MMPI 5 – Masculinity – Femininity	-.04	-.01	-.19	.16	1.31	4	617	22, 27, 36, 47
Phallometric Assessment								
Any deviant sexual preference	.17	.26	.14	.38	9.82	7	1,263	27, 35, 42.1, 42.3, 48.2, 62m, 81
With outlier	.19	.17	.06	.28	24.75***	8	1,478	56.2
Sexual interest in rape/violence	.18	.18	.06	.31	1.64	5	1,075	27, 35, 43.1, 48, 62m
Sexual interest in children	.27	.23	.10	.36	4.37	5	984	27, 35, 42.1, 48, 62m
Sexual interest in boys	.20	.15	-.09	.38	3.16	3	309	27, 35, 42.1
Antisocial Orientation								
Antisocial Personality								
Antisocial personality disorder	.52	.55	.44	.66	13.03	11	4,770	4, 20, 22, 27, 30, 35, 36, 47, 56.1, 80, 81
PCL-R	.71	.67	.57	.76	9.04	9	1,966	4, 15, 42.3, 48.2, 56.3, 62m, 64, 81, 84
MMPI 4 – Psychopathic deviate	.32	.28	.10	.45	5.13	4	617	22, 27, 36, 47
Any personality disorder	.44	.50	.29	.71	5.73	5	927	9, 35, 43.0, 62.1, 80
Antisocial Traits								
General self-regulation problems	.75	.75	.63	.86	7.56	6	1,300	13, 42.3, 56.3, 59.1, 62m, 84
With outlier	.70	.72	.60	.83	15.34*	7	1,350	47
Employment instability	.34	.33	.27	.39	16.89	11	5,402	8, 12, 18, 27, 50, 52, 56, 62.1, 64, 86, 88
MMPI 9 – Hypomania	.56	.47	.28	.66	5.50	3	559	22, 27, 36
With outlier	.26	.40	.22	.58	13.81*	4	617	47
Any substance abuse	.30	.44	.39	.49	76.94***	21	9,528	5, 6, 8, 9, 18, 27, 29, 30, 35, 36, 42, 47, 50, 56, 59.2, 62m, 64, 81, 86, 88, 90
Intoxicated during offence	.21	.38	.32	.43	48.01***	10	5,838	8, 17, 18, 22, 27, 29, 50, 62m, 88, 90
Hostility	.30	.31	.19	.43	3.99	5	1,251	22, 27, 35, 36, 62m

Table 4 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
History of Rule Violation								
Childhood behaviour problems	.58	.56	.44	.68	7.12	7	1,736	6, 29, 56, 59.2, 64, 81, 90
With outlier	.55	.50	.39	.62	14.98*	8	1,848	5
Childhood criminality	.45	.46	.35	.58	8.29	12	2,053	5, 6, 8, 11, 14, 29, 34, 50, 55, 59.2, 64, 81
With outliers	.42	.34	.24	.44	24.31*	14	2,571	17, 67
Any prior criminal history	.55	.55	.51	.60	49.88***	20	11,251	8, 9, 17, 18, 22, 27, 30.2, 31, 35, 36, 39, 41m, 43.0, 50, 52, 62, 77, 80, 90, 94
History of non-sexual crime	.61	.63	.57	.69	19.53*	9	7,665	8, 12.2, 30.2, 35, 36, 50, 52, 59.2, 86
History of violent crime	.56	.52	.46	.59	19.07	12	4,382	8, 18, 22, 31, 35, 39, 43.1, 52, 59.2, 62m, 64, 90
History of non-violent crime	.57	.68	.61	.76	9.33	8	3,461	6, 8, 35, 39, 62.1, 80, 81, 90
With outlier	.50	.65	.58	.72	19.87*	9	3,652	22
Violation of conditional release	.78	.74	.54	.94	4.80	3	1,751	39, 80, 90
Adverse Childhood Environment								
Separation from parents	.28	.27	.17	.36	5.83	6	2,513	18, 29, 56.1, 59.2, 62m, 90
Childhood neglect, physical or emotional abuse	.05	.14	.06	.22	22.78*	13	4,698	5, 6, 8, 18, 27, 29, 48.1, 50, 56.1, 59.2, 62m, 81, 96
Childhood sexual abuse	-.02	-.03	-.10	.05	27.35**	11	4,463	6, 8, 18, 22, 27, 48.1, 50, 59.2, 62m, 81, 90
Negative relation with father	.09	.08	-.10	.27	2.48	4	530	22, 36, 48.1, 59.2
Negative relation with mother	.22	.22	.04	.40	0.92	4	537	22, 36, 48.1, 59.2
Intimacy Deficits								
General people problems	.19	.17	.00	.33	6.18	8	723	14, 18, 27, 35, 47, 59.1, 64, 67
Social skill deficits	-.24	-.09	-.36	.18	3.47	3	307	36, 47, 59.2
With outlier	-.28	-.26	-.48	-.04	8.35*	4	504	6
Negative social influences	.23	.24	.06	.42	7.61	5	653	18, 27, 29, 55, 59.2
Loneliness	-.10	.00	-.11	.11	2.68	4	1,493	5, 6, 27, 59.2
Sexual Attitudes								
Attitudes tolerant of sexual crime	.32	.29	.12	.47	2.96	5	617	5, 6, 31, 59.2, 62m
Other deviant sex attitudes	-.13	-.18	-.34	-.02	3.50	3	683	5, 22, 62m
Low sex knowledge	.21	.16	.03	.30	4.39	4	1,037	6, 27, 36, 62m

