

**PREDICTING ADULT
OFFENDER RECIDIVISM:
WHAT WORKS!**

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The views expressed are those of the authors and are not necessarily those of the Ministry of the Solicitor General of Canada.

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Abstract

Meta-analytic techniques were used to determine which predictor domains and actuarial assessment instruments were the best predictors of adult offender recidivism. One hundred and thirty-one studies produced 1141 correlations with recidivism. The strongest predictor domains were criminogenic needs, criminal history/history of antisocial behaviour, social achievement, age/gender/race and family factors. Less robust predictors included intellectual functioning, personal distress factors and socio-economic status in the family of origin. Dynamic predictor domains performed at least as well as the static domains. Recommendations for developing sound assessment practices in corrections were provided.

Executive Summary

Correctional policy makers and practitioners are faced with noticeable increases in prison populations, burgeoning probation caseloads, uncertain parole assessment guidelines, and the need to design more effective offender treatment programs. Resolution of these issues is indeed difficult. The literature on the assessment and prediction of criminal behaviour, however, should provide some useful answers in this regard.

Therefore, the purpose of this research project was to provide data on five basic questions regarding the assessment and prediction of criminal behaviour, (i.e., recidivism).

The questions were:

1. Which predictor domains predict recidivism and are some more potent than others?
2. Are dynamic predictors as a group inferior to static predictors in their ability to predict recidivism?
3. Are there differences amongst composite measures of risk prediction instruments and measures of antisocial personality in their ability to predict recidivism?
4. Are the most robust predictors of recidivism associated with different theories of criminal behaviour?
5. What practical guidelines are forthcoming from this research that will assist practitioners in making better assessments of criminal behaviour?

The necessary information was generated from a meta-analysis of the prediction of recidivism literature among adult offenders. One hundred and thirty-one studies were identified which produced 1141 correlations with recidivism.

The strongest predictors of recidivism were criminogenic need, criminal history/history of antisocial behaviour, social achievement, age/gender/race, and family factors. Weaker predictors included intellectual functioning, personal distress (i.e., anxiety, self-esteem), and social class of origin.

Dynamic predictors - those that measure change in the offender - predicted recidivism as well as static predictors such as age and criminal history.

Amongst the composite risk measures, the Level of Service Inventory (LSI-R) generated higher correlations with recidivism than did other risk measures (e.g., Salient Factor Score, Wisconsin) and measures of antisocial personality. In the case of measures of antisocial personality, the Psychopathy Check List (PCL-R) was superior to the MMPI Pd scale/Megargee system and various other antisocial personality scales. Differential association and social learning theories of criminal conduct were associated with the strongest predictors of recidivism.

Several practical guidelines emanated from this meta-analysis that will assist criminal justice practitioners in their goal of reducing prison overcrowding, managing probation and parole caseloads effectively, and designing better treatment programs.

1. The "ideal" assessment protocol should include, whenever possible, the following content areas.

Static Predictors

- a) age
- b) criminal history - both as an adult and juvenile and history of antisocial behaviour when the offender was a youth
- c) family factors - criminality, rearing practices, and structure

Dynamic Predictors

- d) antisocial personality
- e) companions
- f) criminogenic needs
- g) interpersonal conflict
- h) social achievement
- i) substance abuse

2. The available risk instrument that is closest to ideal is the LSI-R. Revisions to existing measures such as the LSI-R or the development of new instruments, should incorporate items that tap into the offender's and his/her family's early antisocial history. The assessment of antisocial or psychopathic personality may be best left to a separate assessment protocol using the PCL-R.

3. The measurement of change - assessing offenders at different points in time - should be done routinely.

4. The magnitude of the prediction of recidivism by any of the predictor domains appears to be little affected by the choice of recidivism outcome employed. Reconviction should be used in any circumstance but, obviously, parole violation and re-incarceration should be gathered by parole and prison authorities respectively.

5. Any correctional agency that has the professional integrity to: (a) compare the ability of different assessment measures (e.g., LSI-R vs. PCL-R) to predict recidivism, (b) assess the usefulness of new techniques (e.g., Neutralization scale), (c) generate prediction data on promising predictor domains and distinct groups of offenders (e.g., violent offenders), will make a substantial contribution to our knowledge base, which, in turn, will benefit practice in the field.

Predicting Adult Offender Recidivism:

What Works!

The efficient management of prisons, probation and parole service and the development and evaluation of treatment programs is contingent, in part, upon the adequacy of our knowledge concerning the predictors of criminal behaviour. There are two questions in this regard. That is, what risk factors are the most potent predictors of recidivism and which actuarial instruments are best suited to that assessment?

In the case of prisons, the United States is the leader in incarceration rates in the Western world, while Canada is usually ranked in the top three (Mauer, 1994; Staff, 1993). It is estimated that 4,000,000 offenders will be imprisoned in the United States by the year 2000 (DiIulio, 1991). The continuing "war on drugs" and the recent "three strikes and out" bill proposed by President Clinton and enthusiastically adopted by many U.S. states may well prove DiIulio's pessimistic projection to be accurate. In Canada, as compared to the U.S., there is less punitiveness in sentencing for most crimes (Lynch, 1993), but the trends for "getting tough" are emerging. Changes in juvenile justice legislation and judges' sentencing practices, and the tightening of parole guidelines are increasing Canada's incarceration rate perceptibly (Leschied & Gendreau, 1994; Moon, 1995).

