The Influence of Social Integration, Religious Integration, and Religious-Social Regulation on Suicidal Behaviors Among Seventh-day Adventist Youth

Elizabeth A. Hossler

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UMI
THE INFLUENCE OF SOCIAL INTEGRATION, RELIGIOUS INTEGRATION, AND RELIGIOUS-SOCIAL REGULATION ON SUICIDAL BEHAVIORS AMONG SEVENTH-DAY ADVENTIST YOUTH

A Dissertation
Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy

by
Elizabeth A. Hossler
May 1998
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APPROVAL BY THE COMMITTEE:

Chair: F. A. Kosinski, Jr.
Member: J. Rijal
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Date approved 11, 1998

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ABSTRACT

THE INFLUENCE OF SOCIAL INTEGRATION, RELIGIOUS INTEGRATION, AND RELIGIOUS-SOCIAL REGULATION ON SUICIDAL BEHAVIORS AMONG SEVENTH-DAY ADVENTIST YOUTH

by

Elizabeth A. Hossler

Chair: Frederick A. Kosinski, Jr.
ABSTRACT OF GRADUATE STUDENT RESEARCH

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Andrews University
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Title: THE INFLUENCE OF SOCIAL INTEGRATION, RELIGIOUS INTEGRATION, AND RELIGIOUS-SOCIAL REGULATION ON SUICIDAL BEHAVIORS AMONG SEVENTH-DAY ADVENTIST YOUTH

Name of researcher: Elizabeth A. Hossler

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Date completed: May 1998

Problem

Since Durkheim's classic 1897 study of differences in suicide rates between Catholics and Protestants in Europe, much research has focused on the relationship between religion and suicide. Pescosolido and Georgianna (1989) have suggested that Durkheim's Catholic/Protestant paradigm may not work well in the more heterogenous religious culture within the United States. This present study used Pescosolido and Georgianna's (1989) social network theory to examine the influence of social integration, religious integration, and religious-social regulation on attempted suicidal behavior in Seventh-day Adventist adolescents.
Method

The data used for this study came from the Valuegenesis (1989) survey conducted by the Search Institute (Minnesota) on behalf of the Seventh-day Adventist Church. Seventh-day Adventist adolescents, ages 11 to 18, were included in the sample. Logistic regression was used to examine the influence of the model on self-reported attempted suicidal behavior in four different analyses.

Results

The results indicated that, after the effects of the controlled variables were accounted for, the social-religious integration and regulation model, although statistically significant ($p < .01$), did little proportionally (.01) to improve the goodness of fit of the model in predicting attempted suicidal behavior.

Furthermore, only one of the theoretical variables, a social integration variable for denominational identity, was a significant predictor in all of the statistical analyses. Another variable, a religious integration variable--Adventist orthodoxy--was significant in three of the analyses.

However, like the full model, neither of these two variables was substantively important. The results indicated that, after the effects of the controlled variables were accounted for, denominational identity and Adventist orthodoxy, although statistically significant ($p <
.01), did little proportionally (.004 and .002, respectively) to improve the goodness of fit of the model in predicting attempted suicidal behavior. Two other variables, family religious socialization and attendance, were each a significant predictor in only one of four different analyses.

Conclusions

The religious-social integration and regulation model, although statistically significant, contributed little proportionally towards predicting attempted suicidal behavior in Seventh-day Adventist youth. Further research that examines the use of this theoretical model (1) in and across other denominations and (2) with adult populations is needed.
In memory of

Edith M. Hossler

You were my first, and always, my best instructor
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CHAPTER 1

INTRODUCTION

Two events in recent history have raised the question of religion's influence on suicidal behavior. The suicides or alleged suicides at Jonestown and Waco might lead one to believe that religion has a self-destructive influence on its adherents. However, conventional wisdom would tend to dictate that religion should protect its adherents from self-destructive behavior. Social science researchers have demonstrated that two aspects of religion--social integration and social regulation--may both protect against and contribute to suicide (Durkheim, 1897/1951; Pescosolido & Georgianna, 1989).

Stack (1985b) defined social integration as "the degree of subordination of the individual's self-interest to the group" (p. 841). Social regulation can be defined as the degree to which an individual's behavior is controlled by his or her group's rules, both written and unwritten. Social theories dealing with the relationship between religion and suicide indicate that the influence of religion on individual suicidal behavior depends on both the organizational structure of the religious group and the
individual's level of involvement (degree of integration and regulation) in that religious social group.

Theoretical Frameworks

Durkheim's Social Theory of Suicide

Durkheim's classic 1897 study on the influence of Catholicism and Protestantism on national suicide rates in Europe tended to demonstrate that two aspects of religion--social integration and regulation--protected its followers from self-destructive behavior (Durkheim, 1897/1951). Durkheim's social perspective on suicide emphasized that the sheer number of commonly held religious beliefs and practices formed the basis of social integration and regulation, and thus provided a prophylactic influence for adherents against suicide. Since Catholics shared more commonly held beliefs and practices than did Protestants, Durkheim believed that Catholic populations would have lower suicide rates. His research tended to indicate that there were fewer suicides among Catholic populations than among Protestant populations.

Durkheim (1897/1951) attempted to explain not only how religious socialization functioned as a protective influence against suicide, but he also theorized about how various degrees of integration and regulation within individuals might predict individual suicidal behavior. He believed that sufficient or moderate integration and regulation would protect followers from suicide, but that
too little or too much integration and regulation would tend to increase suicidal behavior.

Religious Commitment Perspective

The religious commitment perspective (Stack, 1983; Stark, Doyle, & Rushing, 1983) disagreed with Durkheim's emphasis on the sheer number of beliefs as the determining factor in social integration and regulation. Instead, the proponents of this theory postulated that it is the importance of a commitment to a few core beliefs that lowers the risk of suicide within a religious community. These life-saving beliefs included such convictions as suffering will be rewarded and God really understands and cares. Though theoretically appealing, this theory has found little empirical support.

Social Network Theory of Suicide

A third theoretical framework, the social network theory of suicide (Pescosolido & Georgianna, 1989), focuses on the connection between religious organizational structures, the resultant social networks within those structures, and adherence to religious beliefs. Although Pescosolido and Georgianna agreed with Durkheim's basic premise of social integration and regulation as the two important dimensions that protected religious adherents from suicide, they felt that because of historical and cultural changes, Catholic and Protestant affiliation was no longer a sufficient measure of religious integration.
They stated that research into religion's protective power must specify and examine the social mechanisms at work within diverse religious groups. Pescosolido and Georgianna's study tended to demonstrate that religious denominations that were (1) more conservative, (2) non-ecumenical, (3) experiencing medium to high tension with the larger society, and (4) had a congregational governance style, provided more protection against self-destructive impulses than did other religious denominations.

Pescosolido and Georgianna (1989) also determined that there were few differences between these religious groups in the so-called "life-saving" beliefs. Instead, the difference between these groups was the adherence to these beliefs. Conservative groups tended to have practices that were behaviorally more conforming to the beliefs concerning suicide.

Pescosolido and Georgianna (1989) concluded that these protective denominations were structured and organized in ways that promoted the development of socially supportive networks that were more integrating and regulating than other denominations and thus tended to provide a prophylactic influence against suicide. Like Durkheim (1897/1951), Pescosolido and Georgianna (1989) agreed that individuals who were sufficiently or moderately integrated into and regulated by their social-religious group tended to be protected from suicide. Extreme levels of
integration and regulation (either too much or too little) would tend to increase the risk of suicidal behavior.

Adolescent Suicide

Other recent events have precipitated further interest in suicide, specifically among adolescents. With the exception of children, adolescents have consistently had the lowest suicide rates of all age groups. However, adolescent suicide rates in the United States did increase steadily from the century's low in the 1950s to record highs in the late 1970s with a subsequent tendency to level off since then (Holinger, Offer, Barter, & Bell, 1994). The question of why adolescents choose to commit suicide has led to an increase in the amount of research in that area.

Statement of the Problem

With the assumption that the social network theory explains differences in suicidal behaviors between denominations (Pescosolido & Georgianna, 1989), it was expected that this theory could also explain the differences in suicidal behavior within a single denomination. It was hypothesized that individuals within a specific denomination who were sufficiently and/or moderately integrated into and regulated by their religious-social group would tend to be at the lowest risk of suicide. Conversely, those individuals on the extremes of a denomination (e.g., either those who were overly or
not sufficiently integrated and regulated) would be at highest risk of suicide. Furthermore, if the social network theory explains differences in suicidal behavior in the general population of religious denominations, it was anticipated that it might also explain differences in suicidal behavior in the adolescent population of religious denominations. Examining differences in suicidal behavior between individuals within a single denomination was used to control for denominational differences.

A common complaint in the research literature dealing with religion's influence on suicide focuses on the use in sociological research of county-level aggregate data, such as those used by Pescosolido and Georgianna (1989). The complaint contends that the use of these data creates a potential ecological fallacy (Stack, 1992b). This criticism has been leveled not only at Pescosolido's and Georgianna's (1989) research, but also at much of the other sociological research on the relationship between religion and suicide (Pescosolido, 1994). Several authors have suggested that the use of individual-level data would produce a more complete understanding of the relationship between individual religious involvement and suicide (Breault, 1986; Dublin, 1963; Maris, 1981; Pescosolido, 1994; Stack, 1992a).

Of the few empirical studies that have examined the connection between social network theory and suicide (Pescosolido, 1990; Pescosolido & Georgianna, 1989; Stack &
Wasserman, 1992), only Stack and Wasserman (1992) have used individual-level data. However, no empirical studies, published thus far, have examined the predictive relationship between the social network theory and suicide using individual-level data within a specific religious denomination. Furthermore, because of the lack of individual-level data, measures that could potentially provide more sensitive assessments of religious integration, or the individual's commitment to a set of beliefs, have not been used. It was assumed that the social network theory might also explain differences in suicidal behaviors among adolescents. To date, no empirical studies have been published that examine this relationship.

**Purpose of the Study**

The purpose of this study was to examine the influence of social integration, religious integration, and religious-social regulation on attempted suicidal behaviors in adolescents within a single Protestant denomination.

**Research Question**

The following research question was formulated for the purpose of this study. Is there a relationship between measures of social-religious integration and regulation, and attempted suicidal behaviors among adolescents within a religious denomination?
Statement of Hypothesis

The following hypothesis was formulated:

**Hypothesis:** A relationship exists between measures of social-religious integration and regulation, and attempted suicidal behaviors among adolescents within a religious denomination.

Scope and Delimitations

Data from the Valuegenesis (1989) survey, conducted by the Search Institute (SI) for the Seventh-day Adventist Church (SDA), were used for this study. Subject responses were limited to adolescents, ages 11 to 18, who identified themselves as Seventh-day Adventists. For these reasons, the findings of this study are generalizable to adolescents within the Seventh-day Adventist Church.

This study was designed to investigate the impact of religious-social integration and regulation on attempted suicidal behavior in Seventh-day Adventist adolescents. Logistic regression analysis was used to examine the effectiveness of a hypothesized model for predicting the occurrence of one dichotomous dependent variable. The full independent variable model used in the analysis consisted of measures of religious integration, social integration, religious-social regulation, and family religious socialization as well as other controlled independent variables usually associated with adolescent suicidal behaviors (e.g., at-risk behavior, depression, family
stability, gender, age, abuse, community type). These independent variables were selected by theoretical insights and empirical results (correlation, factor, and reliability analyses). The dependent variable was a measure of self-reported attempted suicidal behavior, also from the Valuegenesis data.

Durkheim (1897/1951) and Pescosolido and Georgianna (1989) believed that extreme levels of religious integration and regulation would tend to increase the risk of suicidal behavior, whereas moderate levels would tend to decrease the risk of suicide. Consequently, there was a theoretical assumption that the relationship between suicidal behaviors and social-religious integration and regulation was curvilinear. For this reason, selected independent variables were converted to categorical variables to examine the linearity of their relationships with the dependent variable.

Definition of Terms

Religious Integration: Religious integration was defined as an individual’s acceptance of and commitment to a set of religious beliefs and ideas. Religious integration can be further divided into traditional and specific orthodoxy (Cornwall, 1988, pp. 213-214). Traditional orthodoxy refers to acceptance of traditional Christian beliefs (e.g., the existence of God, the divinity of Christ). Specific orthodoxy refers to acceptance of a
set of beliefs specific to a particular religious organization (e.g., Seventh-day Adventists' Sabbath [or Saturday] worship).

Religious-Social Regulation: Religious-social regulation was defined as an individual's attitudinal and behavioral conformity to a set of religious and/or social beliefs and standards. Theoretically, a distinction could be made between religious regulation and social regulation. For example, an individual may choose to regulate his/her behavior because of a religious conviction of right and wrong (religious regulation) or he/she may choose to regulate his/her behavior out of respect for the religious social group's expectations, regardless of his/her own beliefs (social regulation). However, for the purposes of this study, religious-social regulation was defined as a single construct. The Valuegenesis (1989) data did not include measures for distinguishing intent of self-regulation.

Social Integration: Social integration was defined as an individual's interaction and identification with a social group. Opportunities to interact with others in a social group both contribute to and are a necessary condition for social integration. A distinction was made in this study between social integration and religious integration. For example, individuals may socially identify and interact with a religious social group (social
integration) but not be committed to the group's religious beliefs (religious integration).

**Family Religious Socialization:** Family religious socialization was defined as the family's influence on the development of a child's religious-social attitudes, beliefs, and values. The religious socialization of children is strongly influenced by the family (Cornwall, 1988; Greeley & Rossi, 1966; Himmelfarb, 1977; Johnstone, 1966; Scott, 1988). Parents take their children to church and teach them religious beliefs and values (religious integration), provide opportunities for their children to socialize with others in the family's religious social group (social integration), and use their religious and social standards as a basis to control (or attempt to control) their children's behavior (religious-social regulation). Because of its importance and cross-definitional influence, family religious socialization was treated as a separate construct in this study.

**Controlled Independent Variables:** Controlled independent variables were defined in this study as extraneous measures that are known from previous research to be associated with adolescent suicidal behavior (e.g., gender, family stability, depression), but were not the main theoretical interest of this study (e.g., social-religious integration and regulation). Controlled independent variables are used in this study's statistical
analyses to account or control for the expected or known variance in attempted suicidal behavior.

**Attempted Suicidal Behavior:** Attempted suicidal behavior was defined as a self-reported action taken by an individual in which the expressed or behavioral intent was to kill himself/herself.

**Organization of the Study**

This study contains five chapters. Chapter 1 presented the introduction to problem, theoretical framework, statement of the problem, purpose of the study, research question and hypothesis, scope and limitations, and definition of terms used in the study.

Chapter 2 contains a review of the literature concerning the relationship between suicide and religion, and the methodological problems that have been encountered in the area of study. This chapter also addresses adolescent suicide.

Chapter 3 describes the Valuegenesis (1989) survey, the population sample, selection of variables for the study, and the method of analysis.

Chapter 4 describes the results of the analysis of the data.

Chapter 5 contains a review of the purpose and organization of the study, a discussion of the findings, implications, and recommendations for future research. Appendixes and a reference list complete this report.
CHAPTER 2

REVIEW OF LITERATURE

Social Science Research Focus and Approaches

Focus of Suicide Research

The death of a loved one is usually accompanied by a sense of loss and mourning, but few deaths seem to produce in mourners as much pain and grief as does suicide. Fortunately, suicide is statistically a rare event, measured at an annual rate of the number of deaths by suicide per 100,000 individuals in a given population. In the United States, with an average annual suicide rate of 12 deaths by suicide per 100,000 people in the general population, suicide represents a death rate of only .012% per year (Lester, 1988b).

Although a relatively rare event, suicide produces a tremendous amount of human suffering, both in the victim and in those who remain after a suicide. By identifying and understanding which factors and behaviors contribute to the risk of suicide, as well as understanding those that function as a prophylactic against suicide, potential suicide victims may be identified and measures taken to prevent the occurrence of self-destructive behavior.
Psychological Approach to Suicide Research

Few major psychological theories have attempted to explain suicide. Historically, most of the studies of suicide conducted by researchers in the social sciences have been done by sociologists. Lester (1988b) stated:

> It is interesting to compare the position of suicide as a topic for study in the disciplines of psychology and sociology. Broadly speaking, suicide has the status of an important topic and is considered relevant to basic theories of sociology. In contrast, suicide is not considered an acceptable topic for study in psychology and is ignored by psychological theories. (p. 3)

As evidence, he asserted that the leading psychological journal most relevant to the study of suicide (the *Journal of Abnormal Psychology*, published by the American Psychological Association [APA]) only rarely contained articles dealing with the topic, and those articles were usually of poor quality. Lester concluded that sociologists have developed the most comprehensive theories of suicide.

In his 1992 book that summarized research findings on suicidal behavior, Lester (1992) stated that:

> The 1980s witnessed attempts to tie suicide into the framework of classic psychological theory which for too long has ignored the topic. . . . The 1980s also witnessed the proposal of a few new embryonic psychological theories of suicide whose potential is yet to be explored. (p. 438)

However, he still concluded that "the sociological research into suicide has been, on the whole, methodologically sound and open to far fewer criticisms than the psychiatric research" (p. 436).
In a review of Lester's 1988 text, Siefker (1991) referred to Lester's assertions as "an alarming pronouncement" (p. 215). Nevertheless, she concluded that Lester's book "provide[s] a good basis for discussion of psychological theory in relation to suicide" (pp. 215-216).

Psychologists are certainly not uninvolved with suicidal patients. In response to a question during an interview concerning his thoughts on the clinical issue of suicide, Erik Erikson said, "Frankly, I have not spoken much about suicide. It has happened in my work with adolescents, of course. The problem has vexed me, but I have not written about it" (cited in Jacobs & Brown, 1989, p. xi).

Methodological Difficulties With Psychological Suicide Research

Lester (1988b) concluded that there are probably three reasons for the lack of psychological research in suicide.

1. Psychological research, particularly in the United States, has been largely empirical and limited to individual studies of subjects.

2. Research tended to be centered on those phenomena that could be artificially produced and studied in the laboratory.

3. The preferred method of study in psychology is the experiment that utilizes strict experimental controls to determine cause and effect. Suicide does not conform well to any of these methods.
Using standard psychological research methods to study suicide is problematic for psychologists (Berman & Jobes, 1991; Lester, 1988b; Motto, 1984). Suicide completers, the individuals who should be interviewed about the event, are not available after their deaths. Interviews with a suicide's family and friends can introduce many biases into the research data because the survivors are struggling with their own emotions including guilt and denial. Suicides are statistically rare. Consequently, sample sizes tend to be too small to make meaningful interpretations. Ethical concerns also surround suicide research. It is not appropriate for researchers to allow individuals at risk of suicide to kill themselves simply to study the phenomenon.

Clinical Prediction of Suicide

Perhaps another reason why comprehensive psychological theories about suicide have not been developed is that there is a prevalent belief among clinical psychologists that suicide is a uniquely individual act. Many clinical psychologists believe that suicide cannot be predicted using standardized assessment methods or statistically high-risk group factors. Maris (1992b) claimed that suicide prediction among clinical psychologists "has a tendency to be somewhat mystical and private" (p. 8). He cited two studies to demonstrate this psychological approach to prediction.
Using the best available predictive tests and following population subjects for 5 years, Pokorny (1983) attempted to predict the number of suicides out of a subject population of 4,800 psychiatric patients. Only 35 of the 1,241 predicted cases actually committed suicide. Maris (1992b) stated that Pokorny in his 1983 study had concluded that suicides cannot be predicted using high-risk group factors without identifying very large numbers of false-positive predictions. Maris (1992b) responded that "one might cynically conclude that only suicide 'predicts' suicide" (p. 3).

In the other study cited by Maris (1992b), Shneidman (1971) attempted to predict the five completed suicides out of 30 case studies he had been given to examine. All explicit references to the cause of death had been edited out (some of the subjects had died of natural causes and some were still living). Using clinical judgment, Shneidman accurately predicted four of the five suicides in his first four attempts and identified the fifth on his sixth attempt. The probability of Shneidman accurately predicting four of the suicides in his first five attempts was roughly 0.001. With regard to Shneidman's feat, Maris (1992b) commented:

Impressive as all this was and is, when it came to saying how he did it Shneidman waffled a little. He vaguely mentioned the role of the significant other and "burning out"—hardly concepts that would allow others to make such accurate predictions. (p. 9)
Skilled clinicians may be fairly accurate at predicting suicide, but it has been difficult to identify how they are able to predict who will be a suicide victim. This attitude among clinicians that suicide is a "uniquely individual" act has led some psychologists to conclude that there can be no value in empirically studying suicide using group data.

