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#122

THE DEVELOPMENT OF CLINICAL
AND POLICY GUIDELINES FOR THE
PREDICTION OF CRIMINAL BEHAVIOR IN
CRIMINAL JUSTICE SETTINGS

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ABSTRACT

Three hundred and seventy-two studies were classified into ten categories and subjected to meta-analysis in order to determine the most potent predictors of offender recidivism.

It was found that the categories companions, behavioral history, personal anti-social factors, problems in the family or origin, gender/race and cognitive factors were the strongest predictors. Personal distress, e.g., anxiety, self-esteem and socio-economic status of the offender's family were very weak predictors.

The most appropriate assessment methods were those that employed a wide range of factors (static and dynamic) predictive of recidivism, e.g., Level of Supervision Inventory. If the time allotted for assessment is very brief, classification tools similar to the Salient Factor Score are recommended. The use of omnibus psychological tests such as the MMPI are discouraged, however, some psychological tests/scales have quite reasonable predictive validities and should be used in circumstances permitting. These are the CPI Socialization Scale, Eysenck's EPI (factors E, P), the Psychopathy Check List and measures of risk taking/sensation seeking. The assessment of cognitive abilities merits more consideration.

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In the future, the development of effective classification protocols for the prediction of recidivism will be accomplished by focusing on the offenders criminal associations, anti-social attitudes, beliefs and past/current family problems.

In generating new assessment protocols, researchers should assess the validity of their items in a predictive fashion by tracking clientele in the future. Relying on official records of recidivism will not lead to underestimations of the predictors.

FOOTNOTES

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INTRODUCTION

The ability of criminal justice professionals to predict criminal behavior is essential to the effective functioning of vital aspects of the criminal justice system. For example, the efficient allocation and management of parole/probation caseloads and prison space, the development of treatment programs and the capacity of the correctional system to evaluate itself are indebted to the knowledge generated by the prediction of recidivism literature (cf Andrews, 1990; Bonta & Gendreau, 1990; Clear & Gallagher, 1985; Gendreau & Ross, 1987). As these authors have pointed out, the ability to predict, with reasonable accuracy, which offenders are more at risk of offending will allow probation officers and managers of treatment programs to direct the necessary services to those most in need. Secondly, scarce prison beds and prison resources can be utilized more effectively by insuring that lower risk offenders are transferred to less secure and costly environments, e.g., CRCs.

To the casual observer it might appear that the question of which predictors of offender recidivism are the most useful would be straightforward. Rather, the area has been rife with controversy and misinformation. For years, because of ideological concerns and the professional self-interest emanating from significant segments of the professions of criminology and sociology, predictors in the domain of personal attitudes, beliefs

and temperament have been cavalierly ignored or derided (Andrews & Wormith, 1989). Indeed, as recently as the latter 1980's, the appearance of revisionist texts that attested to the importance of individual differences in accounting for criminal behavior (Eysenck & Gudjonsson, 1989; Wilson & Herrnstein, 1985), have been severely criticized by the previously noted entrenched interests. On the other hand, when the helping professions e.g., clinical psychology, social work, have been involved in corrections they have tended to focus on personal distress factors such as self-esteem and depression. This was a natural consequence of their training in the theory and practise (e.g., Freudian theory, phenomenology) to be found in mental health fields where many of them had gained their experience (cf. Andrews, Bonta, & Hoge, 1990). On a personal note, as a result of conducting many training sessions with criminal justice practitioners during the last several years, the first two authors have been struck by the lack of knowledge that still exists about the predictors of recidivism and the measures available for general use.

However, reviews of the literature conducted to date in this area, with rare exception (e.g., Simourd, Bonta, Andrews, & Hoge 1991), have been narrative in nature. Reviewers have provided their overall qualitative impression of the literature. At best, there is a "vote-counting" along the lines of "of the studies reviewed, some favoured this hypothesis or another and we do not know by exactly how much". Critics of this approach (Glass, McGraw &

Smith, 1981) have commented that narrative reviews in the behavioral sciences have sometimes neglected key information, provided imprecise conclusions, and reflected unduly the biases of the authors. One reviewer's attempt at verification and objectivity is evidence, in some instances, to another of subjectivity and erroneous conclusions. Glass, et al (1981) have suggested the procedure of meta-analysis as a means by which to deal with these problems.