Thus, it comes as no surprise that prison overcrowding will likely become worse. As a consequence, the ability of prison systems to manage themselves in a humane and cost-efficient manner is being seriously jeopardized. Two strategies have been suggested which will help alleviate the stresses in this matter. First, medium and maximum security institutions should be reserved only for those offenders who are identified as being among the highest risk to re-offend. Lower risk inmates should be transferred to minimum security prison placements or, more preferably, to community based correctional facilities. Secondly, at sentencing, lower risk offenders can be diverted to probation, thereby avoiding the use of prisons altogether.

Similarly, probation and parole caseloads have increased by approximately 160% in the U.S. during the last decade (Austin, 1995). These unprecedented increases have occurred at a time when some of the largest states (e.g., California, New York), are cutting staff (Mencimer, 1993). Probation officer caseloads have reached several hundred in some jurisdictions (e.g., California). One partial solution to probation's dilemma is to restrict officers' supervisory practices to offenders designated as high risk. Parole boards find themselves in a Catch 22 situation. They are under pressure to reduce prison overcrowding by granting more parole while, at the same time, responding to the public's and politicians' demands that high risk offenders remain incarcerated.

The effectiveness of offender treatment programs also depends on our knowledge of the predictors of recidivism (Gendreau et al., 1994). In this regard, Andrews and Bonta (1994) developed an elegant risk/need/responsivity theory of criminal conduct that links prediction with

treatment. We will focus on the risk and need principles as they have the strongest implications for prediction.

The risk principle has two components. First, it states that treatment will be effective when treatment services are matched with the offender's risk of re-offending. A risk factor can be anything about the offender's past or present circumstances and behaviour that is predictive of criminal behaviour. Intensive services should be provided for higher risk offenders and minimal services for lower risk offenders. Mismatching level of service with offender risk has seldom shown reductions in offender recidivism, in fact, in some studies increases have been reported (Andrews et al., 1990a; Andrews et al., 1990b).

Secondly, Andrews and Bonta (1994) classified risk factors into two categories: static and dynamic. Static risk factors (i.e., age, previous convictions, early family factors) are aspects of the offender's past that are predictive of recidivism but are not subject to change. On the other hand, dynamic risk factors or needs reflect the present circumstances and behaviour of the offender, and, as such, are mutable. There are two types of offender needs: criminogenic and noncriminogenic. Examples of criminogenic needs are offenders' attitudes, cognitions, and behaviour regarding employment, education, peers, authority, substance abuse and interpersonal relationships that lead to conflict with the law. The importance of criminogenic needs rests in the promise that when treatment programs target criminogenic needs, reductions in offender criminal behaviour can reasonably be expected to occur (Andrews et al., 1990a).

The evaluation of treatment programs depends on the availability of accurate measures of risk. While randomized experiments are difficult to achieve in corrections agencies, quasi-experimental designs utilizing comparison groups can be readily created if offenders have been assessed as to their risk level. In support of the point is that the Andrews et al., (1990b) meta-analysis found the quality of the research design was a minor factor in assessing the effectiveness of services. They endorsed the use of evaluations that controlled for pretreatment risk levels if randomized experiments were not possible.

As noted at the outset, the achievement of the above goals is predicated on the assumption that practitioners and policy makers can arrive at a consensus as to what are the best predictors of recidivism and the most accurate prediction instruments available to assess recidivism based on a reading of the relevant criminal justice literature. We now assess the status of this assumption.

Predictors of Recidivism

There is little disagreement in the criminological literature about some of the predictors of adult offender recidivism such as age, gender, past criminal history, early family factors and criminal associates. There has been, however, considerable controversy and/or lack of interest in dynamic risk factors. There are three reasons for this. First, because of ideological concerns and the professional self-interest of significant segments of the professions of criminology and sociology, the import of individual differences (i.e., offender needs, abilities, attitudes, and

personality styles) has been derided in some criminological literature (cf., Andrews & Wormith, 1989; Rowe & Osgood, 1984; Wilson & Herrnstein, 1985).

Secondly, some methodologists (e.g., Jones, 1996) have expressed scepticism about dynamic risk factors because of their supposed unreliability. Unlike their static counterparts, dynamic risk factors can change over time and their measurement involves some degree of subjectivity. Since elementary psychometric theory reminds us that unreliability in measurement necessarily leads to an underestimation of validity (Cronbach, 1990), this line of reasoning implies that, collectively, dynamic variables must be relatively weak predictors of criminal behaviour.

Thirdly, criminal justice professionals have been, by and large, seemingly oblivious to the possibility that assessment of criminogenic needs might enhance the prediction of criminal behaviour (Bonta, 1996; Gendreau & Ross, 1987). The widely used Wisconsin classification system (Baird, 1981) illustrates this point. This instrument contains a useful needs component, but Bonta (1996) found just two studies that reported on the predictive validity of these items. Furthermore, the emergence of the "new penology" (Feeley & Simon, 1992), which is concerned with managing large aggregates of offenders in a simplistic input-output business-like fashion, has further contributed to the lack of interest in dynamic variables.

This denial of the utility of dynamic risk factors, obviously, has serious ramifications for corrections professionals who are routinely required to reclassify offenders for prison transfers, parole/probation supervision, and treatment services. Simply put, reclassification is devalued if the measurement of change has little validity.

Three specific types of predictors have also been the subject of much debate. They are social class of origin, intelligence, and personal distress. Social class of origin (i.e., parents occupation, education), has been the bedrock variable used in support of sociological theories of crime that assert that criminal behaviour is determined largely by one's social location (cf., Andrews & Bonta, 1994). Tittle and Meier (1990; 1991) have challenged this view, showing social class of origin (SES) to be a very weak predictor of juvenile delinquency.

