Factors That Contribute to the Success or Failure of Risk Reduction Initiative Clients

Michael Birzer and Paul Cromwell

This study investigates factors that contribute to probation clients either successfully completing or failing an offender Risk Reduction Initiative (RRI) program. The study includes (N = 388) clients whom the courts assigned to the RRI program. Clients were divided into three groups: clients who completed the program successfully (n₁ = 237), clients who failed the program due to technical violations of their probation (n₂ = 100), and clients who failed the program due to the commission of new crimes (n₃ = 51). A multivariate discriminant analysis revealed that six discriminator variables met the criteria to be included in interpretation of the discriminant function. Clients who failed to complete the RRI program due to technical violations of probation and for the commission of new crimes were younger and scored at higher risk levels on the Level of Service Inventory–Revised (LSI-R) in the following domains: education/employment, attitude orientation, companionship, criminal history, and alcohol/drug use.

Key Words: Discriminant analysis • risk reduction initiative • risk factors • criminality

Factors that contribute to offenders failing or successfully completing programmatic probation efforts have long attracted the interest of criminologists and corrections authorities. Risk factors known to jeopardize offenders’ successful completion of probation programs aimed at reducing recidivism include antisocial behaviors, negative peer influences, substance abuse, mental illness, lack of financial stability, barriers in securing meaningful employment, and dysfunctional family issues. The inability to overcome such factors will likely also result in probationers’ continuing to lead a criminal lifestyle.

This paper reports the results of a study of adult probation clients in a midwestern city who were part of a Risk Reduction Initiative (RRI). The purpose of this study was to describe factors leading to success or failure in completing the RRI program among probation clients. A corollary objective of the study was to determine whether a multivariate discriminant analysis was a tenable procedure for identifying the factors that separate the three groups of clients: those who completed the program successfully, those who failed the program due to technical violations of probation, and those who failed the program because of the commission of new crimes.

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Risk Factors

Risk factors generally fall into two categories, static and dynamic. Static factors cannot be changed with treatment and include, for example, age, gender, age of first substance abuse, age of first arrest, and past criminal history (Kelly & Welsh, 2008). Static risk factors provide important information for assessing overall risk (Beech, Fisher, & Thornton, 2003).

Dynamic factors can potentially change and are amenable to treatment (Bonta & Wormith, 2008). Dynamic factors include antisocial attitudes and behavior, values that support criminality such as neutralizing or excusing criminal behavior, cognitions, family dysfunction, poor self-control, lack of education, associations, substance abuse, interpersonal relationships, particularly the way offenders communicate with pro-social influences such as family or friends, and maintaining active employment status (Andrews & Bonta, 2003). When addressed effectively, changes or improvements in dynamic factors can significantly reduce the likelihood of criminality and subsequent recidivism (Cottle, Lee, & Heilbrun, 2001; Myner, Santman, Cappelletty, & Perlmutter, 1998).

Risk Reduction Initiative (RRI)

Since the 1980s recidivism rates among offenders have increased steadfastly. For example, in the early 1980s, the Bureau of Justice Statistics conducted a national recidivism study and found that 63% of released prisoners were re-arrested (Beck & Shipley, 1989). Austin, Hardyman, and Irwin (2002) estimate that within three years, more than 51% of prisoners released during the 1980s were back in prison either because of a new crime for which they received another prison sentence or because of a technical violation of their parole. One other study that examined nearly 300,000 prisoners released in 15 states in 1994 found that 67.5% were rearrested within three years (Langan & Leven, 2002). Similarly, a study of recidivism rates in California showed that of inmates released from prison in 2000, 60.5% were re-incarcerated within three years (California Department of Corrections, 2004).

Because of the increase in recidivism rates, the emphasis of corrections authorities shifted from individualized models of rehabilitation to managing the aggregate risk of offenders with strategic offender population management approaches (Feeley & Simon, 1992). In the strategic offender population management approach, offenders are often managed in large groups based on risk level with minimal attention given to individual risk factors that may reduce recidivism (Garland, 2001). Risk Reduction Initiative approaches are designed to tailor treatment strategies based on the individual needs of each offender.
and not simply managing offenders based on large aggregate numbers that often overlook individual treatment needs.