Meta-analysis attempts to standardize and interpret the findings of diverse studies in as objective and verifiable manner as possible, thereby making replications possible. Essentially, meta-analysis strategies undertake the following: 1) group studies and the variables of concern along certain specified dimensions, 2) express the outcomes of interest from these studies in a common metric known as effect size, 3) average the effect sizes obtained and, 4) submit them to statistical analysis to determine if variations in the amount of change are correlated with the type of variable under investigation or other aspects of the studies, e.g., sample size. Clearly, meta-analysis represents a methodological advance, although it is not a panacea (Gendreau and Andrews, 1990). These authors have pointed out that narrative reviews still have value and can accurately assess issues within limits. Nevertheless, meta-analysis has become, justifiably, the review method of choice (Rosenthal, 1991). In fact, meta-analysis has already led to some significant advances in knowledge in the

criminal justice area (Andrews, Zinger, Hoge, Bonta, Gendreau & Cullen, 1990; Bonta & Gendreau, 1990).

The purpose of the present investigation was to assess the offender prediction of recidivism literature since 1970 and subject it to meta-analysis. Our primary goal was to classify the literature into its essential dimensions, and examine how these dimensions ranked in their ability to predict recidivism. Andrews, Leschied & Hoge (1991) have generated useful classification guidelines in this regard.

Secondly, we were interested in the question of whether certain characteristics of studies affected the magnitude of the obtained correlations with recidivism. These were whether a study was predictive or postdictive, employed an official measure of recidivism or self-reported delinquency, and sampled juveniles or adults. Third, we wished to make a preliminary assessment of the ability of the variables sampled to predict violent vs. non-violent offending and "offending" behavior in prison. The prediction of violence is considered to be problematic (Monohan, 1981) as, according to correctional lore, are prison infractions. Finally, correctional psychologists and classification personnel have been interested in which psychological scales/tests and risk measures are the best predictors of recidivism. A ranking of some of the measures in this area was examined.

METHOD AND PROCEDURE

A literature search of those studies (since 1970) purporting to predict anti-social/law-breaking behavior was carried out via library search devices, accessing key reviews on selected topic areas (e.g., Eysenck & Gudjonsson, 1989; Loeber & Stouthamer-Loeber, 1987; Simourd, Bonta, Andrews & Hoge, 1991), and following up on reference lists contained in various articles.

Just over 1,000 potential articles were located. Seven hundred have been obtained to date. For a study to be included in the present analysis it had to report statistical information, e.g., sample size, t , F , χ^2 , Cohen's d , correlation statistics, allowing for conversion by meta-analytic formulae (Rosenthal, 1991, p. 19) into the common metric of Pearson r . If a study reported nothing but non-significance it was assigned a Pearson r of 0.

The study had to contain information on the following characteristics: a) predictive (at least 6 months) of recidivism in the future or postdictive (going back in time), b) contained official documentation of recidivism, ie., conviction, incarceration, police reports or self-reported (SRD) incidences of law violations, c) subjects were juvenile or adult. Whenever permitting, presence of violent infractions was recorded as well as a record of prison violations, i.e., misconducts, assaultive infractions. Racial and gender breakdown of the sample, if noted,

was also recorded. In the case of race and gender some studies reported that a small percentage of the sample was, for example, black or female. These studies were coded as to the majority. A study was not included if it reported a comparison between an offender sample and a clinical or 'normal' group. The majority of studies were coded by the first author.

Three hundred and seventy-two studies were located. The references are available from the author upon request. Similar to the guidelines Andrews, et al. (1991) have suggested for classifying predictors of recidivism, we categorized the predictors as follows:

- 1) Socioeconomic (SES) Status of family of origin
 - father/mother's education/occupational status
- 2) Gender and Race
 - male/female; caucasian vs black/hispanic/mixed samples
- 3) Problems in Family of Origin
 - criminality, parenting skill deficits, psychological handicaps, substance abuse, social stressors
- 4) Behavioral History
 - history of antisocial behavior/low violations/convictions etc., starting at an early age up to and including adulthood, type and variety of offenses, prison misconducts, risk scales (e.g., SFS, LSI, Iowa, Wisconsin). If a risk scale reported correlations on its subcomponents, the results were tabulated in the appropriate category, e.g., LSI-companions component was placed in #5.
- 5) Companions
 - association with criminal others/substance abusers