The notion that criminals are less intelligent than nonoffenders has been prevalent for decades (cf., Goddard, 1920). Over the years, a number of studies have demonstrated a correlation between intelligence and delinquency (Hirschi & Hindelang, 1977). Recently, with the publication of *The Bell Curve* (Herrnstein & Murray, 1994), arguably the strongest claim yet has been made that IQ is a particularly powerful predictor. Their conclusions have implications for the provision of treatment programs for offenders, since IQ, in their view, is considered to be largely immutable.

According to Andrews et al. (1990a) personal distress variables (e.g., low self-esteem, anxiety) are not risk factors and are, therefore, inappropriate targets for treatment. Their conclusions are in stark contrast to the practices of many therapists and programs that give priority to lowering offenders' anxiety level and raising their self-esteem. The genesis of this perspective is, most likely, a consequence of the training received in mental health theory and practise (e.g., psychodynamic theory, phenomenology), where treatment professionals initially

gained experience before emigrating to corrections in the 1960s (Gendreau, 1996). The current widespread popularity of the recovery and self-help agendas (see Kaminer, 1992) lends further credibility to the notion that personal distress factors are suitable targets for intervention, a view which has, in our opinion, generalized to corrections where surveys of treatment programs have found that it is not uncommon for programs to attempt to alleviate offenders' personal distress (Gendreau et al., 1990; Hoge et al., 1993).

To date, reviews of the evidence concerning the predictors of recidivism have been limited in scope and have been narrative in nature - except for two reviews that employed meta-analytic procedures. One meta-analysis, however, was quite preliminary (Gendreau et al., 1992) while the other was restricted to twin and adoption studies that combined juvenile and adult samples (Walters, 1992).

Actuarial Measures for Predicting Recidivism

Bonta (1996) has categorized risk assessment measures within a developmental framework. First generation techniques are based on clinical intuition and professional judgement. There is a plethora of literature documenting the lack of validity of this approach (cf., Meehl, 1954), even amongst the most highly trained clinicians and scholars (Little & Schneidman, 1959). This perspective is still commonplace among corrections professionals (Clear & Gallagher, 1985).

Second generation assessments are actuarial in nature. They are based on standardized, objective risk prediction instruments, such as the Salient Factor Score (SFS) (Hoffman, 1983) that are based almost entirely on static criminal history items. These kinds of measures provide little direction for classification and treatment decisions because the fixed nature of the items does not allow for changes in the offenders behaviour to be reflected in subsequent re-testing.

Bonta's third generation consists of two types of instruments. One of them encompass risk prediction measures that include dynamic factors (e.g., Community Risk/Needs Management Scale, Motiuk, 1993; Level of Service Inventory (LSI-R), Andrews & Bonta, 1995; the Wisconsin, Baird, 1981) which assess a wide range of criminogenic needs. The second type includes personality test scales in the antisocial personality/sociopathy/psychopathy content area. While these scales (e.g., the MMPI Pd scale, the Psychopathy Checklist (PCL-R), Hare, 1991; the Socialization scale (Soc) of the California Personality Inventory (CPI), Gough, 1957) do contain static items, the majority are dynamic in nature.

Reviews of the risk measure literature have also been, with one exception (Simourd et al., 1991), narrative in nature. Their meta-analysis reported that the PCL-R and the Soc scale of the CPI were better predictors of recidivism than the MMPI Pd scale. Unfortunately, most of the studies available to the authors were postdictive.¹

¹ Brief mention should also be made of a few within-subject prospective comparisons of risk instruments and personality scales (Gendreau et al., 1979a; Gendreau et al., 1980; Gough et al., 1965; Motiuk, 1991; Motiuk et al., 1986; Serin et al., 1990). The results indicated that, in most

A final comment concerns the fact that the validity of various theories of criminal behaviour relies, somewhat, on the prediction literature. Anomie/strain (Merton, 1957) and sub-cultural theories (Cohen, 1955; Matza, 1964) support SES and, to some extent, personal distress, as strong predictors. Contemporary reformulations of differential association, social learning, and control theories (Andrews & Bonta, 1994; LeBlanc et al., 1988; Widom & Toch, 1993) centre on antisocial peers, learned antisocial values, early criminogenic family factors, and personality dimensions (e.g., egocentricity). Strong biologically oriented theories base much of their credence on IQ and twin studies (see Herrnstein & Murray, 1994; Walters, 1992).

In summary, our review of the predictors of recidivism literature for adult offenders has indicated a need for a comprehensive, quantitative research synthesis (i.e., meta-analysis) of the major classes of the predictors of recidivism and of the available prediction instruments. The potential advantages of meta-analysis over narrative reviews have been summarized in detail elsewhere (Cooper & Hedges, 1994). It has become the review method of choice in many applied areas (e.g., Lipsey & Wilson, 1993) and has recently led to advances in knowledge in the correctional field (Andrews et al., 1990b; Bonta & Gendreau, 1990; Gendreau & Andrews, 1990; Lipsey, 1992; Walters, 1992).

The questions we address in this study are as follows:

1. Which predictor domains predict recidivism and are some more potent than others?
2. Are dynamic predictors as a group inferior to static predictors in their ability to predict recidivism?
3. Are there differences amongst composite measures of risk prediction instruments and measures of antisocial personality in their ability to predict recidivism?
4. Are the strongest predictors of recidivism associated with different theories of criminal behaviour?
5. What guidelines are forthcoming from the meta-analysis that will assist criminal justice professionals in making more accurate assessments of criminal behaviour?

instances, risk measures (SFS, LSI-R) were better predictors of offender recidivism than were antisocial personality scales such as the MMPI Pd.

