Discriminant Function Analysis: Concept and Application

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Abstract

Problem Statement: Discriminant analysis is a multivariate statistical method that serves to set up a model to predict group memberships. The model consists of discriminant functions that appear based on a linear combination of predictive variables that provide the best discrimination between groups. These functions are derived from a sample whose group memberships are known. Afterward, they could be applied to new individuals or units with measures related to the same variables and unknown group memberships. Although discriminant analysis is not frequently used in behavioral sciences because its assumptions are not always easy to meet, it is a conceptually and mathematically powerful multivariate statistical method. Therefore, a description and illustration of the discriminant analysis method may help increase its use.

Purpose of the Study: The purpose of the present study is to describe discriminant analysis, provide basic information such as intended uses and interpretation of results, and determine convergence between discrimination application using the high-low-27-percent group method and classification through discriminant analysis.

Methods: The study group of the research conducted according to correlational research design consisted of a total of 244 volunteer students from Ankara University, Faculty of Educational Sciences, Department of Psychological Consulting and Guidance. Students were between years 1 and 4 in the 2006-2007 academic year. The students in the study were divided into two groups according to their scores from the Epistemological Beliefs Questionnaire, as groups with high and low belief levels in accordance with the high-low-27-percent group method. Hence, a total of

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132 students, 66 in each group, were included in the study, and 112 students with moderate epistemological belief levels were excluded. Then an attempt was made to determine how the scores from the subscales of Analyticity, Openmindedness, and Curiosity of the California Critical Thinking Disposition Inventory were successful in discriminating epistemological belief groups.

Findings and Results: The total accurate classification percentage of the discriminant function obtained from the analysis was found to be 75.80%. In other words, it was seen that the compatibility level of the classification through discriminant analysis with the initial discrimination using the high-low-27-percent group method was 75.80%. Moreover, the accurate classification proportion of discriminant analysis was higher than the proportional chance criterion (75.80% > 50.00%). That is, the obtained discriminant function provided accurate classification beyond chance classification.

Conclusions and Recommendations: Discriminant analysis is used to discriminate between predetermined groups based on certain scores. Although there are some limitations to the common use of discriminant analysis (such as the fact that its strong assumptions are not easy to meet and that it is necessary to determine groups before analysis), they may not appear in every research problem. There might be some cases where assumptions of the analysis are easily met or the groups are clear. In such cases, its benefits must be considered, since it is a conceptually and mathematically powerful multivariate method.

Keywords: Discriminant analysis, multivariate statistics, high-low-27-percent group method, epistemological beliefs, critical thinking disposition