

A META-ANALYSIS OF THE PREDICTORS OF ADULT OFFENDER RECIDIVISM: WHAT WORKS!*

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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 1,141 correlations with recidivism. The strongest predictor domains were criminogenic needs, criminal history/history of antisocial behavior, social achievement, age/gender/race, and family factors. Less robust predictors included intellectual functioning, personal distress factors, and socioeconomic status in the family of origin. Dynamic predictor domains performed at least as well as the static domains. The LSI-R was identified as the most useful actuarial measure. Recommendations for developing sound assessment practices in corrections are provided.

Verification of the risk factors most predictive of adult offender recidivism and identification of the actuarial instruments best suited to that end have major implications for corrections policymakers, practitioners, and program evaluators. The cost-effective and humane management of prisons, particularly in light of the dramatic increase in incarceration rates (Mauer, 1994), dictates that maximum security prisons be reserved for the highest risk offenders. Moreover, the design of effective offender treatment programs is highly dependent on knowledge of the predictors of recidivism (Gendreau et al., 1994).

Andrews and Bonta (1994) identify two categories of risk factors: static and dynamic. Static factors (i.e., age, previous convictions) are aspects of the offender's past that are predictive of recidivism but cannot be changed. Dynamic risk factors, or what Andrews and Bonta commonly refer to as criminogenic needs (e.g., antisocial cognitions, values, and behaviors), are mutable and thus serve as the appropriate targets for treatment (Andrews

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et al., 1990a). There is, however, little consensus regarding the measurement of specific offender risk factors.

PREDICTORS OF RECIDIVISM

There is no 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 (Andrews and Wormith, 1989; Rowe and Osgood, 1984; Wilson and Herrnstein, 1985).

Second, some methodologists (e.g., Jones, 1996) have expressed skepticism 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 one 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 behavior.

Third, criminal justice professionals have been, by and large, antipathetic to the possibility that assessment of criminogenic needs might enhance the prediction of criminal behavior (Bonta, 1996; Gendreau and 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 those items. Further, the emergence of the "new penology" (Feeley and Simon, 1992), which is concerned with managing large aggregates of offenders in a simplistic input-output, businesslike fashion, has further contributed to the lack of interest in dynamic variables.

This denial of the utility of dynamic risk factors 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 behavior is determined largely by one's social location

(Andrews and Bonta, 1994). Tittle and Meier (1990, 1991) have challenged this view, showing social class of origin (socioeconomic status, or SES) to be a very weak predictor of juvenile delinquency.

The view that criminals are less intelligent than nonoffenders has been prevalent for decades (Goddard, 1920). Over the years, a number of studies have demonstrated a correlation between intelligence and delinquency (Hirschi and Hindelang, 1977). Recently, with the publication of *The Bell Curve* (Herrnstein and Murray, 1994), arguably the strongest claim yet has been made that IQ is a particularly powerful predictor. Their conclusions have serious 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 practice (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 in our opinion, has been 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 narrative in nature—except for two reviews that employed meta-analytic procedures. One meta-analysis, however, was quite preliminary (Gendreau et al., 1992), and 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 judgment. There is a plethora of literature documenting the lack of validity of this approach (Meehl, 1954), even among the most highly trained clinicians and scholars (Little and Schneidman,

1959). This perspective is still commonplace among corrections professionals (Clear and 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 offender's behavior to be reflected on subsequent retesting.

Bonta's third generation consists of two types of instruments. One of them encompasses risk prediction measures that include dynamic factors (e.g., Community Risk/Needs Management scale, Motiuk, 1993; Level of Service Inventory (LSI-R), Andrews and Bonta, 1995; the Wisconsin system, 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 of items 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

A final comment concerns the fact that the validity of various theories of criminal behavior relies, somewhat, on the prediction literature. Anomie/strain (Merton, 1957) and subcultural theories (A. 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 and Bonta, 1994; LeBlanc et al., 1988; Widom and Toch, 1993) center 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 and Murray, 1994; Walters, 1992).

