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RELATIONSHIPS BETWEEN MEASURES OF SELF-CONCEPT,
EXISTENTIAL VARIABLES, AND MALADAPTIVE PSYCHOSOCIAL OUTCOMES
IN A COLLEGE POPULATION

BY
SHERRI NELSON FITTS

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
IN
PSYCHOLOGY

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Abstract

Selected psychosocial correlates of maladaptive behaviors were evaluated within the context of Howard Kaplan's multivariate theory of self-concept and deviance (e.g., Kaplan, Martin, & Johnson, 1986). The hypothesized relationships between self-concept, existential variables, and maladaptive psychosocial outcomes were examined using structural modeling techniques with a sample of 290 undergraduates. Six separate models were tested using these three general sets of variables. In each model, the independent construct was a self-concept variable, either self-derogation or self-esteem. In four of the six models, the existential variables of purpose in life or hopelessness were alternately used as mediating constructs. The maladaptive psychosocial outcomes--substance use, depression, and suicide ideation--represented the dependent constructs in each of the six models.

The data was analyzed using estimation procedures that could account for the nonnormality inherent in the data. Results indicated that overall model fit was generally adequate. However, two of the six models yielded unstable results, a finding that may be due to a small sample size for the models explored here, collinearity, and/or nonnormality. In terms of individual pathways, the self-concept variables were found to be highly significant

predictors of the existential variables. There were also several significant direct and indirect (via the mediation of the existential variables) relationships between the self-concept and maladaptive outcome variables. There were strong direct associations between low self-concept and depression, and significant indirect relationships via the mediation of hopelessness. Negative self-concept directly predicted suicide ideation and there was a strong indirect association via the mediation of existential situation, particularly hopelessness. Few linkages of either a direct or indirect nature were noted between self-concept and substance use.

Overall then, it appears that, in this college sample, individuals with a negative self-concept are more likely to experience hopelessness, a lack of purpose in life, feelings of depression, and suicide ideation. Furthermore, it seems that negative perceptions of existential situation serve to augment feelings of low self-concept and thus contribute to feelings of depression and suicide ideation. The relationship between self-concept, existential variables, and substance use is less clear from this sample and may reflect the difficulty of adequately modeling extremely nonnormal data using existing methods and/or signify changing attitudes towards substance use in a college population.

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**Relationships Between Measures of Self-Concept,
Existential Variables, and Maladaptive Psychosocial Outcomes
in a College Population**

Introduction

The determinants of an individual's level of psychological functioning are numerous and complex. Psychosocial, physiological, environmental, genetic, and developmental factors all contribute and interact to determine the placement of an individual on a continuum of more or less adaptive functioning. This study focuses on the psychosocial correlates of selected maladaptive behaviors. Specifically, the relative contributions of self-concept and the mediation of existential variables in the prediction of the dependent variables of substance use, depression, and suicide ideation in a college population are examined using structural modeling techniques.

Self-Concept and Maladaptive Behaviors

Howard Kaplan's theory of self-derogation and deviance.

The particular models explored here derive from a general theory of self-concept and deviant behavior proposed by the sociologist Howard Kaplan and his colleagues (e.g., Kaplan, 1975, 1978, 1980; Kaplan, Robbins, & Martin, 1983b; Kaplan, Martin, & Johnson, 1986). According to this theory, the central motive of

human behavior is that of self-esteem. Individuals operate in order to maximize positive self-attitudes and minimize negative self-attitudes (Kaplan, Robbins, & Martin, 1983a). Individuals' experiences in their normative reference groups (e.g., family, peers, teachers) are critical determinants of their feelings of self-acceptance or self-rejection. If the experience of a particular individual is such that he or she develops a pervasively negative perception of self, the individual will experience feelings of self-derogation. Given the centrality and psychological importance of the self-esteem motive, such feelings are intensely dysphoric for the individual (Kaplan et al., 1983b). Furthermore, these feelings of self-derogation will act in concert with the primacy of the self-esteem motive to spur the individual to consciously or unconsciously seek alternative, nonnormative, avenues for the attainment of self-esteem and the alleviation of self-derogation. It is in the context of an individual's nonnormative choices that his or her behavior is seen as "deviant." Thus deviant behavior represents an attempt by the individual to reduce the subjectively distressful feelings of self-derogation or self-rejection.

Kaplan and his colleagues have tested and revised this multivariate theory of deviance in longitudinal studies of large groups of individuals (e.g., Kaplan et al., 1983a,

1983b; Kaplan, Martin, & Robbins, 1984, 1985; Kaplan et al., 1986). Much of their focus has been on a very large four-wave longitudinal study of 7000 subjects beginning in early adolescence and continuing through young adulthood. They have explored the direct and additive effects of self-derogation and other psychosocial variables (e.g., peer influence, weakening of social controls, life events, deprivation of social supports) on various outcomes including the initiation of substance use (Kaplan et al., 1984), the escalation of drug use (Kaplan et al., 1985), psychological distress in young adults (Kaplan et al., 1983a), and patterns of psychopathology, including depression and suicide ideation (Kaplan et al., 1983b) and antisocial behaviors (Kaplan et al., 1986).

The research by Kaplan and his associates has lent support to his theory of self-derogation and deviant behavior. For example, self-derogation was found to be a predictor of the initiation of substance use in an adolescent sample (Kaplan et al., 1984). It appears that these self-rejecting feelings influence the initiation of substance use through two routes. First, feelings of self-rejection cause the individual to become less motivated to conform to the norms that led to the feelings of low self-esteem and more motivated or disposed to deviant alternatives. Second, early self-derogation was found to predict later self-derogation, and it appears

that the self-esteem motive impels individuals to adopt deviant patterns of behavior in order to mitigate the pervasive dysphoria produced by continuous feelings of self-rejection (Kaplan et al., 1984).

The research by Kaplan et al. (1985) on the escalation of substance use among adolescents provides further support for the theory. The results of that study indicated that drug use beyond the level of initial experimentation was more likely to occur if the motivation for initial use was due to psychological distress (i.e., feelings of self-derogation) than to conformity to peer expectations. Furthermore, the experience of self-enhancing effects was positively related to increased use, lending support to the notion that self-derogating individuals seek out deviant alternatives that allow them to achieve more positive self-attitudes.

Their study of the antecedents of psychological distress (Kaplan et al., 1983a) provided evidence that the impact of earlier self-derogation on later perceived distress is an enduring one. Feelings of self-derogation in the 7th grade were found to predict psychological distress ten years later, a finding that is particularly notable considering that self-attitudes in the 7th grade are typically very unstable.

Kaplan et al. (1983b) extended the general theory of deviance to include broader patterns of psychopathology

(e.g., depression, suicide attempts, panic episodes, paranoid delusions, and antisocial acts). Consistent with expectations, self-derogation was found to be a significant long-term predictor of psychopathology occurring ten years later.

The authors acknowledge that it is more difficult to integrate certain manifestations of psychopathology (e.g., depression and suicidal ideation) into their theoretical framework. That is, it is harder to conceptualize certain psychopathological outcomes as deviant responses "chosen" in an attempt to alleviate feelings of self-derogation and fulfill the self-esteem motive. However, responses such as depression and suicidal ideation can be incorporated into the general model on at least two levels. First, such consequences can be interpreted as mechanisms by which the individual can withdraw from social interaction and thus avoid further experiences that could perhaps produce increased feelings of self-rejection. Second, it is conceptually clear that these particular behavioral outcomes represent a manifestation of the dysphoric affect produced by an experiential history of self-devaluation. Both interpretations are consistent with the expectation that self-derogating attitudes would anticipate the subsequent adoption of psychopathological responses (Kaplan et al., 1983b).

Other research relating self-concept and maladaptive outcomes.

Self-derogation is but one way to conceptualize the construct of negative self-concept. Low self-esteem and demoralization represent examples of additional ways in which this construct has been labelled and for which measures have been developed (e.g., Coopersmith, 1986; Harlow, 1987). Although these terms are not necessarily synonymous, there is much conceptual overlap between them and it seems reasonable to assume that they would also overlap functionally; that is, there should be relatively high correlations found between various measures of self-concept.

It also seems intuitively clear that a high correlation would exist between low self-concept and both depression and suicide ideation. Indeed, feelings of worthlessness or self-reproach are one of the defining characteristics of the presence of clinical depression (American Psychiatric Association, 1987). Other researchers besides Kaplan have explored this relationship and obtained similar findings. For example, Beck (1967) noted that negative self-evaluation is a hallmark of depression. In a review of the clinical literature, Levitt and Lubin (1975) found low self-esteem to be a core symptom of the depression syndrome. Harlow, Newcomb, and Bentler (1986) reported a significant relationship between

self-derogation and depression in a college population.

Because suicide ideation is a potential symptom of depression (American Psychiatric Association, 1987), it would be expected to be correlated in a similar fashion with negative self-concept. Firestone (1986) posits the existence of an "inner voice" in depressive symptomatology which represents the embodiment of self-criticism. He contends that when this inner voice goes unchallenged, it becomes the core of a negative self-concept which, in turn, can cause the escalation of depression into suicide ideation and/or a suicide attempt. Harlow et al. (1986) found a direct relationship between self-derogation and suicide ideation for college females. Other research has examined the relationship between depression and suicide ideation through the mediation of hopelessness (e.g., Petrie & Chamberlain, 1983; Cole, 1988).

In the area of substance use, there has been some recent research which has suggested that the relationship between self-concept and drug use is not always clearcut. For example, in a review of the literature on adolescent marijuana use, Penning and Barnes (1982) reported that findings relating self-confidence or self-esteem to marijuana use are inconclusive. Brennan, Walfish, and AuBuchon (1986), in a review of the literature on alcohol use and abuse in college students, found that most studies did find a negative relationship between heavy drinking

and self-esteem, but that there were some exceptions. For example, Ratliff and Burkhart (1984) found no relationship between self-esteem and level of alcohol consumption.

Labouvie and McGee (1986) also failed to find an association between differences in self-esteem and differences in drug use (alcohol, cigarettes, marijuana, and cocaine) in their longitudinal study of 882 subjects from the ages of 12 to 21.

There are at least two interpretations for the inconsistency in the findings regarding substance use. The first involves the logical implications of Kaplan's theory of deviant behavior regarding temporal changes in self-derogation. This theory actually implies a decrease in self-derogation over time under certain circumstances as the result of engaging in deviant behavior. Indeed, some longitudinal research has found such a temporal decrease in self-derogation (e.g., Kaplan, 1978; Kaplan et al., 1985; Huba & Bentler, 1982). Kaplan (1978) found that this self-enhancing effect of deviance in adolescents occurred when the initial level of self-derogation was high, when the particular mode of deviance chosen was compatible with valued social roles (e.g., involvement in drug use as a symbol of social status in this age group), and when individuals were able to defend against negative responses regarding their deviant behavior by valued others. Similarly, Huba and Bentler (1982) reported

results which corroborate this aspect of Kaplan's theory. They observed that cannabis use in early adolescence contributed to a positive self-concept measured four years later.