- 6) Educational/Vocational/Social Achievement
 - grade completed, achievement in school, employment and financial status, accommodations, married/single
- 7) Personal Temperament/Beliefs/Attitudes
 - a) Anti-social
 - history of or current indices of aggression, anger/hostility/substance abuse, measures of extraversion, externalization, impulsivity, moral development, neutralization psychopathy/sociopathy (e.g., CPI Soc, EPI-P, PCL, MMPI Pd), sensation seeking/risk taking, thinking style/ content that is anti-social in nature
 - b) Psychological distress
 - alienation, anxiety, depression, empathy, inadequacy, mental disorder, schizo-affective symptoms, self-esteem
- 8) Cognitive Functioning
 - verbal/performance IQ, aptitude assessment, neuropsychological indices, psychomotor variables
- 9) Physical Health
 - hospital visits, injuries, physical handicaps, other physiological factors
- 10) Miscellaneous
 - variables that were not readily categorized into the above classifications

The first nine categories were used in the analysis yielding 372 studies that generated 1734 individual Pearson r correlations available for statistical analysis. Since sample sizes for studies ranged from several thousand to 20 (most were in the 80-500 range), each Pearson r was transformed into ZrT or $(Zr - \frac{r}{2 \times (n-1)} (\sqrt{n-3}))$ (E. Marchand, March, 1992, personal communication; adapted from Rosenthal, 1991) to control for possible effects of each studies

sample size on its reported correlations.

The statistical tests computed were one-way analysis of variance. The ZrT was the dependent variable of primary interest.

The results were categorized in the following way:

- A: A determination of the correlation of all variables (Categories 1-9) with recidivism and whether the correlation varied as to the study characteristics, e.g., predictive-postdictive, etc.
- B: A comparison of the potency of each of the nine categories ability to predict recidivism.
- C: An assessment as to whether each categories prediction of recidivism varied by study characteristics.
- D: A ranking of selected psychological scales and risk measures prediction of recidivism.

RESULTS

The information, recorded in tabular format, is as follows:

a) # of entries = n , b) mean Pearson r , its transformation into ZrT, and the respective standard deviations (SD) in brackets, and c) the significance of the statistical test as indicated by the F value and * = $p < .05$ or ** = $p < .01$.

SRD refers to self-reported delinquency. The violent vs. non-violent category also includes incidences that occurred within prison. Recidivism (community) refers to studies that measured law violations "on the street" vs. in a prison environment.

A: The mean correlation reported for all entries ($n = 1733$) with recidivism was $r = .16$ (.16).

Next, the effect of five study characteristics on the correlations, and their transformed values (ZrT) for the entire sample, were examined. Those studies that were predictive, measured official recidivism, and sampled juveniles reported significantly higher correlations. Prediction of recidivism in prison vs. the community was less robust.

	<u>n</u>	<u>r</u>	<u>ZrT</u>
Predictive	1087	.17 (.15)	3.12 (3.67)
Postdictive	581	.15 (.17)	2.20 (3.28)
		F=4.19*	F=25.47**
SRD	395	.14 (.16)	2.44 (3.84)
Official recidivism	1214	.17 (.16)	2.91 (3.52)
		F=11.49**	F=5.03*
Juvenile	775	.17 (.17)	3.09 (4.16)
Adult	778	.14 (.14)	2.44 (2.54)
		n.s.	F=14.06**
Violent Recidivism	231	.15 (.16)	2.83 (3.58)
Non-violent	1322	.16 (.14)	2.82 (2.64)
		n.s.	n.s.
Recidivism (community)	1402	.16 (.16)	2.88 (3.58)
Recidivism (in prison)	151	.13 (.14)	1.72 (1.67)
		F=5.36*	F=15.54**

B. The mean r and it's ZrT value for each category of predictor is summarized below.

<u>Category</u>	<u>n</u>	<u>r</u>	<u>ZrT</u>
#1) SES	100	.06(.12)	1.39 (3.08)
#2) Gender/Race	46	.14(.12)	3.06 (3.20)
#3) Problems in Family	341	.18(.17)	3.04 (3.82)
#4) Behavioral History	335	.22(.16)	4.02 (4.30)
#5) Companions	46	.27(.18)	4.46 (4.11)
#6) Educ./Voc./Soc. Ach.	151	.12(.13)	2.13 (2.80)
#7) a) Personal anti-social	395	.19(.16)	2.94 (3.35)
b) Personal-distress	201	.07(.13)	1.17 (2.35)
#8) Cognitive	107	.16(.12)	2.58 (3.07)
#9) Physical Health	17	.14(.11)	1.33 (0.93)