In summary, our review of the literature on predictors of recidivism for adult offenders has indicated a need for a comprehensive, quantitative

1. Brief mention should also be made of a few quantitative within-subject prospective comparisons of several risk instruments and personality scales (Gendreau et al., 1979a, b; Gough et al., 1965; Motiuk et al., 1986; Motiuk, 1991; Serin et al., 1990). The results from these studies indicated that, in most instances, risk measures (SFS, LSI-R) were better predictors of offender recidivism than were antisocial personality scales such as the MMPI Pd.

research synthesis (i.e., meta-analysis) of the major classes of predictors of recidivism and the available prediction instruments. The potential advantages of meta-analysis over narrative reviews have been summarized in detail elsewhere (Cooper and Hedges, 1994). It has become the review method of choice in many applied areas (e.g., Lipsey and Wilson, 1993) and has recently led to advances in knowledge in the correctional field (Andrews et al., 1990b; Bonta and Gendreau, 1990; Gendreau and 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 among 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 behavior?
5. What guidelines are forthcoming from the meta-analysis that will assist criminal justice professionals in making more accurate assessments of criminal behavior?

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 were 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 were used.
2. Treatment studies that directly attempted to change offender personality or behavior were not included.
3. The criterion or outcome measure of recidivism had to be recorded when the offender was an adult (18 years or older).
4. The criterion or outcome measure had to have a no-recidivism category. Studies that used "more" versus "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 formulas (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, multidisciplinary authorship, judgment 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, SES, 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: agreement = number of agreements \div (number of agreements + number of disagreements) (Yeaton and 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). The coding criteria are detailed in the appendix. Then, for the purposes of research synthesis, the 18 domains were collapsed into 8 all-encompassing predictor domains (Category II): (1) age/gender/race, (2) criminal history, (3) criminogenic needs, (4) family factors, (5) intellectual functioning, (6) personal distress, (7) SES, and (8) 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, they were converted to r using the appropriate statistical formulas (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 (1985:230–232), the statistic z^+ , representing the weighted estimation of Pearson r , was calculated for each predictor domain by dividing the sum of

the weighted z 's per predictor domain by dividing 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 and Wong, 1992) was also employed. The CL measure is little affected by changes in base rates and selection ratios, which makes it ideal for prediction studies (Rice and Harris, 1995). 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 z^+ values for each domain were multiplied by the value of $(N - 3k)^{1/2}$, where N = the number of subjects per predictor domain and k = the number of predictors per domain (Hedges and Olkin, 1985).

One-way ANOVAs and the Student-Newman-Keuls (SNK) multiple comparison test were then applied to the mean r values of those domains that 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 z^+ values for significant predictor domains were also assessed using an analog to the ANOVA's F test, the goodness-of-fit statistic Q (Hedges and Olkin, 1985). Following that, post hoc comparisons of the differences between mean z^+ 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 r were employed to assess whether type of outcome criteria, length of follow-up, and study characteristics were related to effect size.

The CL statistic does not involve significance testing.

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

RESULTS

We identified 131 studies as suitable for the meta-analysis. These studies generated 1,141 effect sizes with future criminal behavior.

For those variables for which at least 60% of the studies reported information on the study characteristics sampled, the results were as follows: (1) 86% of the studies were published, 58% in journals; (2) 73% of the

senior authors had published in the area previously, 51% of them were male; (3) 44% and 54% of authors were based in an academic or government agency setting, respectively; (4) the studies were evenly distributed across the decades and the majority emanated from the United States and Canada, although Canadian studies contributed the majority (63%) of effect sizes; (5) 95% of studies consisted of male or mixed samples; (6) only 5% of studies employed an extreme groups design; and (7) 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 ($n = 1$).

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 and involved a total of 61,312 subjects. The associated mean Pearson r for age with outcome was .15 (S.D. = .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 analog (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 [$F(16, 1001) = 5.59$]. An SNK multiple comparison test of the mean r values is specified in Table 1. Adult criminal history and criminogenic needs produced the greatest frequency of significant differences. Each of these was significantly different from family structure, intellectual functioning, personal distress, and SES.