Table 4 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
General Psychological Problems								
General psychological functioning	.08	-.08	-.22	.07	0.72	4	785	18, 22, 35, 62m
Anxiety	-.03	-.04	-.26	.18	1.11	4	405	22, 27, 35, 36
Depression	.05	.02	-.14	.17	10.57	7	1,237	5, 22, 27, 35, 36, 59.2, 62m
MMPI 2 – Depression	.02	-.01	-.19	.17	0.20	4	615	22, 27, 36, 47
Low self-esteem	.14	.11	-.08	.29	2.77	6	529	5, 22, 27, 36, 47, 59.2
Severe psychological dysfunction	.21	.12	-.05	.28	4.36	7	3,986	5, 20, 27, 30, 35, 56.1, 59.2
Seriousness of Sex Offence								
Degree of force used	.17	.28	.22	.33	33.06**	16	5,940	5, 6, 8, 18, 27, 29, 36, 50, 56.1, 59.2, 62.1, 64, 80, 81, 86, 90
Degree of sexual intrusiveness	.05	.18	.08	.28	7.76	9	1,947	6, 18, 24, 29, 30, 50, 62m, 64, 81
With outlier	.05	.13	.03	.23	20.15*	10	2,060	5
Any non-contact sexual offences	.02	.07	.01	.13	36.01***	14	10,556	5, 12.1, 22, 24, 30.1, 31, 50, 52, 53, 55, 59.2, 64, 85, 90
Clinical Presentation								
Lack of victim empathy	.14	.12	.02	.21	1.26	5	1,744	5, 6, 27, 31, 36
Denial of sexual crime	.00	.12	.02	.22	4.69	7	1,918	5, 6, 29, 50, 59.2, 62m, 64
Minimizing culpability	.16	.14	-.02	.31	8.97	6	768	5, 6, 27, 29, 36, 59.2
Low motivation for treatment at intake	-.14	-.09	-.21	.03	7.37	8	1,294	5, 6, 27, 28, 36, 40, 55, 81
With outlier	-.09	-.01	-.13	.10	17.17*	9	1,498	31
Poor progress in treatment (post)	.16	.18	.03	.34	7.64	5	744	14, 36, 42, 56.4, 80
Approaches to Risk Assessment								
Clinical assessment	.13	.23	.09	.36	15.36*	7	1,077	5, 6, 15, 23, 28, 36, 56.3
Empirically guided	.29	.27	.14	.41	5.21	5	892	31, 56.3, 59.2, 79, 84.1
Actuarial risk scale: sex	.58	.52	.42	.61	21.19	14	2,217	7, 10, 14, 31, 50, 56.3, 58, 59.2, 60, 62.7, 67, 79, 84.1, 86.1
Actuarial risk scale: criminal	1.02	1.03	.84	1.23	1.19	3	532	10, 18, 39
With outlier	.99	.92	.75	1.10	9.22*	4	609	59.2
Unvalidated objective risk assessment scheme	.94	.88	.78	.97	11.52	14	2,248	5, 15, 29, 43.0, 43.1, 61, 62.1, 62.1, 62.1, 62.2, 62.8, 64, 86, 91
With outlier	.96	.93	.84	1.03	24.73*	15	2,793	90