Labouvie and McGee (1986) suggest a similar, alternative explanation for the observed lack of relationship (either cross-sectionally or longitudinally) between self-concept and substance use in their data. They hypothesize that perhaps these findings reflect an historical change in attitudes regarding substance use among adolescents. That is, substance use may no longer be considered deviant behavior and thus may not represent a response chosen to reduce feelings of self-derogation and experiences of self-rejection in normative reference groups. Thus they conclude that level of substance use may be unaffected by low self-esteem in the adolescent/young adult population.

Existential Variables and Maladaptive Behaviors

A second general construct which has been investigated in connection with various maladaptive outcomes can perhaps be appropriately classified under the rubric of "existential" variables (Grygielski, Januszewska, Januszewski, Juros, & Oles, 1984). This construct incorporates variables which attempt to capture, for example, an individual's sense of purpose in life and the degree to which he or she feels hopeful about the future.

While there is some conceptual overlap between this category and variables relating to self-concept (i.e., an individual with high self-derogation would probably have a lesser rather than a greater sense of purpose in life), this set of variables seems less directly attributable to internal, stable characteristics of self-concept.

Just as Kaplan and others view self-esteem as the central motive underlying human behavior, some theoreticians regard a sense of purpose in life as the primary psychological force. Victor Frankl (1955, 1963, 1969) has written extensively about the importance of being able to find meaning in life or make coherent sense out of one's existence. If individuals are unable to find meaning, they may experience what Frankl calls "existential vacuum" (Yarnell, 1971). Frankl (1969) maintains that such feelings of meaninglessness can lead to symptoms of psychological distress, including substance abuse, aggression, and depression.

There has been a wealth of research investigating the relationship between existential constructs such as purpose in life or hopelessness and difficulties in psychological adjustment (e.g., Shean & Fechtmann, 1971; Padelford, 1974; Jacobson, Ritter, & Mueller, 1977; Hutzell & Peterson, 1986; Harlow et al., 1986; Newcomb & Harlow, 1986; Reker, Peacock, & Wong, 1987). In the area of substance use, much of this research has focused on

lack of purpose in life as a correlate. Padelford (1974) found a negative relationship between meaning in life and drug use among high school students. Similarly, Shean and Fechtmann (1971) reported that regular marijuana users in an undergraduate sample scored significantly lower on a measure of purpose in life. Hutzell and Peterson (1986) also found a decreased sense of life meaning in an alcoholic population. Jacobson et al. (1977) reported a significant increase of purpose in life for alcoholics in a 30-day inpatient treatment program. In their review of the literature on adolescent marijuana use, Penning and Barnes (1982) reported that a number of studies have found an association between indices of alienation, a construct which is similar to a lack of meaning in life, and marijuana use.

Reker et al. (1987) speculated that a sense of purpose in life may be important in coping with developmental crises. Thus an adolescent or young adult who feels that life has little meaning may struggle more in his or her attempts to accomplish the crucial developmental tasks involved in making a successful transition to adulthood: achieving autonomy, establishing a stable identity, and forming intimate relationships. They found purpose in life to be positively associated with perceived psychological and physical well-being.

Newcomb and Harlow (1986) explored the role of lack of

meaning in life as an indirect or mediating variable, along with perceived loss of control, between stressful life events and substance use in an adolescent/young adult sample. The results supported their contention that negative life change events create a feeling of loss of control which in turn promotes a sense of meaninglessness in life. Drugs are then used to medicate or assuage the feeling of lack of meaning.

Much of the research using measures of hopelessness has focused on the connection between this construct and those of depression and/or suicide ideation (e.g., Beck, 1967; Johnson & McCutcheon, 1980; Petrie & Chamberlain, 1983; Cole, 1988). Johnson and McCutcheon (1980) found that in an adolescent sample, hopelessness was positively correlated with depression and also with general maladjustment. Beck (1967) suggests that hopelessness mediates the link between depression and suicide ideation. Recent research (e.g., Petrie & Chamberlain, 1983; Cole, 1988) has offered substantiation for this hypothesis. Other researchers have reported a direct association between hopelessness and suicidal ideation or intent (e.g., Wetzel, Margulies, Davis, & Karam, 1980).

Empirical evidence exists which corroborates the notion that lack of purpose in life and hopelessness are indeed similar constructs. Grygielski et al. (1984) made a direct comparison between the Purpose in Life Test

(Crumbaugh & Maholick, 1964, 1969) and the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974). The authors contend that, although the underlying conceptual frameworks guiding the development of these measures are very different, both constructs are dependent on perceptual or cognitive processes, and both are measures of existential experiences. They point out that the two scales differ in their temporal orientation; the Hopelessness Scale is more future-oriented, while the Purpose in Life test is focused on the past and present (i.e., the extent to which meaning in life has already been found). The results confirmed their expectation of a high negative correlation between the two measures ($-.73$ average over five groups). There were significant differences between group means; university students reported the highest level of meaning in life and handicapped subjects the lowest, with the opposite holding true for hopelessness. They interpret these results as support for their contention that both scales capture mechanisms that are connected with processes of perception and that they reflect the existential situation of the individual. The observed high negative correlation thus may reflect a perceived sense of continuity between the degree of meaning in life already attained and hopefulness for the future (Grygielski et al., 1984).

Research Relating Self-Concept, Existential Variables, and Maladaptive Behaviors

Testing a theoretical model of adolescent behavior, Harlow et al. (1986) examined the relationships between the three general types of variables as they have been categorized here (i.e., measures of self-concept, existential variables, and maladaptive behaviors). They hypothesized that high levels of depression and self-derogation can engender a sense of lack of purpose in life which in turn can lead to substance use and suicide ideation. The results offered adequate support for their theoretical model, with the dynamics between these variables appearing to operate differently for males and females. For females, the relationship between self-derogation and suicide ideation was a direct one, while the relationship between self-derogation and substance use was an indirect one that was mediated by a lack of purpose in life. The converse appeared to hold true for males: a lack of purpose in life mediated the relationship between self-derogation and suicide ideation while self-derogation directly affected substance use. In addition, self-derogation was found to act as a mediator between depression and suicide ideation for women, and between depression and substance use for males. The authors conclude that males and females respond differently to feelings of psychological distress (i.e.,

depression and self-derogation). Males are more likely to choose substance use while females contemplate suicide. But perceived lack of meaning produces the reverse situation, with males responding with suicide ideation and females turning to substance use. The links between self-derogation and both substance use and suicide ideation, directly or indirectly through a lack of purpose in life, lend support to Kaplan's theory of deviant behavior.

Another recent formulation of Kaplan's model involving structural equation modeling techniques (Kaplan et al., 1986) utilized latent variables similar to the three constructs of interest in the present investigation, thus providing support for this conceptualization of the processes involved in maladaptive psychosocial outcomes. In this three-wave panel study of junior high school students, Kaplan et al. (1986) found strong empirical support for the postulated latent structure involved in the evolution of deviant behaviors: self-rejection (the independent construct) had the anticipated strong positive effect on disposition to deviance (the mediating construct) which in turn had the hypothesized strong positive effect on deviance (the dependent construct). The authors maintained that this more clearly articulated exposition of the model, including the specification of intervening variables and the use of structural modeling

to more appropriately represent the hypothesized variables, was responsible for the observed stronger effects of self-rejection on deviance than had been attained in earlier analyses of the same data.

The intervening variable of disposition to deviance used in the study by Kaplan et al. (1986) was measured by 1) disaffection from family and school and 2) disaffection from the conventional community. The specification of this construct is similar to that of hopelessness and lack of purpose in life in that both are addressing the issue of alienation and are reflecting a more existential state than are measures of self-concept. Therefore it seems appropriate to consider the three constructs used by Kaplan et al. (1986) comparable to the constructs defined for the current study, with self-rejection representing the independent construct of self-concept, disposition to deviance representing the mediating construct of existential experience, and deviance representing the dependent construct of maladaptive behaviors.

Research Questions

The present study examines three questions regarding the relationships between three general sets of variables. Two measures of self-concept--self-derogation and self-esteem--are used separately as independent variables in the models under investigation. Three dependent variables are used in all the models: substance use,

depression, and suicidal ideation. Two existential measures, purpose in life and hopelessness, are examined separately as mediating variables in four of the models. A complete listing of the seven measures that are being used is given in the Appendix. The various combinations of variables constitute six different theoretical models that are analyzed using structural modeling procedures. The hypothesized models are depicted in Figures 1-6.

The particular arrangement of the variables used in this investigation was guided by the theoretical framework outlined above. It should be acknowledged however, that alternative formulations could also be justified, both theoretically and empirically. For example, Harlow et al. (1986) posed depression as an independent variable. This positioning would also be consistent with the medical model. Clearly the relationships among the variables as they are defined here are more complex than the models explored here are able to capture. However, the positioning of the variables in this investigation was chosen in keeping with Kaplan's theory of self-concept and deviance in order to clarify the current status of this theory and to suggest directions for both further empirical explorations and theoretical refinement of the relationships among self-concept, existential situation, and maladaptive psychosocial outcomes.

The first question to be addressed is represented by Models 1 and 2 (see Figures 1 and 2) and concerns a test of the direct effects of self-concept on deviant behavior in a college population. Does high self-derogation or low self-esteem predict substance use, depression, or suicide ideation in the present sample? It was hypothesized that Kaplan's model would be essentially upheld; that is, a significant positive relationship between self-derogation and the three outcome measures was predicted. However, it was expected that self-derogation would not be as significant a predictor of substance use as of depression and suicide ideation. The expectation of a weaker link between self-derogation and substance use was made in light of Labouvie and McGee's (1986) contention that drug use is no longer a deviant response chosen to defend against, or cope with, feelings of self-derogation. That is, substance use may not be regarded as deviant in a college population in the 1980s. In contrast, depression and suicide ideation would not appear to be prone to such temporal changes in societal attitudes regarding their relative adaptiveness or social value.