PREDICTOR DOMAINS: CATEGORY II

With the exception of the risk scales domain, the predictor domains

Table 1. Mean Effect Sizes for Predictor Domains: Category I

Predictor (<i>k</i>)	<i>N</i>	<i>M r</i>	<i>M z</i> ⁺
Static ^a			
1. Age (56)	61,312	.15(.12) ^b	.11*
2. Criminal History: Adult (164)	123,940	.18(.13) ^c	.17*
3. History of Antisocial Behavior: Preadult (119)	48,338	.13(.13) ^b	.16*
4. Family Criminality (35)	32,546	.12(.08)	.07*
5. Family Rearing Practices (31)	15,223	.15(.17) ^b	.14*
6. Family Structure (41)	24,231	.10(.08)	.09*
7. Gender (17)	62,021	.10(.07)	.06*
8. Intellectual Functioning (32)	21,369	.07(.14)	.07*
9. Race (21)	56,727	.13(.15)	.17*
10. SES (23)	13,080	.06(.11)	.05*
Dynamic ^a			
11. Antisocial Personality (63)	13,469	.18(.12) ^d	.18*
12. Companions (27)	11,962	.18(.08) ^e	.21*
13. Criminogenic Needs (67)	19,809	.18(.10) ^c	.18*
14. Interpersonal Conflict (28)	12,756	.15(.10) ^b	.12*
15. Personal Distress (66)	19,933	.05(.15)	.05*
16. Social Achievement (168)	92,662	.15(.14) ^e	.13*
17. Substance Abuse (60)	54,838	.14(.12) ^b	.10*
Composite Measures			
18. Risk Scales (123)	57,811	.30(.14)	.30*

NOTES: *k* = effect sizes per predictor domain; *N* = subjects per predictor domain; *M r* = mean Pearson *r* (S.D.); *M z*⁺ = $\Sigma [(z_r) \times (n - 3)] \div \Sigma [(n - 3)]$, where *n* = number of subjects per effect size.

^a *M r*: $F(16, 1001) = 5.59, p < .05$.

^b 1, 3, 5, 14, 17 vs. 15; SNK post hoc comparison, $p < .05$.

^c 2, 13 vs. 6, 8, 10, 15; SNK post hoc comparison, $p < .05$.

^d 11 vs. 8, 10, 15; SNK post hoc comparison, $p < .05$.

^e 12, 16 vs. 8, 15; SNK post hoc comparison, $p < .05$.

* $p < .05$.

from Category I were collapsed into 8 groups (see Table 2). All predictor domains were significantly greater than 0. There were significant differences among the 8 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, and SES.

Table 2. Mean Effect Sizes for Predictor Domains: Category II

Predictor (<i>k</i>)	<i>N</i>	<i>M r</i>	<i>M z</i> ⁺
Static ^a			
1. Age/Gender/Race (94)	180,060	.14(.12) ^b	.11*
2. Criminal History ^c (282)	171,159	.16(.13) ^d	.16*
3. Family Factors (107)	72,000	.12(.12) ^b	.08*
4. Intellectual Functioning (32)	21,369	.07(.14)	.07*
5. SES (23)	13,080	.06(.11)	.07*
Dynamic ^a			
6. Criminogenic Need Factors ^e (246)	113,153	.17(.11) ^d	.14*
7. Personal Distress (66)	19,933	.06(.15)	.05*
8. Social Achievement (168)	92,662	.15(.14) ^f	.13*
Static versus Dynamic ^g			
9. Static (536)	457,552	.12(.14)	.11*
10. Dynamic (482)	226,664	.15(.13)	.13*

NOTES: *k* = effect sizes per predictor domain; *N* = subjects per predictor domain; *M r* = mean Pearson *r* (S.D.); $M z^+ = \Sigma [(z_i) \times (n - 3)] + \Sigma [(n - 3)]$, where *n* = number of subjects per effect size.

^a *M r*: $F(7, 1010) = 10.00, p < .05$.

^b 1, 3 vs. 4, 7; SNK post hoc comparison, $p < .05$.

^c Criminal history = adult plus preadult.

^d 2, 6 vs. 3, 4, 5, 7; SNK post hoc comparison, $p < .05$.

^e Criminogenic need factors = antisocial personality, companions, interpersonal conflict, criminogenic needs, and substance abuse.

^f 8 vs. 4, 5, 7; SNK post hoc comparison, $p < .05$.

^g *M r*: $F(1, 1016) = 6.18, p < .05$.

* $p < .05$.