The ZrT mean values provide a ranking (controlling for sample size) of the categories. Inspection of the Pearson r values revealed considerable scatter within those categories that

consisted of several types of indices. The Kruskal-Wallis non-parametric test (Siegal & Castellan Jr., 1989) provides a helpful computation for ranking observations. The scores from all categories were combined and ranked in a single series. This procedure ranked the categories in descending order:

<u>Mean Rank</u>	<u>Category</u>
1143.96	#5
1036.92	#4
919.36	#7a)
903.55	#2
883.80	#3
790.74	#8
789.56	#6
595.32	#9
570.18	#7b)

A one-way ANOVA reported a significant difference among categories [$F_{(9,1704)} = 13.60$, $p < .01$]. A similar result was also found using the Kruskal-Wallis ANOVA by ranks ($X^2 = 174.41$, $p < .01$).

The least significant difference (LSD) test of multiple comparisons denoted the pairs of groups significantly different at the .05 level.

Group	1	7b)	6	9	2	8	3	7a)	4	5
1										
7b)										
6	*	*								
9										
2	*	*								
8	*	*	*							
3	*	*	*							
7a)	*	*	*		*	*				
4	*	*	*	*	*	*	*	*	*	
5	*	*	*	*	*	*	*	*	*	*

In summary, companions is the best predictor and it and behavioral history are superior to all others. While there are some differences within the following group; personal temperament anti-social, problems in family of origin, gender/race, and educational/vocational all are clearly significantly better predictors than SES, personal-distress, and physical health.

C: The comparison of category by study characteristics qualified the results reported in part A (p.14). The effect of study characteristics on effect size varied by the category surveyed. The following observations were noted: a) predictive studies produced significantly higher correlations in most of the categories, b) the higher correlations found for official records were primarily due to the categories of SES and companions, c) problems in family of origin and criminal history were better predictors of non-violent crime while cognitive factors were better predictors of violence, d) the significantly lower effect sizes for prediction of within prison infractions was mostly due to behavioral and personal temperament/anti-social attitudes and beliefs. These two categories were better predictors of violations outside of prison.

Study Characteristics

Category	Predictive Postdictive	SRD Official	Juvenile Adult	Violent Non-V.	Recidivism Com. vs. Prison
# 1) SES	F=10.45**	F=9.99**	n.s	n.s	n.s
# 2) Gender/Race	n.s.	n.s.	n.s.	n.s.	n.s.
#3) Problems in Family	n.s.	n.s.	F=12.98**	F=7.19**	n.s.
# 4) Behavioral History	F=6.60**	n.s.	F=30.36**	F=5.20'	F=14.77**
# 5) Companions	F=8.60**	F=6.22'	F=6.18'	n.s.	n.s.
# 6) Educ./Voc./Soc.Ach	F=9.22**	n.s.	n.s.	n.s.	n.s.
# 7) a) Personal-anti-social	F=4.00'	n.s.	F=7.28**	n.s.	F=6.61**
b) Personal - distress	F=5.03'	n.s.	n.s.	n.s.	n.s.
# 8) Cognitive	F=10.23**	n.s.	F=9.84'	F=14.24**	n.s.
# 9) Physical Health	n.s.	n.s.	n.s.	n.s.	n.s.

D) Section D contains rankings of the ability of selected risk measures and psychological scales to predict recidivism. We include only those measures (see Appendix A for a complete list of names and references) that contributed at least 5 entries.

Risk Measures

	<u>n</u>	<u>r</u>	<u>ZrT</u>
SFS	16	.29 (.11)	8.88 (6.10)
LSI	24	.32 (.12)	4.45 (1.82)
BES	8	.23 (.12)	4.23 (4.72)

Psychological Test Scales

	<u>n</u>	<u>r</u>	<u>ZrT</u>
CPI Soc	6	.40 (.15)	3.27 (1.60)
PCL	23	.25 (.13)	3.20 (1.96)
Sensation seeking (various indices)	31	.17 (.14)	2.75 (2.53)
MMPI <u>Pd</u>	27	.17 (.14)	2.18 (1.92)
EPI P	20	.24 (.19)	1.89 (3.45)
EPI E	23	.16 (.16)	1.89 (2.26)
MMPI (scales 1-3,7,8)	15	.04 (.06)	1.42 (2.13)
MMPI-Megargee	16	.08 (.10)	1.06 (1.30)
EPI N	25	.07 (.16)	.87 (1.30)
Self-esteem (various measures)	12	.04 (.14)	-.52 (3.80)

DISCUSSION

The results reported should be tempered by noting the following caveats.