One objective in assessing risk and reducing recidivism is identifying and addressing criminogenic needs—attributes of offenders that are directly linked to recidivism. Criminogenic needs that place an offender at high risk of re-offending include association with other known offenders, substance abuse habits, unemployment, and lack of job skills.

Effective treatment programs develop comprehensive case plans that identify offenders’ criminogenic needs in an effort to treat the underlying risk factors and minimize future criminality. The RRI is designed to accomplish this important mandate of identifying and treating the individual offender’s criminogenic needs. The RRI program targets clients at high risk for revocation of probation.

Methods

This study is part of a larger evaluation of the RRI program the Department of Adult Corrections initiated in this community. The study took place in a city in the midwestern United States with a metropolitan population of about 500,000. The 2000 census data show the community to be 69% White, 11% Black, 13% Hispanic, 5% Asian, and 2% other race or ethnicity.

Comparison Groups

The participant population consisted of all clients (N = 388) sentenced to the RRI program from January 1, 2008 to June 30, 2008. At the conclusion of the RRI program, clients were placed into one of three mutually exclusive groups: (1) those who successfully completed the RRI program, (2) those who failed the RRI program due to technical violations, and (3) those who failed the RRI program due to the commission of new crimes. Technical violations of probation are specific violations of the terms and conditions of probation, such as alcohol use, a urinalysis positive for illicit drugs, or failure to report to program authorities.

Data Analysis

Because the RRI clients fell exclusively into one of three groups, and because one of the objectives of the research was to describe factors that separate the groups, the authors selected discriminant analysis (DA), a multivariate statistical procedure, as the technique for investigating the differences among the groups. As with other multivariate techniques, the emphasis in DA is on analyzing several variables together rather than singly, which allows researchers to consider the interaction of multiple variables simultaneously. DA facilitates the investigation of the differences between two or more known and distinct
groups in relationship to a set of discriminator variables (Birzer & Craig-Moreland, 2008; Klecka, 1980). DA is used to predict group membership and describe the way(s) that groups differ (Betz, 1987; Huberty & Olejnik, 2006). In this study, we were primarily interested in describing group differences.

Measures
The analysis included 10 discriminator (independent) variables. These variables were examined to see whether they were useful in differentiating between the outcome variable, which was group placement: successful completion, failed due to technical violations, failed due to new criminal charges. Nine discriminator variables were taken directly from domain scores of the List Service Inventory–Revised (LSI-R) assessment instrument.

The LSI-R is a dynamic risks/needs assessment instrument first developed in Canada and subsequently used widely as a valid and reliable offender classification and management tool (Andres and Bonita, 1995; Andrews, Kiessling, Mickus, & Robinson, 1986; Austin, 2006; Folsom & Atkinson, 2007; Holsinger, Lowenkamp, & Latessa, 2006; Lowenkamp & Bechtel, 2007). The LSI-R’s applications include assisting in probation placement decisions, making appropriate security level classifications, and assessing treatment progress.

The LSI-R consists of 54 static and dynamic items that are grouped into ten subscales believed to be related to future criminal behavior: criminal history (10 items); education and employment status (10 items); financial status (2 items); family and marital relationships (4 items); accommodation, i.e., level of domestic security (3 items); leisure and recreation activities (2 items); character of companions (5 items); alcohol and drug use (9 items); emotional and personality characteristics (5 items), and attitude orientation, i.e., attitudes, values, and antisocial or prosocial beliefs (4 items).

The LSI-R interviewer is expected to make either a dichotomous “yes” or “no” to 37 items and a Likert scale rating of satisfactory, relatively satisfactory, relatively unsatisfactory, or very unsatisfactory for the other 17 items. Based on these responses, the interviewer scores the offender on each item, totals the item scores, and determines the client’s overall risk level. The higher the score on any given domain, the higher the risk for re-offending.