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 CL effect size indicator provided another approach to examining the relative usefulness of the eight 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 can be read in the following way. With regard to direction, unbracketed scores favor the horizontal axis predictor while bracketed

Table 3. Common Language Effect Size Indicators

	<u>CH</u>	<u>CN</u>	<u>F</u>	<u>I</u>	<u>PD</u>	<u>SES</u>	<u>SA</u>
AGR	[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]

NOTES: Common language effect size indicators for mean r values. Bracketed Values favor vertical axis; unbracketed values favor horizontal axis. AGR = age, gender, race; CH = criminal history/history of antisocial behavior; CN = criminogenic need factors; F = family factors; I = intellectual functioning; PD = personal distress; SES = socioeconomic status or social class of origin; SA = social achievement.

scores favor 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 favor 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 Other risk scale domains [$F(3, 119) = 1.52$]. The Other domain consisted of SFS clones, that is, instruments containing about 5 to 10 items, almost all of which were static in nature.

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.

The CL analysis indicated that 83% of the time the PCL produced

larger Pearson r correlations with recidivism than did the MMPI.²

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., 1979a) 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. In addition, little attempt was made to retrieve unpublished studies that were not immediately available. A common assumption is that one of the reasons some

2. As a result of collecting the literature and analyzing the data, some other comparisons came to light that merited closer examination.

Personal Distress: Within the personal distress domain, 24 of 66 effect sizes tapped the psychiatric symptomatology dimension through items such as schizophrenia, psychosis, and prior psychiatric history. The mean r (S.D.) for this subset with recidivism was .00 (.17).

Family Factors: Our analysis of family factors did not include studies from the gene-crime relationship because Walters (1992) has already conducted a thorough meta-analysis in this area. He reported small correlations between genetic background and criminal behavior. We determined whether, in fact, genetic background predicted criterion significantly greater than 0. Only those studies that were twin and adoption studies (the most stringent comparison of the gene-crime relationship) and used an official measure of outcome were assessed. Fifteen effect sizes from Tables 2 and 3 of Walter's (1992) study were generated and analyzed using the Hedges and Olkin (1985) formulas. The mean r with recidivism was .08. The z^* was also .08, indicating that genetic background was a significant predictor of recidivism.

Measuring Change: Andrews and Bonta (1994) and Bonta (1996) have stressed the importance of measuring change with dynamic predictors. Six studies were located that assessed offenders at two points in time and derived a change score, which was then correlated with future recidivism. A meta-analysis of their results was not possible because five of the six studies did not report data in a suitable form or had very small cell frequencies. The following narrative will have to suffice.

Recidivism rates changed between 30% and 50% when an offender's status moved from high to low risk or vice versa (Motiuk et al., 1986; Motiuk, 1991). Change scores predicted recidivism as well as measures taken at either entry to prison or prior to release (Gendreau et al., 1979b). The effect size for change scores may be quite substantial. Data from Table 3 of Bonta (1996) were recalculated (for the low-high/high-low cells) yielding a X^2 (1, $N = 808$) = 116.41, which is equivalent to an r of .38.

Type of Outcome: While the issue is rarely, if ever, raised in the research literature, one is occasionally asked by practitioners which official measure of recidivism is the most sensitive. Four criteria—arrest, conviction, incarceration, and parole violation—were compared as to differences in mean effect size, where values ranged from .13 to .19. There was a significant difference among the mean values [$F(3, 894) = 6.71$]. The SNK multiple comparison test reported that the mean r values associated with incarceration were significantly greater than those of conviction or parole violation. The CL scores for the four outcome indices were calculated. In all comparisons, however, the CL scores were less than 60%.

Table 4. Mean Effect Sizes for Risk and Antisocial Personality Scales

Predictor (<i>k</i>)	<i>N</i>	<i>M r</i>	<i>M z</i> ⁺
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)	.30*
Antisocial Personality Scales^b			
5. MMPI Based (16)	3,420	.16(.09)	.21*
6. PCL (9)	1,040	.28(.09) ^c	.29*
7. Other (37)	8,875	.16(.13)	.16*

NOTES: *k* = effect sizes per predictor domain; *N* = subjects per predictor domain; *M r* = mean Pearson *r* (S.D.); $M z^+ = \frac{\sum [(z_i) \times (n - 3)]}{\sum [(n - 3)]}$, where *n* = number of subjects per effect size.