Sociological Approaches to Suicide Research

Although sociologists certainly recognize suicide as an individual act, they also view it as having social causes (Pescosolido, 1994). For this reason, the sociological research approach to suicide tends to focus on social or large group data, often using aggregate data to study the phenomenon. An aggregate is a group of persons who have certain characteristics in common but do not necessarily have any direct social connection with each other (Vogt, 1993). Aggregate data include information about groups using such specific variables as gender, race, social classes, or even nations. An aggregate could be "all female doctoral students" or "all cities in the United States with a population under 100,000." County or national suicide rates (the number of deaths by suicide within a given time period within a defined area) are often used by sociologists as the dependent or criterion variable in their studies.
Independent or predictive variables used by sociologists have also tended to reflect large group data. For example, to measure the impact of religion on suicide, national religious book publication rates (Stack, 1983), national and state church attendance data (Lester, 1987, 1988a; Stack, 1985a), United States and Standard Metropolitan Statistical Areas (SMSAs) church membership rates (Breault, 1986; Stark et al., 1983), and national, state-averaged, and county-group religious affiliation data (Pescosolido & Georgianna, 1989; Pope & Danigelis, 1981) have been used as predictive variables for measures of religiosity. This focusing on group statistics in studying suicide also lies at the heart of the distinctive differences between psychological and sociological approaches to the study of suicide.

Psychological Versus Sociological Approaches

In a series of articles written by Stack and Gundlach (1992, 1994) and Mauk, Taylor, White, and Allen (1994), the distinctive differences between psychological and sociological research approaches to suicide are defined. Stack and Gundlach (1992) conducted a study to test the effect of country music on suicide rates in 49 metropolitan areas. They compared suicide rates with the proportion of radio air time devoted to country music. Stack and Gundlach concluded from their analysis that the greater the
air time devoted to country music, the greater the suicide rate.

In a response to the above study, Mauk et al. (1994) argued that Stack and Gundlach fell prey to the "ecological fallacy." They contended that "it is possible that none of the individuals who committed suicide ever listened to country music" (p. 1250). Mauk et al. concluded that the use of aggregate data in Stack and Gundlach's (1992) study "may fail to account for what is actually occurring at the individual level" (p. 1250). They claimed that suicide is solely an individual act and that only through the use of psychological autopsies (an extensive study on individuals who have committed suicide) "can we ascertain the specific individual factors that precipitated the suicides and construct psychological mosaics of the deceased individuals" (p. 1252).

In response to the criticism of the ecological fallacy by Mauk et al. (1994), Stack and Gundlach (1994) defended their use of aggregate data by explaining that "available evidence suggests . . . that ecological relationships have, in fact, been supported by individual-level data" (p. 1258). They cited several studies that demonstrated a powerful relationship between research results using aggregate data and similar results that used individual-level data (Lester, 1992; Stack, 1989, 1990; Trovato, 1987). Studies of methodology, reported by Stack and Gundlach, had determined that when aggregate data are used,
a properly specified model with controls for relevant variables can avoid the ecological fallacy (Gove & Hughes, 1980; Massey & Denton, 1985).

In their reply to Mauk et al. (1994), Stack and Gundlach (1994) responded not only to the criticisms of the ecological fallacy but they also discussed the deeper issue: the criticisms of the sociological approach to the study of suicide. They credited Emile Durkheim's (1897/1951) classic study as the seminal work that, late in the last century, attempted to counter the then-prevalent approach to suicide as a highly individual act. They argued that Durkheim's work not only changed the way suicide was studied, it also gave life to the whole field of sociology. "Durkheim's treatise on suicide was used to legitimate sociology as a field of study. He demonstrated that even the allegedly most private or personal behaviors such as suicide are subject to group-level processes . . . and other social forces" (p. 1258).

Individual Versus Group Data

Avoiding the ecological fallacy when using aggregate data can be difficult. However, it can also be difficult to obtain individual-level data on suicide (Maris, 1981). Moksony (1990) explained that aggregate data are used when individual-level, or micro-level data, are not available. He cautioned, however, that "results of such analyses are . . . very often said to be suggestive but not conclusive;
researchers must make serious efforts to uncover the conditions under which inferences from aggregate to individual data are still permissible" (p. 121).

But erroneous results can also occur when using individual-level data to draw conclusions about groups. Vogt (1993) defined an ecological fallacy as "an error of reasoning committed by coming to conclusions about individuals based only on data about groups" (p. 78). However, he also cautioned about generalizing conclusions drawn from only individual data. "Reasoning in the opposite direction, from data about a few individuals to generalizations about groups, is also a widespread form of fallacious thinking, but it does not have a well-known technical name" (p. 78).

Like Mauk et al. (1994), Berman and Jobes (1991) supported the use of psychological autopsies of suicide victims as a valuable and effective research tool. However, they also argued that suicidal risk factors are both abstract and general, as well as highly individual. Each individual who commits suicide in the United States annually presents a unique contribution to the group as a whole. And yet the group as a whole has some definable properties and attributes of import to us. We have much to learn from both the statistical set (and its scientific base) and the individual case (and the art of working with it). (p. 4)

Pescosolido (1994) stated that "the basic problem for social research becomes interrelating the life-histories of
Epidemiological Approach to Suicide Research

Berman and Jobes (1991) suggest that an epidemiological approach to studying suicide is valuable. Epidemiology is defined as "the study of disease among populations" (p. 9). Epidemiological approaches are used to identify which groups are at risk for particular diseases or, in this case, at risk for suicide. By determining which groups are at risk, epidemiological methods help in identifying and characterizing the scope of the problem. By identifying factors that contribute to suicide, clinicians can be aided in helping assess and treat individuals who might potentially commit suicide. "Epidemiological research techniques clearly represent a major force in the study and prevention of suicide, on both the macro and micro levels" (p. 10).

However, Berman and Jobes (1991) also reported that there are problems with epidemiological methods. The validity and reliability of official death and suicide statistics have been widely questioned and debated (Jobes, Berman, & Josselson, 1987; Kreitman, 1988; Pescosolido & Mendelsohn, 1986). Official suicide rates tend to underestimate the actual number of suicides. Berman and Jobes referred to a previous study they had done that indicated that 58% of practicing medical examiners surveyed
tend to agree that the actual rate is twice the reported rate (Jobes & Berman, 1984). Since epidemiological studies tend to rely on official rates, the results of these studies are often called into question. But Berman and Jobes (1991) concluded that although epidemiological studies can be problematic, the strength and value of such studies on suicide outweigh their criticism.

It is not just the use of research methods that focus on either the individual or the group that creates problems for both the psychological and sociological approaches to understanding suicide. Suicide is an individual action, but it is an individual action that is influenced by many factors.

**Suicide--Multidimensional**

Shneidman (1985) defined suicide as "a conscious act of self-induced annihilation, best understood as a multidimensional malaise in a needful individual who defines an issue for which the suicide is perceived as the best solution" (p. 203). He explained his choice of the word multidimensional by stating:

> No single learned discipline is sufficient to explain any individual suicidal event. I believe it is most accurate to define . . . suicide as a biological / biochemical / sociocultural / sociological / interpersonal / intrapsychic / philosophic / existential event. . . . The main point is that suicide is a multidimensional event and requires, for its understanding, a multidisciplinary approach. (p. 207)
Any study of suicide and self-destructive behaviors must recognize the multidimensional qualities of the phenomenon. Like Shneidman, Black (1989) stated that suicide is a multidimensional problem that requires analytic methods and research designs suitable for a multidimensional analysis.

Suicide and Religion

Historical Perspective

Historical suicide events, both in the distant as well as in the recent past, are compelling in their demands for social and religious explanations. Flanders (1991) reported on perhaps the earliest suicide note written by an Egyptian around 2,000 B.C.

The author, contemplating suicide, recounts his efforts to convince his soul to join him in death. Weary of life, the writer views his death as a kind of permanent vacation. His soul disagrees, observing on the one hand the various benefits to be lost along with his life, and on the other the author's social and religious responsibilities. (p. 4)

Other historical examples include many individual acts of suicide that were and are influenced by religious and social factors. Some early Christian martyrs welcomed their deaths in Roman games as an opportunity to ascend to heaven, whereas others took their own lives to avoid falling into sin (Flanders, 1991). Japanese kamikaze pilots during World War II, Buddhist monks burning themselves to death in protests over the Vietnam War, and Arab terrorists who, in this present day, commit suicide by bombing are other examples. There are also examples of
historical mass suicides such as Masada and Jonestown. Coming to terms with these events requires an understanding of social as well as religious influences on the individual act of suicide.

Theoretical Frameworks

Psychological Versus Sociological Theories of Suicide and Religion

Few, if any, psychological theories discuss the impact of religion on suicidal behavior. In reviews of psychological theories of suicide (Leenaars, 1988, 1990; Lester, 1988b), none of the theories reported addressed the influence of religion on suicide. The impact of religion on suicide has been a significant theme among sociological theories since Durkheim's (1897/1951) classic study that tested the impact of Catholicism and Protestantism on national suicide rates. Stack (1992b) has identified three major sociological and theoretical frameworks that examine religion's influence on suicide.

Durkheim's Social Theory of Suicide

Durkheim's (1897/1951) social perspective on suicide emphasized that the sheer number of commonly held religious beliefs and practices formed the basis of social integration and regulation, and thus provided religious adherents protection against suicide. The specific details of these beliefs and practices were of secondary importance. What was essential was that they were capable
of supporting a sufficiently intense collective life within the community. It was this 'sufficiently intense collective life' that tended to protect the individual from suicide. Durkheim believed that Catholics shared more commonly held beliefs and practices than did Protestants, and thus, because Catholics were more socially integrated, Catholic populations would have lower suicide rates. His research tended to indicate that there were fewer suicides among Catholic populations than among Protestant populations.

Durkheim's (1897/1951) theory explained not only religious socialization as a protective influence against suicide, but it also attempted to explain individual suicidal behavior. Sufficient or moderate integration and regulation tended to protect followers from suicide. Too little or too much integration and regulation tended to increase suicidal behavior.

Durkheim (1897/1951) used four terms to identify suicidal behavior associated with the extremes of his model. Anomie suicides occur when individuals are not sufficiently regulated by their social group. Egoistic suicides occur when individuals are not sufficiently integrated and have too few social connections. Altruistic suicides occur when individuals were overly integrated into their social group and the group might literally demand individual self-sacrifice for the sake of the whole society. Fatalistic suicides occur because of excessive
social regulation. Although Durkheim's theory has
generated much discussion and research for nearly a
century, numerous studies have challenged Durkheim's theory
on his basic theoretical, historical, and statistical
premises.

Religious Commitment Perspective

The religious commitment perspective (Stack, 1983;
Stark et al., 1983) disagreed with Durkheim's emphasis on
the sheer numbers of commonly held beliefs and instead
postulated that it is the importance of a commitment to a
few core beliefs that lowers the risk of suicide within a
religious community. Such beliefs would include a
knowledge that Jesus knows and cares when problems are
overwhelming, a belief in "gods that can offer heavenly
glory for earthly suffering" (Stark et al., 1983, p. 125),
belief in a better life hereafter, that there is a purpose
for suffering, and the example of significant suffering
role models (Stack, 1983). Although the religious
commitment perspective is theoretically appealing, it has
been supported in only a little more than half of the
subsequent research (Stack, 1992b).

Social Network Theory

A third theoretical framework, the social network
perspective (Pescosolido & Georgianna, 1989), focused on
the connection between religious organizational structure
and beliefs, and the resultant social networks. Using this
perspective, Pescosolido and Georgianna examined the extent that these supportive social networks within religious communities function as a prophylactic influence against suicide. Stack (1992a) has credited this theory with breaking new ground in examining what factors within religions and religious organizations help protect against suicide.

Pescosolido and Georgianna (1989) tested Durkheim's basic theoretical position in light of historical and societal changes. They argued that three socio-historical trends--secularization, ecumenicalism, and the revival of evangelicalism--have changed the relationship between religion and society. These changes have reduced the important differences between Protestants and Catholics, and have increased the differences among Protestant denominations. Their social network theory agrees with Durkheim's basic premise that religious integration may serve as a protection against self-destructive impulses. However, in light of the changes in religion and society, they argued that Catholic or Protestant affiliation is no longer a sufficient measure of religious integration. They stated that research into religion's protective power must specify and examine the social mechanisms at work within the diverse religious groups.

Pescosolido and Georgianna (1989) examined the differences between religious groups in terms of four theoretical dimensions: theological conservatism,
ecumenicalism, church governance, and cultural tension. Using these dimensions, they rated 27 religious groups, which included Catholics, Jews, and 25 Protestant denominations. Their results indicated that religious groups that were (1) more conservative, (2) nonecumenical, (3) experienced higher tension with the larger society, and (4) were congregational in governance style were more protective against self-destructive impulses (Pescosolido & Georgianna, 1989).

As they further explored the different characteristics of religious groups, they found high correlations between the various dimensions (Pescosolido & Georgianna, 1989). Religious groups that were liberal also tended to be ecumenical, experience low tension with the surrounding culture, and were more presbyterian or episcopal in their governing style. These religious groups tended to show less protective influences against suicide. Churches that were more conservative tended to be nonecumenical, experience higher tensions with the surrounding culture, and were more congregational in their governance style. These groups were also more likely to be the most evangelical. These religious groups tended to show more protective influences against suicide.

Pescosolido and Georgianna (1989) further investigated the differences in beliefs concerning suicide as a possible explanation for the variance in suicide rates between denominations. What they discovered is that there were
very few major differences in beliefs or dogma concerning suicide between religious groups. Beliefs alone did not appear to be the protective influence. What they concluded was that it was the adherence to the dogma that appeared to be the major variable. Conservative groups to a larger degree had practices that were more conforming to, or socially regulated by, the beliefs concerning suicide.

Like Durkheim's (1897/1951) theory, Pescosolido and Georgianna (1989) also viewed the relationship between religious-social integration and regulation as curvilinear. Individuals who were sufficiently or moderately integrated into and regulated by their social-religious group tended to be protected from suicide. On the one extreme, individuals who were not religious and did not have significant social ties (e.g., non-affiliated atheists) would tend to have higher suicide rates. On the opposite extreme, individuals who were so absorbed by their religious groups that they had lost a sense of personal identity and social connection outside of the group (e.g., adherents of "greedy cults") would also represent a higher suicide risk.

Pescosolido and Georgianna (1989) believe that their results hold important theoretical and methodological implications for future studies into the relationship between religion and suicide. First, they demonstrated that religious affiliation is a variable to be considered when studying suicide rates in contemporary United States
society. Second, the effects of religious affiliation on suicide rates are more complex than Durkheim's theory and subsequent research would suggest. They agreed with Durkheim's basic premise that the social integration that results from religious involvement does influence an individual's attitudes, beliefs, and behavior, and thus may provide the protective influence against self-destructive impulses. Nevertheless, they argued that this protective influence is more than social integration. It also involves social regulation, a point, according to Pescosolido and Georgianna, that Durkheim had de-emphasized. They conceptualized social integration and social regulation as two aspects of their theory of social networking.

Criticisms of social network research

Stack (1992b) argued that there are several problems with Pescosolido and Georgianna's (1989) social network theory research. First, he contended that although Pescosolido and Georgianna (1989) were technically correct in using relaxed significance levels since they had used county-aggregated suicide rates, almost all of the other previous studies had also used population statistics, but had not used the relaxed standards. If Pescosolido and Georgianna (1989) had used the significance standards used in other studies, only 5 of the 27 denomination coefficients would have been significant. Increased
suicide would then be associated with mainline Episcopalians and reduced suicide would be found among Catholics, Reformed Churches, Evangelical Baptists, and Seventh-day Adventists.

Another problem with the social network theory that Stack (1992b) cited is that the theory, in part, depends on the religious heterogeneity that characterizes the United States' religious culture. This limits the theory being tested in other cultures that are not as diversified.

Stack and Wasserman (1992) argued that a third problem with Pescosolido and Georgianna's (1989) research was their use of county-level aggregate data to examine the relationship between religious integration and suicide. Stack and Wasserman (1992) argued that "this created ecological problems" (p. 458).

Value of individual-level data

The use of ecological data has been a point of criticism not only with Pescosolido and Georgianna's (1989) research, but also with most other research on the relationship between social-religious integration and suicide (Pescosolido, 1994). Almost all of the research has used broad measures of religiosity such as comparing the percentage of church membership in a county with the county's suicide rate. Breault (1986) also argued against the use of ecological data and suggested that "an ideal measure would include not only affiliation or membership,
... but a more complete measure of the degree of religiosity and the extent of involvement in and commitment to church and church-related activities" (p. 639). However, Breault (1986) also stated that church affiliation and membership may be the best measures to use since other individual religious commitment data do not exist. Maris (1981) concluded that, "of course, religious affiliation is not an entirely adequate indicator of religiosity. To measure the influence of religious attitudes and practices on suicide one should know how active the individual was in his or her respective religion" (p. 249). Dublin (1963) suggested that it is virtually impossible to know anything about the relationship between religion and suicide because "we cannot measure statistically the influence of religion, as such, on the suicide rate, for we do not know whether the individuals who committed suicide were devoutly religious or not" (p. 78).

Stack (1992a) agreed that the use of individual-level data would provide a better indication of the relationship between suicide and religion. When Stack and Wasserman (1992) examined the social network theory they used micro-level data concerning suicide ideology. Their study tended to support the social network theory. However, Stack (1992a) also cautioned that when individual-level data are available, interpreting micro-level data that combine all Protestant denominations may mask variations in suicides.
that correspond to relevant variations in religious practices and beliefs between denominations.

Adolescent Suicidal Behavior and Religion

The adolescent age cohort has been a population that has been studied before to determine the effect of religion on suicide. Stack (1983) determined that church attendance was the leading negative predictor of suicide rates among the youth-age cohort. Stack (1985a) also examined the influence of religiosity on youth and determined that as the importance of both the family and religion declines, there was a corresponding rise in suicides in both the general population and in the youth cohort. He assumed that the youth would be the subgroup of the population that would be particularly influenced by cultural and social changes.

Adolescent Suicide Risk Factors

In the report from the United States Department of Health and Human Services (USDHHS) Secretary's Task Force on Youth Suicide to the Alcohol, Drug Abuse, and Mental Health Administration (1989), the following social and psychological factors were most clearly linked to youth suicide: substance use and abuse; parental loss and family disruption; and aggressive, impulsive behavior. Substance abuse and impulsive behaviors are particularly strong predictors of adolescent suicidal behaviors.
Holinger et al. (1994) also found that one of the risk factors that appears to contribute to adolescent suicide involves at-risk behavior, specifically drug and alcohol abuse. These at-risk behaviors have been linked with between 33%-70% of adolescent suicides.

There may also be gender differences in suicidal behaviors among adolescents. Hughes and Neimeyer (1990) found a definite gender trend in suicidal behaviors. Three times more females than males attempt suicide, but three times more males than females actually complete suicide.

Summary

This chapter presented a review of the literature related to the area of investigation for this study. First, the methodological differences between psychological and sociological approaches to the study of suicide were discussed. Second, difficulties in studying suicide were presented. Third, theories related to the influence of religion on suicide were introduced and discussed. Fourth, findings of research studies dealing with the effect of religion on adolescent suicidal behavior and adolescent suicide risk factors were presented.

Of the few empirical studies that have examined the connection between religion, social network theory, and suicide (Pescosolido, 1990; Pescosolido & Georgianna, 1989; Stack & Wasserman, 1992), only Stack and Wasserman (1992) have used individual-level data. However, no empirical
studies published thus far have examined the relationship between the social network theory and suicide using individual-level data within a specific religious denomination. In addition, no studies have examined the relationship between religion, the social network theory, and suicide in adolescent populations.
CHAPTER 3

METHODOLOGY

Introduction

In this study, an ex post facto research design utilizing logistic regression analysis was used to examine the relationship between religious-social integration and regulation variables and attempted suicidal behavior. This study attempted to overcome the methodological problems of examining religion's influence on suicidal behaviors by using individual-level data from within a single Protestant denomination. Of the few social network theory studies that have been conducted (Pescosolido, 1990; Pescosolido & Georgianna, 1989; Stack & Wasserman, 1992), none have examined suicide using individual-level data within a specific religious group. By examining subjects within a single denomination, the differences between religious groups that might mask or alternately exaggerate the effects were controlled. Furthermore, by using individual-level data, the ecological fallacy problems that arise with large county aggregate data were also avoided.