The second question involves the potential mediation of two existential variables, purpose in life and hopelessness, in the relationship between self-concept and maladaptive psychological outcomes. That is, does negative self-concept have an indirect effect on

maladaptive behaviors via the specified existential constructs? These variables are tested, in turn, with each of the two self-concept measures, thus creating four additional models (Models 3-6, shown in Figures 3-6). To illustrate, Model 3 involves self-derogation as an independent variable and purpose in life as a mediating variable. This model assesses the hypothesis that self-derogation is negatively associated with a sense of purpose in life, which, in turn, is negatively correlated with substance use, depression, and suicide ideation. This conceptualization is comparable to that of Harlow et al. (1986) and Kaplan et al. (1986) in which intervening variables of an existential nature were used (purpose in life in Harlow et al., (1986); disposition to deviance in Kaplan et al., (1986)) to assess their potential mediating effects on the relationship between self-concept and maladaptive outcomes. It was predicted that the addition of these mediating variables in each of the four models would effect a small but significant increase in the capacity of the models to predict the dependent variables. In other words, it was expected that negative self-concept would be correlated both directly and indirectly (via the mediation of the existential variables) with maladaptive outcomes. The increase was hypothesized to be a small one because the correlation was expected to be high between the self-concept variables and the existential variables.

While the first two questions are primarily conceptual in their focus, the third question is more methodological in nature. It involves the use of alternative measures for the independent and mediating variables. Specifically, how do the indices for self-derogation and self-esteem, and for purpose in life and hopelessness, compare across models? Because of the conceptual similarities between the latent constructs underlying these measures, it was hypothesized that there would be few significant differences in overall fit of the six models under consideration. However, there may be some variability in structural path coefficients across the models. For example, based on previous findings (e.g., Beck, 1967; Petrie & Chamberlain, 1983), it was expected that hopelessness would be more highly correlated with suicide ideation than with depression.

Justification for and Significance of the Study

The conceptualization of this study as presented appears to be justified on several levels. First, the multivariate approach used in this study is clearly justified by the recognized multiplicity of psychosocial factors that are involved in the three behavioral outcomes under investigation. Indeed, the antecedents being explored here undoubtedly still account for only a relatively small percentage of the overall variance in the dependent variables. In addition, this investigation,

while sharing many of the features of the work of Harlow et al. (1986) and Kaplan's research on deviance, especially as represented by Kaplan et al. (1986), also differs from these investigations in several respects and thus hopefully will add to them through further refinement of the psychosocial processes involved in the evolution of the particular maladaptive outcomes being studied. The variables in the present study are modeled in a way that is similar to that of Harlow et al. (1986), except that depression is specified as a dependent rather than an independent construct. An additional feature is the inclusion of the alternative constructs of self-esteem as an independent variable and hopelessness as a mediating variable, allowing for a comparative evaluation of the predictive capacity of the models generated by the combinations of these variables. While the conceptual framework used in this study is similar to that of Kaplan et al. (1986), the constructs are articulated and operationalized in a different manner. Significant findings would add validity to his overall theory of self-concept and deviance. Finally, the specification of the independent and mediating constructs as self-concept variables and existential variables, respectively, is an additional feature that is unique to this study. This conceptualization may prove useful in further theoretical and empirical investigations of the correlates of

four-point Likert scale ranging from "rarely or none of the time" (1) to "most or all of the time" (4). Two scaled variables were created from the seven original items. The first scaled variable represents the mean of the five negative self-concept items (e.g., "All in all, I am inclined to feel like I am a failure"). The second scaled variable represents the mean of the two positive self-concept items (e.g., "On the whole I am satisfied with myself"). These composite variables were used as indicators of a latent variable of self-derogation. This index has been shown to have satisfactory internal consistency, with values of alpha ranging from .58 (Kaplan et al., 1983a) to .84 (Kaplan et al., 1986). A measure of internal consistency for the data used in this study yielded an alpha coefficient of .88.

2) Self-esteem. Coopersmith's (1986) Self-Esteem Inventory (SEI) was used as the second independent factor representing self-concept. Subjects were asked to rate the 25 items in the same Likert scale format as was used for the Self-Derogation Index. A principal component analysis led to the creation of three composite variables underlying the latent construct of self-esteem. The first scaled variable was formed from the mean of 13 items relating to self (e.g., "Things don't usually bother me"). The second composite was formed from the mean of 6 items relating to family (e.g., "My family usually considers my

feelings"). The third scaled variable is the mean of 6 items relating to nonspecified others (e.g., "I find it very hard to talk in front of a group"). These three composites taken together represent a latent variable of self-esteem. This inventory is one of the most widely used measures of self-esteem and has been shown to be a reliable and valid instrument (Coopersmith, 1986). In a sample of college students, Bedeian, Geagud, and Zmud (1977) found test-retest reliability of a short form of the scale to be .80 for males and .82 for females. They found Kuder-Richardson reliabilities in the same sample to be .74 for males and .71 for females. An estimate of internal consistency using the current data yielded an alpha coefficient of .73.

B. Existential measures--Mediating variables:

1) Purpose in life. A slightly revised version of Crumbaugh and Maholick's (1964, 1969) Purpose in Life Test (PIL) was used as a mediating factor to assess lack of purpose or meaning in life (Harlow, Newcomb, & Bentler, 1987). Subjects were requested to rate the 20 items on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Based on a principal component analysis, 2 scaled variables were created. The first represents the mean of 9 items reflecting a positive sense of purpose in life (e.g., "If I should die today, I would feel that my life has been very worthwhile") and the

second represents the mean of 11 items relating to a negative sense of purpose in life (e.g., "In achieving life goals I have made no progress whatsoever"). Together these 2 scaled variables represent a latent construct of the perceived degree of purpose in life. In previous research, split-half reliability estimates have ranged from .77 (Reker & Cousins, 1979) to .85 (Crumbaugh, 1968) using Pearson r , and from .87 (Reker & Cousins, 1979) to .92 (Crumbaugh, 1968) using the Spearman-Brown correction. Reker and Cousins (1979) found test-retest reliability to be .79. Harlow et al. (1987) estimated internal consistency at .86 using latent variable methods. An estimate of internal consistency in the current study yielded an alpha coefficient of .73.

2) Hopelessness. The Hopelessness Scale (Beck et al., 1974) was used as a second mediating construct assessing an individual's existential situation. Subjects were instructed to use the previous 6 months as a time frame to rate 20 statements on a 4-point Likert scale ranging from "rarely or none of the time" (1) to "most or all of the time" (4). Two composite variables were created from the original 20 items. One composite was formed from the mean of the 9 positively worded statements assessing a sense of hopefulness (e.g., "My past experiences have prepared me well for my future"). The second composite was formed from the mean of the 11

negatively worded items relating to a sense of hopelessness (e.g., "I don't expect to get what I really want"). Beck et al. (1974) found this scale to have a high degree of internal consistency, obtaining a coefficient alpha of .93. Johnson and McCutcheon (1981) reported support for both convergent and discriminant validity of the scale within an adolescent population, finding scores on the Hopelessness Scale to be positively correlated with depression, external locus of control, and general maladjustment, and unrelated to social desirability. The data in this study generated an alpha coefficient of .72.

C. Maladaptive behaviors measures--Dependent variables:

1) Substance use. Four scaled variables assessing level of use of various substances (Harlow, 1987) comprised the dependent variable of substance use. The first composite represents a measure of alcohol use and was formed from the mean of four items concerning the frequency of use of beer, wine, and hard liquor, and the quantity of overall alcohol use. The second indicator assesses cannabis use and was formed from the mean of three items regarding the frequency of marijuana and hashish use as well as the quantity of general marijuana use. The third indicator is a cocaine use composite, and was formed from the mean of four items assessing the

frequency of use of cocaine and crack and the general quantity of use of these two substances. The fourth composite represents a measure of "hard" drug use and was formed from the mean of three items reflecting the frequency of use of uppers, downers, and psychedelic drugs. These four composite variables are used as indicators of a latent construct of substance use. Internal consistency was found to be .69 (coefficient alpha) using the data collected for this study. The use of both frequency and quantity for several types of substances appears to offer face validity for the overall construct of substance use.

2) Depression. Radloff's (1977) Center for Epidemiologic Studies - Depression Scale (CES-D) was used as a second dependent factor representing maladaptive outcomes. This is a 20-item index assessing symptoms of depression. Subjects were directed to rate the statements over the previous 6 months on a 4-point Likert scale ranging from "rarely or none of the time" (1) to "most or all of the time" (4). A principal component analysis was used to create 3 scaled variables from the original items. The first composite was the mean of the 4 positively worded items (e.g., "I was happy"). The second scaled variable was the mean of 12 negatively worded items (e.g., "I was bothered by things that usually don't bother me"). The third composite was the mean of 4 items relating to

interactions with others (e.g., "I talked less than usual"). Together these 3 scaled variables represent a latent construct of depression. Radloff (1977) reports substantial evidence of construct validity and excellent concurrent validity as assessed by clinical and self-report criteria. Test-retest reliability has been found to be moderate (.54) and internal consistency, as measured by the Spearman-Brown correction, has been found to be high (.95) (Radloff, 1977). In the present study, an alpha coefficient of .84 was obtained.

3) Suicide ideation. Three items from the Zung Index of Potential Suicide (Zung, 1974) plus two items from Harlow et al. (1986) were used to evaluate a latent construct of suicide ideation as a third dependent factor. Subjects were requested to rate the five statements based on the previous six months on a five-point Likert scale ranging from "never" (1) to "always" (5). Two scaled variables were created from the original five items. Both composites were comprised of items worded in the negative direction, with the first composite being the mean of the three items taken from Zung (1974) (e.g., "I have been thinking about ways to kill myself") and the second composite being the mean of the two items taken from Harlow et al. (1986) (e.g., "I imagine my life will end with suicide"). An estimate of reliability for the data to be used in these analyses yielded an alpha coefficient

of .80.

Analyses

Structural equation modeling techniques were used to examine the relationships between the independent variables of self-concept, the dependent variables of negative psychosocial outcomes, and the mediating variables of existential factors. This statistical procedure is also known as latent variable modeling, causal modeling, or analysis of covariance structures. Structural modeling can probably best be conceptualized as a combination of multiple regression, path analysis, and factor analysis (Harlow et al., 1986). Multiple regression techniques are usually used to assess the degree of relationship among variables when there are several independent measured variables and one dependent measured variable. A linear combination of independent variables is created to optimally predict the dependent variable. Path analysis is used in situations in which there are multiple independent and dependent variables. This technique can assess potentially causal influences and their directions between sets of variables by assessing the sizes of regression coefficients (Tabachnick & Fidell, 1983). Both of these techniques, however, are primarily concerned with relationships between sets of observed variables. By contrast, factor analysis can be used to reveal relationships between observed (measured)

and hypothetical (latent) variables.

Structural modeling combines the best of these three statistical procedures into one methodology. Linear combinations of observed variables representing underlying, latent variables are created and regressions are hypothesized among the latent constructs. These regressions can then be evaluated in a path analytic framework in which the relationships among the observed and latent variables are considered simultaneously.

