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The relationship of personal dispositional orientation, social support, and stress to physical health and psychological well-being: A theoretical model

Nafziger, Mark Arnold, Ph.D.

The Ohio State University, 1990
THE RELATIONSHIP OF PERSONAL DISPOSITIONAL ORIENTATION, SOCIAL SUPPORT, AND STRESS TO PHYSICAL HEALTH AND PSYCHOLOGICAL WELL-BEING:
A THEORETICAL MODEL

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of the Ohio State University

by

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* * * * *

The Ohio State University
1990

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>VITA</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>viii</td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1. Psyche and Soma</td>
<td>4</td>
</tr>
<tr>
<td>2. The Biomedical Model</td>
<td>4</td>
</tr>
<tr>
<td>3. A Nondualistic View of Body and Mind</td>
<td>6</td>
</tr>
<tr>
<td>4. Cholesterol and heart disease</td>
<td>7</td>
</tr>
<tr>
<td>5. Asthma, allergies, and emotions</td>
<td>8</td>
</tr>
<tr>
<td>6. Psyche and chemotherapy</td>
<td>8</td>
</tr>
<tr>
<td>7. The Biopsychosocial Model</td>
<td>9</td>
</tr>
<tr>
<td>8. Theoretical Model</td>
<td>12</td>
</tr>
<tr>
<td>9. Covariance Structure Modeling</td>
<td>12</td>
</tr>
<tr>
<td>10. Conclusion</td>
<td>15</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW</td>
<td>17</td>
</tr>
<tr>
<td>11. Stress and illness</td>
<td>17</td>
</tr>
<tr>
<td>12. Response model</td>
<td>17</td>
</tr>
<tr>
<td>13. Stimulus model</td>
<td>19</td>
</tr>
<tr>
<td>14. Psychoneuroimmunology</td>
<td>21</td>
</tr>
<tr>
<td>15. Interactional model</td>
<td>26</td>
</tr>
<tr>
<td>16. Coping</td>
<td>29</td>
</tr>
<tr>
<td>17. Definitions</td>
<td>29</td>
</tr>
<tr>
<td>18. Assessment of coping</td>
<td>31</td>
</tr>
<tr>
<td>19. Personal Characteristics</td>
<td>33</td>
</tr>
<tr>
<td>20. Hardiness</td>
<td>34</td>
</tr>
<tr>
<td>21. Sense of Coherence</td>
<td>38</td>
</tr>
<tr>
<td>22. Coherence, Appraisal, and Coping</td>
<td>42</td>
</tr>
<tr>
<td>23. Optimism</td>
<td>44</td>
</tr>
<tr>
<td>24. Social Support</td>
<td>47</td>
</tr>
<tr>
<td>25. Models</td>
<td>48</td>
</tr>
<tr>
<td>26. Definitions</td>
<td>49</td>
</tr>
<tr>
<td>27. Functions of social support</td>
<td>52</td>
</tr>
<tr>
<td>28. Social support and personal characteristics</td>
<td>54</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Health and Well-Being</td>
<td>57</td>
</tr>
<tr>
<td>Models of health</td>
<td>58</td>
</tr>
<tr>
<td>Counseling psychology and salutogenesis</td>
<td>62</td>
</tr>
<tr>