METHOD AND PROCEDURE

Sample of Studies

A literature search for relevant studies published between January 1970 and June 1994 was conducted using the ancestry approach and library abstracting services. For a study to be included, the following criteria applied:

1. Data on the offender was collected prior to the recording of the criterion measures. A minimum follow-up period of six months was required. If a study reported more than one follow up period, data from the longest interval was used.
2. Treatment studies that directly attempted to change offender personality or behaviour were not included.
3. The criterion or outcome measure of recidivism had to be recorded when the offender was an adult (18 years or more).
4. The criterion or outcome measure had to have a no-recidivism category. Studies that used "more" vs. "less" crime categorizations were not used. The criterion measures were arrest, conviction, incarceration, parole violation or a combination thereof.
5. The study was also required to report statistical information that could be converted, using meta-analytic formulae (Rosenthal, 1991) into the common metric or effect size of Pearson r .

Coding the Studies

For each study the following information was recorded:

1. Coder characteristics: date, coder identity.
2. Study characteristics: published document, type of publication, funding source, multi-disciplinary authorship, judgement of senior author's knowledge of the area, gender of authors, affiliation of authors, geographic location of study, decade in which study was published.
3. Study sample characteristics: age, gender, race, urban/rural, socio-economic status, risk level, crime history, psychological make-up.

4. Study methodology: extreme groups design, attrition, follow-up length, type of outcome measure, sample size, statistical value.

The accuracy of coding was assessed using the index: $\text{agreement} = \frac{\# \text{ of agreements}}{\# \text{ of agreements} + \# \text{ of disagreements}}$ (Yeaton & Wortman, 1993). The second author coded all studies. The first author blindly coded a random sample of 30 studies. Percentage agreement scores for the two raters ranged from 85% to 98% across coding categories. Where disagreements occurred, the coding used was based on the first author's classification.

Predictor Categories

The predictors were initially sorted into 18 domains (Category I). Their coding criteria are detailed in Appendix A. Then, for the purposes of research synthesis, the 18 domains were collapsed into eight all-encompassing predictor domains (Category II): a) age/gender/race, b) criminal history, c) criminogenic needs, d) family factors, e) intellectual functioning, f) personal distress, g) SES, and h) social achievement.

Effect Size Calculation

Pearson product-moment correlation coefficients were produced for all predictors in each study that reported a numerical relationship with the criterion. When statistics other than Pearson r were presented, their conversion to r was undertaken using the appropriate statistical formulae (Rosenthal, 1991). Where a p value of greater than .05 was the only reported statistic, an r of .0 was assigned.

Next, the obtained correlations were transformed using Fisher's table. Then, according to the procedures outlined by Hedges and Olkin (1985, p. 230-232), the statistic z_{\pm} , representing the weighted estimation of Pearson r , was calculated for each predictor domain by dividing the sum of the weighted z_{\pm} s per predictor domain by the sum of each predictor's sample size minus three across that domain.

In order to determine the practical utility of various predictors relative to each other, the common language (CL) effect size indicator (McGraw & Wong, 1992) was also employed. The CL measure is little affected by changes in base rates and selection ratios making it ideal for prediction studies (Rice & Harris, 1995a). The CL statistic converts an effect size into the probability that a predictor-criterion score sampled at random from the distribution of one predictor domain (e.g., criminogenic needs) will be greater than that sampled from another distribution (e.g., personal distress).

Significance Testing

To determine which of the predictor domains predicted criterion significantly different from zero, the mean \bar{z}^{\pm} values for each domain were multiplied by the value of $(\underline{N} - 3\underline{k})^{1/2}$, where \underline{N} = the number of subjects per predictor domain and \underline{k} = the number of predictors per domain (Hedges & Olkin, 1985).

One-way ANOVAs and the Student-Newman-Keuls (SNK) multiple comparison test were then applied to the mean \bar{r} values of those domains which significantly predicted criterion better than zero in order to assess which domains differed significantly from each other.

Mindful of the debate regarding alternatives to the use of parametric methods as tests of significance in meta-analyses, the mean \bar{z}^{\pm} values for significant predictor domains were also assessed using an analogue to the ANOVA's F -test, the goodness-of-fit statistic Q (Hedges & Olkin, 1985). Following that, post-hoc comparisons of the differences between mean \bar{z}^{\pm} values of each pair of significant predictor domains were conducted using the z test (E. Marchand, personal communication, June 15, 1994).

Finally, one-way ANOVAs and the SNK test using Pearson \bar{r} were employed to assess whether type of outcome criteria, length of follow-up, and study characteristics were related to effect size.

The \underline{CL} statistic does not involve significance testing.

Unless otherwise specified, alpha was set at .05 2-tail for all significance tests.

RESULTS

One hundred and thirty-one studies were identified as suitable for the meta-analysis. These studies generated 1141 effect sizes with future criminal behaviour.

For those variables where at least 60% of the studies reported information on the study characteristics sampled, the results were as follows: a) 86% of the studies were published, 58% in journals, b) 73% of the senior authors had published in the area previously, 51% of the them were male, c) 44% and 54% of authors were based in an academic and government agency setting respectively, d) the studies were evenly distributed across the decades with the majority emanating from the United States and Canada, although Canadian studies contributed the majority (63%) of effect sizes, e) 95% of studies consisted of male or mixed samples, f) only 5% of studies employed an extreme groups design and g) 83% did not suffer subject attrition of more than 10% of their sample.

Predictor Domains: Category I

Table 1 presents the mean effect sizes for the 18 levels of Category I in conjunction with the number of effect sizes (k) and the total number of subjects associated with each predictor domain (N). The domains are grouped as follows: static ($n = 10$), dynamic ($n = 7$) and composite measures ($n = 1$).