The domain variables taken from the LSI-R for use as discriminator variables in this study were criminal history score, education and employment score, family/marital score, accommodation score, leisure/recreational score, companion score, alcohol/drug use score, emotional/personality score, and attitude/orientation score. The tenth variable used was age.
Results

Recall that the study included 388 clients who were assigned to the RRI program from January 1, 2007 to June 30, 2008. Of these, 293 (76%) were males, and 95 (24%) were female. Of these clients, 235 (61%) were White; 120 (31%) Black; 28 (7%) were Hispanic, and 5 (1%) were other race. Twelve (12) clients reported having some college, four (4) reported having attended vocational education courses, 252 (65%) reported having a high school diploma or its equivalent, 120 (31%) reported having less than a high school diploma (this ranged from 6th grade to 11th grade). In regards to marital status, 325 (84%) reported being single or divorced, and 63 (16%) reported being married. Of these 388 clients, 237 (61%) completed the RRI program successfully, 100 (26%) failed the program due to technical violations, and 51 (13%) failed the program due to the commission of new crimes.

Discriminant Analysis

In preparing for discriminant analysis, it is important to ensure that several assumptions are met. The first assumption is that the analysis includes two or more mutually exclusive groups and each group has at least two subjects. Recall that in this study each client was placed into one of three mutually exclusive groups: successful completion, failed due to technical violations, failed due to the commission of a new crime. Furthermore, 237 clients were in the successful completion group, 100 in the failed due to technical violations group, and 51 in the failed due to commission of new crimes group.

The second assumption is that the discriminating variables are measured at the interval level. In this study, nine variables, which consisted of interval level domain scores from the LSI-R, were used along with the variable of age.

The third assumption is that the size of each group must exceed the number of discriminating variables by 2. The smallest group size in this study was the failed due to technical violations group (n = 51). Recall that this study used 10 discriminating variables.

The fourth assumption is that the discriminating variables must not share variance. To determine this, the researchers examined the pooled within-groups matrices. This examination revealed that none of the variables shared variance.

The fifth and final assumption the researchers considered was that the covariance matrices for each group were approximately equal. If the covariance matrices are equal, the assumption is that the subjects were sampled from the same population. Thus, any differences noted in the DA can be attributed to the variables of interest rather than the possibility that the two groups were different (Sherry, 2006). Homogeneity of
variance/covariance matrices in DA is similar to homogeneity of variance in ANOVA. The researchers calculated the Box’s M test of homogeneity of variance/covariance to evaluate whether this assumption was met. The Box’s M test revealed a non-significant finding: $F(132, 70068.19) = 1.158, p = .104$). The non-significant Box's M test indicated that the variances are equal across the groups; thus, the homogeneity of variance/covariance assumption is met.

Canonical Discriminant Functions

The researchers evaluated the statistical significance of the canonical discriminant functions. In DA the number of functions is equal to $g$ (groups) – 1. In this study two discriminant functions were produced because RRI clients were placed into one of three mutually exclusive groups. At least one discriminant function should be statistically significant; if not, no further analysis can be completed, and a DA would not be useful. The Wilks’ lambda statistic is the procedure used in DA to discern which functions are statically significant ($p = .001$). After examining the Wilks’ lambda statistic, the researchers concluded that only one of the two discriminant functions was statistically significant (function 1); thus, it was used in the interpretation of the discriminant function. Function 2 was not statistically significant; thus, it was not considered further (see Table 1).

<table>
<thead>
<tr>
<th>Function</th>
<th>Wilks’ Lambda</th>
<th>Chi Square</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.797</td>
<td>86.386</td>
<td>22</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>.981</td>
<td>3.613</td>
<td>10</td>
<td>.963</td>
</tr>
</tbody>
</table>

Significant Variables

To judge the acceptance of the discriminant analysis, it is important that the discriminant function produced is describable by using the structure coefficients of the analysis. Thus, a value of .3 or greater was used as the criterion for determining whether variables would be used from the structure matrix. Six of the 10 discriminating variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function: education/employment score ($= .578$), attitude/orientation score ($= .556$), companions score ($= .538$), criminal history score ($= .512$), age ($= .368$) and alcohol/drug score ($= .352$).