Approval to conduct this study was granted by the Andrews University Human Subjects Review Board (see Appendix A). Permission to use the Valuegenesis (1989)...
data was granted by Dr. Jerome Thayer, Andrews University (also see Appendix A).

Valuegenesis Survey

The data that were used for this study came from the Valuegenesis (1989) survey conducted by the Search Institute (Minnesota) on behalf of the Seventh-day Adventist Church. The focus of the survey was to study the influence of family, school, and church on the formation of religious faith. "Valuegenesis provides an omnibus portrait of Adventist youth, documenting and evaluating the current condition of their faith, their values, their loyalty to Adventism, and how each of these is reflected in their behaviors" (Benson & Donahue, 1990, p. 1). The Valuegenesis survey provided individual-level measures of social integration, religious integration, religious-social regulation, and attempted suicidal behavior.

Data Collection

The Valuegenesis (1989) survey was given to several different populations including pastors, principals, teachers, parents, and youth (Dudley & Gillespie, 1992). The participants addressed approximately 500 responses regarding support of Adventist doctrinal beliefs and Christian tenets of faith, commitment to church, lifestyle preferences, behavioral standards, and family life. Each survey shared a common core and also contained a section specific to the designated population. Consequently, the
Valuegenesis youth survey was divided into the core section and a specific youth section.

Researchers collected data from over 12,000 youths ranging from grades 6 to 12, most of whom were attending Adventist schools. A stratified-random method was used to select a sample of 20% (n = 271) of elementary schools and academies in the North American Division of the Seventh-day Adventist Church (Dudley & Gillespie, 1992). These schools were asked to designate a site supervisor who would oversee the administration of the survey to all 6th- through 12th-grade students who attended that school. Pastors of Adventist churches who had students in their congregations who were not attending Adventist schools were encouraged to invite those students to participate in the survey. Because the high-school years were a focus of the Valuegenesis study, a special oversampling was completed for senior academies.

Since the questionnaire contained over 500 responses, school site supervisors were requested to designate two class periods for administration of the survey. When the surveys were completed, they were returned to the Search Institute (Dudley & Gillespie, 1992).

Return rates for the survey varied with the population. The return rate for the 271 school sample was 56%, a moderate, but acceptable rate (Dudley & Gillespie, 1992, p. 302). The return rate for the 73 senior academies oversample was 79% and was considered a highly respectable
rate. It was difficult to calculate an accurate return rate for the church population (Dudley & Gillespie, 1992, p. 302). Since the vast majority of the youth sample were attending Adventist schools, it appeared that the return rate from the church population was low.

After the surveys were returned to the Search Institute, the data were "cleaned." The surveys were examined to ensure that the data were usable (SI, 1990, p. 1-2). Surveys were deleted from the sample if they had demonstrated any of the following:

1. If a survey had more than 10 items missing out of the first 100 items.
2. If a survey had more than 4 missing items out of the first 10 items in the youth section of the survey.
3. Any respondents who reported abnormally high levels of at-risk behaviors (e.g., reporting doing 10 at-risk behaviors, 40 or more times in 1 year).
4. Any respondent who reported that he/she (1) was older than 22 years, (2) had attended either sophomore, junior, or senior years of college, or (3) was in the fifth grade.

The final sample of useable youth surveys totaled 12,142, which consisted of 10,641 Adventist students in Adventist schools, 457 Adventist youths in non-Adventist schools, and 1,044 non-Adventist students who were attending Adventist schools (Dudley & Gillespie, 1992, p. 15).
Validity of Instrument

The Search Institute has conducted similar surveys with various other Christian denominations. To ensure the validity of the Valuegenesis (1989) survey for the Seventh-day Adventist Church, two Valuegenesis project committees—the Coordinating Committee and the Consultation Committee—were formed, consisting of professors and administrators from Adventist colleges and universities, members of the Adventist clergy, and research consultants.

Some of the scales used in the Valuegenesis survey had displayed "respectable psychometric characteristics in other populations" (Benson & Donahue, 1990, p. 1). However, that fact did not determine the validity of the scales for the Adventist context (Benson & Donahue, 1990).

The Valuegenesis Coordinating and Consultation Committees both considered a lengthy list of possible measures of faith maturity and related concepts before deciding to employ these particular measures. These measures and their underlying conceptual bases were reviewed by several Adventist theologians and scholars, at the invitation of the Coordinating Committee. These reviewers endorsed the use of these measures, in the context of the larger study, to address the issues at hand. (Benson & Donahue, 1990, pp. 50-51)

In addition, several scales were developed that were uniquely Adventist, such as a scale of Adventist orthodoxy and endorsement of beliefs unique to Adventism. This validation process was confirmed by P. L. Benson (personal communication, December 3, 1996). Even after the survey results were collected, work on refining the validity of scales within the Valuegenesis (1989) data, particularly a
denomination-specific faith maturity scale, continued (Dudley, 1994; Thayer, 1993).

The face validity of other single items appeared to be a priori, such as, "Have you ever tried to kill yourself?" "How often do you attend worship services at a church?" "How often do you attend Sabbath School?" and other single items that requested demographic information concerning gender, age, ethnic background, and type of community. Where theoretically appropriate, the scales and single-item indices validated by the above process were used as defined in this study.

Reliability of Instrument

The reliability of the original Valuegenesis (1989) measures were assessed. In the original data preparation of the youth sample, scales that did not achieve a reliability of .60 were not retained (Search Institute, 1990, p. 8). Cronbach's alpha reliability coefficients were calculated for all scales used with the study's sample. The preferred criteria used in scale selection for this study was a reliability coefficient of .70 or higher (Gable & Wolf, 1993).

Research Design Issues

Berman and Jobes (1991) reported that valid and reliable studies of suicide "tend to use more rigorously controlled designs, comparison or control groups, and clear, measurable operational definitions of independent
and dependent variables" (p. 77). Pfeffer (1989) identified several components that should be included in the research design of clinical studies of adolescent suicidal behavior. First, the severity of the suicidal behavior used in the study should be defined and measured. Second, the sample population used in the study needs to be described. Descriptive, demographic data on suicidal subjects may help identify risk factors, particularly when those factors are compared with a non-suicidal control group. Third, a comparable control group should be selected. Describing the sample population allows for the selection of a comparable control group. One of the problems often cited with clinical studies of suicide (Berman & Jobes, 1991; Lester, 1988b; Pfeffer, 1989) is that they fail to use a normal control group as a comparison with the clinical sample. Some of the difficulties in conducting these studies have been access to these normal populations and gaining parental consent for participation.

Population and Sample Selection

Description of Population

The Seventh-day Adventist (SDA) Church is a particularly appropriate denomination to examine. Based on Pescosolido and Georgianna's (1989) study, the Seventh-day Adventist Church was one of four Protestant denominations that exerted the most protective influences against
suicide. Even after Stack (1992b) examined Pescosolido and Georgianna's (1989) data using stricter significance levels, the Seventh-day Adventist Church was one of only three Protestant denominations that still showed significantly reduced suicide rates.

Description of Sample

The original Valuegenesis (1989) sample consisted of over 10,000 Seventh-day Adventist youths ranging from grades 6 to 12, most of whom were attending Adventist schools throughout the United States. It was assumed that the youth portion of the Valuegenesis (1989) survey was conducted on a "normal" (nonclinical) adolescent population. The data provided an adequate and comparable control group of non-attempting subjects with which to compare the self-destructive group.

Sample Defined

For the purpose of this study, only those respondents, ages 11 to 18, who had declared their affiliation with the Seventh-day Adventist Church were included in the sample. Subjects with missing data were excluded from the statistical analyses.

In the original Valuegenesis (1989) sample, only 11% ($n = 1536$) of the adolescents indicated that they had attempted to kill themselves. When the behavior of interest is dichotomous (e.g., it either occurs or it does not occur) and represents a relatively small percentage of
the population, a strategy that is sometimes used for statistical analyses is to choose a sample that has a fixed number of observations per group (Norusis, 1990a, p. B-8). Accordingly, for this study all of the respondents who indicated that they had attempted to kill themselves were kept in the sample and a randomly selected, comparable fixed number of non-attempters \( (n = 1536) \) was selected to complete the study sample \( (N = 3072) \). Due to listwise deletion, the final number of subjects who were included in the statistical analysis was 2122 (69% of the original sample, \( N = 3072 \)).

The details of the demographics of the sample are listed in Table 1. Along with the demographic data is the percentage of those who did or did not attempt suicide in each identified group.

**Research Variables**

**Dependent Variable—Suicidal Behavior Defined**

**Attempted Versus Completed Suicides**

Maris (1992a) wrote that "suicide is emphatically not one type of behavior. Suicidology will never be an exact science until it carefully specifies its dependent variable. The predictors or causes of suicide vary immensely with the specific type of suicidal outcome" (p. 2111).
Table 1

Percentage of Suicide Attempters by Levels of Gender, Community Type, and Ethnic Grouping

<table>
<thead>
<tr>
<th>Group</th>
<th>Suicide Attempts</th>
<th>No Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Total Sample</td>
<td>2122</td>
<td>100</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>871</td>
<td>41</td>
</tr>
<tr>
<td>Female</td>
<td>1251</td>
<td>59</td>
</tr>
<tr>
<td>Community Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1334</td>
<td>63</td>
</tr>
<tr>
<td>Not Urban</td>
<td>788</td>
<td>37</td>
</tr>
<tr>
<td>Ethnic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1189</td>
<td>56</td>
</tr>
<tr>
<td>All others</td>
<td>933</td>
<td>44</td>
</tr>
</tbody>
</table>

Note. Average age = 15.3 years (sample includes 11- to 18-year-olds).
Researchers have attempted to define both the relationships and the differences between completed suicides and other types of self-destructive behaviors. Hughes and Neimeyer (1990) determined that there were distinct differences in the intention of self-destructive behavior. Many suicide attempters report that their suicidal behaviors were not intended to be fatal. Maris (1992b) defined a suicidal continuum of self-destructive behaviors that include completions, nonfatal attempts, gestures, partial self-destruction, indirect suicide, and ideation. He cautioned that studies need to clearly define which behavior is being studied.

One common mistake is to equate completed suicides with nonfatal suicide attempts. This is absurd on the face of it, since in the first case people die and in the second they do not. It is amazing how many clinical researchers study nonfatal suicide attempts and then claim to understand completed suicides. (p. 4)

However, Berman and Jobes (1991) claimed that there are valuable advantages to studying suicide attempters. Although they agreed, like Maris (1992b), that a completed suicide differs distinctively from a suicide attempt, nevertheless many suicide completers have previously attempted suicide. By studying suicide attempters, valuable data about eventual completers may be gathered. The most compelling reason for studying attempters is that they, unlike suicide completers, are still living and are able to provide personal information.
Dublin (1963) noted that it is virtually impossible to study the relationship between the suicide victim and religion because it cannot be determined, post facto, whether the individual was devoutly religious or not. Furthermore, interviews with the surviving friends and relatives are confounded by a wide variety of factors such as grief and distorted memories.

The relationship between attempted suicide and completed suicide has been examined. The reported percentages of suicide attempters who ultimately commit suicide varies from 5% to 15% (Flanders, 1991; Maris, 1992b; Shneidman, 1994). Shneidman (1994), however, also reported that 40% of suicide completers have attempted suicide sometime in their lives. Hughes and Neimeyer (1990) reported the following summary of research findings dealing with the relationship between various suicidal behaviors: (1) between 32% to 63% of the general population have, at some point in their lives, experienced suicidal ideation; (2) between 13% to 20% of ideators have engaged in self-destructive behaviors; and (3) between 32% to 59% of completed suicides did not have a history of previous suicide attempts.

Self-Reported Data

Stack and Wasserman (1992) used a self-reported suicide ideology index derived from individual or micro-level data from the General Social Survey (GSS) as
their dependent variable. The self-report suicide ideology index was composed of four items dealing with suicide attitudes. This index did not measure the probability of suicide or the risk of suicide in the respondent. Instead, it measured the respondent's suicide ideology or degree of approval as to when it might be legitimate for others to commit suicide.

Self-reported data are commonly used in outpatient, non-hospitalized samples. Smith and Crawford (1986) and Rubenstein, Heeren, Housman, Rubin, and Stechler (1989) used self-reported survey data to examine suicidal behavior in "normal" adolescent populations. Berman and Jobes (1991) considered these studies to be useful contributions to the literature.

Dependent Variable Defined

The dependent variable used in this study was an item from the Valuegenesis (1989) survey that measured self-reported suicide attempts: "Have you ever tried to kill yourself?" (item # Y417). The possible responses included: No; Yes, once; Yes, twice; and Yes, more than two times.

Originally this item was included in the At-Risk Index from the Valuegenesis (1989) survey (Search Institute, 1990). This index included items that focused on adolescents' deviant behaviors. Although item Y417 was treated as interval in nature, when it was included in the deviance scale, it was dichotomized (0 = no attempt, 1 =
attempt) and added with the other items, which were also
dichotomized at various levels, to form the At-Risk Index.
It is assumed that to the original designers of this At-
Risk Index, what was important was not how many times the
individual attempted to kill himself or herself, but that
he or she had made any attempt. Smith and Crawford (1986)
also used this same approach in their study of suicide
attempters. With the precedent set by the formulation of
the At-Risk Index, this item was dichotomized for the
analysis in this study.

Since the subjects who responded to the Valuegenesis
(1989) survey were obviously living, it is clear that this
study focused on suicide attempts. The self-reported item
in the Valuegenesis survey simply asked, "Have you ever
tried to kill yourself?" From this, it was impossible to
determine whether the attempts reported were intended to be
fatal or non-fatal.

Therefore, in this study, the dependent variable was
defined as self-reported attempted suicidal behavior,
specifically in response to the question, "Have your ever
tried to kill yourself?" For that reason, any conclusions
or generalizations drawn from this study are limited to
self-reported suicide attempts, not completed suicide.
Model Defined

Independent Variables

As discussed in chapter 2, research into the relationship between suicide and religion has tended to use county aggregated data. The types of independent or predictive variables used in previous research included national religious book publication rates (Stack, 1983), national and state church attendance data (Lester, 1987, 1988a; Stack, 1985a), United States and Standard Metropolitan Statistical Areas church membership rates (Breault, 1986; Stark et al., 1983), and national, state-averaged, and county-group religious affiliation data (Durkheim, 1897/1951; Pescosolido & Georgianna, 1989; Pope & Danigelis, 1981). Most of these studies used these variables as measures of "religiosity" and tended to use religiosity as a global measure of social-religious integration and regulation.

Church attendance and naming other church members as friends have also been used as measures of religiosity. Several studies have suggested that attendance at religious functions is correlated with religious beliefs (Johnstone, 1975; Stack, 1985a). Fischer (1982) used the naming of fellow congregational members, both kin and non-kin, as a measure of religious integration. Stark and Glock (1973) have determined that conservative Protestants are more likely to participate in religious activities and that they also name fellow congregational members as best friends.
Kelly (1972) referred to mainline, liberal, or ecumenical Protestants as "dormant" because they are less likely to attend church frequently and often do not know other congregational members. In his study, Stack (1983) found that church attendance was the leading predictor of suicide rates among the youth-age cohort. Based on their findings, Pescosolido and Georgianna (1989) suggested that adherents of conservative, non-ecumenical, medium or high tension denominations were more likely to attend services on a weekly basis than were adherents of liberal, ecumenical, low tension denominations. Stack and Wasserman (1992) chose to include church attendance as one of their independent variables for religious networks because they felt that the Pescosolido and Georgianna study (1989) had failed to control for church attendance as an alternative measure of religious networks. Stack and Wasserman (1992) argued that attendance at religious services is a necessary condition for developing networks with co-religionists. Pescosolido and Georgianna (1989) concluded that denominations whose adherents (1) report a greater average number of friends and relatives of the same religion, (2) are more active in participation, and (3) attend church more regularly have the greatest protective effect against suicide.

One of the purposes of this study was to overcome the ecological fallacy problem that has often been a criticism of the previous research. Rather than using large global
measures of religiosity, the Valuegenesis (1989) survey provided individual or micro-level data that allowed for the use of more direct measures of the social-religious integration and regulation variables.

Based on Durkheim's (1897/1951) and Pescosolido and Georgianna's (1989) theories, three categories of theoretical independent variables were included in this analysis: (1) social integration variables, (2) religious integration variables, and (3) religious-social regulation variables. Since the sample was drawn exclusively from adolescents, a fourth category was added to the study. Stack's (1983, 1985a) studies on the effect of religion on suicide among adolescents suggested that the family exerts a strong influence on adolescent religious beliefs. Other research studies agree with these findings (Cornwall, 1988; Greeley & Rossi, 1966; Himmelfarb, 1977; Johnstone, 1966). An examination of suicide among adolescents without including the family's religious influence would fail to account for potential error in the analysis. Therefore, a fourth category dealing with family religious socialization was included in this study.

Independent Variables Defined

A lack of potential independent variables was certainly not a problem with this study. The Valuegenesis (1989) survey is rich with data, but because so many variables were available, an overly complex model was
possible. Glass and Hopkins (1984) suggest that after the best three or four predictors, there is little increase in the multiple correlation coefficient (R). For this reason, efforts were made to reduce the amount of data while ensuring the selection of the best theoretically appropriate and psychometrically sound independent variables.

**Independent variable selection process**

Briefly, the following is an overview of the process that was used to select the independent variables used in this study:

1. All potential Valuegenesis (1989) single items, single-item indices, and scales were screened for their face validity with each of the theoretically defined constructs: religious integration, social integration, social-religious regulation, family religious socialization, and the controlled independent variables. Where theoretically appropriate, the scales and single-item indices used in this study were those that were originally validated for the Valuegenesis data (SI, 1990). Other single items and one scale that were not originally defined and validated for the Valuegenesis survey were selected for use in this study. As with the other previously validated Valuegenesis scales and single-item indices, these additional variables were selected because they appeared on the face to address the defined theoretical constructs.
All single-item indices and scales used in this study are described and detailed in Appendix B.

2. Some of the original scales defined in the Valuegenesis documentation (SI, 1990) were modified for use in this study. One scale not defined in the original documentation was developed from Valuegenesis survey items. These specific scales are discussed later in this chapter. The psychometric soundness of these scales was confirmed using factor and reliability analyses. Confirmatory factor analysis was used to determine if the individual scales shared a common underlying structure and to ensure that those structures addressed the defined theoretical construct. The internal consistency of the scale was then determined using reliability analysis. Single-item indices were selected a priori.

3. To reduce the number of variables for a particular construct, all individual scale scores and single-item indices selected for each construct were analyzed for their statistical "fitness" as a combined construct variable, again using confirmatory factor and reliability analyses.

4. The factor and reliability analyses criteria used to select individual scales were also used to select the combined construct variables for the theoretical constructs.

5. Scales and variables that did not meet statistical or theoretical criteria were either eliminated from
consideration or revised if they were considered theoretically important to the study.

Variable selection statistical criteria. The statistical appropriateness of the factor model for each individual scale and combined construct variable was examined using the following criteria:

1. A correlation matrix was computed to indicate how well the variables selected for a particular construct were related. Correlation coefficients between variables were examined to determine if they were greater than an absolute value of .3 (but not larger than .8) and/or had large correlations with at least one of the other variables being considered (Norusis, 1990c, p. B-127).

2. The Bartlett test of sphericity was used to ensure that the correlation matrix was not an identity matrix (p < .05).

3. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used to determine the appropriateness of the factor model. The KMO measure of sampling adequacy is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. . . . Small values for the KMO measure indicate that factor analysis of the variables may not be a good idea, since correlations between pairs of variables cannot be explained by the other variables. (Norusis, 1990c, p. B-128)

KMO values of .8 or higher were desirable.
4. Measures of sampling adequacy (SMA), printed on the diagonal of the anti-image correlation matrix, were examined to ensure that they were reasonably large.

Factors were initially analyzed using principal component analysis. If the principal component analysis indicated that there was more than one factor identified, varimax and oblimin rotation extraction analyses were used. The following statistical criteria were used to determine variable inclusion in each factor:

1. Eigenvalues of 1.0 or larger and scree plots were used to determine the number of underlying factors.

2. In the original Valuegenesis (1989) analysis, items were discarded if they had factor loadings below .40 or if there was a difference of less than .20 between the main factor and other unrelated factors (South Pacific Division of the Seventh-day Adventist Church, 1993, p. 93). With two exceptions, a factor loading of at least .5 was preferred for use in this study. The exceptions were included because they (1) theoretically were important to the factor, (2) the factor loadings fell within the original Valuegenesis criteria, and (3) their factor loading values could be rounded up to .5.