<td>Psychological well-being</td>
<td>63</td>
</tr>
<tr>
<td>III. METHOD</td>
<td>66</td>
</tr>
<tr>
<td>Participants and Procedures</td>
<td>66</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>68</td>
</tr>
<tr>
<td>Measures</td>
<td>77</td>
</tr>
<tr>
<td>Personal Dispositional Orientation</td>
<td>78</td>
</tr>
<tr>
<td>Sense of Coherence Questionnaire</td>
<td>78</td>
</tr>
<tr>
<td>Life Orientation Test</td>
<td>80</td>
</tr>
<tr>
<td>Social Support</td>
<td>80</td>
</tr>
<tr>
<td>Interpersonal Support Evaluation List</td>
<td>80</td>
</tr>
<tr>
<td>Social Support Questionnaire</td>
<td>81</td>
</tr>
<tr>
<td>Stress</td>
<td>83</td>
</tr>
<tr>
<td>Life Experiences Survey</td>
<td>83</td>
</tr>
<tr>
<td>Perceived Stress Scale</td>
<td>84</td>
</tr>
<tr>
<td>Psychological Well-being</td>
<td>85</td>
</tr>
<tr>
<td>Beck Depression Inventory</td>
<td>85</td>
</tr>
<tr>
<td>Affectometer 2</td>
<td>86</td>
</tr>
<tr>
<td>Satisfaction with Life Scale</td>
<td>87</td>
</tr>
<tr>
<td>The Happiness Measures</td>
<td>88</td>
</tr>
<tr>
<td>Physical Health</td>
<td>89</td>
</tr>
<tr>
<td>C-H Inventory of Physical Symptoms</td>
<td>89</td>
</tr>
<tr>
<td>Global self-rated health index</td>
<td>90</td>
</tr>
<tr>
<td>Demographic Variables</td>
<td>91</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>92</td>
</tr>
<tr>
<td>Descriptive Statistics</td>
<td>92</td>
</tr>
<tr>
<td>Part One</td>
<td>96</td>
</tr>
<tr>
<td>Regression analyses</td>
<td>99</td>
</tr>
<tr>
<td>Part Two</td>
<td>100</td>
</tr>
<tr>
<td>Initial model</td>
<td>100</td>
</tr>
<tr>
<td>Revised models</td>
<td>103</td>
</tr>
<tr>
<td>Regression analyses</td>
<td>114</td>
</tr>
<tr>
<td>Post-hoc analyses</td>
<td>114</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>119</td>
</tr>
<tr>
<td>Introduction</td>
<td>119</td>
</tr>
<tr>
<td>Part one: Analysis of Findings</td>
<td>120</td>
</tr>
<tr>
<td>Part one: Limitations</td>
<td>121</td>
</tr>
<tr>
<td>Part two: Analysis of Findings</td>
<td>125</td>
</tr>
<tr>
<td>Relationships between Independent Variables</td>
<td>126</td>
</tr>
<tr>
<td>Relationships Between IV's and DV's</td>
<td>127</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Personal dispositional orientation</td>
<td>128</td>
</tr>
<tr>
<td>Stress, health, and well-being</td>
<td>131</td>
</tr>
<tr>
<td>Social support, health, and well-being</td>
<td>131</td>
</tr>
<tr>
<td>Relationships Between Dependent Variables</td>
<td>133</td>
</tr>
<tr>
<td>Limitations</td>
<td>136</td>
</tr>
<tr>
<td>Directions For Future Research</td>
<td>140</td>
</tr>
<tr>
<td>Conclusion</td>
<td>143</td>
</tr>
</tbody>
</table>