Table 4 continued

Variable	Median	Mean	95% C.I.		Q	k	Total	Studies
Risk Scales								
SORAG	.78	.79	.66	.92	5.36	5	1,009	7, 56.3, 60, 79, 86
STATIC-99	.50	.52	.42	.62	8.91	8	1,795	10, 31, 50, 56.3, 59.2, 79, 84.1, 86
RRASOR	.25	.26	.15	.38	1.70	5	1,291	10, 50, 56.3, 59.2, 86
SVR-20	.51	.52	.36	.68	0.29	3	673	56.3, 79, 84.1
Other sex risk scales	.55	.52	.41	.62	3.26	4	1,668	52, 56.3, 58, 86

*p<05, **p<.01, ***p<.001
Note: C.I. – confidence interval, k is the number of studies.

Table 5
Key to studies used in the meta-analysis

Number	Study	Number	Study
1.0	Abel et al. (1988)	40	Perkins (1987)
1.1	Gore (1988)	41.1	Soothill, Jack & Gibbens (1976)
2.0	Haynes et al. (2000)	41.2	Gibbens, Soothill & Way (1978)
2.1	Nicholaichuk (1997)	41.3	Soothill, Way & Gibbens (1980)
2.2	Nicholaichuk (2001)	42.0	Khanna, Brown, Malcolm & Williams (1989)
3	Hood, Shute, Feilzer & Wilcox (2002)	42.1	Malcolm, Andrews & Quinsey (1993)
4	Buffington-Vollum et al. (2002)	42.2	Quinsey, Khanna & Malcolm (1998)
5	Smith & Monastersky (1986)	42.3	Serin, Mailloux & Malcolm (2001)
6.0	Kahn & Chambers (1991)	43.0	Rice, Quinsey & Harris (1989)
6.1	Schram, Milloy & Rowe (1991)	43.1	Rice, Harris & Quinsey (1990)
7	Hartwell (2001)	43.2	Rice, Quinsey & Harris (1991)
8	Schram & Milloy (1995)	43.3	Quinsey, Rice & Harris (1995)
9	Tracy et al. (1983)	43.4	Rice & Harris (1995)
10	Hills (2002)	43.5	Rice & Harris (1997)
11	Waite et al. (2002)	44	Harris et al. (2003)
12.0	Broadhurst & Maller (1992)	45	Lab, Shields & Schondel (1993)
12.1	Broadhurst & Loh (1997)	46	Money & Bennet (1981)
12.2	Broadhurst (1999)	47	Davis, Hoffman & Stacken (1991)
13	Prentky, Knight, Lee & Cerce (1995)	48.0	Gretton (1995)
14	Prentky et al. (2000)	48.1	McBride, Gretton & Hare (1995)
15	Wormith & Ruhl (1986)	48.2	Gretton et al. (2001)
16	Kozol, Boucher & Garofalo (1972)	49	Ryan & Miyoshi (1990)
17	Pacht & Roberts (1968)	50	Song & Lieb (1994)
18	Motiuk & Brown (1995)	51	Wing (1984)
19	McGrath et al. (2003)	52	Thornton (1997)
20	Fitch (1962)	53	Radzinowicz (1957)
21	Frisbie & Dondis (1965)	54	Federoff et al. (1992)
22.0	Hanson et al. (1993)	55	Meyer & Romero (1980)
22.1	Hanson et al. (1992)	56.0	Barbaree, Seto & Maric (1996)
23	Florida (1985)	56.1	Barbaree & Seto (1998)
24.0	Mair & Stevens (1994)	56.2	Barbaree, Seto, Langton & Peacock (2001)
24.1	Mair & Wilson (1994)	56.3	Langton (2003a)
24.2	Mair & Wilson (1995)	56.4	Langton (2003b)
25	Hall (1988)	57.0	Barbaree & Marshall (1988)
26	Sturgeon & Taylor (1980)	57.1	Marshall & Barbaree (1988)
27.0	Marques & Day (1996)	58	Hanlon, Larson & Zacher (1999)
27.1	Schiller (2000)	59.0	Worling & Curwen (2000)
27.2	Marques et al. (2002)	59.1	Worling (2001)
28	Dix (1976)	59.2	Morton (2003)
29	Santman (1998)	60	Belanger & Earls (1996)
30.0	Sturup (1953)	61	Bench, Kramer & Erickson (1997)
30.1	Sturup (1960)	62.1	Bradford, Firestone, Fernandez et al. (1997)
30.2	Christiansen et al. (1965)	62.2	Firestone, Bradford, McCoy et al. (1998)
31	Hanson (2002)	62.3	Firestone, Bradford, McCoy et al. (1999)
32	Rooth & Marks (1974)	62.4	Firestone, Bradford, McCoy et al. (2000)
33	Weaver & Fox (1984)	62.5	Greenberg, Firestone, Bradford et al. (2000)
34	Doshay (1943)	62.6	Nunes, Serran, Firestone et al. (2000)
35	Proulx et al. (1995)	62.7	Nunes, Firestone, Bradford et al. (2002)
36	Reddon et al. (1996)	62.8	Rabinowitz-Greenberg et al. (2002)
37	Meyer, Cole & Emory (1992)	62.9	Rabinowitz-Greenberg (1999)
38	Mohr, Turner & Jerry (1964)	63	Prentky, Knight & Lee (1997)
39	Bonta & Hanson (1995)	64.0	Långström & Grann (2000)