3. Communality was used to examine the strength of the linear association among variables. The communality of a variable is "the proportion of variance accounted for by the common factors" (Norusis, 1990c, p. B-129). It can also be defined as "the squared multiple correlation
coefficient between a variable and all other variables" (p. B-129). Variables with small squared multiple correlation coefficients, or communality values, should be considered for elimination from a set of variables.

Once the variables had been selected by factor analysis, the selected items and resultant scales were checked for direction, correlation, potential variability, and reliability. The following criteria were used:

1. Items selected for inclusion in a scale were checked to see if they were positively correlated since it was assumed that they were measuring approximately the same thing and in the same direction (Norusis, 1990c, p. B-190). Correlation coefficients were also checked to ensure that items were not measuring the same thing (r < .8).

2. Corrected item-total correlation coefficients were examined to determine the relationship between the value of an individual item with the sum of the scores of the remaining items in the scale. Corrected item correlation coefficients between .3 and .8 were desirable (Norusis, 1990c, pp. B-189-B-190).

4. Attention was given to the potential variance that items could bring to the scale. Individual items that had small standard deviations and appeared to be generally agreed on by the sample were examined. If there were other items with more variability that statistically measured the same construct, the items with more variability were selected.
5. To check for internal consistency, Cronbach's alpha reliability coefficients were calculated for all individual scales and combined variables used with this study. In the original data preparation of the youth sample, scales that did not achieve a reliability of .60 were not retained (Search Institute, 1990, p. 8). The preferred criteria used for scale selection for this study was a reliability coefficient of .70 or higher (Gable & Wolf, 1993). There were a few exceptions to this criteria. It is difficult for two-item scales to meet this criteria and a few of the individual scales were two-item scales that had alphas less than .70 but greater than .60. Also, one combined construct variable (attendance) with an alpha of .65 was included in the model because it was considered theoretically important to the study and its reliability coefficient fell within the criteria set for the original Valuegenesis (1989) scales.

*Items and scale scores combined.* After the variable selection process, all single-item indices and individual scale scores, selected for inclusion in one of the combined variables used to measure the operationalized theoretical constructs, were then converted to T-scores and added together to create the construct variable. With the exception of evaluating the statistical validity and reliability of some of the individual scales used with this
sample, scale scores, not individual scale-item values, were used in all other analyses.

All individual scales and single-item indices used in this study, including specific items and, if appropriate, factor loadings and reliability coefficients, are listed in Appendix B. All combined variables used to operationalize the theoretically defined constructs are discussed later in this chapter and are listed in Tables 2-7.

**Missing values.** In the Valuegenesis (1989) data were a number of variables with a high percentage of missing cases. This created a problem with the selection of variables for the model and in the statistical analyses. Of particular concern was the fact that suicide attempters appeared to be over-represented among the missing variables. The missing data were examined and a strategy was devised to save some of the missing cases. This process is discussed in detail in Appendix C. The strategy resulted in a 19% (n = 599) reduction of missing cases. The sample used in the statistical analyses increased from 50% (n = 1523) to 69% (n = 2122) of the original sample (N = 3072).

**Social integration**

Social integration was defined in this study as an individual's interaction and identification with a social group. Ten items that appeared to measure social integration were ultimately selected. During the factor
analysis process these 10 items loaded into two factors. The first factor loaded 6 of the 10 and appeared to measure denominational and church identity (see Table 2). The loading values for this factor ranged from .535 to .801 with an eigenvalue of 3.76. The factor explained 38% of the variance. Both factors together explained 51% of the variance. All of the single-item indices and individual scales for the social integration identity variable are described and detailed in Appendix B (see p. 138).

The second factor loaded 4 of the 10 items and appeared to address attendance and participation in church activities (see Table 3). The loading values for the second factor ranged from .570 to .783 with an eigenvalue of 1.35. The factor explained 13% of the variance.

Even though the reliability coefficient for this combined construct variable was below the study's preferred criteria of .7 (alpha = .65), this scale was retained because it fell within the original Valuegenesis (1989) criteria and it theoretically matched a concern expressed in the research literature. Attendance at and participation in church functions were considered important variables to include in examining the relationship between suicidal behavior and religion (Johnstone, 1975; Kelly, 1972; Pescosolido & Georgianna, 1989; Stack, 1983, 1985a; Stack & Wasserman, 1992; Stark & Glock, 1973).
Table 2

Statistical Results of the Factor and Reliability Analyses for the Social Integration Identity Variable

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominational Loyalty</td>
<td>.801</td>
<td>.689</td>
<td>.71</td>
</tr>
<tr>
<td>Belonging to a church is important</td>
<td>.758</td>
<td>.636</td>
<td>.66</td>
</tr>
<tr>
<td>Adventism is life goal</td>
<td>.728</td>
<td>.589</td>
<td>.61</td>
</tr>
<tr>
<td>Adventist at 40</td>
<td>.763</td>
<td>.610</td>
<td>.62</td>
</tr>
<tr>
<td>Number of SDA friends</td>
<td>.535</td>
<td>.287</td>
<td>.34</td>
</tr>
<tr>
<td>Peer Religious</td>
<td>.546</td>
<td>.304</td>
<td>.41</td>
</tr>
</tbody>
</table>

Note. Varimax Rotation Analysis (first factor statistics); Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .84; Standardized Cronbach Alpha Reliability Coefficient = .80.
Table 3

Statistical Results of the Factor and Reliability Analyses for the Social Integration Attendance Variable

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worship attendance</td>
<td>.658</td>
<td>.468</td>
<td>.46</td>
</tr>
<tr>
<td>Sabbath school attendance</td>
<td>.570</td>
<td>.442</td>
<td>.41</td>
</tr>
<tr>
<td>Attend other SDA programs</td>
<td>.783</td>
<td>.614</td>
<td>.45</td>
</tr>
<tr>
<td>Volunteer time at church</td>
<td>.680</td>
<td>.468</td>
<td>.39</td>
</tr>
</tbody>
</table>

Note. Varimax Rotation Analysis (second factor statistics); Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .84; Standardized Cronbach Alpha Reliability Coefficient = .65.

All of the single-item indices for the social integration attendance variable are described and detailed in Appendix B (see p. 141).

Religious integration

Religious integration was defined in this study as an individual's acceptance of and commitment to a set of religious beliefs and ideas. Religious integration can be further divided into traditional and specific orthodoxy (Cornwall, 1988, pp. 213-214). Traditional orthodoxy refers to acceptance of traditional Christian beliefs whereas specific orthodoxy refers to acceptance of a set of beliefs specific to a particular religious organization.
Two religious integration variables were ultimately selected. Thayer's (1993) long-form faith maturity scale was selected to represent traditional orthodoxy. Thayer validated this scale for the youth portion of the Valuegenesis (1989) data and reported that this scale may be appropriate for use with other denominations. The faith maturity scale, as it was originally defined by Benson and Donahue (1990), was used to measure mature faith across denominations. The standardized Cronbach's alpha reliability coefficient for this scale with this sample was .90. The faith maturity scale used as the traditional orthodoxy variable is described and detailed in Appendix B (see p. 144).

The specific orthodoxy variable was a revised version of the Adventist Orthodoxy Index from the Valuegenesis data (SI, 1990, p. 12), which measured the endorsement of various uniquely Adventist beliefs. This was one of the scales most affected by the change from the special missing to regular missing with 30% of the cases missing for the original scale. Since religious integration conceptually can be divided into traditional and specific orthodoxy, this scale was considered theoretically to be important and was kept in the study.

The original 10-item Valuegenesis scale (SI, 1990, p. 12) was modified for this study. After Varimax rotation extraction, the item "God created the world in six 24-hour days" factor loaded with the other items in the scale at
.380. This did not meet the factor loading criteria of .50 for the study or the .40 criteria for the Valuegenesis scale development (South Pacific Division of the Seventh-day Adventist Church, 1993, p. 93). Furthermore, it did not appear to be an item that was unique to Adventists. It was eliminated from the scale.

Three other items had very small standard deviations (less than .6) and very large means (greater than 4.8 on a 5 point scale). With the exception of the item "The true Sabbath is the seventh-day--Saturday," these items also did not appear to be unique to Adventists: "Jesus will come back to earth again and take the righteous to heaven" and "The Ten Commandments still apply to us today." Because they contributed little variance to the scale and, in the case of the latter two, did not appear to be unique to Adventists, these were also removed from the scale.

The remaining six items in the revised scale all loaded into one factor with loading values ranging from .618 to .748 with an eigenvalue of 2.886 (see Table 4). The factor explained 48% of the variance. Both the original and the revised Adventist Orthodoxy scale items are described and detailed in Appendix B (see p. 145).
Table 4

Statistical Results of the Factor and Reliability Analyses for the Religious Integration Adventist Orthodoxy Variable

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigative judgment in heaven, 1844</td>
<td>.682</td>
<td>.465</td>
<td>.53</td>
</tr>
<tr>
<td>People remain in grave until resurrection</td>
<td>.693</td>
<td>.480</td>
<td>.53</td>
</tr>
<tr>
<td>Wicked not burn forever, totally destroyed</td>
<td>.618</td>
<td>.381</td>
<td>.46</td>
</tr>
<tr>
<td>Ellen White fulfilled Bible predictions</td>
<td>.748</td>
<td>.559</td>
<td>.59</td>
</tr>
<tr>
<td>SDA Church is God's true last-day church</td>
<td>.737</td>
<td>.543</td>
<td>.57</td>
</tr>
<tr>
<td>Body is God's temple, responsible for it</td>
<td>.676</td>
<td>.457</td>
<td>.50</td>
</tr>
</tbody>
</table>

Note. Principal-Component Analysis; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .84; Standardized Cronbach Alpha Reliability Coefficient = .78.
Social-religious regulation

For the purpose of this study, religious-social regulation was defined as an individual's attitudinal and behavioral conformity to a set of religious and/or social beliefs and standards. Two scale scores were derived for the religious-social regulation variables.

The first index, Endorsement of SDA Standards Overall, measured how much the respondent agreed with or his or her attitude towards various SDA standards. This scale was an original Valuegenesis (1989) scale (SI, 1990, p. 12). The standardized Cronbach's alpha reliability coefficient for this scale with this sample was .88. All of the items used in the Endorsement of Adventist Standards scale are described and detailed in Appendix B (see p. 147).

The second index, self-regulation of Adventist standards, was used as a behavioral scale that measured self-reported enforcement or violation of Adventist lifestyle standards by the individual. Although this was not an original scale for the Valuegenesis (1989) survey, it theoretically appeared to be an important behavioral measure to include in this study.

These items loaded into one factor with loading values ranging from .773 to .496 with an eigenvalue of 2.974 (see Table 5). The factor explained 42% of the variance. All of the items used in the self-regulation of Adventist standards scale are described and detailed in Appendix B (see p. 149).
Table 5

Statistical Results of the Factor and Reliability Analyses for the Social-Religious Regulation Self-Regulation Variable

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear jewelry</td>
<td>.680</td>
<td>.462</td>
<td>.51</td>
</tr>
<tr>
<td>Listen to rock music</td>
<td>.617</td>
<td>.380</td>
<td>.46</td>
</tr>
<tr>
<td>Went to movie theater</td>
<td>.752</td>
<td>.565</td>
<td>.60</td>
</tr>
<tr>
<td>Eat unclean meats</td>
<td>.568</td>
<td>.323</td>
<td>.41</td>
</tr>
<tr>
<td>Watch TV</td>
<td>.496</td>
<td>.246</td>
<td>.35</td>
</tr>
<tr>
<td>Watch movie on VCR</td>
<td>.633</td>
<td>.400</td>
<td>.47</td>
</tr>
<tr>
<td>Drink caffeine</td>
<td>.773</td>
<td>.597</td>
<td>.63</td>
</tr>
</tbody>
</table>

Note. Principal-Component Analysis (1 Factor Criterion); Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .82; Standardized Cronbach Alpha Reliability Coefficient = .77.
Family religious socialization was defined as the family's influence on the development of a child's religious-social attitudes, beliefs, and values. Unfortunately, potential variables that were considered for the family religious socialization variable suffered from very high percentages of missing values (from 13% to 21%). These included items that asked the respondent his or her perception of his or her mother's and father's religiousness and whether the respondents' parents were "biological" Adventists. Unfortunately, due to the large number of missing cases, these items were not included in the analysis.

Items dealing with how much the respondent talked to his/her parents about faith were included in this variable (see Table 6). Benson and Donahue (1990) identified this concept as one of their "effectiveness factors" that are characteristic of families that are associated with the development of faith maturity and denominational loyalty. The factor loads were .879 with an eigenvalue of 1.54. The factor explained 77% of the variance. Cronbach's alpha for this 2-item scale was .704. The KMO value was below the desired .8 criteria (KMO = .50) but the criteria for the other statistical analyses were above those criteria. Both of the items used in the Family Religious Socialization
Table 6

Statistical Results of the Factor and Reliability Analyses for the Family Religious Socialization Variable

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talk to mom about faith</td>
<td>.879</td>
<td>.772</td>
<td>.54</td>
</tr>
<tr>
<td>Talk to dad about faith</td>
<td>.879</td>
<td>.772</td>
<td>.54</td>
</tr>
</tbody>
</table>

Note. Principal-Components Analysis; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .50; Standardized Cronbach Alpha Reliability Coefficient = .70.

variable are described and detailed in Appendix B (see p. 150).

Controlled Independent Variables

Many studies have used gender, age, race, and urban/rural differences as controls in their studies. Self-esteem is a known factor influencing adolescent suicide. Stack (1985a) used divorce and mother's labor force participation as the variables for individualism values and their effect on suicide rates. In the USDHHS report (1989), the following social and psychological factors were most clearly linked to youth suicide: substance use and abuse; parental loss and family disruption; and aggressive, impulsive behaviors. The report also suggested that although there may be a
relationship between sexual and physical abuse and suicide, the studies reviewed did not show one.

Controlled Independent Variables Defined

Controlled independent variables were defined in this study as extraneous measures that are known from previous research to be associated with adolescent suicidal behavior (e.g., gender, family stability, depression), but were not the main theoretical interest of this study (e.g., social-religious integration and regulation). Controlled independent variables are used in this study’s statistical analyses to both account and control for expected or known variance in attempted suicidal behavior.

The following controlled independent variables were selected for use in this study: age, gender, community type, race, family stability, mother's employment, depression, abuse, a self-esteem scale, and an at-risk behaviors index. Since it was assumed that these variables all addressed different constructs, no attempt was made to combine them into a single construct variable. All of the single-item indices, the self-esteem scale, and the at-risk index are described and detailed in Appendix B (see pp. 151-158).

The at-risk scale was a revised version of the At-Risk Index defined in the Valuegenesis documentation (SI, 1990). It was modified in two ways for this study. First, the "Have you ever tried to kill yourself?" item was used as
the dependent variable. Second, since depression had been demonstrated to be a strong predictor of suicide, the item "How often have you felt very sad or depressed during the last month?" was removed from the original At-Risk Index and used as an a priori single-item index.

Even with these changes, the at-risk scale still demonstrated appropriate statistical validity and internal consistency (see Table 7). Using a one-factor Principal Component extraction criterion, all of the remaining eight items loaded together with factor loading values ranging from .552 to .793. The eigenvalue was 3.732. The factor explained 47% of the variance.

The self-esteem scale is a brief version of the standard Rosenberg Self-Esteem scale that was validated on the youth sample of the Valuegenesis survey (SI, 1990, p. 32). The standardized Cronbach's alpha reliability coefficient for this scale with this sample was .76.

To avoid potential problems with zero cell counts in the logistic regression analysis, three of the controlled independent variables were collapsed into dichotomous dummy variables. Community type was collapsed into not urban (farm to small town under 9,999) and urban (e.g., town over 10,000 to large city). Race was dichotomized into White and all other ethnic groups. Family stability was collapsed into married and not married (see Appendix B, pp. 152-155).
Table 7

Statistical Results of the Factor and Reliability Analyses for the At-risk Index

<table>
<thead>
<tr>
<th>Valuegenesis Survey item or scale</th>
<th>Factor loadings</th>
<th>Communality</th>
<th>Correlation with scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drank alcohol</td>
<td>.728</td>
<td>.529</td>
<td>.60</td>
</tr>
<tr>
<td>Used marijuana</td>
<td>.793</td>
<td>.629</td>
<td>.66</td>
</tr>
<tr>
<td>Used cocaine</td>
<td>.734</td>
<td>.539</td>
<td>.59</td>
</tr>
<tr>
<td>Binge drinking</td>
<td>.770</td>
<td>.592</td>
<td>.65</td>
</tr>
<tr>
<td>Beat someone up</td>
<td>.552</td>
<td>.305</td>
<td>.44</td>
</tr>
<tr>
<td>Shoplifting</td>
<td>.702</td>
<td>.492</td>
<td>.57</td>
</tr>
<tr>
<td>Trouble at school</td>
<td>.569</td>
<td>.323</td>
<td>.46</td>
</tr>
<tr>
<td>Engaged in sexual intercourse</td>
<td>.568</td>
<td>.322</td>
<td>.44</td>
</tr>
</tbody>
</table>

Note. Principal-Components Analysis (1 Factor Criterion); Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .85; Standardized Cronbach Alpha Reliability Coefficient = .83.
Unfortunately, the present study lacked appropriate data to control for other identified risk factors. The USDHHS report (1989) listed the following as additional risk factors in adolescent suicides: biochemical factors; specific psychiatric diagnostic groups such as affective disorders, schizophrenia, and borderline personality disorders; a strong family history of suicidal behavior; homosexuality; being a friend or a family member of a suicide victim; experiencing rapid socio-cultural change; having a history of previous suicide behavior; media emphasis on suicide; and ready access to lethal means for committing suicide, such as guns. No variables measuring these risk factors exist in the Valuegenesis (1989) data.

Descriptive Statistics
for All Variables

Table 8 contains the mean, standard deviation, range, and skewness for all variables used in the analysis.

Statistical Analysis Issues

Potential theoretical and statistical problems were encountered in the analysis of the data. The use of a dependent variable that represented a low percentage of the full sample (11%) was problematic. Selecting a random sample of the non-attempting control group, equal in number to the suicide-attempting group, was used in the analysis to overcome this potential problem.
Table 8
Descriptive Statistics for All Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attempted Suicide</td>
<td>.5</td>
<td>.5</td>
<td>0-1</td>
<td>.10</td>
</tr>
<tr>
<td>Gender</td>
<td>.4</td>
<td>.5</td>
<td>0-1</td>
<td>.29</td>
</tr>
<tr>
<td>Age</td>
<td>15.3</td>
<td>1.8</td>
<td>11-18</td>
<td>-.45</td>
</tr>
<tr>
<td>White/Other Ethnic</td>
<td>.6</td>
<td>.5</td>
<td>0-1</td>
<td>-.12</td>
</tr>
<tr>
<td>Urban/Not Urban</td>
<td>.6</td>
<td>.5</td>
<td>0-1</td>
<td>-.56</td>
</tr>
<tr>
<td>Family Stability</td>
<td>.8</td>
<td>.4</td>
<td>0-1</td>
<td>-1.04</td>
</tr>
<tr>
<td>Mom's Employment</td>
<td>2.8</td>
<td>1.1</td>
<td>1-4</td>
<td>-.28</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>14.2</td>
<td>3.0</td>
<td>5-20</td>
<td>-.12</td>
</tr>
<tr>
<td>Abused</td>
<td>1.5</td>
<td>1.0</td>
<td>1-5</td>
<td>1.90</td>
</tr>
<tr>
<td>Depression</td>
<td>2.8</td>
<td>1.0</td>
<td>1-5</td>
<td>.26</td>
</tr>
<tr>
<td>At-Risk Behaviors</td>
<td>1.2</td>
<td>1.8</td>
<td>0-8</td>
<td>1.71</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>68.8</td>
<td>15.5</td>
<td>18-105</td>
<td>-.27</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>26.2</td>
<td>4.0</td>
<td>6-30</td>
<td>-1.25</td>
</tr>
<tr>
<td>Identity</td>
<td>301.6(^a)</td>
<td>41.8</td>
<td>140-380</td>
<td>-.71</td>
</tr>
<tr>
<td>Attendance</td>
<td>200.2(^b)</td>
<td>27.2</td>
<td>113-276</td>
<td>-.39</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>55.7</td>
<td>12.1</td>
<td>17-85</td>
<td>.15</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>30.1</td>
<td>8.9</td>
<td>7-56</td>
<td>.10</td>
</tr>
<tr>
<td>Family Religious</td>
<td>99.5(^c)</td>
<td>17.3</td>
<td>80-134</td>
<td>.42</td>
</tr>
</tbody>
</table>

Note: N = 2122.
\(^a\) Skewness is interpreted as follows: 0 = normal skew, - values = negative skew (tail left), + = positive skew (tail right).
\(^b\) T-scores totaled to combine construct variable.
Two other issues were more difficult to address: (1) the shape of the relationship between the dependent and independent variables and (2) a dichotomous dependent variable. Since the shape of the data was expected, at least theoretically, to be curvilinear, certain statistical procedures did not appear to be appropriate. A dichotomous dependent variable also would create problems for certain statistical analyses.