LIST OF REFERENCES .......................................................... 145

APPENDICES

A. Solicitation Announcement and Initial Instructions . 161
B. Debriefing statement .............................................. 163
C. Sense of Coherence Questionnaire ......................... 165
D. Facet Design and Composition of the SOC .............. 170
E. Life Orientation Test ........................................... 172
F. Interpersonal Support Evaluation List .................. 174
G. Social Support Questionnaire - Short Form .......... 179
H. Life Experiences Survey ....................................... 182
I. Perceived Stress Scale ........................................ 186
L. Satisfaction with Life Scale ................................. 189
N. Cohen-Hoberman Inventory of Physical Symptoms ........ 191
O. Delighted-Terrible and Faces Health Index ......... 194
P. Formulas for Computing Goodness-of-fit Indexes .... 195
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demographic information</td>
<td>93</td>
</tr>
<tr>
<td>2. Mean scores and standard deviations (sample and normative data)</td>
<td>95</td>
</tr>
<tr>
<td>3. Correlation coefficients for variables used as LISREL input in part one</td>
<td>97</td>
</tr>
<tr>
<td>4. Simultaneous multiple regression analysis of change in dependent indicators</td>
<td>101</td>
</tr>
<tr>
<td>5. Correlation coefficients for variables used as LISREL input in part two</td>
<td>102</td>
</tr>
<tr>
<td>6. Summary of overall goodness-of-fit information for models tested in part two</td>
<td>104</td>
</tr>
<tr>
<td>7. Detailed fit information for models of health and well-being</td>
<td>107</td>
</tr>
<tr>
<td>8. Simultaneous regression analysis of six dependent measures</td>
<td>115</td>
</tr>
<tr>
<td>9. Goodness-of-fit information for post-hoc and path models</td>
<td>116</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Theoretical variables</td>
<td>13</td>
</tr>
<tr>
<td>2. Effects of environment on health and behavior</td>
<td>23</td>
</tr>
<tr>
<td>3. Interactions between nervous and immune systems</td>
<td>24</td>
</tr>
<tr>
<td>4. Hypothesized model</td>
<td>70</td>
</tr>
<tr>
<td>5. Model A</td>
<td>105</td>
</tr>
<tr>
<td>6. Model B</td>
<td>109</td>
</tr>
<tr>
<td>7. Model C</td>
<td>110</td>
</tr>
<tr>
<td>8. Model D</td>
<td>112</td>
</tr>
<tr>
<td>9. Model E</td>
<td>113</td>
</tr>
</tbody>
</table>
Presently, as we move towards the 21st century, we are witnessing a profound change in beliefs about the relationship of physical and mental aspects of human functioning (Taylor, 1986). Empirical evidence generated by the biological and behavioral sciences is leading to a new, interdisciplinary approach to health and disease; one based on the ancient tenets of harmony and holism characteristic of Hippocratic medicine (Thorensen & Eagleston, 1984). And as the role of psychological factors in the maintenance of health and the onset of disease has become more established (Matarazzo, 1980), changes are occurring with the health care system. Psychological interventions are being utilized successfully within traditional medical settings to reduce costs and the scope of the interventions needed with many medical patients (Mumford, Schesinger, Glass, Patrick, & Cuerdon, 1984; Taylor, 1986). Concern with the impact of "life-style" related behaviors has expanded, as has the quantity of research investigating the modification of specific health related behaviors (Brandt, 1982; Micheals, 1982; Gentry, 1984; Farquhar, Maccoby, & Solomon, 1984). "Stress" has become a popular topic of daily conversation and media discussion as awareness of the impact of stressful events on physical and psychological well-being increases in the scientific community (Selye, 1982). Finally, the quest to understand the factors which help
individuals cope with the stressors inherent in the human condition has begun in earnest (e.g. Antonovsky, 1979, 1987; Lazarus & Folkman, 1984).

Despite these changes in attitudes and advances in knowledge, problems and challenges remain. Quality research into the dynamic interplay of a multitude of biological, psychological, and social variables and their impact on human health is difficult and expensive. The "new" biopsychosocial model, which views human behavior as complexly organized, dynamically varying through time and situations, and as the product of multiple influences, presents a problem for traditional research designs (Ford, 1985). It requires data collection and analysis techniques which yield multivariate, multi-occasion, and multi-subject information on patterns of interindividual consistency and variability as well as intra-individual consistency and change (Ford, 1985). At present, the nature of the relationship between and relative importance of major psychosocial variables remains unclear, as does the specific mechanisms through which they impact human beings (Gentry, 1984). As the result, the limited (although growing) theoretical understanding and empirical knowledge of the impact of psychological and social factors on health and well-being is often eclipsed by the enthusiastic claims and hopes of some theorists and practitioners (Evans, 1988; Kaplan, 1984).

In addition, while many benefits have accrued from the nearly exclusive focus on the treatment of illness, particularly within medicine (Engel, 1977), the potential inherent in the study of healthy individuals has, until recently, been virtually ignored (Antonovsky,
1979; 1987). The focus on what factors predict good outcomes (as opposed to pathology, or even the mediation of pathology) has the potential of being more than just a look at "the other side of the coin". Such an orientation can result in the asking of different questions and the generation of alternative hypotheses, as well as the examination of deviant cases and suggestions of new and different interpretations of existing data (Antonovsky, 1987). In general, it focuses on the process of successful coping rather than the etiology and treatment of specific diseases.