^a *M r*: $F(3, 119) = 1.52, p > .05$.

^b *M r*: $F(2, 59) = 4.01, p < .05$.

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

* $p < .05$.

studies are not published is that they lack methodological rigor, which in turn, affects the magnitude of effect sizes (see Lipsey and Wilson, 1993). Lipsey and Wilson's (1993) analysis applied to treatment studies, but so far, prediction studies have not shown similar results (Goggin and Gendreau, 1995).

Another methodological point concerns one of the goals of meta-analysis. Hunter and Schmidt (1990) are interested in determining the maximum value that can be obtained in prediction if all variables are 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 . . ." (italics added; Rosenthal, 1991:25). We are of the latter view and did not attempt to adjust statistically 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 (Andrews and Bonta, 1994).

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

The fact that the data base consisted of just over 1,000 effect sizes involving almost 750,000 subjects 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 this 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 favor 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 in criminogenic needs may produce strong correlations in that regard.

Early family factors and history of preadult antisocial behavior are rarely included in adult offender risk prediction instruments.³ 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 preadult history of antisocial behavior (Table 1) produced correlations of .12 and .13 with recidivism,

3. Typically, risk prediction instruments for adults assess just one aspect of this predictor domain and employ one or two items in so doing. For example, the LSI-R has one item (no. 5) in this regard (i.e., "arrested under age 16").

respectively, demonstrating once again that antisocial risk factors in childhood can have far-reaching influence (e.g., Stattin and Magnusson, 1989).

Much controversy has focused upon how well personal distress, intelligence, and SES predict recidivism (Andrews and Bonta, 1994; Herrnstein and Murray, 1994; Tittle and Meier, 1990). From a treatment standpoint, the important result centered 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 reoffending in the field of psychiatry (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, that is, standard paper and pencil tests that measured linguistic and mathematical abilities. Although these sorts of IQ measures can produce modest correlations with criminal behavior 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 monitor one's own and other's feelings and needs, and solve the problems of everyday life (Gardner, 1983; Sternberg et al., 1995).

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 and Bonta (1994) and Tittle and 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 versus 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 and 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 and Simourd, 1994). One area in which the predictors of violent offending may be quite different is that of impulsivity

combined with overly hostile attributions of other people's intent (Serin and 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, centering on the offense itself, that are unique to this population (Hanson and Bussière, 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 and Bonta, 1994:104-124). These authors assert that it is absolutely essential that criminogenic needs and antisocial associates are two of the strongest correlates of criminal conduct. Criminogenic needs establish the standards of conduct and generate the rationale for engaging in antisocial behavior. Antisocial associates provide the opportunity for antisocial modeling to occur, govern the rewards and costs of such behavior, 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 and subcultural theories 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.

Among 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 significant,⁴ the CL effect size indicator provided a result of practical importance. The LSI-R produced larger correlations with recidivism than did the three other risk measures between 62% and 76% of the time. The LSI-R, therefore, appears to be the current measure of choice. An impressive number of studies confirming its predictive validity with recidivism and prison adjustment have been generated for a variety of offender populations (i.e., adults, juveniles, natives, females) (Andrews and 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).

4. See J. Cohen (1994) and Schmidt (1992) for a criticism of the use 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.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the modest contribution from this meta-analysis has been to clarify which predictor domains and actuarial measures of risk will be most useful to practitioners and policymakers. In regard to the assessment of static predictors, protocols should contain any reliable information that accurately captures early family life and social adjustment risk factors. Dynamic risk factors, particularly those of criminogenic needs, must be included and reassessed over time. The choice of criterion (e.g., reconviction) should depend on the goals of the assessment. Of the available risk measures, the LSI-R is recommended. In the case of specialized offender populations, additional measures (e.g., PCL-R) might be used in conjunction with a general measure of risk.

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APPENDIX
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 behavior: preadult—prior arrest, probation, jail, conviction, incarceration, alcohol/drug abuse, aggressive behavior, conduct disorder, behavior 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: socioeconomic status (SES) 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 behavior 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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