Menard (1995) states that a dichotomous dependent variable violates several of the assumptions required for linear regression analysis. When a dichotomous variable is used in regression, the statistical model is technically termed a linear probability model (Agresti, 1990, p. 84; Aldrich & Nelson, 1984; as cited in Menard, 1995, p. 6). Probabilities are expressed as values between 0 and 1 (e.g., a value of 0 would indicate that there is no probability of an event occurring and 1 would indicate that there is a 100% chance of the event occurring). However, when a dichotomous dependent variable is used in regression, it is possible that the predicted values for an event occurrence can fall either above 1 or below 0 (Menard, 1995, p. 6).

Second, the relationship between a dichotomous dependent variable and continuous independent variables is inherently nonlinear (Menard, 1995, p. 7). If there is a relationship between X and Y, the plotted observed values of X and Y would resemble an "S curve" with a regression
slope steeper for the middle values of X but flattening at the upper and lower portions of the plot, which represent the upper and lower values of X.

Third, when a dependent variable is dichotomous, the characteristic "S curve" plot and the possibility of the predicted values of Y falling above 1 or below 0 also influence the normal distribution and homoscedasticity of the residuals (Menard, 1995, p. 7). Assuming that the values for X are continuous and capable of being very high and/or very low, residuals at the extreme upper values for X would be negative because the predicted values for Y will be greater than the observed values for Y and positive at the extreme lower values for X because the predicted values for Y would be smaller than the observed values of Y. Consequently, the distributions of the residuals would not be normally distributed. Menard refers to this condition as heteroscedasticity, and

implies that the estimates for the regression coefficients, although not unbiased (not systematically too high or too low), will not be the best estimates in the sense of having a small standard error. . . . Therefore the results of hypothesis testing or construction of confidence intervals for the regression coefficients will not be valid. (1995, p. 7).

Although discriminant analysis is used with categorical dependent variables and can deal with dichotomous dependent variables, its assumptions are far more rigid and less robust than logistic regression. Logistic regression requires far fewer assumptions and even
when the assumptions for linear regression and discriminant analysis are met, logistic regression still functions well (Norusis, 1990a).

Unlike linear regression, which uses the least squares method to estimate the parameters of the model, logistic regression uses the maximum-likelihood method (Hosmer & Lemeshow, 1989; Menard, 1995; Norusis, 1990a). The coefficients that make the observed results most likely are therefore selected. An iterative algorithm is used for parameter estimation since the logistic regression model is nonlinear.

Data Analysis

Logistic regression was used in this study to examine (1) the effect of each of the social-religious integration and regulation independent variables on attempted suicidal behavior, after accounting for all expected or known variance brought to the model by the controlled independent variables, (2) the effect of the full theoretical model alone on attempted suicidal behavior, and (3) the effect of the restricted or theoretical model on attempted suicidal behavior, after accounting for the variance of the controlled independent variables. The full independent variable model in this study consisted of both the controlled and combined construct independent variables. The combined construct variables alone are identified as the restricted or theoretical model. The controlled
independent variables alone are referred to as the controlled model.

Four different statistical analyses were performed to assess the effect of the theoretical variables alone and in the full model. First, t tests, using the dichotomous dependent variable as the grouping variable, were conducted on each of the six social-religious integration and regulation variables. Second, each of the seven social-religious integration variables were logistically regressed alone with the controlled variables. Third, the full theoretical model was logistically regressed without the controlled variables. Fourth, the full theoretical model was regressed with the controlled variables.

To control for differences between groups, separate statistical analyses were also used to examine the effect of the model on attempted suicidal behavior in different groups within the sample. Specific, controlled, independent variables were used as categorical variables to split the sample into the defined groups. Separate, statistical analyses examined the different effects of the model on attempted suicidal behavior among males and females, Whites and other ethnic groups, and urban and non-urban community types. All hypotheses were tested with alpha set at .05.
Diagnostic Examination

Several tests for diagnosing statistical problems in logistic regression analyses have been suggested (Hosmer & Lemeshow, 1989; Menard, 1995; Norusis, 1990a). They include diagnosing specification errors, nonlinearity, nonadditivity, nonnormality of distributed error, collinearity, zero cell counts, complete separation, outliers, and influential cases.

Specification Error

Menard (1995) states that "the first and most important assumption in both linear and logistic regression analysis is that the model is correctly specified" (p. 58). In determining the correct specification of the model, two components are expected. First, the functional form of the model is correct. In other words, the model is correctly specified as linear and/or additive. These two concerns are addressed in the next two subsections.

The second component of determining the correctness of the model specification is that the model includes all of the relevant and no irrelevant independent variables. Theoretically, all of the independent variables used in the model are supported either by the theory or by previous use in the research literature. Omitted variables may occur because theories do not sufficiently explain the phenomenon and fail to identify all of the relevant predictors of the variable of interest.
Additivity

Testing for nonadditivity should be conducted if theoretically it is suspected or if other reasons occur that suggest such interactions exist (Berry & Feldman, 1985, pp. 53-54; Menard, 1995, pp. 78-79).

Linearity

Berry and Feldman (1985) defined linearity as the assumption that for each independent variable $X_i$, the amount of change in the mean value of $Y$ associated with an unit increase in $X_i$, holding all other independent variables constant, is the same regardless of the level of $X_i$... In contrast, if for any independent variable $X_i$ in a model, the change in the mean value of $Y$ associated with a unit increase in $X_i$ varies with the value of $X_i$, we say that $X_i$ is nonlinearly related to the independent variable. (p. 51)

Berry and Feldman (1985, p. 53) and Menard (1995) suggest that the first step that should be taken to determine the shape of the relationship between $X$ and $Y$ should be theoretical rather than technical. Berry and Feldman (1985) indicate that two questions need to be asked when first attempting to detect nonlinearity: (1) Does the theory underlying the statistical model specify a nonlinear relationship between the values of $X$ and $Y$? and (2) If the theory assumes that the relationship is nonlinear, does it also suggest the nature or shape of the nonlinear relationship? Once the theoretical nature of the relationship is well understood, the next step is to determine a technical approach for detecting and then, if...
necessary, for dealing with the statistical problems presented.

The social network theory (Pescosolido & Georgianna, 1989) clearly suggests the possibility of a nonlinear relationship and describes the nature of that relationship as curvilinear. The theory postulates that moderate religious and social integration and regulation predict lower levels of suicidal behaviors. Both extremely high or low religious and social integration and regulation predict higher levels of suicidal behaviors.

With this particular theory, it would be expected that the sign of the value of the relationship between X and Y would change from positive to negative at various levels of X. Generally an easy way to detect a curvilinear relationship is with a simple bivariate plot. However, in the case of a binary dependent variable, the shape of the relationship is not necessarily obvious.

Berry and Feldman (1985) and Menard (1995) suggested a more rigorous test to assess whether the shape of the relationship is curvilinear. They suggested developing categories from continuous-level variables where each category includes a logical range of values for the independent variable that theoretically should change in either coefficient value or sign depending on the theoretical nature of the relationship between X and Y. If the statistical analysis performed on these categorical variables generates estimates that differ substantially
across the various categories from what would be expected in a linear relationship, a nonlinear relationship between X and Y would be suspected.

Logistic regression is capable of supporting such a procedure (Hosmer & Lemeshow, 1989; Menard, 1995). Indicator variables can be used to represent the effect of various categories with regard to a reference category for that variable. Any category can be designated as the reference category. When using indicator variables in logistic regression, interpretation of the effect of these variables is restricted to reference to the other categories within that variable (Norusis, 1990a, p. B-48).

In this study, since the concern was with the effect of the extreme values on the prediction of suicidal behaviors, the second category that contained the middle (or moderate) values was used as the reference category and the signs for the coefficients for the first and third categories were examined for their effect.

In social integration and religious integration variables, higher scores indicated higher integration. In the social-religious regulation variables, because these two variables measured in the opposite direction from each other, higher scores for self-regulation indicated less regulation, whereas higher scores in the Endorsement of Standards indicated higher regulation. It was expected that if the relationship was linear (the null hypothesis), the signs of the coefficients for the first category of the
social and religious integration variables should be positive (indicating that low values predict suicidal behaviors with reference to the middle category) and the signs of the coefficients for the third category should be negative (indicating that high values predict non-suicidal behaviors with reference to the second category). In the social regulation variables, it was expected that the sign of the coefficients for the Endorsement of Standards variable would function like the social and religious integration variables, whereas the self-regulation variable, measured in the opposite direction, would function in the reverse.

Berry and Feldman (1985) acknowledged that the selection of how many categories to use when dividing the variable and where to divide the variable is arbitrary and, if not carefully selected, may influence whether nonlinearity is detected. In this study, the theoretical assumption was that extreme values (both high and low) for the social-religious variables would tend to predict suicidal behavior, whereas moderate or middle values would tend to predict non-suicidal behaviors. For that reason, the social-religious variables for integration and regulation were divided into three categories using one standard deviation above and below the mean as the dividing point. Since the exact nature or strength of the relationship is not precisely predicted by the theory, change in the sign rather than in the size of the
coefficients would be used to detect nonlinearity. The middle values were used as the reference category and the two categories containing the extreme values were used as the indicator variables.

Collinearity

Testing for collinearity in logistic regression is conducted using regression procedures prior to the logistic regression analysis (Menard, 1995). Using regression procedures to diagnose collinearity appears to ignore the concerns of using linear regression with a dichotomous dependent variable. In testing for collinearity, however, the concern is not with the relationship between the independent and dependent variables, but with the relationship between the independent variables themselves (Menard, 1995).

Three tests for collinearity are suggested by Norusis (1990c): tolerance, variance inflation factor (VIF), and variance proportions using eigenvalues. "The tolerance (TOL) of variable i is defined as 1-R_i, where R_i is the multiple correlation coefficient when the ith variable is predicted from the other independent variable" (Norusis, 1990c, p. B-109). Small tolerance values indicate that a variable is a linear combination of other independent variables. The variance inflation factor is considered to be the reciprocal of the tolerance index where VIF_i = 1/(1-R_i) (Norusis, 1990c, p. B-108). Large variance inflation
factors would tend to indicate collinearity. Variance proportions indicate collinearity by identifying variables with high proportions of variance for the same eigenvalue.

Complete Separation

Complete separation in logistic regression occurs when the model perfectly predicts the classification of cases. This results in extremely large coefficients and standard errors. Although theoretically this is what is desired, practically this condition should raise concern about potential problems with the data or having too many variables in relationship to the number of cases (Menard, 1995). This is easily detected by examining the classification or prediction tables that are produced from the logistic regression analysis. Complete separation would be indicated if the model predicted 100% of the observed cases.

Zero Cell Counts

Zero cell counts in logistic regression would tend to result in very large standard errors and possibly large coefficients (Hosmer & Lemeshow, 1989). Only categorical independent variables create problems with zero cell counts. Checking for zero cell counts with a model that contains many independent variables could be a daunting task. Preventing zero cell counts might be a better alternative. One potential remedial or preventive action
is to collapse variables with large numbers of categories into a smaller number of categories (Menard, 1995).

In this study, none of the independent variables of theoretical interest were categorical, although four of the controlled variables were: gender, ethnicity, community type, and family stability. Since these variables were not crucial to the theoretical analysis, and to avoid any potential problem with zero cell counts, ethnicity, family stability, and community type were collapsed into dichotomous dummy variables: White--all other races for ethnicity, married--not married for family stability, and urban--not urban for community type (see Appendix B, pp. 152-155, for a complete description of these variables). Obviously gender was already dichotomous.

Normally Distributed Probability

Plotting the normal probability of the deviance residuals is used to determine if the model fits well (Norusis, 1990a, p. B-54). The deviance statistic in logistic regression is used to assess the goodness-of-fit and is analogous to the residual sum of squares of error in linear regression (Hosmer & Lemeshow, 1989). "Deviance compares the predicted probability of being in the correct group based on the model to the perfect prediction of 1" (Norusis, 1990a, p. B-53).
Analysis of Residuals

In logistic regression, analyses of plotted residuals (e.g., normalized or studentized), differences in beta, and leverage values are used to determine those cases (1) for whom the model does not work well, and (2) that exert considerable influence on the estimated coefficients of the model (Menard, 1995; Norusis, 1990a). Differences in beta are used to measure the change in the logistic coefficients when a case is deleted from the model. Leverage values are used to detect cases that exert a large impact on the predicted values.

Menard (1995) suggested that these plotted diagnostic statistics may "hint at potential problems, but what those problems are, and whether remedial action is required, can only be decided after closer inspection of the data for the unusual cases" (p. 79). However, unusual cases are likely to occur at a rate of at least 5% as a result of random sampling variation and "human choice and free will may naturally produce less than perfect prediction of human behavior" (p. 79).

Summary

This chapter discussed (1) the study's design, (2) data collection, (3) the validity and reliability of the Valuegenesis (1989) survey, (4) the sample and how it was selected, (5) the process for the selection of the research variables used in the statistical analyses, (6) the
statistical issues germane to this study and the data, (7) the procedures used in the data analyses and, finally, (8) the diagnostic procedures that were used to detect potential problems with the data and statistical procedures.
CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

This chapter is organized into three sections: (1) a discussion of the results of the diagnostic examination of the data and statistical procedures, (2) the results of the data analysis, and (3) the conclusions from the data analysis.

Diagnostic Examination

Specification Error

Two components of diagnosing specification error are to first examine the linear and additive forms of the model and, second, to determine the appropriateness of the variables selected for the study. The results of the linear and additive diagnostics are discussed in the next two sections.

Selection of research variables used in a model should be supported either by the theory or by previous use in the research literature. Every attempt was made to select the most appropriate research variables for this study. Variables were selected based on theoretical definitions, use in previous studies, and empirical validation. That process is documented in chapter 3 and Appendix B.

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Additivity

Since the theory did not suggest any interactive or nonadditive conditions and since the statistical responses of the variables during the individual and full model statistical analyses gave no indication of unusual interaction, it was assumed that the model was additive and no further examination was conducted.

Linearity

The results of the statistical test using categorical variables to diagnose nonlinearity in the relationship between the social-religious integration and regulation variables and attempted suicidal behaviors tended to indicate that the relationship between the independent and dependent variables was linear. Table 9 includes the expected and observed coefficient signs. Four of the seven indicator variables functioned as expected. In fact, two of the variables were significant in the model (identity and Adventist orthodoxy).

Of the three variables that did not perform as expected, one of them, faith maturity, had coefficient signs that were opposite of what would be expected. Both high and low values of faith maturity tended to predict non-attempts. The classification table produced by the logistic regression analysis displayed a zero cell count in observed attempts. There were no suicide attempters with high values for faith maturity. This second analysis would
Table 9

Expected and Observed Indicator Variable Coefficient Signs in Testing for Linearity

<table>
<thead>
<tr>
<th>Observed</th>
<th>Expected Sign</th>
<th></th>
<th>Observed Sign</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Values</td>
<td>Category</td>
<td>Values</td>
<td>Category</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Attendance</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Identity</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Family Religious</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Note. A positive sign indicates that the categorical variable tends to predict a suicide attempter. A negative sign indicates that the categorical variable tends not to predict a suicide attempter.
tend to indicate a linear relationship between faith maturity and suicide.

Even though attendance did perform as predicted for a suspected curvilinear relationship, these findings may not support the theory, particularly for an adolescent population. Attendance at church functions may or may not be an adolescent's choice. Religious parents' typically require (or at least strongly encourage) church attendance for their children, including adolescents. Attending church because one is made to go and attending church voluntarily because one wants to and is well integrated into a religious social network are probably two different things. This variable may function differently with an adult population that has the choice of whether or not to attend church. For this reason, the response of this variable was not considered to be a serious indication of the theoretical curvilinear relationship between attendance and suicide attempts. There may be a curvilinear relationship indicated by this variable's performance, but it may well be caused by dynamics other than those considered by the theory.

The family religious socialization variable did perform as predicted by the social network theory. However, since five of the seven variables (including faith maturity) indicated a linear relationship, and since attendance's performance was interpreted as perhaps unique to an adolescent population, it was concluded that the
results tended to demonstrate that the overall nature of the relationship between social-religious integration and regulation, and suicide attempts was linear.

Collinearity

Three tests for collinearity are suggested by Norusis (1990c): tolerance, variance inflation factor (VIF), and variance proportions using eigenvalues. Small tolerance values indicate that a variable is a linear combination of other independent variables. The smallest tolerance value for the variables in this model was .50.

The variance inflation factor is considered to be the reciprocal of the tolerance index (Norusis, 1990c, p. B-108). Large variance inflation factors would tend to indicate collinearity. None of the VIF values were large (VIF < 2.00).

Variance proportions indicate collinearity by identifying variables with high proportions of variance for the same eigenvalue. None of the independent variables for this model shared high proportions of variance for the same eigenvalue. Based on these three diagnostic tests, it was concluded that the independent variables in the model were not collinear.

Complete Separation

Logistic regression produces classification or prediction tables that compare predicted values with observed values. These tables are easily examined to
determine if complete separation has occurred. With complete separation, 100% of the observed cases would be correctly predicted. None of the classification or prediction tables produced by the logistic regression analyses indicated complete separation (see Tables 13, 15, and 16). The largest percent of predicted attempted suicidal behavior was 75%.

Normally Distributed Probability

A plot of the probability of the deviance residuals for this model revealed that the deviances did not appear to be normally distributed. Furthermore, the Kolmogorov-Smirnov (Lilliefors) statistical test for normality also indicated that the assumption of normality should also be rejected (.1315, df = 2122, p < .01).

Although the deviance residuals did not appear to be normally distributed, it was assumed that the statistical conclusions based on this model were not affected. Norusis (1990b) indicated that for most statistical procedures it is important to remember that whenever the sample size is large enough almost any goodness-of-fit test will result in rejection of the null hypothesis [of normality]. For most statistical tests, it is sufficient that the data are approximately normally distributed. (p. B-104)

Menard (1995, pp. 72-73) argued that, in logistic regression, the errors are not assumed to be normally distributed unless the sample size is large. Unlike linear regression analysis, a non-normal distribution, even in small samples, should not affect the validity of the
statistical inferences. More often, deviance residuals are used to identify cases for which the model fits poorly.

Analysis of Residuals

With a large sample size \( N = 2122 \), it was concluded that the elimination of a few highly unusual cases would not have a significant impact on the final results of the analysis. More importantly for this study, extreme cases were at least part of the focus of the analysis. In most statistical analyses, the average performance of the group is the focus. In this study, what was of both theoretical and statistical interest was the relationship of these extremes of the population, overly or not sufficiently integrated and/or regulated individuals, to suicidal behaviors as compared with those individuals who were moderately integrated and regulated. For these reasons, no cases were eliminated from the analysis.

Statistical and Substantive Significance of the Model

Statistical Significance

As with linear regression, there is a distinction made in logistic regression between the statistical and substantive significance of the data results. Statistical significance merely indicates that the model predicted the dependent variable better than if the model had not been used. Substantive significance goes one step beyond mere statistical significance and asks the question, *How much*
better did the predictive model fit or explain the relationship compared to no model?

Three statistics, the Model Chi-Square ($G_\text{m}$), the -2 Log Likelihood (-2 LL), and the goodness-of-fit statistic, are generally evaluated to determine the statistical significance of the goodness-of-fit of a model in logistic regression. Generally, however, it is the Model Chi-Square ($G_\text{m}$) that is the most important to examine in determining the significance of the model. It is analogous to the $F$ statistic in linear regression and is the difference between the -2 LL with only a constant (or, if no constant is used, without any variables) and the present model. In other words, it assumes a null hypothesis that the model does not fit or explain the dependent variable any better than the constant (or no constant if applicable).