The structure coefficient values were squared to calculate the variance accounted for in the composite score for the discriminant function. The variable “education/employment” accounts for 33.40% of the variance on the discriminant function, and the variable “attitude-
orientation score” accounts for 30.91% of the variance in the function. Collectively, these two variables account for 64.31% of the variance in scores on the discriminant function. The variable “companion score” accounted for 28.94% of the variance on the function, the variable “criminal history” accounted for 26.21%, “age” accounted for 00.13%, and “alcohol/drug use score” variable accounted for 00.70%. Table 2 provides the standardized discriminant function coefficients and structure coefficients for the variables that contributed to the groups’ differences. Overall, 64.9% of the originally grouped cases were classified correctly. In other words, the discriminant function classified RRI clients correctly in nearly 65% of the cases by using only 10 discriminating variables.

Table 2. Discriminant Function Coefficients and Structure Coefficients

<table>
<thead>
<tr>
<th>Function 1 Variable</th>
<th>Standardized Coefficient</th>
<th>Structure Coefficient $r_s$</th>
<th>$r^2_s$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education/employment score</td>
<td>.350</td>
<td>.578</td>
<td>33.40%</td>
</tr>
<tr>
<td>Attitude orientation score</td>
<td>.467</td>
<td>.556</td>
<td>30.91%</td>
</tr>
<tr>
<td>Companion score</td>
<td>.283</td>
<td>.538</td>
<td>28.94%</td>
</tr>
<tr>
<td>Criminal history score</td>
<td>.307</td>
<td>.512</td>
<td>26.21%</td>
</tr>
<tr>
<td>Age</td>
<td>-.410</td>
<td>-.368</td>
<td>00.13%</td>
</tr>
<tr>
<td>Alcohol/drug use score</td>
<td>.171</td>
<td>.352</td>
<td>00.70%</td>
</tr>
</tbody>
</table>

Table 3. Mean LSI-R Domain Scores of Three Client Groups (N = 388)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Successful Completion (n = 237)</th>
<th>Failed—Technical Violations (n = 100)</th>
<th>Failed—New Crimes (n = 51)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education/employment score</td>
<td>3.91</td>
<td>5.40</td>
<td>5.39</td>
</tr>
<tr>
<td>Attitude orientation score</td>
<td>1.56</td>
<td>2.33</td>
<td>2.10</td>
</tr>
<tr>
<td>Companion score</td>
<td>2.55</td>
<td>3.31</td>
<td>3.16</td>
</tr>
<tr>
<td>Criminal history score</td>
<td>4.59</td>
<td>5.66</td>
<td>5.65</td>
</tr>
<tr>
<td>Age</td>
<td>34.62</td>
<td>31.35</td>
<td>29.73</td>
</tr>
<tr>
<td>Alcohol/drug use score</td>
<td>3.91</td>
<td>4.84</td>
<td>4.49</td>
</tr>
</tbody>
</table>

Note. Higher group means on a domain score represent increased risk factors.
Table 3 provides the mean scores of each of these variables by group. Depicting the mean of each of the variables assists in seeing conceptually how the groups differ.

**Group Centroids**

The group centroid is the mean of the discriminant function scores within a group. The purpose of the centroid is to represent the convergence of several dimensions to a single point (Huberty & Olejnik, 2006). The group centroid is calculated by applying the discriminant weights to the group means on each variable. By comparing the structure coefficient table with the groups, the researcher can discern how the groups differ on centroid scores. The group centroid value for the successful completion group is -.392. The centroid value for the group that failed for technical violations was .640, and the value for the group that failed because of the commission of a new crime was .566. As noted, there is minimal separation between the failed technical violations group and failed new crimes group. There is a greater separation between the two failed client groups and the successful completion group.

**Discussion and Conclusions**

The purpose of this study was to describe factors contributing to the success or failure of clients’ completion of the Risk Reduction Initiative program. A corollary objective was to determine whether multivariate discriminant analysis was a robust and tenable procedure in discerning factors that contribute to clients’ success or failure in the RRI program. The discriminant analysis identified six discriminator variables that met the criteria for interpretation of the meaning of the discriminant function (education/employment score, attitude orientation score, companion score, criminal history, age, and alcohol/drug use score).