Table 5 continued

Number	Study
64.1	Långström (2002a)
64.2	Långström (2002b)
65	Sjöstedt & Långström (2002)
66.0	Sjöstedt & Långström (2001)
66.1	Långström Sjöstedt et al. (in press)
66.2	Långström (in press)
67	Hecker, Scoular et al. (2002)
68.0	Witte, Di Placido & Wong (2001)
68.1	Witte, Di Placido, Gu & Wong (2002)
69	Poole, Liedecke & Marbibi (2000)
70	Wilson & Prinzo (2001)
71	Tough (2001)
72	Williams & Nicholaichuk (2001)
73.0	Thornton (2002a)
73.1	Thornton (2002b)
74.1	Dempster (1998)
74.2	Kropp (2000)
74.3	Dempster & Hart (2002)
75.0	Beech, Erikson et al. (2001)
75.1	Beech, Friendship et al. (2002)
76.0	Hudson, Wales et al. (2002)
76.1	Bakker, Hudson et al. (2002)
77	Ohio (2001)
78	Gfellner (2000)
79	Ducro, Claix & Pham (2002)
80.0	Mulloy & Smiley (1996)
80.1	Mulloy & Smiley (1997)
80.2	Smiley, McHattie & Mulloy (1998)
80.3	Smiley, McHattie et al. (1999)
81	Langevin & Fedoroff (2000)
82	Berger (2002)
83	Hanson & Harris (2001)
84.0	Hildebrand, de Ruiter & de Vogel (in press)
84.1	de Vogel, de Ruiter, van Beek & Mead (2002)
85	Allam (1999)
86.0	Fischer (2000)
86.1	Bartosh, Garby & Lewis (2003)
87	Cooper (2000)
88	Minnesota Department of Corrections (1999)
89.0	Epperson, Kaul & Huot (1995)
89.1	Epperson, Kaul & Hesselton (1998)
89.2	Epperson, Kaul, Huot et al.(2000)
90	Greenberg, Da Silva & Loh (2002)
91.0	Miner (2002a)
91.1	Miner (2002b)
92	Rasmussen (1999)
93	Dwyer (1997)
94	Nutbrown & Statiak (1987)
95	Thornton (2000)

Note: If a number is followed by “m”, then it indicates that the effect size was based on information from more than one article.

Appendix: Formula for calculating d

From sample sizes (N), means (M), and standard deviations (SD):

$$d = \frac{(M_1 - M_2)}{S_w} \qquad \text{Variance of d} = \left[\frac{N_1 + N_2}{N_1 N_2} + \frac{d^2}{2(N_1 + N_2)} \right]$$

S_w is the pooled within standard deviation. $S_w = \sqrt{\frac{(N_1 - 1)(SD_1)^2 + (N_2 - 1)(SD_2)^2}{N_1 - 1 + N_2 - 1}}$

Source: Cohen (1988); Hasselblad & Hedges (1995).