Structural modeling has several advantages over other statistical techniques. First, it is particularly appropriate for use with variables that are not easily manipulated experimentally, such as substance use, depression, and suicide ideation. Second, it allows for the assessment of both direct and indirect (mediating) effects (Harlow et al., 1986). Third, hypothetical or latent constructs can be differentiated from the concrete operationalization of those constructs in the form of manifest or observed variables. Fourth, a latent construct can be operationalized in a number of ways allowing for the inclusion of a number of indicators of the same construct. For example, there are four indicators of the latent construct of substance use in the present study. Fifth, measured variables always contain a certain degree of error which means that any predictions made between these measures are likely to be biased or

unreliable. A latent variable modeling approach reduces the potential for both random and nonrandom measurement error because several manifest indicators of the same latent construct are used in the theoretical models to be tested. Regressions among latent constructs, as opposed to those among measured variables, are relatively unbiased. Finally, structural modeling is useful in situations in which it is difficult to capture the theoretical construct(s) under investigation in isolation from other variables. For example, it may be impossible to derive a pure measure of purpose in life that is not confounded with hopelessness or self-derogation. Through a latent variable modeling approach, the presence and influence of other potentially "causal" variables can be accounted for (James, Mulaik, & Brett, 1982).

The two most widely used programs for structural modeling are LISREL VI (Joreskog & Sorbom, 1986) and EQS (Bentler, 1985). LISREL is the preferred program when the models consist of variables that are distributed normally and thus can be adequately modeled with maximum likelihood (ML) estimation. The nonnormal methods of EQS are more appropriate with skewed or kurtotic data, but typically require a greater number of subjects in order to generate stable parameter estimates. Preliminary analyses for the current investigation were conducted using ML estimation with LISREL. However, due to the presence of nonnormality

in the data (particularly with substance use and suicide ideation), EQS was chosen to run the final analyses reported here. This program provides an estimation procedure (arbitrary distribution free--ADF) which has no distribution assumptions as well as one which is more relaxed than ML but more restrictive than ADF (elliptical reweighted least squares--ERLS). Although it would have been preferable in analyzing the data with these nonnormal methods in EQS to have more than the 290 subjects used here, the procedures provided in this program represent a more appropriate way of looking at the current data than only presenting analyses obtained with ML estimation.

The appropriateness of the hypothesized structural models was assessed in terms of overall model fit and the significance of individual path coefficients. Overall model fit is conventionally evaluated using several indices, including the chi-squared statistic, the root mean squared residual (RMSR), and various indices of fit specific to structural equation modeling techniques. There is not one generally accepted index of model fit and this remains an unresolved issue in the structural modeling literature. In an extensive review of various indices currently in use, Marsh, Balla, and McDonald (1988) recommend the Normed Fit Index (NFI) (Bentler & Bonett, 1980) and the Tucker Lewis Index (TLI) (Tucker & Lewis, 1973). These indices are included in the analyses

presented here, along with their parsimonious versions (PNFI and PTLI) (James, Mulaik, & Brett, 1982; Mulaik, James, Van Alstine, Bennett, Lind, & Stillwell, in press). These latter two adjusted fit indices take degrees of freedom into account and provide a measure of how good the obtained structural coefficients are given the number of estimates used to explain the data. The issue of model parsimony is important to consider since model fit will always stay the same or be improved by adding parameters. A model is considered to be well-fitting if the hypothesized parameter estimates are significant, the ratio of chi-squared to degrees of freedom is low, the root mean squared residual (RMSR) is close to zero, and the NFI, TLI, PNFI, and PTLI are close to 1.0.

Since one of the questions considered here is concerned with the issue of increased explanatory power when mediating variables are included in the models, the issue of an appropriate method of comparison across models becomes relevant. According to Tanaka (1982), a measure of variance accounted for in structural equation models analogous to R^2 in multiple regression cannot be evaluated in the same way since the latent variable R^2 won't necessarily be increased by additional structural paths. He recommends instead the NFI for cross-model comparisons. Other factors considered in the comparative evaluation of the results obtained here include relative increases or

decreases in prediction error for the mediating and dependent variables, indications of parameter estimate stability, and the significance of individual pathways.

Results

The first step taken in analyzing the data was to assess missing data, since only complete cases are conventionally used in structural modeling analyses. 214 out of the 290 cases were complete. The percentage of missing data for any given variable was relatively small, with 1.4% being the highest (for frequency of hashish use). This amount was not considered to be problematic. Because of this fact and because of the necessity of using as many subjects as possible to adequately complete the structural modeling analyses, the missing data points were estimated using a regression procedure available in BMDPAM (Dixon, 1988). This method involves using the best two variables to predict the missing variable(s) for any individual case. Given the small amount of missing data, this is considered an appropriate step to take; previous studies suggest this method may be preferred to using a reduced sample of only complete cases (Tabachnick & Fidell, 1989; Raymond & Roberts, 1987).

The second step in data analysis was the assessment of the normality of the variables. The descriptive statistics for all of the measured variables are given in Table 1. For normally distributed variables, skewness and

kurtosis should be equal to zero. As indicated in Table 1, there are some variables with high positive values for skewness and kurtosis, particularly Cocaine Use, Hard Drug Use, and Suicide Ideation 1 and 2. The values obtained for these variables are consistent with the low incidence of these behaviors found in this nonclinical population; hence the distributions are skewed in the positive direction and are highly peaked at the lower responses for all of these variables. Since the presence of moderate to severe nonnormality can adversely affect structural modeling analysis (Boomsma, 1983; Browne, 1982, 1984; Harlow, 1985), data transformations were employed for the four extremely nonnormal variables. Tabachnick and Fidell (1989) argue that data transformations can and should be used with nonnormally distributed data unless there is good reason not to do so. The advantage to transforming the data is that the results are more accurate; that is, any significant relationships that do exist are more likely to be detected. A potential disadvantage is that transforming the data complicates the issues of interpretation to some degree, because of the change in scale involved. But since the original scale of any psychological variable (including the ones used here) is somewhat arbitrary, it was concluded that interpretation would not be significantly affected by the transformations.

Both square root and logarithmic transformations were tested. The log transformations consistently corrected more for nonnormality than the square root transformations and hence the log transformations were the ones retained for data analysis (see Table 1 for comparison of skewness and kurtosis of original, square root, and log values). In all cases, using the log of the original variable decreased the values of skewness and kurtosis. This finding is consistent with the position taken by Tabachnick and Fidell (1989), who suggest log transformations as the most appropriate solution for data with high positive values of skewness and kurtosis. As can be seen from the adjusted values, moderate to high degrees of nonnormality remain in most of the transformed variables, indicating that nonnormality was decreased but not completely corrected.

As indicated above, Bentler's (1985) EQS program was chosen over LISREL VI (Joreskog & Sorbom, 1986) to perform the structural equation modeling analyses. The analyses were executed three times, using three different estimation procedures: maximum likelihood (ML), elliptical estimation (ERLS), and arbitrary distribution theory (ADF). Maximum likelihood is the most basic and widely used estimation procedure, but it operates on the assumption of multivariate normality of the distribution of the variables. Elliptical estimation (ERLS) allows for

nonnormality but assumes equal kurtosis among the variables. It is considered to be a compromise between the stringent requirements of ML and the more general method of ADF. Arbitrary distribution theory estimation, as its name implies, has the least stringent distribution assumptions of the three methods. It allows for skewness and kurtosis, and specifically corrects for kurtosis in the distribution of the variables. Given the nonnormality of some of the variables, particularly substance use and suicide ideation, ADF appears to be the most appropriate method of estimation for this sample. For comparison purposes, the overall results with respect to model fit for all three methods are given (see Table 2), but the focus in the ensuing discussion centers primarily on the results obtained using ADF.

Results across Models

All of the factor loadings in each of the six models were significant at the .001 level or better. This was true for all three estimation procedures. Table 4 lists the factor loadings and error variances obtained with ADF estimation. The fact that all of the loadings are highly significant indicates that the measurement portion of each of the models holds up well. This is evidence that the factors are appropriately defined for each construct. Such integrity of the measurement model is important in contributing to the accuracy of the prediction model (the

structural relationships across latent constructs).

The prediction errors for the dependent constructs were allowed to correlate based on the assumption that there would be some overlap between the unexplained variances of the maladaptive outcome variables. Results indicated that the residuals for depression and suicide ideation were significantly related in each of the six models (Models 1, 2, 4, 5, $p < .05$; Models 3, 6, $p < .01$). No significant relationships were found between the unexplained variances for substance use and depression or those between substance use and suicide ideation in any of the six models. These findings suggest that there is some systematic overlap between depression and suicide ideation that is not explained by self-concept and existential variables. Substance use does not appear to share this overlap of unexplained variance.

Prediction errors for the dependent variables were significant at the .05 level or better across all six models. The prediction error for substance use was consistently high across all six models, ranging from .64 in Model 4, to .98 in Models 1 and 2. The high prediction error for this construct suggests imprecision in predicting this variable using only self-concept and existential constructs. In contrast, the self-concept and existential constructs were good predictors of depression and suicide ideation; these prediction errors range from

.28 in Model 3 to .35 in Model 6, and .32 in Model 5 to .47 in Model 1, respectively. These values indicate greater precision in predicting these dependent variables. The prediction errors for purpose in life (.24 in Model 3 and .25 in Model 5) and hopelessness (.23 in Model 4 and .31 in Model 6) are also relatively small and suggest that self-concept explains most of the variance for these mediating variables.

Model 1

Model 1 (see Figure 1) represents a plausible fit of the data (ADF chi-square = 102.69, df = 38, RMSR = .11, NFI = .72, PNFI = .50, TLI = .70, PTLI = .48; see Table 2). The obtained path coefficients were all significant and in the expected direction (see Table 3). The relationship between self-derogation and substance use was the weakest (.14, $p < .05$). Self-derogation was a strong positive predictor of depression (.84, $p < .001$) and of suicide ideation (.73, $p < .001$). These results indicate that self-derogating individuals are significantly likely to use substances and even more likely to be depressed or to have suicidal thoughts.

Model 2

Model 2 (see Figure 2) provides an acceptable representation of the data (ADF chi-square = 106.51, df = 48, RMSR = .09, NFI = .71, PNFI = .52, TLI = .73, PTLI = .48; see Table 2). Self-esteem was a significant negative

predictor of both depression ($-.74, p < .001$) and suicide ideation ($-.75, p < .001$), but not of substance use although all three relationships were in the predicted direction (see Table 3). The results of this model are similar to those of Model 1, except that the regression between self-esteem and substance use is not significant. In this model, individuals low in self-esteem are significantly more likely to feel depressed and/or experience suicide ideation.