Substantive Significance

Menard (1995) suggests the use of both the $R^2_\text{m}$ and $R^2$ in determining the substantive significance of the model. $R^2_\text{m}$ in logistic regression is a proportional reduction in chi-square and indicates how much the predictive model proportionally reduces "badness-of-fit" (Menard, 1995, p. 22). Ranging from 0 to 1, it can be calculated by using the -2 LL and Model Chi-Square ($G_\text{m}$) values ($R^2_\text{m} = G_\text{m}/(G_\text{m}+\text{-2 LL})$).

$R^2$ is referred to as the coefficient of determination and is used in linear regression analysis to explain the
amount of variance in the dependent variable that is explained by the predictive model. Menard suggests that the use of $R^2$, along with the $R^2_{res}$, provides a direct comparison between logistic regression analysis results and other statistical procedures. $R^2$ can be obtained for logistic regression by saving the predicted values from the logistic regression analysis and regressing them with the observed values (Menard, 1995, p. 23).

Predictive Significance

Although the primary function of logistic regression is to determine the likelihood of cases being accurately predicted into the correct categories of interest, there is little agreement on the indices of predictive efficiency (Hosmer & Lemeshow, 1989; Menard, 1995). Menard (1995) suggests that in theory testing, the goodness-of-fit of the model, rather than predictive efficiency, is a more important approach. Classification tables are included in these results, however, since this study focused on theory testing, the goodness-of-fit of the model was of primary interest.

Results of the Data Analysis

Four different statistical analyses were performed to assess the effect of the theoretical variables alone and in the full model: (1) $t$ tests were conducted to evaluate the mean differences between attempters and non-attempters for each of the theoretical variables, (2) each of the seven
social-religious integration and regulation variables were logistically regressed alone with the controlled variables, (3) the full theoretical model was logistically regressed alone without the controlled variables, and (4), finally, the full theoretical model was regressed with the controlled variables. Correlation coefficients were also examined. The correlation matrix of all variables used in the study is contained in Appendix D.

To measure the amount of improvement brought to the full model by the theoretical variables, both of the logistic regression analyses that used the controlled variables along with the theoretical variables (analyses b and d in the preceding paragraph) were performed as follows:

1. The complete model (theoretical variable(s) with the controlled variables) was analyzed first.

2. The controlled variable model was entered, followed by either the individual theoretical variable (analysis b above), or the restricted theoretical model (analysis d above).

This procedure produced an improvement statistic (Improved $R^2$) that indicates how much better the full model predicts suicide attempts with the addition of the theoretical model, after accounting for the effects of the controlled variables.
Results of the t Test Analyses

Table 10 contains the results of the t test analyses. Three of the seven variables, identity, Adventist orthodoxy, and family religious socialization, demonstrated significant differences in the mean values between attempters and non-attempters for the social-religious integration and regulation variables.

Results of the Analysis of the Individual Theoretical Variables With the Controlled Variables

Table 11 contains the results of the logistic regression analyses of the individual theoretical variables alone with the controlled variables. Again, identity and Adventist orthodoxy were significant in the analysis. Even though they were significant, they only proportionally improved the badness of fit by .004 and .002 respectfully.

Results of the Analysis of the Theoretical Model Alone

The Model Chi-Square value for the restricted or theoretical model alone was significant ($G^2 = 146.54, df = 7, p < .01$). The restricted model consisting of the social-religious integration and regulation variables did appear, at least statistically, to significantly predict suicidal behavior (see Table 12). However, the $R^2$ and the $R^2_i$ were only .05 and .07, respectfully. Although the theoretical model by itself was statistically significant, it was not substantively important. Two of the theoretical
Table 10

Results of the t Tests of the Mean Differences Between Attempters and Non-Attempters for Each Social-Religious Integration and Regulation Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean of Non-Attempters</th>
<th>Mean Difference</th>
<th>t Value</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faith Maturity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>68.8</td>
<td>.1</td>
<td>.04</td>
<td>2120</td>
<td>.97</td>
</tr>
<tr>
<td>Attempters</td>
<td>68.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>26.3</td>
<td>.3</td>
<td>1.99</td>
<td>2120</td>
<td>.05</td>
</tr>
<tr>
<td>Attempters</td>
<td>26.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>311.1'</td>
<td>19.9</td>
<td>11.18c</td>
<td>2006</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Attempters</td>
<td>291.2''</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>200.8'</td>
<td>1.3</td>
<td>1.14c</td>
<td>1955</td>
<td>.26</td>
</tr>
<tr>
<td>Attempters</td>
<td>199.5'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>30.0</td>
<td>-.2</td>
<td>-.47</td>
<td>2120</td>
<td>.64</td>
</tr>
<tr>
<td>Attempters</td>
<td>30.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards Endorse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>56.1</td>
<td>.9</td>
<td>1.74</td>
<td>2120</td>
<td>.08</td>
</tr>
<tr>
<td>Attempters</td>
<td>55.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Religious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>100.6'</td>
<td>2.4</td>
<td>2.37</td>
<td>2120</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Attempters</td>
<td>98.2'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 2122.
* Combined T-scores.
* Unequal variance.
Table 11

Logistic Regression Analysis Results—Each Theoretical Variable in Addition to Controlled Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>-2LL</th>
<th>Improve Model Chi-Square</th>
<th>Full Model $R^2$</th>
<th>Improve Model $R^2$</th>
<th>Improve Model $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faith Maturity</td>
<td>2149.7</td>
<td>.3</td>
<td>.27*</td>
<td>.32*</td>
<td>--</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>2144.5</td>
<td>5.5*</td>
<td>.27*</td>
<td>.32*</td>
<td>.002*</td>
</tr>
<tr>
<td>Identity</td>
<td>2140.9</td>
<td>9.1*</td>
<td>.27*</td>
<td>.32*</td>
<td>.004*</td>
</tr>
<tr>
<td>Attendance</td>
<td>2149.0</td>
<td>1.0</td>
<td>.27*</td>
<td>.32*</td>
<td>--</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>2150.0</td>
<td>&lt; .1</td>
<td>.27*</td>
<td>.32*</td>
<td>--</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>2147.5</td>
<td>2.5</td>
<td>.27*</td>
<td>.32*</td>
<td>--</td>
</tr>
<tr>
<td>Faith Religious</td>
<td>2149.6</td>
<td>.4</td>
<td>.27*</td>
<td>.32*</td>
<td>--</td>
</tr>
</tbody>
</table>

Note. $N = 2122$, full model $df = 11$, improvement $df = 1$, dashes indicate improvement was not significant.
* significant, $p <= .05$
Table 12

Logistic Regression Analysis Results—Theoretical Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated Coefficient</th>
<th>Standard Error</th>
<th>Wald</th>
<th>Sig</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faith Maturity</td>
<td>.001</td>
<td>.003</td>
<td>.37</td>
<td>.54</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>-.018</td>
<td>.012</td>
<td>2.11</td>
<td>.14</td>
<td>&lt;-.01</td>
</tr>
<tr>
<td>Attendance</td>
<td>.008</td>
<td>.002</td>
<td>17.06</td>
<td>&lt;.01</td>
<td>.07</td>
</tr>
<tr>
<td>Identity</td>
<td>-.014</td>
<td>.001</td>
<td>117.86</td>
<td>&lt;.01</td>
<td>-.19</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>-.005</td>
<td>.006</td>
<td>.81</td>
<td>.36</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>-.007</td>
<td>.005</td>
<td>2.27</td>
<td>.13</td>
<td>&lt;-.01</td>
</tr>
<tr>
<td>Family Religious</td>
<td>-.002</td>
<td>.003</td>
<td>.34</td>
<td>.55</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Constant</td>
<td>3.73</td>
<td>.663</td>
<td>31.78</td>
<td>&lt;.01</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 2122, G. = 146.54, -2 LL = 2789.47, df = 7, p < .01, R^2 = .05, R^2 = .07.
variables, attendance and identity, were significant predictors.

Logistic regression attempts to predict the group to which an individual case belongs. The predictions produced by the logistic regression analysis of the theoretical model alone are listed in Table 13. Overall, 60% were correctly placed, indicating a relatively low degree of predictive ability.

Results of Analysis of the Theoretical Model With the Controlled Variables

The Model Chi-Square value for the full model was significant ($G^2 = 809.67$, $df = 17$, $p < .01$). The full model consisting of both the theoretical variables and the controlled independent variables did appear to significantly predict suicidal behavior (see Table 14).

The full predictive model with the controlled variables and the integration and regulation independent variables proportionally reduced the badness-of-fit by .28 ($R^2_{\text{prediction}} = .28$) and explained 33% of the variance ($R^2 = .33$).

As a whole, it would appear that the model was modestly effective in predicting the dependent variable. However, when the effects of the controlled variables were accounted for, the addition of the social-religious integration and regulation variables, although significant (improvement chi-square test = 23.66, $df = 7$, $p < .01$), only proportionally reduced the badness-of-fit by .01 ($R^2_{\text{improvement}} = .01$).
Table 13

Classification Table for Attempted Suicide--Theoretical Model Alone

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Attempters</td>
<td>Attempters</td>
</tr>
<tr>
<td>Non-Attempters</td>
<td>782</td>
<td>334</td>
</tr>
<tr>
<td>Attempters</td>
<td>519</td>
<td>487</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. \( N = 2122 \).
Table 14

Logistic Regression Analysis Results--Theoretical Model in Addition to Controlled Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated Coefficient</th>
<th>Standard Error</th>
<th>Wald</th>
<th>Sig</th>
<th>Partial Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.570</td>
<td>.114</td>
<td>24.6</td>
<td>&lt;.01</td>
<td>-.10</td>
</tr>
<tr>
<td>Urban\Not Urban</td>
<td>-.019</td>
<td>.115</td>
<td>.1</td>
<td>.86</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Age</td>
<td>.069</td>
<td>.030</td>
<td>5.1</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
<td>White\Other</td>
<td>-.352</td>
<td>.114</td>
<td>9.4</td>
<td>&lt;.01</td>
<td>-.05</td>
</tr>
<tr>
<td>Family Stability</td>
<td>-.399</td>
<td>.128</td>
<td>9.7</td>
<td>&lt;.01</td>
<td>-.05</td>
</tr>
<tr>
<td>Mom's Employment</td>
<td>.039</td>
<td>.049</td>
<td>.6</td>
<td>.42</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Depression</td>
<td>.545</td>
<td>.066</td>
<td>67.3</td>
<td>&lt;.01</td>
<td>.17</td>
</tr>
<tr>
<td>Abused</td>
<td>.504</td>
<td>.065</td>
<td>60.7</td>
<td>&lt;.01</td>
<td>.16</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>-.150</td>
<td>.022</td>
<td>45.4</td>
<td>&lt;.01</td>
<td>-.14</td>
</tr>
<tr>
<td>At-Risk Behavior</td>
<td>.417</td>
<td>.040</td>
<td>104.2</td>
<td>&lt;.01</td>
<td>.21</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>.001</td>
<td>.004</td>
<td>&lt;.1</td>
<td>.89</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>-.029</td>
<td>.015</td>
<td>3.8</td>
<td>.04</td>
<td>-.02</td>
</tr>
<tr>
<td>Attendance</td>
<td>.001</td>
<td>.002</td>
<td>5.6</td>
<td>.01</td>
<td>.04</td>
</tr>
<tr>
<td>Identity</td>
<td>-.001</td>
<td>.001</td>
<td>13.2</td>
<td>&lt;.01</td>
<td>-.07</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>-.013</td>
<td>.007</td>
<td>2.8</td>
<td>.08</td>
<td>-.02</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>-.009</td>
<td>.006</td>
<td>2.3</td>
<td>.12</td>
<td>-.01</td>
</tr>
<tr>
<td>Family Religious</td>
<td>-.001</td>
<td>.003</td>
<td>&lt;.1</td>
<td>.93</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Constant</td>
<td>1.232</td>
<td>1.046</td>
<td>1.3</td>
<td>.23</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 2122; Full model statistics: $G^2 = 809.67$, $-2 LL = 2126.34$, df = 17, $p < .01$, $R^2 = .28$, $R^2_i = .33$; Improvement statistics: $G^2 = 23.66$, $-2 LL = 2126.34$, df = 7, $p < .01$, Improvement $R^2_i = .01$. 

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Furthermore, the theoretical model did not appear to improve the predictive ability of the full model. The predictions produced by the logistic regression analysis using the controlled variables model alone before the addition of the theoretical variables are listed in Table 15. Overall, 75% were correctly placed with the controlled variables model, indicating a relatively moderately high degree of predictive ability.

The predictions produced by the logistic regression analysis using both the controlled variables model and the theoretical model are listed in Table 16. Overall, again, 75% were correctly placed. Compared to the 75% predicted by the controlled variables alone, this tended to indicate that the theoretical model, when combined with the controlled variables, contributed nothing to the predictive ability. This finding, coupled with only a .01 improvement in reducing the badness-of-fit tends to indicate that the theoretical model is not particularly helpful in predicting attempted suicide among Seventh-day Adventist youth.

The theoretical model also did not appear to predict well within subgroups of the populations. Tables 17 and 18 include the logistic regression analyses for demographic subgroups of the sample. Only 4 of the 11 analyses were significant.
Table 15

Classification Table for Attempted Suicide—Controlled Variables Alone

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-attempters</td>
<td>Attempters</td>
</tr>
<tr>
<td>Non-attempters</td>
<td>885</td>
<td>231</td>
</tr>
<tr>
<td>Attempters</td>
<td>304</td>
<td>702</td>
</tr>
<tr>
<td>Overall</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

Note. $N = 2122.$

Table 16

Classification Table for Attempted Suicide—Theoretical Model in Addition to Controlled Variables

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-attempters</td>
<td>Attempters</td>
</tr>
<tr>
<td>Non-attempters</td>
<td>883</td>
<td>233</td>
</tr>
<tr>
<td>Attempters</td>
<td>297</td>
<td>709</td>
</tr>
<tr>
<td>Overall</td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>

Note. $N = 2122.$
Table 17

Logistic Regression Analysis Results--Theoretical Model in Addition to Controlled Variables by Demographic Group

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>-2 LL</th>
<th>Chi-Square</th>
<th>Sig</th>
<th>Improve Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL SAMPLE</td>
<td>2122</td>
<td>2126.3</td>
<td>23.7</td>
<td>&lt;.01</td>
<td>.01</td>
</tr>
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<tr>
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<td>10.5</td>
<td>.16</td>
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<td>14.2</td>
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<tr>
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<td>.02</td>
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<td>13.2</td>
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Note. df = 17 for total sample, df = 16 for all other subgroups, dashes indicate improvement was not significant.
Table 18

Logistic Regression Analysis Results—Theoretical Model in Addition to Controlled Variables by Ethnic Group

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>-2 LL</th>
<th>Chi-Square</th>
<th>Sig</th>
<th>$R^2$ Improve</th>
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<td>TOTAL SAMPLE</td>
<td>2122</td>
<td>2126.3</td>
<td>23.7</td>
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<td>.01</td>
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<td>Asian</td>
<td>143</td>
<td>122.5</td>
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<td>Multi-Racial</td>
<td>281</td>
<td>274.7</td>
<td>4.1</td>
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</table>

Note. $df = 17$ for total sample, $df = 16$ for all other subgroups, dashes indicate that improvement was not significant.
Conclusions

The result of the linearity diagnostic examination tended to indicate that, contrary to the social network theory, the relationship between the theoretical variables and suicide attempt was linear.

The theoretical model both by itself and with the controlled variables was statistically significant ($p < .01$). Furthermore, when the effects of the controlled variables were accounted for, the restricted model was also statistically significant ($p < .01$). However, substantively, the restricted theoretical model contributed little, and for most demographic subgroups, nothing, towards reducing the badness-of-fit of the prediction model.

Identity, one of the social integration variables, appeared to be the most consistent predictor among the theoretical variables. It was significant in all of the analyses. However, it was not substantially important. When regressed alone with the controlled variables, it only reduced the probability of the badness-of-fit by .004. Adventist orthodoxy was a significant predictor in three of the four analyses. However, like identity, Adventist orthodoxy was statistically significant, but not substantively important. When regressed alone with the controlled variables, it only proportionally reduced the badness-of-fit by .002. Attendance and family religious
socialization were each significant in only one of the analyses.

Among the controlled variables within the model, it appeared that at-risk behavior, depression, abuse, and self-esteem were the strongest significant predictors for this model (see Table 14). They were significant in every analysis in which they were included. These variables' partial correlation coefficients were .21, .17, .16, and -.14, respectfully, in the full model analyses.

Summary

This chapter presented the results of the data analyses used in this study. First, the results of the diagnostic information concerning the assumptions of the statistical procedures and the nature of the data were discussed. Next, the results of the logistic regression procedure were presented. Finally, the conclusions based on the statistical results were discussed.

Based on the results, there does appear to be a statistically significant relationship between the variables for social-religious integration and regulation and attempted suicidal behavior in Seventh-day Adventist adolescents. However, the results also tended to indicate that although the relationship was statistically significant, once the effects of the controlled variables were accounted for, the theoretical model containing the social-religious integration and regulation variables did
little to decrease the badness-of-fit of the model and, thus, was not substantively significant. Another theoretically significant finding indicated that the shape of the relationship appeared to be linear.
CHAPTER 5

SUMMARY, DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Summary

Statement of the Problem

Pescosolido and Georgianna's (1989) social network perspective focuses on the connection between religious organizational structure and beliefs, and the resultant social networks. This perspective examines the extent to which supportive social networks and, in particular, the influences of social-religious integration and regulation within these religious communities function as a prophylactic influence against suicide.

Two methodological criticisms are cited in the research literature dealing with religion's influence on suicide. The first criticism focuses on the use in sociological research of county-level aggregate data, such as those used by Pescosolido and Georgianna (1989). Several authors have suggested that the use of individual-level data would produce a more complete understanding of the relationship between individual religious involvement and suicide (Breault, 1986; Dublin, 1963; Maris, 1981; Pescosolido, 1994; Stack, 1992a).
The second criticism of this research involves the use of individual-level data. Even when individual-level data are available, Stack (1992a) cautioned that interpreting data that combine all Protestant denominations may mask variations in suicidal behaviors that correspond to differences between denominations.

Statement of Purpose

The purpose of this study was to examine the influence of social integration, religious integration, and religious-social regulation on attempted suicidal behaviors in adolescents within a single Protestant denomination.

Overview of Related Literature

Durkheim's classic 1897 study on the influence of Catholicism and Protestantism on national suicide rates in Europe tended to demonstrate that two aspects of religion--social integration and regulation--protected its followers from self-destructive behavior (Durkheim, 1897/1951). Durkheim's social perspective on suicide emphasized that the sheer number of commonly held religious beliefs and practices formed the basis of social integration and regulation, and thus provided a prophylactic influence for adherents against suicide.

A new theoretical framework, the social network theory of suicide (Pescosolido & Georgianna, 1989), focuses on the connection between religious organizational structures, the resultant social networks within those structures, and
adherence to religious beliefs. Pescosolido and Georgianna agreed with Durkheim's basic premise that social integration and regulation were the two important dimensions that protected religious adherents from suicide; however, because of historical and cultural changes, research into religion's protective power must specify and examine the social mechanisms at work within diverse religious groups. Furthermore, they also demonstrated that there were few differences between religious groups in the number of so-called "life-saving" beliefs. Instead, the difference between these groups was the adherence to these beliefs.

Pescosolido and Georgianna (1989) concluded that protective denominations were structured and organized in ways that promoted the development of socially supportive networks that were more integrating and regulating than other denominations and thus tended to provide a prophylactic influence against suicide.

Methodology

This study was designed to investigate the impact of religious-social integration and regulation on attempted suicidal behavior in Seventh-day Adventist adolescents. Data from the Valuegenesis (1989) survey, conducted by the Search Institute for the Seventh-day Adventist Church, were used for this study. Subject responses were limited to
adolescents, ages 11 to 18, who identified themselves as Seventh-day Adventists.

Logistic regression analysis was used to examine the relationship between the hypothesized model and one dichotomous dependent variable. The model used in the analysis consisted of religious integration, social integration, religious-social regulation, and family religious socialization measures as well as controlled variables from the Valuegenesis (1989) data. These independent variables were selected by theoretical insights and empirical results (factor and reliability analyses). The dependent variable was a measure of self-reported attempted suicidal behavior included in the Valuegenesis data.