Table 1

Mean effect sizes for predictor domains: Category I

Predictor (k)	N	$r(SD)$	z^{\pm}
Static ^a			
1. age (56)	61,312	.15(.12) ⁴	.11*
2. criminal(164) history: adult	123,940	.18(.13) ¹	.17*
3. antisocial history: pre-adult (119)	48,338	.13(.13) ⁴	.16*

Table 1 continued

Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]
4. family criminality (35)	32,546	.12(.08)	.07*
5. family rearing (31) practices	15,223	.15(.17) ⁴	.14*
6. family (41) structure	24,231	.10(.08)	.09*
7. gender (17)	62,021	.10(.07)	.06*
8. intellectual (32) functioning	21,369	.07(.14)	.07*
9. race (21)	56,727	.13(.15)	.17*
10. SES (23)	13,080	.06(.11)	.05*
		dynamic ^b	
11. antisocial (63) personality	13,469	.18(.12) ²	.18*
12. companions (27)	11,962	.18(.08) ³	.21*
13. criminogenic (67) needs	19,809	.18(.10) ¹	.18*
14. interpersonal (28) conflict	12,756	.15(.10) ⁴	.12*
15. personal (66) distress	19,933	.05(.15)	.05*
16. social (168) achievement	92,662	.15(.14) ³	.13*
17. substance abuse (60)	54,838	.14(.12) ⁴	.10*

Table 1 continued

Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]
Composite Measures			
18. risk scales (123)	57,811	.30(.14)	.30*

Note. k = effect sizes per predictor domain; N = subjects per predictor domain; SD = standard deviation

^a $F(16, 1001) = 5.59, p < .05.$

¹ 2, 13 vs. 6, 8, 10, 15; ² 11 vs. 8, 10, 15; ³ 12, 16 vs. 8, 15; ⁴ 1, 3, 5, 14, 17 vs. 15; Student-Newman-Keuls post-hoc comparison, $p < .05.$

* $p < .05.$

The following is an example of how to read Table 1. Across the 131 studies sampled, a quantitative relationship between the predictor age and recidivism was reported on 56 occasions involving a total of 61,312 subjects. The associated mean Pearson r for age with outcome was .15 (SD = .12), with younger age being positively correlated with poorer outcome. Mean z[±], the weighted estimation of Pearson r for age with outcome, was .11. Application of Hedges and Olkin's (1985) method for testing the significance of the mean z[±] values confirmed age as a significant predictor of recidivism.

All predictor domains were significant predictors of recidivism. The largest mean r values were found for adult criminal history, antisocial personality, companions, and criminogenic needs. Risk scale measures, which contained information from several predictor domains, produced the highest mean r value with recidivism (.30).

The conclusions reached by the parametric (ANOVA, SNK) statistical analysis were virtually identical to those of the F-test analogue (Q, Z-test comparison). We report the results of the standard parametric analysis.

A one-way ANOVA applied to the mean r values (excluding composite risk scales) indicated there was a significant difference across the predictor domains [$F(16, 1001) = 5.59$]. A Student Newman - Keuls (SNK) multiple comparison test of the mean r values are specified in Table 1. Adult criminal history, and criminogenic needs produced the greatest frequency of significant differences. Each of these were significantly different from family structure, intellectual functioning, personal distress, and SES.

Predictor Domains: Category II

With the exception of the risk scales domain, the 17 predictor domains from Category I were collapsed into 8 groups. All predictor domains were significantly greater than 0 (see Table 2). There were significant differences among the eight predictor domains [$F(7, 1010) = 10.00$]. The SNK multiple comparison test of the mean r values revealed that the predictor domains criminal history and criminogenic needs were significantly greater than those of family factors, intellectual functioning, personal distress, SES.

Table 2

Mean effect sizes for predictor domains: Category II

Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]
Static ^a			
1. age/gender/race (94)	180,060	.14(.12) ³	.11*
2. criminal (282) history ^c	171,159	.16(.13) ¹	.16*
3. family factors (107)	72,000	.12(.12) ³	.08*
4. intellectual (32) functioning	21,369	.07(.14)	.07*
5. SES (23)	13,080	.06(.11)	.07*
Dyanmic ^b			
6. criminogenic (246) needs factors ^d	113,153	.17(.11) ¹	.14*
7. personal (66) distress	19,933	.06(.15)	.05*
8. social (168) achievement	92,662	.15(.14) ²	.13*

Table 2 continued

Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]
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	Static versus Dynamic ^b		
9. static (536)	457,552	.12(.14)	.11*
10. dynamic (482)	226,664	.15(.13)	.13*

Note. k = effect sizes per predictor domain; N = subjects per predictor domain; SD = standard deviation

^ccriminal history = adult plus pre-adult; ^dcriminogenic need factors = antisocial personality, companions, interpersonal conflict, criminogenic needs, and substance abuse.

^a $F(7, 1010) = 10.00, p < .05$; ^b $F(1, 1016) = 6.18, p < .05$.

¹2, 6 vs. 3, 4, 5, 7; ²8 vs. 4, 5, 7; ³1, 3 vs. 4, 7; Student-Newman-Keuls post-hoc comparison, $p < .05$.

* $p < .05$.

The eight predictor domains were classified into dynamic and static factors. The dynamic grouping consisted of criminogenic needs factors, personal distress, and social achievement. The mean r values for dynamic (.15) and static (.12) were significantly different [$F(1, 1016) = 6.18$].

The common language effect size indicator (CL) provided another approach to examining the relative usefulness of the 8 predictor domains from Table 2 as well as the static-dynamic comparison. The CL scores, summarized in Table 3, indicate the percentage of time that one of a pair of predictors produced larger correlations with outcome.