From raw frequencies in 2 x 2 tables:

	Not deviant	Deviant
Recidivists	a	b
Not recidivists	c	d

$$d = \frac{\sqrt{3}}{\pi}\left[\ln\left(\frac{\{b + .5\}\{c + .5\}}{\{a + .5\}\{d + .5\}} \right) \right]$$

Variance of d $= \frac{3}{\pi^2}\left(\frac{1}{a + .5} + \frac{1}{b + .5} + \frac{1}{c + .5} + \frac{1}{d + .5} \right)$, where $\frac{\sqrt{3}}{\pi} \cong .55133$

Note: d is directly proportional to the natural logarithm of the odds ratio.

Following the advice of Fleiss (1994), .5 was added to each cell of the twofold table to allow the calculation of odds ratio in the case of empty cells.

Source: Hasselblad & Hedges (1995).

From recidivism rates when the sample size of the deviant and non-deviant groups are unknown:

N_1 = sample size of recidivists
N_2 = sample size of non-recidivists
R_d= recidivism rate of deviant group
R_{nd} = recidivism rate of non-deviant group

$$d = \frac{\sqrt{3}}{\pi}\left[\ln\left(\frac{\frac{R_d}{1-R_d}}{\frac{R_{nd}}{1-R_{nd}}}\right)\right] \qquad \text{Variance of d} = \left[\frac{N_1+N_2}{N_1N_2} + \frac{d^2}{2(N_1+N_2)}\right]$$

From the definition of the odds ratio (e.g., Fleiss, 1994), and from Hasselblad & Hedges (1995).

From F/t:

$$d = t\sqrt{\frac{1}{N_1}+\frac{1}{N_2}} \qquad \text{Variance of d} = \left[\frac{N_1+N_2}{N_1N_2} + \frac{d^2}{2(N_1+N_2)}\right]$$

Note: $t^2 = F$, for df = 1.

Source: re-arranging Formula 2.4 from Rosenthal (1991).

From r:

$$d = \frac{r}{\sqrt{pq(1-r^2)}}, \text{ or } d = \frac{(N_1+N_2)r}{\sqrt{N_1N_2(1-r^2)}},$$ where p is recidivism rate and q = 1- p.

$$\text{Variance of d} = \left[\frac{N_1+N_2}{N_1N_2} + \frac{d^2}{2(N_1+N_2)}\right]$$

Source: re-arranging Formula 2.2.7 from Cohen (1988).

From χ^2:

$$d = (N_1 + N_2)\sqrt{\frac{\chi^2}{N_1 N_2\left[(N_1 + N_2) - \chi^2\right]}}, \text{ or } d = \sqrt{\frac{\chi^2}{pq\left[(N_1 + N_2) - \chi^2\right]}},$$

where p is recidivism rate and q = 1- p.

Variance of d = $\left[\frac{N_1 + N_2}{N_1 N_2} + \frac{d^2}{2(N_1 + N_2)}\right]$

Source: substituting definition of r (ϕ) from Rosenthal's (1991) Formula 2.15 into

$d = \frac{(N_1 + N_2)r}{\sqrt{N_1 N_2\left(1 - r^2\right)}}$ and re-arranging.

From probabilities:

For exact probabilities, find the t value that corresponds to the desired probability value with appropriate degrees of freedom. If the sample size is large (> 60), t can be approximated with Z.

$d = t\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}$, or $\quad d = Z\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}$.

Variance of d = $\left[\frac{N_1 + N_2}{N_1 N_2} + \frac{d^2}{2(N_1 + N_2)}\right]$

Source: Rosenthal (1991).

For effects that are described as "non-significant", d = 0.

For effects that are non-significant, but a direction is given, calculate the d value needed for significance, then randomly select a two decimal number that fit between the range of zero and the minimally significant d value.

ROC areas:

Given the assumption of equal variance in the recidivists and non-recidivist groups,

$d = \sqrt{2}Z(AUC)$, where $\sqrt{2} \cong 1.4142$, and Z(AUC) is the area under the ROC curve expressed as Z units. The following table reports Z(AUC) for some typical values of AUC:

AUC	Z(AUC)
.40	-.25
.50	.00
.60	.25
.75	.68
.80	.84
.90	1.28

For example, AUC = .690, Z(AUC) = .496 (from Z table), d = 1.4141(.496) = .701.

Source: Swets (1986; equation 21, p. 114).