Discussion of Findings

The purpose of this study was to examine the relationship between measures of social-religious integration and regulation, and attempted suicidal behaviors among adolescents within a religious denomination. The statistical analyses indicated that there was a significant relationship between the measures of social-religious integration and regulation, and attempted suicidal behaviors.

As with linear regression, there is a distinction made between the statistical and substantive significance of the data results. Statistical significance merely indicates
that the model predicted the dependent variable better than if the model had not been used. Substantive significance goes one step beyond mere statistical significance and asks the question, How much better did the predictive model fit or explain the relationship compared to no model?

Although there does appear to be a relationship between the variables for social-religious integration and regulation and the dependent suicidal behavior in Seventh-day Adventist adolescents, the statistical evidence also tends to indicate that although the relationship is statistically significant, once the effects of the control variables were accounted for, the theoretical model containing the social-religious integration and regulation variables did little to decrease the "badness-of-fit" of the model and, thus, was not substantively significant.

Furthermore, only one of the theoretical variables, a social integration variable for denominational identity, was a significant predictor in all of the statistical analyses. Another variable, a religious integration variable--Adventist orthodoxy--was significant in three of the analyses. However, like the full model, neither of these two variables was substantively important. The results indicated that, after the effects of the controlled variables were accounted for, denominational identity and Adventist orthodoxy, although statistically significant ($p < .01$), did little proportionally (.004 and .002, respectively) to improve the goodness-of-fit of the model.
in predicting attempted suicidal behavior. Two other variables, family religious socialization and attendance, were each a significant predictor in only one of four different analysis.

Another theoretically significant finding from the linear diagnostic procedure indicated that the nature of the relationship between the independent and dependent variables was linear, not curvilinear as the theory suggested.

Implications

The results of this study indicated that although the relationship between social-religious integration and regulation and suicidal behaviors was significant, it was not substantive. These conclusions were not surprising. Many studies over the past 100 years since Durkheim published his classic book on the subject have produced mixed results concerning the nature of the relationship between religion and suicide (Stack, 1983, 1992b; Stark et al., 1983).

There may be several reasons why the results of this study were inconclusive. Possible explanations tend to center around five points of concern: statistical issues, Adventist cultural issues, perfectionism and depression, characteristics of adolescent populations, and a need for comparison groups.
Statistical Limitations

Limitations are always a concern in any study. However, before the discussion of the limitations, it may be valuable to point out that although there were certainly several major problems that could potentially restrict the interpretation of these results, nevertheless, this study and the Valuegenesis (1989) data provided a good opportunity to improve on the methodological problems experienced in the previous research in this area. The relationship between social-religious integration and regulation, and attempted suicidal behavior at the individual level within a single denomination was able to be examined.

There were several major statistical problems with this study. The high percentage of missing data for some of the research variables was certainly an area of concern. Of particular concern was the over-representation of suicide attempters among the missing variables.

Another limitation of the data was the homogeneity of the sample. Although it was an advantage to examine the relationship between social-religious integration and regulation, and attempted suicidal behavior within a single denomination, the single denomination population restricted the amount of variance brought to the study.

Many of the variables "ceilinged" out. In other words, most of the responses were either agreed or strongly agreed with no potential for higher responses that might
tease out other "upper end" differences. Three of the items eliminated from the Adventist Orthodoxy scale had means of over 4.8 on a 5-point scale with a standard deviation of under .6. On those three items, 96% of the participants marked the two highest response categories. These items were not isolated responses. The vast majority of the response patterns in the Valuegenesis data were negatively skewed.

The homogeneity of the sample also caused less variance at the high-end values for the variables than for the low-end values. The social network theory suggests that those who are overly integrated into and regulated by their social-religious network are at a higher risk for suicide than are those individuals who are moderately integrated and regulated. Since differences among the high-end values could not be teased out due to the ceiling effect, it was difficult to separate moderately from overly integrated and regulated individuals, thus making it difficult, if not impossible, to determine if there were any real differences in attempted suicidal behavior between the two groups.

Finally, attempted suicide is not the same as completed suicide. Any conclusions about suicide attempters cannot be extended to individuals who commit suicide.
Adventist Culture

It is necessary to consider the influence of Adventist culture on its adolescents and its potential influence on the results of this study. There may be several reasons why social and religious integration and regulation variables explained so little of the variance in attempted suicidal behavior among Adventist youth.

Although Adventist youths were higher in both faith maturity and denominational loyalty than were youths in six other U.S. denominations (which included five defined as mainline Protestant denominations and the Southern Baptist Convention), Adventist adolescents did not demonstrate anticipated increases in these dimensions between grades 6 and 12 (Benson & Donahue, 1990, p. 15). Comparatively, adolescents in the Southern Baptist Convention increased in faith maturity, from 26% to 34% between the grades 7 to 12. Among Adventist youth during those same grades, the growth pattern for faith maturity is mixed while denominational loyalty declined slightly. At least some Adventists suggest that this indicates a decline in the influence of the Adventist church on its youth.

According to Benson and Donahue (1990), Adventist youths had noticeably lower rates of sexual and chemical involvement when compared with the general U.S. adolescent population (Benson & Donahue, 1990). This indicated that they were less likely to engage in at-risk behaviors that often are strong predictors of suicide in adolescents.
Nevertheless, the percentage of attempted suicidal behavior was actually higher among Adventist youth than among other adolescent samples. In the Valuegenesis (1989) data, 11.5% of the respondents indicated that they had attempted suicide compared with a suicide attempt rate of 8.4% among "normal" Midwest high-school students (Smith & Crawford, 1986).

These attempted suicide statistics are rather startling considering Pescosolido and Georgianna's (1989) results that found the Adventist Church to be one of only four Protestants denominations that tended to protect its adherents from suicide. Of course, attempted suicide is not the same as completed suicide. Nevertheless, the fact that Adventist adolescents tend to attempt suicide at a higher rate than do other adolescents raises questions that perhaps have no easy answers. Since Benson and Donahue's (1990) research indicated that Adventist youths engaged in fewer at-risk behaviors than did other youths from other denominations, some other dynamic must be influencing Adventist youths' suicidal behavior.

Although at-risk behavior among Adventist adolescents is less prevalent than for some other denominations, is was one of the most consistent predictors of attempted suicidal behavior in this study. One approach that might be used would be to examine the relationship between the theoretical model and the constellation of at-risk behaviors, instead of examining suicide by itself. Suicide
is 1 of 10 at-risk behaviors identified for the At-Risk Index in the Valuegenesis (1989) data. A very preliminary regression analysis using this approach showed a mild relationship between the theoretical model and at-risk behavior ($R^2 = .28$, $R^2$ Change = .08, $F = 529$, $df = 15$, $p < .01$).

**Perfectionism and Depression**

Huffine (1989) suggests that social structures can support and protect individuals, but they can also produce stress. Within the Adventist church are strong doctrinal themes involving the concept of perfection. Born out of the Wesleyan tradition, this belief suggests that as Christians gradually die to sin and grow in grace, God will someday perfect them in love. There is in Wesley’s doctrine a clear message not only of right living, but also of grace and mercy.

This doctrine of perfection may inadvertently increase the stress an Adventist adolescent may experience. It is often difficult for adolescents, and for some adults, to understand that perfectionism is not just keeping all of the commandments faithfully. Grace is a rather abstract concept even for some mature Christians. Adolescents understand rules. As will be discussed later in this chapter, they may not yet cognitively understand the concepts of grace and mercy. Perhaps for some Adventist
youth, failing to live up to their idealized concept of perfection may drive them to attempt suicide.

Depression has been identified as a strong predictor of suicide in all age groups. In this study, depression appeared to be one of the stronger predictors of attempted suicidal behavior. Some theorists suggest that there is a strong link between perfectionism and depression. Beck (1976) refers to this kind of thinking as polarized thinking that involves thinking in either/or extremes. He suggests that depressed persons are more prone to perfectionistic thinking. They set up idealized standards, and when they fail to live up to these standards, they spiral into more depression.

Clearly there is in this study a relationship between depression and attempted suicidal behavior in Adventist youth. However, it may not be related to perfectionism. Within the Valuegenesis (1989) data is a scale that measures a law/works orientation towards salvation. It uses such items as "I know that to be saved I have to live by God's rules" and "The more I follow Adventist standards and practices, the more likely it is that I will be saved." If this unrealistic, idealized drive to be perfect by living according to God's rules is strong among Adventist youth, it would be expected that depression and this law/works orientation would be correlated. However, when the score of this scale was correlated with depression, there was virtually no statistical relationship between the two
variables \((r = .0413, N = 2122)\). Furthermore, law/works did not correlate with suicidal behavior \((r = -.0095, N = 2122)\). Operationalizing perfectionism by using the law/works scale suggests that perfectionism is not related to either depression or suicidal behavior in this sample.

Characteristics of Adolescent

One of the potential problems with this study and its results may be that it utilized an adolescent sample. This theoretical model may simply work better with adults. Several characteristics of adolescents point to this conclusion.

Although there has been considerable debate within the Adventist community concerning the validity of Benson and Donahue's (1990) definition and measurement of faith maturity (Dudley, 1994; Thayer, 1993), nevertheless, part of Benson and Donahue's (1990) definition of that construct may be applicable to the results of this study. Benson and Donahue identified several concepts that fit with this study. They refer to an individual with maturing faith as integrating several dimensions including, "experiences a sense of personal well-being, security, and peace. . . . Seeks to be a part of a community of believers in which people. . . . support and nourish one another. . . . Holds life-affirming values" (p. 5).

These dimensions certainly appear to be characteristics of the supportive type of social network.
that Pescosolido and Georgianna (1989) would consider as protective against suicidal behavior. However, Benson and Donahue (1990) continued and stated that "faith maturity is most likely to be evidenced in the adult years" (p. 6). Perhaps adolescents have not developed enough in their faith to understand the social support that comes with mature faith.

Fowler (1981) suggests that adolescents during this age may be in what he terms the Synthetic-Conventional Faith stage. This stage is characterized by conformity to the religious beliefs of others. Personal, internalized faith is thought by Fowler to come later in an individual's development. Perhaps, cognitively, adolescents cannot conceptually understand the protective value of a secure faith. In a crisis, faith that is borrowed from others but not personally owned and internalized may be abandoned.

Other characteristics of adolescents may help explain why this model may not fit particularly well with this study's sample. Elkind (1978) described a characteristic of adolescents that might explain why social support variables may not function as well with adolescents as they might in adult populations. Elkind describes adolescents as having a special type of egocentrism that manifests itself as a personal fable mentality. Within the personal fable is a belief that no one else ever has experienced, and, therefore, cannot possibly feel the pain that the adolescent feels. This sense of "painful uniqueness" may
lead many adolescents to social isolation at a time when they most need social support.

**Need for Comparison Groups**

Certainly, as Stack (1992a) suggested, examining data from single denominations is a methodological improvement over the use of data that combine various Protestant groups. Looking at data from within a single denomination does allow the researcher to potentially unmask variations in suicidal behaviors that may represent differences between denominations.

However, caution should also be used in the interpretation of data that is only from a single denomination as was the case in this study. With no other denominational data or other comparison groups with which to compare the results, conclusions drawn from single samples are limited in scope. Expanded comparisons—and with them, perhaps, reliable conclusions—may not be possible until the model is applied across denominations. Only then can differences between denominations be "unmasked" and with that a better understanding of the dynamics within a denomination.

Certainly, part of the advantage of the whole Valuegenesis project has been the comparison of the data collected from Adventists with data collected from other denominational groups. Perhaps the lack of growth in faith maturity and denominational loyalty among Adventist
adolescents cited earlier would not have been identified had other denominations' data not been available with which to compare.

Part of the intent of this study was to develop a model, or a template for a model, that could be applied to data from other denominations. Several different denominational databases have been collected by the Search Institute and the template for this model could well be applied to the data from those other groups.

**Recommendations**

The following are suggestions for further research in this area. Similar studies both within and across other denominations should be conducted. Further studies with other age group populations and using populations that are more heterogeneous (religious and nonreligious participants) would be beneficial. It also would be helpful to conduct qualitative methods, along with quantitative methods, to develop a better understanding of the relationship between religion and suicide.
APPENDIX A

PERMISSION LETTERS
June 24, 1997

Elizabeth Mossier
734 S. 34th Street
South Bend IN 46615

Dear Elizabeth:

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

HSRB Protocol #: 96-97 154 : Application Type: Original Dept:
Review Category: Exempt Action Taken: Approved
Protocol Title: The Influence of Social Integration, Religious Integration, and Religious-Social Regulation on Suicidal Behaviors Among Seventh-day Adventist Youth

On behalf of the Human Subjects Review Board (HSRB) I want to advise you that your proposal has been reviewed and approved. You have been given clearance to proceed with your research plans.

All changes made to the study design and/or consent form after initiation of the project require prior approval from the HSRB before such changes are implemented. Feel free to contact our office if you have any questions.

The duration of the present approval is for one year. If your research is going to take more than one year, you must apply for an extension of your approval in order to be authorized to continue with this project.

Some proposal and research designs may be of such a nature that participation in the project may involve certain risks to human subjects. If your project is one of this nature and in the implementation of your project an incidence occurs which results in a research-related adverse reaction and/or physical injury, such an occurrence must be reported immediately in writing to the Human Subjects Review Board. Any project-related physical injury must also be reported immediately to the University physician, Dr. Loren Hamel, by calling (616) 473-2222.

We wish you success as you implement the research project as outlined in the approved protocol.

Sincerely,

James R. Fisher, Director
Office of Scholarly Research
c: Frederick Kosinski
Memo

To: James Fisher, Office of Scholarly Research
From: Jerry Thayer
Subject: Permission to use data
Date: May 7, 1997

Liz Hossler has been authorized to use the Valuegenesis data for her dissertation. She will be receiving the data from my office.
APPENDIX B

RESEARCH VARIABLES
APPENDIX B

RESEARCH VARIABLES—SCALES
AND SINGLE ITEM INDICES

Introduction

Most of the single item indices and scales listed in this appendix were developed and identified as specific Valuegenesis measures by the Search Institute in conjunction with the Seventh-day Adventist committee that validated the Valuegenesis (1989) survey. The documentation and descriptions of these scales and single item indices are listed in Documentation of data Valuegenesis procedures and scale calculations (Search Institute[SI], 1990, September 2, revised). These specific measures are referenced with page numbers to that document.

Some of the single item indices and two scales (self-regulation of Adventist standards and Thayer's [1993] long form faith maturity scale) were not identified scales or indices in the Valuegenesis documentation (SI, 1990). These single item indices and the scale were selected for use in this study because they appeared on the face to measure the constructs used in this study. They are cited as an "a priori index." Several of the single item indices were variables used in other studies and, for consistency, were selected for use in this study. References to other
studies that used similar measures are cited. New or revised individual scales were evaluated using factor and reliability analyses. Tables with the statistical results of these analyses are listed Chapter 3.

With the exception of evaluating the statistical validity and/or reliability of an original individual scale for use with this sample, scale scores, not individual scale item values, were used in all other analyses. Scale scores and single item index values were converted into T-scores and added together to create the combined construct variables. Results of the factor and reliability analyses for the combined construct variables are discussed in Chapter 3.

The survey numbers for each item precede the item listing. An "R" preceding an item number indicates a permanently reversed recode (SI, 1990, pp. 4-5). All item numbers are preceded by either a C or a Y. The Valuegenesis (1989) survey was given to several different populations including pastors, principals, teachers, parents, and youth. Each survey shared a common core and a section specific to that population. Consequently, the Valuegenesis youth survey is divided into the core section (designated by C) and a specific youth section (designated by Y). The response format and the scoring range are included for each item.
Social Integration

Social integration was defined as an individual's interaction and identification with a social group. Opportunities to interact with others in a social group both contribute to and are a necessary condition for social integration.

Identity

Denominational Loyalty Scale
(SI, 1990, p. 14)

Item: Y149 How important is it to you to attend a local church of your denomination?

Response format:

1 = It is not too important at all, I could just as well attend a church of another denomination
2 = It is not too important to me
3 = It is somewhat important to me
4 = It is important to me
5 = It is extremely important to me

Item: Y150 How satisfied are you with your denomination?

Response format:

1 = Very dissatisfied
2 = Dissatisfied
3 = Neither satisfied nor dissatisfied
4 = Satisfied
5 = Very satisfied

Item: Y151 If you moved to another city that had many
churches from which to choose, would you attend a church of the same denomination you now attend?

Response format:

1 = No
2 = No, probably not
3 = Maybe
4 = Yes, probably
5 = Yes, absolutely

Scale score range: 3-15

Standardized Cronbach's alpha reliability coefficient: .74

Adventist Life Goal Scale
(SI, 1990, p.14)

Item stem: Listed below are 14 goals that some people say are important to them. What are your goals? For each of these, indicate how important the goal is for you. Speak for yourself, according to what you want in life.

C134 To live my life according to Adventist standards
C141 To be active in the Adventist Church

Response format:

1 = Not at all important
2 = Somewhat important
3 = Quite important
4 = Extremely important
Scale score range: 2-8

Standardized Cronbach's alpha reliability coefficient: .76

Adventist at 40

(SI, 1990, p. 37)

Item: Y374 When you are 40 years old, do you think you will be active in the Adventist Church?

Response format:

1 = No chance
2 = Small chance
3 = Fair chance
4 = Good chance
5 = Excellent chance

Score range: 1-5

Church Importance

Importance of Belonging to a Church (a priori index)

Item: Y42 How important is it to you belong to a church?

Response format:

1 = Not at all important
2 = Not too important
3 = Somewhat important
4 = Important
5 = Very important

Score range: 1-5
Adventist Friends
(SI, 1990, p. 34)

Item: C44 If you had a birthday party and invited your 5 best friends (excluding relatives), how many would be people who go to an Adventist Church?

Response format:
1 = 0 friends
2 = 1 friend
3 = 2 friends
4 = 3 friends
5 = 4 friends
6 = 5 friends

Score range: 1 - 6

Peer Religious
(SI, 1990, p. 37)

Item: Y372 How religious, on the average, are your 3 or 4 best friends?

Response format:
1 = not at all religious
2 = somewhat religious
3 = very religious

Score range: 1-3

Attendance

Sabbath School Attendance
(a priori index)

Item: Y225 How often do you attend Sabbath School?
Response format:

1 = never
2 = less than once a month
3 = about once a month
4 = 2 or 3 times a month
5 = about once a week
6 = every week

Score range: 1-6

Worship

Worship Attendance (SI, 1990, p. 35)

Item: Y145 How often do you attend worship services at a church?

Response format:

1 = never
2 = less than once a month
3 = about once a month
4 = 2 or 3 times a month
5 = about once a week
6 = every week

Score range: 1-6

Program

Attendance at church programs other than Sabbath School or worship (a priori index)

Items: Y146 How many hours, if any, during an average month
do you attend programs or events at a church other than worship services or Sabbath (or Sunday) schools?

Response format:
1 = 0
2 = 1-2 hours
3 = 3-5 hours
4 = 6-10 hours
5 = 11-20 hours
6 = More than 20 hours

Score range: 1-6

Volunteer

Amount of time spent volunteering at church (a priori index)

Item: Y147 How many hours, if any, during an average month do you give volunteer time at a church to teach, lead, serve on a committee, or help with some program or event?

Response format:
1 = 0
2 = 1-2 hours
3 = 3-5 hours
4 = 6-10 hours
5 = 11-20 hours
6 = More than 20 hours

Score range: 1-6
Religious Integration

Religious integration was defined in this study as an individual's acceptance of and commitment to a set of religious beliefs and ideas. Religious integration was further divided into traditional and specific orthodoxy (Cornwall, 1988, pp. 213-214). Traditional orthodoxy refers to acceptance of traditional Christian beliefs. Specific orthodoxy refers to acceptance of a set of beliefs specific to a particular religious organization.

Traditional Orthodoxy

Faith Maturity Scale

Thayer's (1993) long form faith maturity scale

Item stem: How true are each of these statements for you?
Mark one answer for each. Be as honest as possible, describing how true it really is and not how true you would like it to be.