Model 3

Model 3 (see Figure 3) is an adequate representation of the data (ADF chi-square = 151.17, $df = 55$, RMSR = .11, NFI = .68, PNFI = .48, TLI = .73, PTLI = .47; see Table 2). Three of the four direct pathways and two of the three indirect pathways for self-derogation were significant (see Table 3). Self-derogation was a significant negative predictor of substance use ($-.50, p < .05$) and of purpose in life ($-.87, p < .001$), and a significant positive predictor of depression (.63, $p < .001$). Self-derogation also served as an indirect predictor of substance use ($-.77, p < .001$) and of suicide ideation ($-.51, p < .05$) via the mediation of purpose in life. In this model then, self-derogating individuals experience significantly less purpose in life and substance use, and significantly more depression. Furthermore, individuals high in self-derogation and low

in purpose in life are significantly more likely to use substances or to have suicidal ideation. It should be noted that the relationship between self-derogation and substance use was not in the predicted direction (this was the only such instance among all six models), but the indirect path to substance use was in the expected direction. These contradictory findings suggest instability in the parameter estimates that may occur with smaller sample sizes, colinearity among the variables, and nonnormal distributions of the data. These factors will be addressed in greater detail in the Discussion section.

Model 4

Model 4 (see Figure 4) represents a satisfactory fit of the data (ADF chi-square = 149.80, df = 55, RMSR = .13, NFI = .68, PNFI = .48, TLI = .66, PTLI = .47; see Table 2). All of the relationships were in the expected direction, with three of the four direct pathways and two of the indirect pathways for self-derogation being significant (see Table 3). Self-derogation significantly predicted hopelessness (.88, $p < .001$), depression (.67, $p < .001$), and suicide ideation (.46, $p < .01$). In addition, self-derogation significantly indirectly predicted depression (.17, $p < .05$) and suicide ideation (.80, $p < .05$) via the mediation of hopelessness. In this model, self-derogating individuals experience significantly more hopelessness, depression, and suicide ideation.

Self-derogating individuals who are feeling hopeless are also significantly more likely to experience depression and suicide ideation.

Model 5

In terms of overall fit, Model 5 (see Figure 5) appears to be an adequate representation of the data (ADF chi-square = 154.03, df = 67, RMSR = .11, NFI = .66, PNFI = .49, TLI = .67, PTLI = .49; see Table 2). All of the relationships were in the predicted direction under ADF estimation (see Table 3), but only one of the pathways proved to be significant: the relationship between self-esteem and purpose in life (.87, $p < .001$). As expected, individuals high in self-esteem experience greater purpose in life. In terms of significance, this model appears to be the weakest of the six under consideration. In fact, a comparison of structural coefficients across the three types of estimation procedures in Table 3 reveals clear problems in terms of fit for individual pathways using maximum likelihood and elliptical estimation. Those procedures yielded pathways that were not in the predicted direction (self-esteem to substance use; purpose in life to depression) and two pathways with values of -1.0, an unlikely finding. No problems were reported in the running of the program, but it appears that these estimates are highly unstable. In this model, the ADF estimates differ more substantially

from those of ML and ERLS than in any of the other models. However, within this model, ADF seems to provide the most stable and certainly the most plausible representation of the data of the three estimators. As in Model 3, instability in parameter estimates is most likely reflective of a sample size that is smaller than needed for nonnormal data, high colinearity, and/or nonnormality.

Model 6

Model 6 (see Figure 6) represents a reasonable fit of the data (ADF chi-square = 178.03, df = 67, RMSR = .13, NFI = .65, PNFI = .48, TLI = .64, PTLI = .47; see Table 2). Two of the four direct pathways and two of the three indirect pathways were significant for self-esteem, with all paths in the expected direction. Self-esteem was a significant negative predictor of hopelessness ($-.83$, $p < .001$) and depression ($-.44$, $p < .001$). Furthermore, there was a significant indirect relationship between self-esteem and depression ($.43$, $p < .001$) and between self-esteem and suicide ideation ($.82$, $p < .001$) via the mediation of hopelessness. According to this model then, individuals low in self-esteem experience more hopelessness and more depression. Additionally, individuals with low self-esteem and high feelings of hopelessness are more likely to feel depressed and/or to have suicide ideation.

Discussion

To fully answer the question of whether the proposed structural models represent plausible conceptualizations of the variables under investigation, the results need to be evaluated in light of both overall model fit and individual structural paths. One way to evaluate overall fit is to examine the ratio of the chi-squared statistic to the degrees of freedom for each model. The closer to one is the ratio, the better the fit; values up to five are considered acceptable (Wheaton, Muthen, Alwin, & Summers, 1977). Using this criterion, the six models investigated here appear to be plausible representations of the data. The ratio of chi-squared to degrees of freedom using the ADF estimator ranges from 2.30 for Model 5 to 2.75 for Model 3.

The assessment of the root mean square residual (RMSR) is another way to judge overall model fit. The RMSR represents the unexplained variances and covariances in the model. Well-fitting models should have RMSR values of .06 or less (Hayduk, 1987). While the ML and ERLS estimators consistently yield RMSR values of .04 (see Table 2), the ADF estimator produces RMSR estimates ranging from .09 in Model 2 to .13 in Models 4 and 6 (see Table 2). These values are higher than currently accepted standards for well-fitting models and may indicate problems with interpreting fit indices when using the ADF

estimation procedures. It is not clearly understood at this time why the RMSR is higher under ADF estimation (P. M. Bentler, personal communication, April 14, 1989).

Incremental fit indices are a third way to assess overall model fit. These indices assess the fit of a proposed model, relative to a null model that poses no relationships among the variables. The greater the discrepancy between the chi-squared values for the proposed and null models, the higher the values for the fit indices. A value of .90 or greater for the normed fit index (NFI) is considered an indication of well-fitting models (Tanaka, 1987). As was the case with the RMSR values, the NFI and TLI values for the ADF estimator differ significantly from the ML and ERLS estimation procedures (see Table 2). Whereas the NFI and TLI values for the ML and ERLS estimators range from .88 (in Model 6) to .97 (in Models 1, 3, and 5) and thus fall within the generally accepted range, the values for the fit indices for the ADF estimators are considerably lower, ranging from .64 (in Model 6) to .73 in Model 2. The same pattern is observed with the parsimonious versions of the NFI and TLI (PNFI and PTLI, respectively), with the ADF values for these indices consistently lower than those for ML and ERLS (see Table 2). Ideally, these values should be greater than about .70 for well-fitting models. The ADF estimation procedure consistently generated lower null

model chi-squared values than under ML and ERLS estimation, which accounts for the reduced values for the fit indices reported here. The reasons for these disparities between ADF estimation and other methods are not yet fully understood, and should be explored further in future studies.

Before evaluating the models on the level of individual structural coefficients, it should be stated at the outset that the results obtained in two of the models are suspect and suggest general instability in the parameter estimates. Model 5 provides the poorest solution in terms of individual paths, although the overall model fit is in line with the other models. The values for each of the paths are consistent with expectations, but only the path between self-esteem and purpose in life is significant (.87, $p < .001$) (see Table 3). Further evidence of problems in this model can be seen by examining the parameter estimates obtained using the ML and ERLS methods. Both estimators yielded two coefficients of -1.0 (self-esteem to depression and purpose in life to substance use), an unlikely finding that is the strongest indicator of unstable parameter estimates.

The results of Model 3 are less problematic, but still suspicious. The path between self-derogation and substance use is not in the expected direction (-.50,

$p < .05$). Given that the other path to substance use, an indirect one via purpose in life, is in the expected direction ($-.77$, $p < .01$), and that all the paths to substance use in the remaining models are in the predicted direction, this aberrant finding is also an indication of instability in the parameter estimates of this model.

Several factors could contribute to unstable parameter estimates, including a low number of subjects for these data, colinearity, and nonnormality. Structural modeling techniques in general require large numbers of subjects in order to yield stable estimates, but the ADF estimation method requires even more because of its relaxation of distribution assumptions. Bentler (1985) states that not enough research has been done yet on ADF to establish reliable guidelines; he suggests that a ratio of subjects to number of free parameters at least 10:1 may be appropriate for ADF estimation. For the six models under investigation here, the ratio ranges from 7.63 in Models 5 and 6 to 10.36 in Model 1. Indeed, only Model 1 exceeds the recommended 10:1 minimum. The fact that there are fewer subjects than recommended does not negate the findings, but indicates that they should be interpreted with this caution in mind (P. M. Bentler, personal communication, April 14, 1989).

Colinearity is a second problem that could affect the stability of parameter estimates. An analysis of the

correlations between parameter estimates revealed some problems that are indicative of high collinearity. In particular, there were very high correlations between the self-derogation and purpose in life pathways in Model 3, and between the self-esteem and purpose in life pathways in Model 5. This finding suggests that purpose in life has a great deal of overlap with self-concept, making it difficult to separate these two constructs conceptually and computationally. Furthermore, standard errors in general were somewhat high, especially for the structural paths (see Table 6). This problem was particularly evident in Model 5 and slightly more noticeable in Model 3 than in the remaining models. High standard errors may be due to high collinearity, nonnormality, and/or small sample size. Their presence may partially account for the estimation problems that were present in Models 3 and 5.

Nonnormality is a third potential contributor to unstable structural coefficients. As discussed above, log transformations of the most nonnormal variables were performed, mitigating the nonnormality to some degree. However, these transformations didn't alleviate nonnormality completely (see Table 1 for skewness and kurtosis values for the log transformed variables). The presence of nonnormality in the data should not preclude the use of structural modelling techniques to analyze the data, particularly with ADF which allows for nonnormally

purpose in life or hopelessness (see Figure 7). Of the ten potential pathways to depression, seven were found to have significant structural coefficients ($p < .05$ or better). Four of the six direct pathways and three of the four indirect pathways were significant. Hence it appears that feelings of low self-esteem are highly related to feelings of depression, and sometimes it is the combination of high self-derogation and hopelessness or a sense of purposelessness that engenders feelings of depression. The fact that this maladaptive outcome was more significantly predicted than the other dependent variables suggests that, in this college sample, depression may be more clearly and strongly linked to poor self-concept and existential angst than either suicide ideation or substance use.

Of the ten pathways leading to suicide ideation, three of the six direct pathways and three of the four indirect pathways were significant. As with depression, these overall results indicate that low self-esteem alone is strongly related to suicidal feelings in some individuals, whereas in other individuals, it is the combination of negative self-concept and a pessimistic outlook about one's existential situation that is associated significantly with suicide ideation. In general, the paths to suicide ideation were not as strong as those to depression (see Figure 7). An explanation for this may be

that, although suicide ideation would seem to be a stronger feeling than depression and thus show a stronger relationship with self-concept and existential variables, the actual incidence of these feelings is so low in this nonclinical population that few individuals experience them, even though they may have the much more common experience of feeling depressed.