This study demonstrated that the two failed client groups (failed for technical violation and failed for new criminal offenses) do not appear to differ a great deal. For example, the centroid value for the failed due to a technical violation group is .640, and the centroid value for the failed due to new crimes group is .566. In comparison, the centroid value for the successful completion group is -.392. The two failed groups are very close on their centroid values while the successful completion group demonstrates a fairly good separation from the failed client groups. Moreover, as Table 3 depicts, the failed groups’ mean scores on the dependent variable (LSI-R scores) were very similar. However, even though the mean scores on the dependent variables were relatively close in terms of separating the two failed groups, the DA indicated significant differences when analyzing the variables simultaneously.

The discriminant function classified nearly 65% of the cases correctly. While the researchers certainly desired a higher classification result, we point out that accuracy of...
the discriminant classification is secondary to the identification of substantively important variables that help distinguish between the groups (Holbert & Unnithan, 1990). The two groups of clients that failed the RRI program appear to have in common many of the same problems that preclude them from adapting to a lifestyle free from criminality.

While the variable "drug/alcohol use score" had a structure coefficient value of .352, it had the lowest predictive value. Nevertheless, clients in the two failed groups may indeed experience similar drug and alcohol addiction problems and may be less responsive to treatment compared with clients in the successful completion group. The clients’ attitude and whom they associate with may add to this pathology.

Because clients who successfully completed the RRI program scored at lower risk levels on the companion domain of the LSI-R, they may have more pro-social influences in their lives. Lifestyles predicated on sensation seeking and general acceptance of criminal orientation are associated with poor informal social controls. In some cases, an offender’s family, peer group, and identified role models may provide poor informal social controls (Bernburg & Thorlindson, 2001; Tunnell, 2006). Attitude and effective pro-social companionship may indeed work hand in hand in keeping risk reduction initiative clients from re-offending.

The variable education/employment domain score had a structure coefficient value of .578 and carried the most weight in describing the factors that separate the groups. It appears that a lack of consistent employment leads to a heightened risk of criminal behavior. Perhaps in these three groups of clients, attitude and pro-social companionship influence the ability to maintain employment and minimize the incidence of substance/alcohol use. The group of clients who scored at lower risk on the attitude/orientation domain of the LSI-R also scored at lower risk on the alcohol and drug domain and were, in fact, the clients who completed the RRI program successfully.

The criminal history score also carried weight in describing the factors that separate the groups. The criminal history score had a structure coefficient value of .512. It appears that those clients who failed the program for either technical violations or for new crimes scored at higher risk levels on the criminal history domain of the LSI-R. This suggests that they have more extensive criminal histories compared with the clients who completed the RRI program successfully.

Age also appeared to be a factor in this study. Age had a structure coefficient value of -368. The younger the RRI clients were, the more likely they were to fail the RRI program. Clients who completed the program successfully were on average about 3.2 years older than those clients who failed for technical violations, and 4.8 years older than those clients who failed due to the commission of new crimes.
Discriminant analysis is a multivariate procedure, thus it is important to point out that not any one variable describes the factors that separate the groups; rather a constellation of variables interact with one another. In this analysis, the variables of education/employment score, attitude/orientation score, companion score, criminal history score, age, and alcohol/drug use score were significant in describing the factors that separated the groups.

Discriminant analysis and its simultaneous investigation of a variety of variables was an effective statistical procedure to discriminate between the three client groups. Because a recognizable discriminant function was produced that classified clients in the three groups accurately, it was possible to view the variables that were relevant in separating the three groups. In this sense DA proved useful in understanding the factors that separate the groups. The DA allowed the researchers to examine multiple variables simultaneously to see whether they could describe group placement.

Even though this study was limited to 388 risk reduction initiative clients in one midwestern community and as a case study of sorts cannot be generalized to the larger population, it adds to the body of empirical research that centers on risk factors and criminality. The data appear to show that when probation authorities addressed dynamic risk factors such as education/employment, attitude orientation, pro-social companions, and alcohol/drug addictions in this small group of 388 offenders, the offenders' chances of failing probation due to a technical violation or for the commission of a new crime was minimized. These data may show preliminarily that efforts to address dynamic risk factors among individual offenders such as drug and alcohol abuse and ensuring that offenders are exposed to pro-social influences, maintain employment, maintain proper attitude, and the like holds much promise. Because the small study was limited to one risk reduction initiative program in a midsized Adult Community Corrections agency, we suggest that state level studies be conducted to determine whether the findings of this study can be replicated in other community settings.

References


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