First, it is felt the potential database could be expanded by approximately 50%. It is estimated that about 100 more studies could be located and some 100 studies from the present sample might provide more effect size estimates upon re-coding or re-calculation of the original authors data.

Secondly, one individual was responsible for the majority of coding. Even with checks on coding, recording errors can occur in the range of 1-5% for meta-analyses (Rosenthal, 1991).

Third, we did not code for extreme group comparisons and non-criminal samples. Simourd et al. (1991) examined 55 effect size estimates for measures of psychopathy and their correlations with recidivism. They found extreme groups inflated and non-criminal samples deflated their effect sizes. We discovered a similar result for the non-criminal variable. Studies in our sample that employed SRD contained more non-criminal samples. The mean r for SRD was significantly less than for official measures of recidivism. We will be addressing the above noted issues shortly as well as whether the predictors of recidivism vary for those rare offenders who persist in committing only one type of

crime, e.g., DWI.

Nevertheless, with a sample size of almost 2,000 correlations with recidivism it would be highly unlikely that dramatic shifts in the rankings of the predictors will occur in the future. Therefore, we feel relatively confident in concluding the following.

Well-established Predictors

There has been little debate in the literature over the fact that association with criminal others, gender/race (in this study gender was a better predictor, $r=.17$, than race; $r=.12$,) behavioral history and problems in family of origin are important predictors of recidivism. This fact was confirmed once again.

The behavioral history category deserves more comment. Risk scores were coded within that category. In and of themselves, they are powerful predictors ($r=.28$), which is not surprising given they summarize several behavioral history items. All of the ones in current usage (e.g., SFS, SIR, Wisconsin), however, concentrate on an offenders past criminal history.

The LSI, and it's version for juveniles (Shields and Simourd, 1991), is the exception. The LSI also contains several dynamic need factors, e.g., criminal associates, an offenders

social functioning, that are predictive of criminal behaviour. Thus, the LSI is the most sensitive risk measure available for assessing change in an offender. This feature alone denotes the LSI as a valuable evaluative tool for any sort of systems intervention where the focus is on changing or providing on-going monitoring of the criminogenic behaviours and circumstances of the offender.

It should be noted that the one-to-one structured interview format of the LSI requires about 45 minutes to an hour to complete. A group involving the first author, charged with developing prototypes for probation programs in the U.S., discovered that some U.S. correctional jurisdictions, sadly, cannot afford more than a few minutes of assessment time per offender. In these instances, measures such as the Salient Factor Score (Hoffman & Adelberg, 1980) are the obvious choice.

Another point regarding risk inventories should be made. None contain items examining early family of origin problems. Retrieving reliable information on adult offenders may pose some logistical problems - inadequate records, offenders ability to recall - but efforts should be made to this end. Preliminary results on the inclusion of a couple of "early family" items has increased the predictive validity of the LSI (D. Andrews personal communications, March, 1992).

Finally, there can be no denying that personal temperament, anti-social attitudes, beliefs and behavior, are powerful predictors of recidivism and cannot be ignored by anti-personality adherents (e.g., Andrews - Hastings, "crime/class" debate in Forum on Correctional Research, 1991, 3, p.36). In fact, one of the contributors in this dimension - measures of psychopathy/sociopathy - produced one of the highest correlations with recidivism ($r=.24$). Two individual measures, CPI Soc and the PCL (Hare, 1985), performed equally impressively. The Eysenck Personality Inventory measures of extraversion and psychoticism (more a measure of sociopathy, cf. Liebert & Speigler, 1990) and the Pd scale of the MMPI produced acceptable predictive validities.

The above scales require minimal reading ability and take up to 30 minutes to complete. The PCL, on the other hand, is a structured interview, requires time to administer, and interviewers need special training. For that matter, situations employing the use of psychological tests/scales necessitate the supervision of a licensed psychologist.

Correctional settings, however, should be encouraged to establish the suitable test conditions and have the appropriate personnel in place. It would be short sighted not to take advantage of the useful data that can be generated by some of these psychometric instruments.