An interesting finding regarding suicide ideation involves the comparison with the models using purpose in life as a mediating variable with those using hopelessness. The prediction errors for these mediating variables are similar across the four models (see Table 5), indicating similar precision in the prediction of these variables. As predicted, the models using hopelessness yield stronger relationships with suicide ideation. The two models using hopelessness as a mediating variable yield three (out of a possible four) significant paths to suicide ideation, whereas the models using purpose in life yield only one (out of a possible four) significant paths to suicide ideation. In fact, the two pathways between hopelessness and suicide ideation have the highest numerical values of all the structural paths between mediating and dependent variables. This finding is consistent with previous research which suggests that hopelessness is the crucial variable involved in suicide ideation (Beck, 1967; Petrie &

Chamberlain, 1983).

Substance use was the maladaptive outcome with the weakest relationships to self-concept and existential variables, both in terms of coefficient values and significance levels. Of the ten pathways to substance use, two of the direct paths and one of the indirect paths were found to be significant. Of these, two were obtained in Model 3. The discrepancy between the direct relationship not in the expected direction and the indirect relationship in the predicted direction has already been noted above. There are at least a few potential reasons for the weakness of these results relative to the other two outcome variables. The problems of nonnormality have already been addressed. Even with log transformations, hard drug use remained highly nonnormal (see Table 1). However, these same models were analyzed without the cocaine use and hard drug use factors, and no substantial improvement was noted in either overall model fit or individual paths.

An alternative explanation involves the meaning of substance use in a current college population. The relationships between substance use and self-concept and existential variables may be a weak and unstable one because, in a college population, these constructs have a relatively weak, or perhaps complex, association. The results obtained here thus seem to at least partially

substantiate Labouvie and McGee's contention (1986) that substance use is so much a part of the current college subculture that there is no longer a negative relationship between low self-concept and substance use. Because two of the three significant paths were in the expected direction and one was not, it is not possible to advance the notion that substance use is now correlated with higher levels of self-esteem. But it does seem that substance use in this college sample is currently less likely to be a manifestation of deviance (in Kaplan's sense of the word) chosen to assuage feelings of self-derogation.

A second alternative explanation involves sex differences in the "choosing" of deviant behaviors. In clinical populations, men are more likely than women to be diagnosed with a substance use disorder, while women are twice as likely as men to receive the diagnosis of depression (American Psychiatric Association, 1987). Patterns of substance use appear to be changing, especially in the college population, with the gap closing between men and women (e.g., Penning & Barnes, 1982), but the majority of studies indicate that substance use remains more prevalent among men, at least for alcohol consumption (e.g., Brennan et al., 1986). The findings of Harlow et al. (1986) support the notion of a complex relationship between self-derogation and substance use

based on sex differences. There were not enough subjects in the sample used for this study to assess the models according to sex, but the subjects were disproportionately female (73%). It is possible that the findings regarding substance use were weaker because of these sex differences. Similarly, the strength of the results for depression and suicide ideation may reflect the high proportion of women in this sample.

A discussion of the overall results will yield some answers to the questions originally posed in this study. First, does Kaplan's model of self-concept and deviance hold up in this college sample? Second, how does the addition of mediating variables affect the relationships between negative self-concept and the outcome variables? Third, how does the use of two different independent variables (self-derogation and self-esteem) and two different mediating variables (purpose in life and hopelessness) affect the relationships between these constructs and the maladaptive outcomes?

In general, it seems that Kaplan's multivariate theory of self-concept and deviance (e.g., Kaplan et al., 1983a, 1983b; Kaplan et al., 1984, 1985) is partially upheld in this college sample. In the two models using only self-concept variables (Models 1 and 2; see Table 3), five out of six paths are significant, indicating that a strong relationship does exist between feelings of high

self-derogation or low self-esteem and negative psychosocial outcomes. The relationship between self-concept and substance use is weakest, and it seems less clear that this variable can be considered a "deviant" alternative chosen by individuals high in self-derogation. However, these variables are significantly associated in Model 1, and in the direction that would be predicted by Kaplan's theory.

The addition of mediating variables in Models 3-6 yields a more complex picture, both statistically and conceptually. Overall, the results indicate that the addition of the existential constructs as mediating variables provides information about the indirect ways in which self-concept might be related to maladaptive outcomes. With the exception of Model 5, two of three possible indirect paths are significant in each of the models (see Table 3). Thus it seems that feelings of hopelessness or a sense of lack of purpose in life can augment feelings of self-derogation or low self-esteem in the production of maladaptive behaviors. Another way to think of these mediating variables is in the context of a "buffering" effect; that is, for some individuals with a negative self-concept, a high sense of purpose in life or feelings of hopefulness may buffer them from feelings of depression or suicide ideation.

Evidence of mediating effects corroborates the more

recent research of Kaplan and his associates (Kaplan et al., 1986) in which structural equation modelling techniques were used to examine the direct and indirect relationships between self-derogation and deviant outcomes. Their use of alienation as a mediating variable is similar to the constructs of hopelessness and purpose in life used in this study in that all of these concepts refer to the existential status of the individual. The findings in the current study are also consistent with the research by Harlow et al. (1986) in which they found purpose in life to mediate the relationships between self-derogation and the outcomes of substance use and suicide ideation.

The comparison of self-derogation versus self-esteem as independent variables suggests that self-derogation "performed" somewhat better than self-esteem in these models. First, an analysis of Table 4 indicates that the factor loadings for self-derogation were consistently higher and the error variances consistently lower for the self-derogation factors than for the self-esteem factors. The factor loadings for self-derogation ranged from .88 to .93 (absolute value) while those for self-esteem ranged from .62 to .97. The error variances ranged from .13 to .23 for self-derogation and from .06 to .62 for self-esteem. Second, the models using self-derogation yielded a greater number of significant paths (13) than

did those using self-esteem (7). Taking out the two problematic models (3 and 5), there are 8 significant self-derogation paths and 6 significant self-esteem paths. Finally, an analysis of the prediction errors (see Table 5) indicates that self-derogation generally predicted the dependent variables more precisely than did self-esteem. All factor loadings for both of these variables were significant at the .001 level or better, indicating that their respective factor structures have been appropriately identified. Since the Self-Derogation Index (Kaplan, 1976) is a 7-item scale and the Self-Esteem Inventory (Coopersmith, 1986) is a 25-item scale, it might also prove more convenient in future research to use the former index as a measure of self-concept.

In terms of mediating variables, it appears that the Hopelessness Scale (Beck et al., 1974) proves more effective in these models than does the Purpose in Life Test (Crumbaugh & Maholick, 1964, 1969). The PIL was used in Models 3 and 5; the problems involved in these models has been discussed previously. These problems reflect conditions true to some extent in all six models, but they seem to have particularly affected the stability of Models 3 and 5. If these problems could be corrected, it may be that the models using the PIL would perform better.

The answer to the question of how the six models differ in their capacity to explain the data is complex,

partially because of the results obtained and partially because, to date, there is no widely accepted single indicator of model fit. The ratio of chi-squared to degrees of freedom, the values of RMSR, and the values of the four fit indices reported here (the NFI, PNFI, TLI, and PTLI) are fairly similar across the six models (see Table 2). It appears that Model 3 and especially Model 5 yielded unstable results; these models can thus be regarded as the least appropriate ones in terms of explaining the relationships among the constructs of interest.

Although the addition of mediating variables does not improve overall model fit in terms of the indices noted above, a comparative analysis of prediction errors indicates that Model 4 is the one which "best" explains the data. The prediction error for substance use is considerably lower in this model than in any of the remaining five and the prediction errors for depression, suicide ideation, and hopelessness are comparable to those in the other five models. It makes sense that Model 4 would be the most appropriate overall since it is the one that contains the combination of the two "best" independent and mediating variables, self-derogation and hopelessness, respectively. However, it should be kept in mind that this model does not stand out from the others on all indicators of model appropriateness. In general, it

appears that the additional structural pathways provided by the mediating variables allow for a more complex, and perhaps more complete, picture of the relationships between self-concept, existential situation, and maladaptive psychosocial outcomes.

In general then, in this college sample, it appears that low self-concept is a direct predictor of hopelessness and lack of purpose in life. As Kaplan et al. (1983b) postulate, low self-concept also consistently predicts depression and suicide ideation via direct and indirect (existential) pathways. The relationship between self-concept and substance use is weak and somewhat contradictory in this sample and thus does not seem as amenable to explication using Kaplan's theory. Nevertheless, the results from Model 1 suggest some support for Kaplan's model. The relationship between self-concept and substance use should continue to be explored empirically in order to more fully elucidate the nature of the association between these two variables. It may also be the case that substance use is better explained by other variables that were not part of this study (e.g., sex differences, parental and peer substance use).

There are several possibilities for future research using the models postulated in this study. First, increasing the sample size would most likely yield more

accurate and stable results. This would be especially appropriate to do in conjunction with the ADF estimation procedure which requires large numbers of subjects in order to achieve stable parameter estimates. Second, it would be useful to try to filter out the conceptual overlap between the self-concept and existential variables used here in order to reduce the problems associated with high colinearity (e.g., unstable parameter estimates). Third, it would be instructive to explore additional or alternative psychosocial correlates of the maladaptive behaviors under investigation. For example, stress levels and social support might be important variables to consider in all of the outcome variables explored here. Fourth, testing the models with different populations (e.g., various age groups, men vs. women, clinical vs. nonclinical samples) would be useful in determining the generalizability of the results obtained here. Using different populations might be especially helpful in further delineating the association between self-concept and substance use, a relationship that may be more likely to be significant in other populations than in a college sample where substance use is perhaps more likely to be regarded as normative behavior. Fifth, it would be interesting to compare these results with models using outcome variables that represent more "externalizing" forms of deviance (i.e., antisocial acts such as theft or

selling drugs) than the primarily "internalizing" modes of deviance investigated in this study. Sixth, it would also be instructive to compare these models with others using adaptive outcomes (e.g., exceptional academic or athletic achievement, community service) as dependent variables to evaluate whether some individuals might choose healthy yet essentially nonnormative alternatives in order to cope with feelings of self-derogation experienced within the context of a normative reference group. Finally, it would be instructive to examine these models longitudinally to determine whether the relationships among the variables are maintained over time. This would be especially important in substantiating the validity of Kaplan's framework since involvement in deviant behaviors as a response to self-derogating feelings should ultimately lead to a decrease in self-derogation over time.