C3 My faith shapes how I think and act each and every day.
C4 I help others with their religious questions and struggles.
C7 My faith helps me know right from wrong.
C9 I devote time to reading and studying the Bible.
C11 Every day I see evidence that God is active in the world.
C14 I seek out opportunities to help me grow spiritually.
C15 I take time for periods of prayer or meditation.
C23 I feel God's presence in my relationships with other people.
C24 My life is filled with meaning and purpose.
C30 My life is committed to Jesus Christ.
C31 I talk with other people about my faith.
C33 I go out of my way to show love to people I meet.
C34 I have a real sense that God is guiding me.
C36 I like to worship and pray with others.
C38 I am spiritually moved by the beauty of God's creation.

Response format:

1 = Never
2 = Rarely true
3 = True once in a while
4 = Sometimes true
5 = Often true
6 = Almost always true
7 = Always true

Scale score range: 15-105

Standardized Cronbach’s alpha reliability coefficient: .90

Specific Orthodoxy

Adventist Orthodoxy Scale
(SI, 1990, p.12)

Item stem: How strongly do you believe each of the
following statements? Please mark only one answer for each.

**Original Valuegenesis Adventist Orthodoxy scale items:**

C98 God created the world in six 24-hour days.

C99 Jesus will come back to earth again and take the righteous to heaven.

C100 The Ten Commandments still apply to us today.

C101 The true Sabbath is the seventh day Saturday.

C102 The Investigative or pre-advent judgement in heaven began in 1844.

C103 When people die, they remain in the grave until the Resurrection.

C104 The wicked will not burn forever but will be totally destroyed.

C105 Ellen G. White fulfilled Bible predictions that God would speak.

C106 The SDA church is God's true last-day church.

C107 The body is a temple of God, and we are responsible to care for it.

**Revised Adventist Orthodoxy scale items:**

C102 The Investigative or pre-advent judgement in heaven began in 1844.

C103 When people die, they remain in the grave until the Resurrection.

C104 The wicked will not burn forever but will be totally destroyed.
C105 Ellen G. White fulfilled Bible predictions that God would speak.

C106 The SDA church is God's true last-day church.

C107 The body is a temple of God, and we are responsible to care for it.

Response format:

1 = I definitely do not believe this
2 = I am uncertain but lean toward not believing
3 = I am uncertain whether or not I believe this
4 = I am uncertain but lean toward believing
5 = I definitely believe this
missing = I have never heard of this

Score range: 6-36

Standardized Cronbach's alpha reliability coefficient: .72

Note: Since this scale was revised and used as the specific orthodoxy variable, the results of the factor and reliability analyses for this scale are discussed in the methodology chapter (see Table 8 in Chapter 3).

Religious-Social Regulation

Religious-social regulation was defined as an individual's attitudinal and behavioral conformity to a set of religious and/or social beliefs and standards.

Endorsement of Adventist Standards Overall

(SI, 1990, p. 18)
Item stem: Adventists have a number of standards about behavior. How much do you personally agree or disagree with each of these standards:

C208 One should not use tobacco
C209 One should not drink beer or liquor
C210 One should not wear jewelry
C211 One should not listen to rock music
C212 One should not watch movies in theaters
C213 One should not dance
C214 One should not use illegal drugs
C215 Sex should only occur in marriage
C216 One should not eat unclean meats
C217 One should not watch TV or VCRs
C218 One should observe the Sabbath
C219 One should wear modest clothes
C220 One should not engage-competitive sports
C221 One should exercise daily
C222 Married persons should not wear a ring
C223 One should not use drinks with caffeine
C224 One should not drink wine

Response format: Choose one of these responses:

1 = I definitely disagree
2 = I tend to disagree
3 = I'm not sure
4 = I tend to agree
5 = I definitely agree
Scale range: 17-85

Standardized Cronbach's alpha reliability coefficient: .88

Regulatory Behavior

Self-Regulation

Behavioral self-regulation of Adventist standards (a priori scale)

Item stem: How often, if ever, did you do each of the following during the last year?

C179 Wear jewelry
C180 Listen to rock music
C181 See a movie at a movie theater
C183 Eat "unclean" meats
C184 Watch TV
C185 Watch a movie on a VCR in your home
C187 Drink caffeinated drinks (cola, coffee)

Response format: Choose one of these responses:

1 = Never
2 = Less than once a month
3 = About once a month
4 = Two or three times a month
5 = About once a week
6 = Several times a week
7 = Once a day
8 = More than once a day

Score range: 7-56

Standardized Cronbach's alpha reliability coefficient: .75
Note: Since this scale was used as one of the social-religious regulation variables, the results of the factor and reliability analyses for this scale are discussed in the methodology chapter (see Table 9 in Chapter 3).

In the Valuegenesis (1989) survey is a larger list of potential items that could have been included in this scale, including items measuring at-risk behaviors (e.g., drinking, drug use) and two items dealing with competitive sports and regular exercise. The originally created scale contained all of these potential items. After factor and reliability analyses, the at-risk items, which contributed little variance, and which are addressed in the at-risk scale, were dropped from the self-regulation scale. The exercise and sports items did not factor well with the remaining items. They were also eliminated. The remaining items attempt to address behavioral self-regulation of lifestyle standards that are common for Seventh-day Adventists.

**Family Religious Socialization**

Family religious socialization was defined as the family's influence on the development of a child's religious-social attitudes, beliefs, and values.

**Mom and Dad Talk**

Talk to Mother and Father About Faith (a priori scale)

*Item stem:* In the last few years, how often did you do or experience each of these things? Mark one answer
for each statement.

Y457 Talk to my mother about faith
Y458 Talk to my father about faith

Response format:
1 = Never or rarely
2 = Sometimes
3 = Often

Scale score range: 2-6

Standardized Cronbach's alpha reliability coefficient: .70

Note: Since this scale was used as one of the family religious socialization variables, the results of the factor and reliability analyses for this scale are discussed in the methodology chapter (see Table 10 in Chapter 3).

Controlled Independent Variables

Controlled independent variables were defined in this study as extraneous measures that are known from previous research to be associated with adolescent suicidal behavior (e.g., gender, family stability, depression), but, were not the main theoretical interest of this study (e.g., social-religious integration and regulation). Controlled independent variables are used in this study's statistical analyses to account or control for the expected or known variance in attempted suicidal behavior. The following item listings are the control variables used in this study.
Gender

Gender of respondent (SI, 1990, p.34)

*Item:* C43. Are you male or female?

*Response value format:*

1 = Male
0 = Female

*Scoring range:* 0-1

Age

(a priori index)

*Item:* Y128. How old are you?

*Response value format:*

11 = 11 or younger
12 = 12
13 = 13
14 = 14
15 = 15
16 = 16
17 = 17
18 = 18

*Scoring range:* 11-18

Ethnic

Racial/Ethnic Identification (SI, 1990, p.34)

*Item:* Y126 How do you describe yourself?

*Original response value format:*

1 = American Indian
2 = Asian or Pacific Islander
3 = Black or African-American
4 = Latino or Hispanic
5 = White
6 = More than one racial background

Revised response value format:
1 = White
0 = All others

Scoring range: 0-1

Community type
(SI, 1990, p.35)

Item stem: Y129 Where do you live?

Original response value format:
1 = On a farm
2 = In the open country, not on a farm
3 = On an American Indian reservation
4 = In a small town or village (under 2,500 in population)
5 = In a town of 2,500 to 9,999
6 = In a small city (10,000 to 49,999)
7 = In a medium-sized city (50,000 to 250,000)
8 = In a suburb of a medium-sized city
9 = In a large city (over 250,000)
10 = In a suburb of a large city

Revised response value format:
1 = Urban (In a city or suburb of a city [10,000 or larger])
0 = Non-urban (In a town [less than 10,000], village, or open country, or on a farm or American Indian Reservation)

Score range: 0-1

Mom's employment

Mother's Employment (a priori index) (Stack, 1985a)

Item: Y320 Did your mother have a paid job (half-time or more) during the time you were growing up?

Response value format:

1 = No
2 = Yes, some of the time
3 = Yes, most of the time
4 = Yes, all of the time
missing = This question does not apply to me

Score Range: 1-4

Family Stability

(a priori index) (Stack, 1985a; USDHHS, 1989)

Item: Y278 Are your parents divorced or separated?

Original response value format:

1 = No
2 = Yes
3 = My parents were never married
4 = I'm not sure

Revised response value format:

1 = Married
0 = Divorced, separated, never married, not sure

Scoring format: 0-1

Self Esteem Scale

(SI, 1990, p.32)(USDHHS, 1989) (This index is a brief version of the standard Rosenberg Self-Esteem scale.)

Items:

Y420 I feel good about myself
Y421 I am able to do things as well as most other people
Y422 On the whole, I am satisfied with myself
RY423 At times I think I am no good at all
RY424 I feel I do not have much to be proud of

Response value format:

1 = Strongly disagree
2 = Disagree
3 = Agree
4 = Strongly agree

Scale score range: 5-20

Standardized Cronbach’s alpha reliability coefficient: .76

Abused

Abused by an Adult (a priori index)

Item: Y418 Have you ever been physically abused by an adult (that is, when an adult caused you to have a scar, black and blue marks, welts, bleeding, or a broken bone)?
Response value format:

1 = Never  
2 = Once  
3 = 2 or 3 times  
4 = 4 to 10 times  
5 = More than 10 times  

Score range: 0-4

Depression

Depression or Sadness (a priori index)

Item: Y416 How often have you felt very sad or depressed during the last month?

Response value format:

1 = Never  
2 = Once in a while  
3 = Some of the time  
4 = Most of the time  
5 = All of the time  

Score range: 1-5

At-Risk Behavior Scale

(SI, 1990, p. 32)

This scale attempts to address whether a youth has engaged in at-risk behavior of a sufficient intensity to raise concern. The scale involves dichotomizing each of eight areas.

In the original Valuegenesis At-Risk Behavior Index (SI, 1990), the index included 10 items. This study
omitted the item Y417, "Ever tried to kill yourself", from the At-Risk Behavior index and used it as the dependent variable. The item Y416, "How often have you felt very sad or depressed during the last month?", was also omitted from the At-Risk Behavior index. This item was used a priori as a control variable to indicate depression.

Item stem: How many times, if ever, during the last 12 months did you do each of the following?

Response format: 0 or 1. A score of 1 results if the respondent has:

Y404 Drank alcohol six or more times in the last year
Y405 Used marijuana more than twice in the last year
Y406 Used cocaine more than twice in the last year
Y409 Engaged in binge drinking once or more in the last year
Y410 Hit or beat someone up more than twice in the last year
Y411 Engaged in shoplifting more than twice in the last year
Y412 Gotten into trouble at school more than twice in the last year
Y415 Ever engaged in sexual intercourse

Score range: 0 - 8

Standardized Cronbach's alpha reliability coefficient: .83

Note: Since this scale was used as one of the controlled independent variables, the results of the factor and
reliability analyses for this scale are discussed in the methodology chapter (see Table 11 in Chapter 3).
APPENDIX C

MISSING VALUES
APPENDIX C

MISSING VALUES

Unfortunately, some of the items and scales in the Valuegenesis (1989) data had a high number of missing cases. When the Valuegenesis data were originally cleaned and permanently recoded where necessary, a special missing value was used to differentiate between "No opinion" or "Does not apply to me" from the regular missing (SI, 1990, p. 4). Some time after the initial cleaning and recoding of the data, those special missing values were changed to regular missing values (J. Thayer, personal communication, February 19, 1998).

This conversion of special to regular missing resulted in scales with as much as 26% of their cases missing (Adventist orthodoxy scale) and created a problem in the selection of some of the variables for the statistical model. Given the number of independent variables included in the model and the necessary listwise deletion of missing cases for logistic regression analysis, even a relatively small number of missing cases per variable would cause the statistical analyses to be performed on a much smaller subset of cases than the original sample. If no
substitution of missing data was used, only 50% (n = 1523) of the original 3072 cases could be used in the statistical analyses.

A visual examination of the data revealed a variety of missing patterns. In some instances, whole blocks of items were missing, particularly for the items in the Adventist orthodoxy and endorsement of Adventist standards scales. Among other scale items, the pattern of missing cases appeared to be entirely random (faith maturity scale). But most disturbing for this study was that there appeared to be a bias among the missing cases. Many of the missing cases within scales were over represented by the suicide attempters. Since a random sample of non-attempters was selected to match the number of suicide attempters, ideally the suicide attempters should have represented 50% of the missing cases. However, this was often not the case. Table 19 indicates the percentage of attempters and non-attempters represented by missing cases within the theoretical construct variables before mean substitution.

In an effort to salvage some of the missing variables without substituting whole blocks of missing data, a strategy was devised for substituting values. The Valuegenesis documentation (SI, 1990) indicated how many, if any, missing values were allowed per defined scale, but it did not indicate what strategy was used to replace the missing values. To determine this, the standard protocol for mean substitution in factor and regression analyses was
used. When mean substitution is used in these statistical analyses, a missing value is replaced with the variable mean of all non-missing cases in the sample (Norusis, 1990c, pp. C-21, C-64).

The Valuegenesis documentation (SI, 1990) was used to determine how many missing values were allowed for a specific scale. Those cases that were within the allowable number of missing items were selected and the variable means were substituted for the missing values. No single item index missing value was replaced. Furthermore, several combined construct variables included several single item indices as well as scale values. In both of these cases (social integration variables, attendance and identity), all of the variables that made up the combined construct variable were not permitted to have any missing items, therefore, no attempt was made to substitute means for these combined indexes. Since most of the 10 controlled variables were either single item indices or scales that were not permitted any missing values, no controlled variable with missing values had means substituted. As a result of the mean substitutions, the sample used in the logistic regression analyses after listwise deletion increased from 50% (n = 1523) to 69% (n = 2122) of the original sample (N = 3072).

Table 20 lists the number of items or scales that make up that variable, the percentage of missing values per variable before mean substitution, the number of missing
values allowed, and the percentage of missing values per variable after mean substitution. Table 21 includes the number of missing values per controlled variable. Table 22 lists the percentage of suicide attempters and non-attempters among missing cases by variable after mean substitution.
Table 19

Percentage of Suicide Attempters and Non-Attempters Among Missing Cases by Total Sample and Theoretical Variable Before Mean Substitution

<table>
<thead>
<tr>
<th>Missing Variable</th>
<th>Total Missing Cases</th>
<th>Percentage Suicide Attempts</th>
<th>Percentage No Attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Total Sample</td>
<td>1549</td>
<td>50</td>
<td>843</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>175</td>
<td>6</td>
<td>93</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>791</td>
<td>26</td>
<td>419</td>
</tr>
<tr>
<td>Identity</td>
<td>109</td>
<td>3</td>
<td>65</td>
</tr>
<tr>
<td>Attendance</td>
<td>143</td>
<td>5</td>
<td>77</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>103</td>
<td>3</td>
<td>58</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>274</td>
<td>9</td>
<td>159</td>
</tr>
<tr>
<td>Family Religious</td>
<td>114</td>
<td>4</td>
<td>62</td>
</tr>
</tbody>
</table>

Note. N = 3072.

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Table 20

Percentage of Missing Data by Total Sample and Theoretical Variable Before and After Mean Substitution

<table>
<thead>
<tr>
<th>Missing Variable</th>
<th>Items in Variable</th>
<th>Missing Value(s) Allowed</th>
<th>Missing Values Before</th>
<th>Missing Values After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Total Sample</td>
<td>1549</td>
<td></td>
<td>50</td>
<td>950</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>15(^a)</td>
<td>1</td>
<td>175</td>
<td>6</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>6</td>
<td>1</td>
<td>791</td>
<td>26</td>
</tr>
<tr>
<td>Identity</td>
<td>6(^b)</td>
<td>0</td>
<td>109</td>
<td>3</td>
</tr>
<tr>
<td>Attendance</td>
<td>4</td>
<td>0</td>
<td>143</td>
<td>5</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>7</td>
<td>1</td>
<td>103</td>
<td>3</td>
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<tr>
<td>Standards Endorse</td>
<td>17</td>
<td>2</td>
<td>274</td>
<td>9</td>
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<tr>
<td>Family Religious</td>
<td>2</td>
<td>0</td>
<td>114</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. N = 3072.

\(^a\) The original faith maturity scale in the Valuegenesis documentation (SI, 1990) contained 38 items and was allowed 3 missing values. Proportionally then, the number of missing items allowed for Thayer's (1993) 15 item long-form faith maturity scale was 1.

\(^b\) Includes 4 single item indices and 2 scale values.
Table 21

Percentage of Missing Data per Controlled Variable

<table>
<thead>
<tr>
<th>Missing Variable</th>
<th>Items in Variable</th>
<th>Missing Value(s) Allowed</th>
<th>Missing Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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<td>0</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>White/Other</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Community Type</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Family Stability</td>
<td>1</td>
<td>0</td>
<td>55</td>
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<tr>
<td>Mom's Employment</td>
<td>1</td>
<td>0</td>
<td>214</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>5</td>
<td>0</td>
<td>118</td>
</tr>
<tr>
<td>Abused</td>
<td>1</td>
<td>0</td>
<td>16</td>
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<tr>
<td>Depression</td>
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<td>0</td>
<td>11</td>
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<td>At-Risk Behavior</td>
<td>8</td>
<td>0</td>
<td>121</td>
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</table>

Note. N = 3072.
Table 22

Percentage of Suicide Attempters and Non-Attempters Among Missing Cases by Theoretical Variable After Mean Substitution

<table>
<thead>
<tr>
<th>Missing Variable</th>
<th>Total Missing Cases</th>
<th>Percentage Suicide Attempts</th>
<th>Percentage No Attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Total Sample</td>
<td>950</td>
<td>31</td>
<td>530</td>
</tr>
<tr>
<td>Faith Maturity</td>
<td>21</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>SDA Orthodoxy</td>
<td>269</td>
<td>9</td>
<td>142</td>
</tr>
<tr>
<td>Identity</td>
<td>109</td>
<td>3</td>
<td>65</td>
</tr>
<tr>
<td>Attendance</td>
<td>143</td>
<td>5</td>
<td>77</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>26</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Standards Endorse</td>
<td>75</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>Family Religious</td>
<td>114</td>
<td>4</td>
<td>62</td>
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Note. N = 3072.
APPENDIX D

CORRELATION MATRIX
### APPENDIX D

#### CORRELATION TABLES

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Theoretical Variable</th>
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<tbody>
<tr>
<td>SUICIDE</td>
<td>Attempted suicidal behavior</td>
</tr>
<tr>
<td>AGE</td>
<td>Age of respondent</td>
</tr>
<tr>
<td>GENDER</td>
<td>Gender</td>
</tr>
<tr>
<td>COMMTYPE</td>
<td>Urban or not urban</td>
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<tr>
<td>WHITE</td>
<td>White or other</td>
</tr>
<tr>
<td>MOMEMPLY</td>
<td>Mother's employment</td>
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<tr>
<td>FMSTABLE</td>
<td>Family stability</td>
</tr>
<tr>
<td>SELFEST</td>
<td>Self-esteem</td>
</tr>
<tr>
<td>ABUSED</td>
<td>Abused by an adult</td>
</tr>
<tr>
<td>DEPRESS</td>
<td>Depression</td>
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<td>ATRISK</td>
<td>At-risk behaviors</td>
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<td>Faith maturity</td>
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<td>ADORTHO</td>
<td>Adventist orthodoxy</td>
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<tr>
<td>SELFREG</td>
<td>Self-regulation of Adventist standards</td>
</tr>
<tr>
<td>ADSOVR</td>
<td>Endorsement of Adventist standards</td>
</tr>
<tr>
<td>ATTEND</td>
<td>Attendance at church</td>
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<tr>
<td>IDENTITY</td>
<td>Denominational identity</td>
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<td>FAMREL</td>
<td>Family religious socialization</td>
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$N = 2122$, 1-tailed Significance: * - .01, ** - .001

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<thead>
<tr>
<th></th>
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<th>AGE</th>
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<th>WHITE</th>
<th>MOMEMPLY</th>
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<td>-.15**</td>
<td>.03</td>
<td>-.08**</td>
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<td>-.10**</td>
<td>.20**</td>
<td>-.06*</td>
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<td>-.01</td>
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<td>-.07**</td>
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<td>-.09**</td>
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<td>WHITE</td>
<td>-.08**</td>
<td>.19**</td>
<td>-.05*</td>
<td>-.24**</td>
<td>1.00</td>
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<td>-.07**</td>
<td>.11**</td>
<td>-.15**</td>
<td>1.00</td>
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<td>.03</td>
<td>-.11**</td>
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<td>-.02</td>
<td>.19**</td>
<td>-.00</td>
<td>.02</td>
<td>-.02</td>
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<td>.03</td>
<td>-.04</td>
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REFERENCE LIST


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