



CART analysis with unit-weighted regression to predict suicidal ideation from Big Five traits

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Abstract

This study examines the Big Five traits as multiple predictors of suicidal ideation. In addition to using multiple regression, this study introduces the use of classification and regression tree (CART) analysis to identify cutoff scores that can be used with unit-weighted regression; the purpose of this approach is to offer a method of analysis that may be useful in a public health approach to suicide prevention. The models were developed with a derivation group ($N = 299$) and applied to a validation group ($N = 175$). Both models performed well in the validation group, with multiple regression correlating at 0.47, and unit-weighted regression at 0.48. The models agreed in suggesting that increased suicidal ideation is associated with high Neuroticism, low Extraversion, and low Agreeableness. Low Conscientiousness was correlated with suicidal ideation in unit-weighted regression.

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Suicide is a significant mental health problem. According to the National Center for Health Statistics (2001), suicide was the number four cause of years of life lost in the United States in 1998 (following cancer, heart disease, and accidental injuries), with an age-adjusted 363 years of potential life lost per 100,000 people.

Personality traits may play an important role in understanding suicidal behavior. The traits of extraversion and neuroticism have been often studied. Higher levels of neuroticism have been found to correlate with more suicide attempts (Beautrais, Joyce, & Mulder, 1999; Nordstrom,

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Schalling, & Asberg, 1995; O'Boyle & Brandon, 1998; Pallis & Jenkins, 1977), with more suicidal ideation (Lolas, Gomez, & Suarez, 1991; Velting, 1999), or with both ideation and attempts (Fergusson, Woodward, & Horwood, 2000; Statham et al., 1998). Low extraversion has been correlated with suicidal ideation (Lolas et al., 1991) and with a history of suicide attempts (Beautrais et al., 1999; Roy, 1998)

Several studies have also found that the trait of psychoticism from Eysenck's personality system is significantly related to suicide (Ashton, Marshall, Hassanyeh, Marsh, & Wright-Honari, 1994; Csorba, Dinya, & Huszar, 1994; Engstrom, Alsen, Gustavsson, Schalling, & Traskman-Bendz, 1996; Lolas et al., 1991; Nordstroem et al., 1995; Upmanyu, Narula, & Moein, 1995). On a related note, Knight, Furnham, and Lester (2000) found that higher psychoticism scores correlated with more positive attitudes toward suicide. Given that Eysenck (1992) has argued that Psychoticism in his system is related to Agreeableness and Conscientiousness in the Big Five system, one might expect on theoretical grounds that suicidal ideation would be related to either low Agreeableness or low Conscientiousness, or perhaps both.

However, despite this theoretical expectation, few studies have addressed the relationship of low Agreeableness or low Conscientiousness to suicidal ideation. One study of older adults (Duberstein, Conwell, & Caine, 1994) found no difference between suicide completers and controls on Conscientiousness or Agreeableness. But Velting (1999) found in a sample of undergraduates that low Conscientiousness was associated with higher suicidal ideation. Clearly, this issue needs more study. Thus, one purpose of this paper is to examine the Big Five traits as predictors of suicidal ideation, with specific attention to the hypothesis that low Agreeableness and low Conscientiousness would correlate with higher levels of suicidal ideation.

A second purpose of this paper is to propose a data analysis method that may be useful in an applied setting where the goal is prevention. The prevention of mental health problems, as opposed to treatment after the problems occur, is the approach taken in public health (Galavotti, Saltzman, Sauter, & Sumartojo, 1997; Miller, Fowler, & Bridges, 1982; Roberts, Banspach, & Peacock, 1997; Singer & Krantz, 1982; Tanabe, 1982). And a public health approach to suicide in particular has been gaining attention recently (Durenberger, 1989; Mercy & Rosenberg, 2000; Potter, Powell, & Kachur, 1995; Potter, Rosenberg, & Hammond, 1998; Rutz, 2001).

To apply a public health approach to suicide, one begins by identifying significant predictors (Centers for Disease Control, 1992). One common method for combining multiple predictors to predict an outcome is multiple regression. While it is a useful method, multiple regression has limitations for an applied prevention program. One limitation is that it assumes model specification; that is, it assumes that all the significant variables are in the model. This assumption is unlikely to be met in applied settings.

Another limitation of multiple regression is that it offers no guidance on cutoff scores. For example, suppose that school officials plan a program to address suicidal thinking. Because previous research shows that higher neuroticism relates to more suicidal thinking, the officials plan a program to assist students in emotional coping. The applied question then becomes: what neuroticism score would suggest that a student might be at increased risk for suicidal thinking and might benefit from the emotional coping program? Multiple regression fails to answer this question; it identifies significant predictors, but not cutoff scores. So the second purpose of this study is to suggest a data analysis method that would address these two limitations of multiple regression; that is, the lack of cutoff scores, and the assumption of model specification.

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