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Table 1
Descriptive Statistics

Variable	Mean	Standard Deviation	Actual Range	Skewness	Kurtosis
Self-Derogation	1.64	0.67	1.00-3.80	1.17	0.67
Lack of Self-Derogation	3.28	0.83	1.00-4.00	-1.01	0.20
Self-Esteem (Self)	1.68	0.53	1.46-3.92	-0.56	-0.31
Self-Esteem (Family)	3.02	0.69	1.00-4.00	-0.72	0.07
Self-Esteem (Social)	2.96	0.52	1.00-4.00	-0.35	-0.13
Purpose in Life (Pos)	3.54	0.54	1.89-4.89	-0.37	-0.02
Purpose in Life (Neg)	1.79	0.58	1.00-3.73	0.94	0.51
Hopefulness	3.25	0.45	1.56-4.00	-1.07	1.67
Hopelessness	1.62	0.45	1.00-3.18	1.12	1.15
Alcohol Use	2.86	0.84	1.00-4.67	-0.49	-0.54
Cannabis Use	1.59	0.76	0.98-4.50	1.59	2.22
Cocaine Use	1.12	0.29	1.00-3.00	2.88	9.81
Cocaine Use (Sqrt) *	1.05	0.12	1.00-1.73	2.51	6.58
Cocaine Use (Log) **	0.04	0.09	0.00-0.48	2.25	4.52
Hard Drug Use	1.06	0.19	1.00-2.67	4.49	25.71
Hard Drug Use (Sqrt) *	1.03	0.08	1.00-1.63	3.94	18.69
Hard Drug Use (Log) **	0.02	0.06	0.00-0.43	3.53	14.00
Lack of Depression	3.33	0.67	1.00-4.00	-1.04	0.63
Depression	1.99	0.55	1.00-3.75	0.82	0.70
Depression (Social)	1.91	0.64	1.00-3.75	0.55	-0.24
Suicide Ideation 1	1.45	0.65	1.00-4.67	2.14	5.24
Suicide Ideation 2	1.20	0.52	1.00-4.50	3.48	13.89
Suicide Ideation 1 (Sqrt) *	1.18	0.24	1.00-2.16	1.61	2.52
Suicide Ideation 2 (Sqrt) *	1.08	0.19	1.00-2.12	2.90	8.99
Suicide Ideation 1 (Log) **	0.13	0.16	0.00-0.67	1.19	0.80
Suicide Ideation 2 (Log) **	0.06	0.13	0.00-0.66	2.47	5.79

* Sqrt = square root transformation

** Log = logarithm transformation

Table 2
Indices of Overall Fit for Models 1-6

Index	Estimation Procedure	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Chi-square	ML	113.28	130.97	147.62	192.20	161.40	227.99
Chi-square	ERLS	78.37	97.19	111.07	145.16	127.45	173.68
Chi-square	ADF	102.69	106.51	151.17	149.80	154.03	178.03
Degrees of Freedom		38	48	55	55	67	67
RMSR	ML	.04	.04	.04	.04	.04	.04
RMSR	ERLS	.04	.04	.04	.04	.04	.04
RMSR	ADF	.11	.09	.11	.13	.11	.13
NFI	ML	.93	.91	.93	.90	.92	.88
NFI	ERLS	.95	.95	.96	.94	.96	.94
NFI	ADF	.72	.71	.68	.68	.66	.65
PNFI	ML	.64	.66	.66	.63	.68	.65
PNFI	ERLS	.66	.69	.68	.66	.71	.69
PNFI	ADF	.50	.52	.48	.48	.49	.48
TLI	ML	.93	.92	.93	.90	.93	.88
TLI	ERLS	.97	.96	.97	.95	.97	.95
TLI	ADF	.70	.73	.66	.66	.67	.64
PTLI	ML	.64	.67	.66	.63	.68	.65
PTLI	ERLS	.76	.70	.68	.67	.71	.70
PTLI	ADF	.48	.53	.47	.47	.49	.47

KEY: ML = Maximum Likelihood
ERLS = Elliptical Estimation
ADF = Arbitrary Distribution Theory
RMSR = Root Mean Squared Residual
NFI = Normed Fit Index
PNFI = Parsimonious Normed Fit Index
TLI = Tucker-Lewis Index
PTLI = Parsimonious Tucker-Lewis Index

Table 3

Standardized Structural Coefficients among Constructs for Models 1-6

Pathway	Estimation Procedure	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SELF-DEROGATION to SUBSTANCE USE	ML	.17*	—	-.29	.01	—	—
	ERLS	.17	—	-.30	.01	—	—
	ADF	.14*	—	-.50*	.04	—	—
SELF-DEROGATION to DEPRESSION	ML	.88***	—	.76***	.75***	—	—
	ERLS	.88***	—	.77***	.75***	—	—
	ADF	.84***	—	.63***	.87***	—	—
SELF-DEROGATION to SUICIDE IDEATION	ML	-.74***	—	.32	.56***	—	—
	ERLS	.74***	—	.32	.56***	—	—
	ADF	.73	—	.29	.46***	—	—
SELF-ESTEEM to SUBSTANCE USE	ML	—	-.14	—	—	.81	.08
	ERLS	—	-.89***	—	—	.81	.08
	ADF	—	-.74	—	—	-.25	-.08
SELF-ESTEEM to DEPRESSION	ML	—	-.89***	—	—	-1.0**	-.69
	ERLS	—	-.89***	—	—	-1.0*	-.69***
	ADF	—	-.74***	—	—	-.36	-.44***
SELF-ESTEEM to SUICIDE IDEATION	ML	—	-.74***	—	—	-.17	-.41**
	ERLS	—	-.74	—	—	-.17	-.41*
	ADF	—	-.75	—	—	-.39	.05
PURPOSE IN LIFE to SUBSTANCE USE	ML	—	—	-.51	—	-1.0	—
	ERLS	—	—	.52	—	-1.0	—
	ADF	—	—	-.77***	—	-.03	—
PURPOSE IN LIFE to DEPRESSION	ML	—	—	-.13	—	.15	—
	ERLS	—	—	-.13	—	.15	—
	ADF	—	—	-.14	—	-.49	—
PURPOSE IN LIFE to SUICIDE IDEATION	ML	—	—	-.47	—	-.61	—
	ERLS	—	—	-.47	—	-.61	—
	ADF	—	—	-.51*	—	-.46	—
HOPELESSNESS to SUBSTANCE USE	ML	—	—	—	.19	—	.26
	ERLS	—	—	—	.19	—	.26
	ADF	—	—	—	.17	—	.12
HOPELESSNESS to DEPRESSION	ML	—	—	—	.16	—	.20
	ERLS	—	—	—	.16	—	.20
	ADF	—	—	—	.17*	—	.43***
HOPELESSNESS to SUICIDE IDEATION	ML	—	—	—	.22	—	.34*
	ERLS	—	—	—	.22	—	.35*
	ADF	—	—	—	.80*	—	.82***

* p < .05 ** p < .01 *** p < .001

Table 4

Standardized ADF Factor Loadings and Error Variances for Models 1-6

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Self-Derog on SELF-DEROGATION	.88(.23)*	—	.90(.19)	.91(.17)	—	—
Lack of Self-Derog on SELF-DEROGATION	-.93(.13)	—	-.93(.14)	-.90(.19)	—	—
Self-Estn (Self) on SELF-ESTEEM	—	.92(.16)	—	—	.91(.18)	.97(.06)
Self-Estn (Family) on SELF-ESTEEM	—	.64(.59)	—	—	.62(.62)	.63(.60)
Self-Estn (Social) on SELF-ESTEEM	—	.63(.60)	—	—	.68(.53)	.63(.61)
Purp in Life (Pos) on PURPOSE IN LIFE	—	—	.70(.50)	—	.66(.57)	—
Purp in Life (Neg) on PURPOSE IN LIFE	—	—	-.86(.26)	—	-.87(.25)	—
Hopefulness on HOPELESSNESS	—	—	—	-.68(.54)	—	-.69(.53)
Hopelessness on HOPELESSNESS	—	—	—	.85(.28)	—	.85(.29)
Alcohol Use on SUBSTANCE USE	.38(.85)	.38(.85)	.35(.88)	.37(.86)	.40(.84)	.36(.86)
Cannabis Use on SUBSTANCE USE	.83(.31)	.89(.21)	.87(.25)	.83(.31)	.89(.20)	.84(.30)
Cocaine Use (Log) on SUBSTANCE USE	.59(.65)	.62(.61)	.51(.74)	.61(.63)	.59(.65)	.69(.53)
Hard Drug Use (Log) on SUBSTANCE USE	.58(.67)	.64(.59)	.56(.69)	.55(.70)	.67(.55)	.64(.60)
Lack of Depressn on DEPRESSION	-.89(.20)	-.81(.35)	-.91(.18)	-.91(.17)	-.83(.31)	-.86(.27)
Depressn on DEPRESSION	.90(.20)	.92(.16)	.91(.17)	.91(.17)	.93(.13)	.92(.16)
Depressn (Social) on DEPRESSION	.73(.47)	.81(.35)	.74(.46)	.76(.42)	.78(.40)	.82(.33)
Suic Ideatn 1 (Log) on SUICIDE IDEATION	.85(.27)	.85(.20)	.85(.28)	.83(.30)	.81(.35)	.83(.31)
Suic Ideatn 2 (Log) on SUICIDE IDEATION	.70(.51)	.67(.44)	.74(.46)	.71(.50)	.73(.50)	.74(.46)

* Parameter estimate is given first followed by error variance in parentheses. All factor loadings are significant at $p < .001$ or better.