Predictors Deserving More Attention

Few reviewers have devoted much attention to IQ-type factors as predictors of redivism in part due to the racial-IQ debate in the U.S. (see Wilson & Herrnstein, 1985). In any case, the predictive validities of this variable were moderate. One intriguing result, which we regard as quite tentative, is that the cognitive category produced greater effect sizes for the prediction of violence vs. non-violence. More studies on this topic and other studies along the lines of Moffitt and her colleagues are needed (e.g., Moffitt & Silva, 1988).

There are two measures within the personal temperament/anti-social attitude category that appear promising and merit more use. Shields (1990) has generated some reasonable predictive validities (e.g. $r=.16$) on his measure of neutralization or how offenders attempt to rationalize their anti-social behaviors and attitudes. Sensation-seeking is also a potent construct. One useful measure of sensation/seeking is that of Zuckerman's (1979).

As well, there are other categories of predictors, with minimal predictor information so far, that deserve more investigation. Two of these are moral development and interpersonal problem solving (cf Nelson et al, 1990).

Problematic Predictors

The favoured predictor of sociological theory - social class - has been confirmed again (see Tittle & Meier, 1990) as inconsequential. Alienation, another sociological construct (from category 7b) was an indifferent predictor ($r=.09$). Measures of personal distress, collectively ($r=.07$) or individually such as self-esteem, anxiety/depression were very weak predictors. Therefore, unless they were compelling circumstances otherwise or exceptional individual cases, the continued use of these two types of predictors in criminal justice settings should be limited.

Omnibus psychological measures e.g., the MMPI, are not recommended for the purpose of predicting recidivism. For example, the Megargee system for the MMPI produced small correlations ($r=.08$) with recidivism.

Methodological Issues

One study characteristic was prominent. By and large, studies that were predictive in nature produced higher correlations with recidivism. Although less consistent across categories, official records of recidivism were generally superior to SRD. A safe recommendation would be to combine SRD and official records whenever possible (Andrews & Wormith, 1989).

Correctional lore was confirmed; the prediction of "criminal" behavior in prison was less accurate than in the community. Porprino (1986) has demonstrated that some situational factors, e.g., transfers, play an important role in prison misconducts.

In our survey we came across some studies that we considered were exemplary models of conceptual clarity and comprehensive in their approach to their issue of concern. As two cases in point, we recommend the studies of Mak (1990) and Motiuk (1991) as models for setting up evaluations in this area in the future.

RECOMMENDATIONS

On the basis of this study's results, three recommendations are forthcoming which will assist criminal justice professionals in dealing with the issues outlined in the Introduction. They are:

- 1) Offender assessments should routinely cover the content areas of companions/criminal associates, behavioral history, personal temperament, anti-social attitudes/beliefs and problems in family of origin. A risk inventory such as the LSI seems the most suitable for this purpose. The Salient Factor Scale is particularly appropriate as a brief screening device.
- 2) Clinicians should emphasize the use of psychometrics like the CPI Soc scale, the PCL, Eysenck's EPI and measures of

sensation seeking/risk taking. While time consuming, intelligence and aptitude testing (GATB, WAIS, WISC) should be employed whenever possible.

Assessment of personal distress and social class factors should be reserved for exceptional cases and/or circumstances where a priori hypotheses would lead one to expect these variables to play a significant role.

Broad based psychological inventories like the MMPI appear to be of little practical use.

- 3) In assessing the predictability of factors, evaluators should focus on predictive formats and measure official recidivism.

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Appendix A

SFS:	Salient Factor Score (Hoffman & Adelberg, 1980).
LSI:	Level of Supervision Inventory (Adult and juvenile version) (Andrews et al., 1990; Shields & Simourd, 1991).
BFS:	Base Expectancy Score (Gottfredson & Tonry, 1987).
CPI <u>Soc</u> :	California Personality Inventory: Socialization Scale.
PCL:	Psychopathy Checklist (Hare, 1985).
MMPI <u>Pd</u> :	Minnesota Multiphasic Personality Inventory: Psychopathic Deviate Scale.
EPI-E,P,N:	Eysenck Personality Inventory: Extraversion, Psychoticism, Neuroticism scale.
MMPI (other):	scales <u>H</u> , <u>D</u> , <u>Hy</u> , <u>Pt</u> , <u>Sc</u> and Megargee classification system.
Sensation Seeking:	Zuckerman (1979)