Table 3

Common language effect size indicators^a

	CH	CN	F	I	PD	SES	SA
AGR ^b	(54)	(58)	54	64	66	68	(53)
CH	-	(52)	58	68	69	71	51
CN		-	62	71	73	75	54
F			-	61	63	64	(57)
I				-	52	51	(66)
PD					-	(52)	(68)
SES						-	(70)

^aCommon language effect size indicators for mean r values. Bracketed values favour vertical axis; unbracketed values favour horizontal axis.

^bAGR = age, gender, race; CH = criminal history/history of antisocial behaviour; CN = criminogenic need factors; F = family factors; I = intellectual functioning; PD = personal distress; SES = social class of origin; SA = social achievement.

Table 3 can be read in the following way. With regard to direction, unbracketed scores favour the horizontal axis predictor while bracketed scores favour the vertical axis predictor. For example, in comparing criminogenic needs (CN) with personal distress (PD), one can see that 73% of the time CN produced higher correlations with recidivism than did PD.

In the case of the static-dynamic comparison (Table 2) the CL score was 54% in favour of the dynamic predictor domain.

Actuarial Measures

Table 4 summarizes the mean effect sizes of the composite risk and personality scales with recidivism. All of the instruments predicted recidivism significantly different from zero. Amongst the risk scales, the LSI-R produced the highest correlation with recidivism ($r = .35$) but it was not significantly greater than the SFS, Wisconsin or the other risk scale domains [$F(3, 119) = 1.52$]. The Other domain consisted of SFS clones, that is, instruments containing about 5-10 items, almost all of which were static in nature.

Table 4

Mean effect sizes for Risk and AntiSocial Personality Scales

Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]
Risk Scales ^a			
1. LSI-R (28)	4,579	.35(.08)	.33*
2. SFS (15)	9,850	.29(.10)	.26*
3. Wisconsin (14)	14,092	.27(.08)	.32*
4. other (66)	29,290	.30(.17)0	.30*
Table 4 continued			
Predictor (<u>k</u>)	<u>N</u>	<u>r</u> (SD)	<u>z</u> [±]

	Antisocial Personality Scales ^b		
5. MMPI based (16)	3,420	.16(.09)	.21*
6. PCL (9)	1,040	.28(.09) ¹	.29*
7. other (37)	8,875	.16(.13)	.16*

Note. k = effect sizes per predictor domain; N = subjects per predictor domain; SD = standard deviation.

^a $F(3, 119) = 1.52, p < .05$; ^b $F(2, 59) = 4.01, p < .05$.

¹ 6 vs. 5, 7; Student-Newman-Keuls post-hoc comparison, $p < .05$.

* $p < .05$.

The LSI-R produced CL scores of 76% and 67% with the Wisconsin and SFS respectively when mean r was the dependent variable.

A comparison of the mean r values associated with the antisocial personality measures revealed a significant difference between measures [$F(2, 59) = 4.01$]. The SNK multiple comparison test reported that the PCL was a significantly better predictor than either the MMPI based measures or Other domain. CL analysis indicated that 83% of the time the PCL produced larger Pearson r correlations with recidivism than did the MMPI. The Social Achievement domain (accommodation, education, employment, and marital status) showed r 's ranging from .15-.16.

Within the personal distress domain, 24 of 66 effect sizes tapped psychiatric symptomatology. The mean r (SD) was .00 (.17). Family factors did not include studies from the gene-crime relationship as Walters (1992) has already conducted a meta-analysis in this area. However, data from Tables 2 and 3 of Walter's (1992) study yielded a mean r and z^{\pm} of .08, indicating that genetic background was a significant predictor of recidivism.

Practitioners occasionally ask which official measure of recidivism is the most sensitive. Four outcomes - arrest, conviction, incarceration, and parole violation - were compared. Mean effect size values ranged from .13 to .19. The mean r values associated with incarceration were significantly greater than those of conviction or parole violation [$F(3, 894) = 6.71$]. In all comparisons, however, the CL scores were less than 60%.

DISCUSSION AND RECOMMENDATIONS

Prior to discussing the results it must be noted that the generalization of the results of any meta-analysis is limited by the nature of the studies examined.

Some valuable studies (e.g., Gendreau et al., 1979) could not be used because the researchers reported their results in formats (e.g., regression analyses) from which Pearson r 's could not be calculated.

Little attempt was made to retrieve unpublished studies that were not immediately available. A common assumption is that one of the reasons that some studies are not published is because they may be lacking in methodological rigour which, in turn, affects the magnitude of effect sizes (see Lipsey & Wilson, 1993). Lipsey & Wilson's (1993) analysis applied to treatment studies but, so far, prediction studies have not shown similar results (Goggin & Gendreau, 1995).

Another methodological point concerns one of the goals of meta-analysis. Hunter & Schmidt (1990) are interested in determining the maximum value that can be obtained in prediction if all variables were perfectly measured. Others insist that the goal of meta-analysis is to "teach us better what is, not what might some day be in the best of all possible worlds..." (Rosenthal, 1991, p. 25). We are of the latter view and did not attempt to statistically adjust for methodological artifacts, which may or may not have had an impact on the magnitude of the effect sizes obtained.

The data base was, regrettably, virtually silent on the prediction of recidivism among female offenders, minority groups, "white collar" offenders, and some important sample characteristics such as risk level and the psychological make-up of the subjects studied. Much of the effect size data on dynamic predictor domains came from Canada where there has been a strong emphasis on the assessment of individual differences (cf., Andrews & Bonta, 1994).