Table 5

ADF Prediction Errors and Intercorrelations for Models 1-6

Dependent Construct(s)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SUBSTANCE USE	.98***	.98***	.83**	.64***	.92***	.96***
DEPRESSION	.29***	.29***	.28**	.32***	.31***	.35***
SUICIDE IDEATION	.47***	.44***	.39***	.45***	.32*88	.40***
PURPOSE IN LIFE	—	—	.24***	—	.25***	—
HOPELESSNESS	—	—	—	.23*	—	.31***
SUBSTANCE USE and DEPRESSION	(-.05)	(-.09)	(-.07)	(-.05)	(-.14)	(-.01)
SUBSTANCE USE and SUICIDE IDEATION	(.09)	(.05)	(-.10)	(.04)	(.09)	(.12)
DEPRESSION and SUICIDE IDEATION	(.32*)	(.37*)	(.36**)	(.27*)	(.29*)	(.31**)

Correlations between prediction errors for the dependent constructs are given in parentheses.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 6

ADF Standard Errors for Models 1-6

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Self-Derog	—	—	—	—	—	—
Lack of Self-Derog	.05	—	.04	.04	—	—
Self-Estn (Self)	—	—	—	—	—	—
Self-Estn (Family)	—	.07	—	—	.06	.06
Self-Estn (Social)	—	.05	—	—	.05	.05
Purp in Life (Pos)	—	—	—	—	—	—
Purp in Life (Neg)	—	—	.10	—	.09	—
Hopefulness	—	—	—	—	—	—
Hopelessness	—	—	—	.11	—	.11
Alcohol Use	—	—	—	—	—	—
Cannabis Use	.21	.20	.19	.19	.18	.19
Cocaine Use (Log)	.02	.02	.02	.02	.02	.02
Hard Drug Use (Log)	.02	.04	.01	.04	.01	.01
Lack of Depressn	—	—	—	—	—	—
Depressn	.05	.06	.05	.05	.05	.05
Depressn (Social)	.06	.06	.06	.05	.05	.05
Suic Ideatn 1 (Log)	—	—	—	—	—	—
Suic Ideatn 2 (Log)	.05	.05	.05	.05	.05	.05
INDEPENDENT FACTOR* to MEDIATING FACTOR**	—	—	.04	.04	.05	.05
INDEPENDENT FACTOR to SUBSTANCE USE	.04	.05	.12	.07	.36	.08
INDEPENDENT FACTOR to DEPRESSION	.05	.07	.15	.10	.39	.14
INDEPENDENT FACTOR to SUICIDE IDEATION	.01	.07	.15	.10	.39	.14
MEDIATING FACTOR to SUBSTANCE USE	—	—	.22	.18	.48	.16
MEDIATING FACTOR to DEPRESSION	—	—	.24	.18	.48	.21
MEDIATING FACTOR to SUICIDE IDEATION	—	—	.07	.06	.10	.05

INDEPENDENT FACTOR = SELF-DEROGATION in Models 1, 3, and 4; SELF-ESTEEM in Models 2, 5, and 6

MEDIATING FACTOR = PURPOSE IN LIFE in Models 3 and 5; HOPELESSNESS in Models 2 and 4

Figure 1

Model 1: Theoretical structural equation model of the relationships between Self-Derogation, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs represent the structural paths or regressions. The double-headed arrows between the constructs and measured variables represent factor loadings. The double-headed arrows between the prediction errors represent the correlations between the prediction errors.

Figure 2

Model 2: Theoretical structural equation model of the relationships among Self-Esteem, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs represent the structural paths or regressions. The arrows between the latent constructs and measured variables represent factor loadings. The double-headed arrows between the prediction errors represent the correlations between the prediction errors.

Figure 3

Model 3:

Theoretical structural equation model of the relationships among Self-Derogation, Purpose in Life, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs represent the structural paths or regressions. The arrows between the latent constructs and measured variables represent the factor loadings. The double-headed arrows between the prediction errors represent the correlations between the prediction errors.

Figure 4

Model 4:

Theoretical structural equation model of the relationships among Self-Derogation, Hopelessness, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs represent the structural paths or regressions. The arrows between the latent constructs and measured variables represent the factor loadings. The double-headed arrows between the prediction errors represent the correlations between the prediction errors.

Figure 5

Model 5: Theoretical structural equation model of the relationships among Self-Esteem, Purpose in Life, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs represent the structural paths or regressions. The arrows between the latent constructs and measured variables represent the factor loadings. The double-headed arrows between the prediction errors represent the correlations between the prediction errors.

Figure 6

Model 6: Theoretical structural equation model of the relationships among Self-Esteem, Hopelessness, Substance Use, Depression, and Suicide Ideation. The large circles represent latent constructs. The boxes represent measured variables. The small circles represent prediction error (for the latent constructs) or measurement error (for the measured variables). The one-way arrows between the constructs and measured variables represent the structural paths or regressions. The double-headed arrows between the latent constructs represent the correlations between the prediction errors.

ADF Standardized Path Coefficients Among Latent Constructs for Models 1-6

Model 1

Model 2

Model 3

Model 4

Model 5

Model 6

Key: SELF-DEROG = SELF-DEROGATION
 SELF-ESTM = SELF-ESTEEM
 PURP IN LIFE = PURPOSE IN LIFE
 HOPELSNS = HOPELESSNESS
 SUBST USE = SUBSTANCE USE
 DEPRSN = DEPRESSION
 SUIC IDEATN = SUICIDE IDEATION

* $p < .05$
 ** $p < .01$
 *** $p < .001$

Appendix ASelf-Derogation Index
(Kaplan, 1976)

Please indicate how much each of the following statements refers to you in the last 6 months using the following alternatives:

- A = Rarely or none of the time
- B = Some or a little of the time
- C = Occasionally or a moderate amount of time
- D = Most or all of the time

1. I wish I could have more respect for myself.
2. On the whole I am satisfied with myself.
3. I feel I do not have much to be proud of.
4. All in all, I am inclined to feel I am a failure.
5. I take a positive attitude toward myself.
6. At times I think I am no good at all.
7. I certainly feel useless at times.

Appendix BSelf-Esteem Inventory (SEI)
(Coopersmith, 1986)

Please indicate how much each of the following statements refers to you in the last 6 months using the following alternatives:

- A = Rarely or none of the time
- B = Some or a little of the time
- C = Occasionally or a moderate amount of time
- D = Most or all of the time

1. Things don't usually bother me.
2. I find it very hard to talk in front of a group.
3. There are lots of things about myself I'd change if I could.
4. I can make up my mind without too much trouble.
5. I'm a lot of fun to be with.
6. I get upset easily at home.
7. It takes me a long time to get used to anything new.
8. I'm popular with persons my own age.
9. My family usually considers my feelings.
10. I give in very easily.
11. My family expects too much of me.
12. It's pretty tough to be me.
13. Things are all mixed up in my life.
14. People usually follow my ideas.
15. I have a low opinion of myself.
16. There are many times when I would like to leave home.
17. I often feel upset with my work.
18. I'm not as nice looking as most people.

19. If I have something to say, I usually say it.
20. My family understands me.
21. Most people are better liked than I am.
22. I usually feel as if my family is pushing me.
23. I often get discouraged with what I am doing.
24. I often wish I were someone else.
25. I can't be depended on.

Appendix C

Purpose in Life Test (PIL)
(Slightly revised version)
(Crumbaugh & Maholick, 1964, 1969)
(Harlow, Newcomb, & Bentler, 1987)

Fill in the number that indicates your amount of agreement or disagreement with the following statements.

- A = Strongly disagree or does not apply
- B = Disagree
- C = Don't know
- D = Agree
- E = Strongly agree

1. I am usually completely bored.
2. Life to me seems always exciting.
3. In life I have no goals or aims at all.
4. My personal existence is utterly meaningless and without purpose.
5. Every day is constantly new and different.
6. If I could choose, I would prefer never to have been born.
7. After retiring, I would do some of the exciting things I have always wanted to do.
8. In achieving life goals I have made no progress whatsoever.
9. My life is empty, filled only with despair.
10. If I should die today, I would feel that my life has been very worthwhile.
11. In thinking of my life, I often wonder why I exist.
12. As I view the world in relation to my life, the world completely confuses me.
13. I am a very irresponsible person.
14. Concerning man's freedom to make his own decisions, I believe man is absolutely free to make all life choices.

15. With regard to death, I am prepared and unafraid.
16. With regard to suicide, I have thought of it seriously as a way out.
17. I regard my ability to find a meaning, purpose, or mission in life as very great.
18. My life is in my hands and I am in control of it.
19. Facing my daily tasks is a source of pleasure and satisfaction.
20. I have discovered no mission or purpose in life.

Appendix DHopelessness Scale
(Beck et al., 1974)

Please indicate how much each of the following statements refers to you in the last 6 months using the following alternatives:

- A = Rarely or none of the time
- B = Some or a little of the time
- C = Occasionally or a moderate amount of the time
- D = Most or all of the time

1. I look forward to the future with hope and enthusiasm.
2. I might as well give up because I can't make things better for myself.
3. When things are going badly, I am helped by knowing they can't stay that way forever.
4. I can't imagine what my life would be like in 10 years.
5. I have enough time to accomplish the things I most want to do.
6. In the future, I expect to succeed in what concerns me most.
7. My future seems dark to me.
8. I expect to get more of the good things in life than the average person.
9. I just don't get the breaks, and there's no reason to believe I will in the future.
10. My past experiences have prepared me well for my future.
11. All I can see ahead of me is unpleasantness rather than pleasantness.
12. I don't expect to get what I really want.
13. When I look ahead to the future, I expect I will be happier than I am now.

14. Things just won't work out the way I want them to.
15. I have great faith in the future.
16. I never get what I want so it's foolish to want anything.
17. It is very unlikely that I will get any real satisfaction in the future.
18. The future seems vague and uncertain to me.
19. I can look forward to more good times than bad times.
20. There's no use in really trying to get something I want because I probably won't get it.

Appendix ESubstance Use

(Harlow, 1987)

How often in the last 6 months have you used any of these without a doctor's orders?

1. wine
2. beer
3. liquor
4. marijuana
5. hashish
6. cocaine
7. crack
8. uppers
9. downers
10. psychedelics

11. In the last year about how many drinks of alcohol did you drink on those days when you drank alcohol? (A drink is the equivalent of a can of beer, a glass of wine or a shot glass of liquor.)

- A. none - I don't drink alcohol
- B. less than 1 drink
- C. 1 or 2 drinks
- D. 3 drinks
- E. 4 or more drinks

12. In the last year about how many marijuana cigarettes (joints) did you smoke on those days when you smoked marijuana?

- A. none - I don't smoke marijuana
- B. less than 1 joint
- C. 1 or 2 joints
- D. 3 joints
- E. 4 or more joints

13. In the last year about how many grams of cocaine have you used on the days that you used cocaine?

- A. none - I don't use cocaine
- B. less than 1/2 gram
- C. 1/2 to 1 gram
- D. 1 to 2 grams
- E. more than 2 grams

14. In the past year about how many vials (or the equivalent) or crack have you used on the days that you used crack?
- A. none - I don't use crack
 - B. less than 1 vial
 - C. 1 or 2 vials
 - D. 3 or 4 vials
 - E. more than 4 vials

Appendix FCenter for Epidemiologic Studies -
Depression Scale (CES-D)
(Radloff, 1977)

For the next 20 items, please indicate how often each pertained to you in the last 6 months using the following alternatives:

- A = Rarely or none of the time
- B = Some or a little of the time
- C = Occasionally or a moderate amount of time
- D = Most or all of the time

1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or friends.
4. I felt that I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.

18. I felt sad.
19. I felt that people disliked me.
20. I could not get "going".

Appendix GSuicide Ideation

(Petrie & Chamberlain, 1983; Harlow et al., 1986)

For the following items, indicate how frequently each experience has occurred in the last six months using the following scale.

- 1 = Never
- 2 = Rarely
- 3 = Sometimes
- 4 = Often
- 5 = Always

- 1. I have been thinking about ways to kill myself.
- 2. I have had recent thoughts about dying.
- 3. I have told someone I want to kill myself.
- 4. I imagine my life will end with suicide.
- 5. I have made attempts to kill myself in the past.

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