

School Violence Predictive Model

Overview

The School Violence Predictive Model study will endeavor to isolate, quantify, and prioritize a statistically significant number of individual discriminant variables that are both directly and indirectly contributive to school violence propensity. The study will endeavor to assemble these contributive factors into primary, secondary, and tertiary levels of discriminant influence within a master Violence Propensity Equation (VPE) that can be used by school administrators, counselors, and justice system agencies to assess the probability of violence for specific individuals, based upon their current susceptibility to such behavior, based on the aggregate influence of all discriminant factors identified as influential VPE indicators. Such an analysis may make it statistically reliable to determine the probability of future outbursts by at-risk youth, based on a comparison of their current values for each discriminant factor included within the equation and the aggregate VPE score they possess, based on a comparison of all of discriminant factors used in assessing the probability of group association.

Methodological Construct of the Study

Using a multi-directional discriminant function array that identifies primary, secondary, and tertiary axes of correlation, with an aggregate equation being the final result, provides an exceptional mechanism to (1) illustrate the relative strength and proportion of influence for each subtle level variable, followed by (2) the creation of a master equation that can be used to determine the statistical probability of success in avoiding future violence for each offender, as compared against historical findings. The research strategy of the project will be to elicit hypothesized and previously correlated independent variables within a multi-dimensional discriminant analysis array. Data relative to the experiment will be gathered for these discriminant factors over a three year period. Two groups of participants will be used for the discriminant function analysis. Group A will consist of those youth who engaged in violent behavior and Group B will be comprised of those youth who did not fall victim to such behaviors. The methodology used for the study will be based on the application both univariate analysis to search for statistically significant differences between groups relative to an hypothesized predictor variable, as well as a multivariate analyses of these factors in the form of discriminant function analysis to assess the standardized canonical correlations that are relevant to determining the relative percentage of influence that each discriminant variable maintains regarding violent tendencies. The final product of the analyses would culminate in the creation of a discriminant function equation that is predicated upon the unstandardized discriminant function scores derived from the analysis and which can be applied to the larger population of youth to determine their individual violence propensity, depending upon the statistical reliability of the findings.

Discriminant Function Analysis

Discriminant Function Analysis (DFA) is a powerful mathematical tool that is perfect for this type of study. It essentially allows the research team to create two groups of outcomes (i.e., Youth with a Violence History and Youth with No Violence History) and then to compare the relative strength and individual predictive power of each variable included within the master equation, as well as the collective power of all of the variables within an aggregate equation. Should the findings of the study yield a degree of statistical reliability that merits the broader application of the master equation to the generalized population of minority youth at-risk, then a computer algorithm in the form of an application program can be created that removes the necessity for end-users to engage in the mathematical processes associated with the regression equation. Instead the end-user can simply enter the values for the current situation in the form of yes/no or true/false responses, and derive a violence propensity score for each youth being assessed. This form of multivariate analysis creates an opportunity to differentiate the controllable or non-controllable nature of each individual variable included within the master equation, in order to formulate judgments about not only the statistical probability of a specific individual engaging in violence based on their current vulnerability to the VPE, but also to use the controllable nature of selected variables to manipulate the probability of such events, by forcing changes to specific factors.

Research Oversight Committee

A Research Oversight Committee will be established initially to elicit prospective variables, determine limitations of the methodology, and prescribe controls for the study. The research strategy of the project will be to elicit hypothesized and previously correlated independent variables within a multi-dimensional discriminant analysis array. Data relative to the experiment will be gathered based on a multi-staged, stratified random sample strategy, relative to these discriminant factors over a three year period. The source of data collection will include school administrators, counsellors, courts, probation officers, and law enforcement. Two groups of participants will be used for the discriminant function analysis. Those youth which have a demonstrated history of violent outbursts and those youth that have not engaged in such behavior. A standardized Variable Quantification Strategy will be developed to guide the assessment and codification of data relative to those subjects selected for inclusion within the study. The VQS will serve as the overriding empirical guide for data quantification. Because DFA provides for the empirical assessment of typically qualitative variables, such as the presence or absence of a specific phenomenon, it is imperative that a standardized quantification strategy be determined prior to the collection of data. Accordingly, the Research Oversight Committee will decide the VQS standards and assure that all data collection is predicated upon these uniformed requirements for assessment and quantification.

Research Questions

What statistically significant differences exist between identified descriptive and inferential variables used to discriminate between two groupings of minority youth relative violence propensity and associated actions?

What discriminant factors aggregate to influence group association relative to whether a student elects to engage in violence or whether they choose to refrain from such behavior?

What is the proportional relationship of each independent variable within the aggregate discriminant function analysis equation relative to its influence in determining group association?

What relationship exists between major categorical factors identified as part of the discriminant function equation and the independent variables used to isolate subtle level influences in determining group association?

Do the variables contained within the perpendicular axes of the VPE possess a degree on controllability?

Research Hypotheses

RH1: There is a statistically significant difference between Group A and Group B members relative to the discriminant function variables identified as applicable to determining violence propensity.

RH2: There is a statistically significant relationship between the aggregate influences of the discriminant function variables selected for inclusion within the VPE as applied to violence propensity.

References:

Discriminant Analysis, Sage University Publications, Klecka, William, 1980

Analysis of Prisoner Escape Potential, Claremont Graduate University, Campbell, Harold G., 1983

The Philosophy and Science of Multivariate Reasoning, ISBN# 978-0-557-35648-5, Campbell Harold G., 2010