One should not assume that many of the correlations found in this meta-analysis (i.e., .10 - .30) are inconsequential. In fact, mean r values in this range can be indicative of substantial practical import (Hunter & Schmidt, 1990; Rosnow & Rosenthal, 1993). Indeed, the percentage improvement in predicting recidivism can equal the actual value of r (Rosenthal, 1991, p. 134), assuming base rates and selection ratios that are not in the extreme.

The fact that the data base consisted of just over 1,000 effect sizes involving almost 750,000 S 's suggests that reasonable confidence can be placed in the results. Additional research, in our view, is not likely to change the direction or ordering of the results of the predictor domains to any marked degree.

The remainder of the discussion addresses the questions raised in the introduction.

Predictor Domains

The meta-analysis provided further confirmation of the narrative reviews which concluded that variables such as age, criminal history, companions, family factors, gender, social achievement, and substance abuse are significant and potent predictors of recidivism. On the other hand, it offered some important insights into several other predictor domains.

The time is long past when those offender risk factors that are dynamic in nature can be cavalierly ignored. Indeed, criminogenic needs produced higher correlations with recidivism (see Table 3) a much higher percentage of the time than did several other predictor domains. When considering all predictor domains, a statistically significant difference was found in favour of dynamic risk factors, but the CL effect size indicator was only 54%. Moreover, the two major static and dynamic categories, criminal history and criminogenic needs, were almost identical in predicting recidivism. While very few studies have assessed how well changes over time within dynamic factors predict recidivism, the data suggest that changes on criminogenic needs may produce strong correlations in that regard.

Early family factors and history of pre-adult antisocial behaviour are rarely included in adult offender risk prediction instruments.² Fortunately, a number of estimable studies (producing 103 effect sizes) were located that followed offenders from early years to adulthood. The combined family factors domain (Table 2) and pre-adult history of antisocial behaviour (Table 1) produced correlations of .12 and .13 with recidivism respectively, demonstrating once again that antisocial risk factors in childhood can have far reaching influence (e.g., Stattin & Magnusson, 1989).

Much controversy has focused upon how well personal distress, intelligence, and SES predict recidivism (Andrews & Bonta, 1994; Herrnstein & Murray, 1994; Tittle & Meier, 1990). From a treatment standpoint, the important result centred on the fact that personal distress turned out to be quite a weak predictor of recidivism. Moreover, one of the components of this domain, psychiatric symptomatology, which has characteristically been perceived as an important predictor of re-offending in the field of psychiatry (cf., Phillips et al., 1988), did not correlate ($r = .00$) with recidivism. This finding was based on few effect sizes; more research is needed to confirm this tentative result.

It would be reasonable, therefore, to assume that programs that insist on alleviating offenders' personal distress, as many do (Gendreau et al., 1994), will have little success in reducing offender recidivism. Meta-analyses of the offender treatment literature (e.g., Andrews et al., 1990b) are also supportive of this conclusion.

The studies in the meta-analysis that included measures of IQ were of the "traditional" sort (i.e., standard paper and pencil tests that measured linguistic and mathematical abilities).

² Typically, risk prediction instruments for adults assess just one aspect of this domain and employ one or two items in so doing. For example, the LSI-R has one item (#5, i.e., "arrested under age 16").

Granted, these sorts of IQ measures can produce modest correlations with criminal behaviour over long periods of time (Moffitt et al., 1994), it is generally agreed that this type of IQ assessment has reached its limits (Gardner, 1995). A much more productive strategy would be to focus on what is called practical or tacit intelligence, which is defined as the ability to learn and profit from experience, effectively monitoring one's own and other's feelings and needs, and solve the problems of everyday life (Gardner, 1983; Sternberg et al., in press).

This meta-analysis extended Tittle and Meier's (1990; 1991) pessimistic conclusions regarding the social class - crime link with delinquent samples to that of adult offenders. It is difficult to judge how social class theories will evolve in the future; for speculations on this matter see Andrews & Bonta (1994) and Tittle & Meier (1990). The most probable scenario is that social class theories will incorporate more psychological concepts (e.g., Agnew, 1992).

How well might the results from the meta-analysis generalize to specialized offender groups? Few violence prediction studies that predicted the occurrence of violence vs. no criminal activity were retrieved. Our reading of the literature indicates that the strongest predictors identified in this meta-analysis also apply to violent offenders (Harris et al., 1993; Reiss & Roth, 1993). As well, composite measures of general recidivism (i.e., LSI-R) correlate highly ($r = .78$) with measures intended to predict violence (i.e., PCL-R) (Loza & Simourd, 1994). One area where the predictors of violent offending may be quite different is in the area of impulsivity combined with overly hostile attributions of other peoples intent (Serin & Kuriychuk, 1994). Sex offenders present a somewhat different picture. At the risk of generalizing across such a complex group, there do appear to be a few predictors, centring on the offense itself, that are unique to this population (Hanson & Bussière, 1995). Moreover, factors that predict sexual violence are different than those that predict other types of violence (Bonta & Hanson, 1995).

In regard to theory development, the results from the meta-analysis are most supportive of recent advancements in differential association and social learning theories (see Andrews & Bonta, 1994, p. 104-124). These authors assert that, from the perspective of these theories, it is absolutely essential that criminogenic needs and antisocial associates be two of the strongest correlates of criminal conduct. Criminogenic needs establish the standards of conduct and generate the rationale for engaging in antisocial behaviour. Antisocial associates provide the opportunity for antisocial modelling to occur, govern the rewards and costs of such behaviour, and influence antisocial attitudes.

The less potent predictors in this meta-analysis (e.g., SES, personal distress, intellectual functioning) have traditionally been associated with the anomie/strain, subcultural, and biologically-oriented theories.

Actuarial Measures for Predicting Recidivism

Composite measures of risk, on average, produced substantially greater correlations with recidivism than antisocial personality scales. This is not surprising, because risk measures generally sample from a much wider variety of predictor domains than personality scales.

Amongst the former, the LSI-R produced higher correlations with recidivism than the SFS, the Wisconsin, or the Other category. While the mean differences among the four measures were not statistically significant³, the CL effect size indicator provided a result of practical importance. The LSI-R produced larger correlations with recidivism than did the other three risk measures between 62% and 76% of the time.

The LSI-R, therefore, appears to be the current measure of choice. An impressive volume of studies confirming its predictive validity with recidivism and prison adjustment has been generated for a variety of offender populations (i.e., adults, juveniles, natives, females) (Andrews & Bonta, 1995).

In the area of antisocial personality assessment, a noteworthy finding was that Hare's (1991) PCL-R produced significantly greater correlations with recidivism than the widely used MMPI based systems. The PCL-R specializes in assessing the psychopathic dimension of antisocial personality. It is recommended by clinicians who are concerned with predicting violence (Harris et al., 1993).

Practical Suggestions for Practitioners

One advantage of a meta-analysis is that a thorough literature search uncovers some promising assessment approaches and measures that, upon further investigation, may prove to be highly useful for practitioners. Meta-analysis also encourages professional judgement where necessary (Light & Pillemer, 1984). Please be aware that these recommendations are based on very limited research and the first author's experience and clinical judgement. They are as follows:

1. Consider measures that assess hostility and/or aggression such as the Aggression Questionnaire (Buss & Perry, 1992). Gendreau et al., (1979a) reported moderate predictive validities on an earlier version of this test (i.e., Buss-Durkee, 1957). The fact that long-term follow-up studies of aggression in childhood correlated so well ($r = .30$ range) with criminal behaviour in later adulthood was impressive (Stattin & Magnusson, 1989).

³ See Cohen (1994) and Schmidt (1992) for a critique of standard significance testing which, they claim, often results in Type II errors and a failure to account for a realistic estimate of the magnitude of the effect sizes under study.

2. Utilize measures that tap into selfish, narcissistic antisocial behaviour, criminal sentiments, and rationalizations for criminal behaviour (e.g., Walters & Chlumsky, 1993; Shields & Simourd, 1991; Shields & Whitehall, 1994).
3. Do not limit assessments of education and employment to just an offender's past performance in this area. Measure current attitudes and performance regarding work and skill development. Substantial predictive validity could result (Gendreau et al., 1979a; Jenkins et al., 1977).
4. Pursue the usefulness of actuarial measures and predictor domains which zero in on offenders that specialize in one type of offense such as violence, paedophilia, or arson (Hare, 1991; Knight et al., 1994; Rice & Harris, 1994; Serin & Kuriychuk, 1994).
5. Collect information on bio-medical factors and relate these to future criminal behaviour. Data from this domain may produce small but helpful predictive validities of recidivism (cf., Raine, 1993). Prisons that have comprehensive medical screening protocols should have a wealth of information for future research.
6. Update the knowledge base about the predictive validities of commonly used psychological tests. There have to be thousands of CPI and MMPI protocols sitting in prison files that could be expediently analyzed to determine whether the time and effort involved in using these tests in corrections is worthwhile.
7. Whenever possible, compare and combine different types of assessment methods, such as structured interviews, actuarial measures, and social history information (see Andrews & Wormith, 1989; Gendreau et al., 1980; Rice & Harris, 1995b). Predictive validities are certain to increase.

In conclusion, the modest contribution from this meta-analysis has been to clarify which predictor variables and measures of risk will provide the most assistance to practitioners and policy makers to reach their objectives of reducing prison overcrowding, managing probation and parole caseloads effectively, and designing better treatment programs.

APPENDIX A

CODING CRITERIA FOR PREDICTOR DOMAINS

Category I

Static Predictors

1. age: at time of data collection/assessment.
2. criminal history: adult - prior arrest, probation, jail, conviction, incarceration, prison misconducts.
3. history of antisocial behaviour: pre-adult - prior arrest, probation, jail, conviction, incarceration, alcohol/drug abuse, aggressive behaviour, conduct disorder, behaviour problems at home and school, delinquent friends.
4. family criminality: parents and/or siblings in trouble with the law.
5. family rearing practices: lack of supervision and affection, conflict, abuse.
6. family structure: separation from parents, broken home, foster parents.
7. gender.
8. intellectual functioning: WAIS/WISC, Raven, Porteous Q score, learning disabilities, reading level.
9. race: white vs. black/hispanic/native.
10. social class of origin (SES): socioeconomic status of parents (parental occupation, education or income).

Dynamic Predictors

11. antisocial personality/sociopathy/psychopathy scales: MMPI Pd, Megargee system, EPI-Psychoticism, CPI-Soc, PCL-R, DSM III personality disorders, any indices of egocentric thinking.
12. companions: identification/socialization with other offenders.
13. criminogenic needs: antisocial attitudes supportive of an antisocial lifestyle and behaviour regarding education, employment.

14. interpersonal conflict: family discord, conflict with significant others.
15. personal distress: anxiety, depression, neuroticism, low self-esteem, psychiatric symptomatology (i.e., psychotic episodes, schizophrenia, not guilty by reason of insanity, affective disorder), attempted suicide, personal inadequacy.
16. social achievement: marital status, level of education, employment history, income, address changes.
17. substance abuse: recent history of alcohol/drug abuse.

Composite Measures

18. LSI-R, SFS, Wisconsin, Other risk scales.

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