This study sought to make a contribution to research in the area of psychology and health by examining a theoretical model of the relationship between several major psychosocial variables and the physical and psychological health and well-being of a population of university students. The study grew from the philosophical perspective of what Antonovsky (1979, 1987) called the "salutogenic model": the study of factors which facilitate movement towards the "health ease" as well as disease end of the multidimensional ease/dis-ease continuum. The research also attempted to access a more complete range of human experience through the use of both health and illness oriented outcome measures. In chapter two, the literature relevant to the specific variables central to this investigation will be examined in detail. The rest of this chapter will focus on the historical development of thought concerning the relationship of physical and "mental" aspects of human functioning; and the overall societal environment from which the field of health psychology has emerged.
Psyche and Soma

Ideas concerning the nature of the relationship between the human mind (psyche) and body (soma) have varied greatly, both between cultures existing at the same time, and during different historical time periods. Many ancient cultures considered mind and body to be an inseparable, harmonious system within human beings. Many later civilizations, such as modern Western civilization, viewed physical and mental processes as being relatively independent of each other (Kaplan, 1975). These philosophical assumptions about mind and body have been reflected in differing approaches to the treatment of "disorder" in either realm. In non-dualistic cultures, for example, "treatments" usually included a combination of physical, social, and spiritual modalities, and were carried out by shamans or priests (Frank, 1973; Kaplan, 1975). In the West, the Renaissance marked the beginning of movement away from the "superstitious" ideas of the past towards a scientific philosophy characterized by reductionism and materialism. Technological advances strongly reinforced the resulting dualistic conception of mind and body, with physicians becoming the guardians of the body, while philosophers, theologians, and (more recently) psychologists became caretakers of the mind (Kaplan, 1975).

The Biomedical Model

Sets of philosophical assumptions create and are reflected in specific models of human functioning. During the last few centuries, Western philosophical ideas have resulted in the ascendancy of the biomedical model (Engle, 1977). This model, which has dominated the thinking of most Western health practitioners during the last 300
years, maintains that all illness results from somatic processes gone awry. In accord with this model, the study of diseases has historically focused on the role of genetic factors, physical trauma (e.g. accidents), hormonal and other bodily changes, and specific pathogens such as viruses and bacteria as the critical agents in the development of illness. This model views body and mind as separate entities, and focuses on problems leading to disease rather than ways of promoting health (Engel, 1977).

Technological advances generated by work based on this model led to a revolution in health care in the United States during the late 1800's and early 1900's. This revolution consisted of the impressively successful struggle against "killer" infectious diseases such as tuberculosis and pneumonia (Michael, 1982). Since the turn of the century, mortality rates have declined dramatically, and life expectancy has increased from 47 to 73 years. Still, much of the increase has been due to disease prevention measures aimed at children (Brandt, 1982); for example, the life expectancy of a 45 year old man has increased by only 4 years during this period. And although health expenditures have increased eleven-fold since 1950, overall mortality and disability have remained unchanged during this period (Brandt, 1982). This is due to the fact that while death from infectious disease has declined, there has been a significant increased in sickness and death attributable to chronic diseases, drug and alcohol abuse, and vehicular accidents (Michael, 1982).

Today, cardiovascular disease and cancer account for 70% of all deaths. These two major killers, and other chronic diseases, are
called "life style" diseases because, in addition to biological factors, they have important cognitive, behavioral, and/or environmental components (Michael, 1982). For example, the Center for Disease Control's 1979 report on health promotion and disease prevention reports that 50% of all mortality in the U.S. is due to unhealthy lifestyle behaviors (compared to 20% due to environmental factors, 20% due to human biological factors, and 10% due to inadequacies in health care (Micheal, 1982).

A Nondualistic View of Body and Mind

Despite its earlier usefulness in the fight against infectious diseases, the rigid reductionism of the biomedical model leaves it unable to explain or predict the substantial impact of psychological or social influences on therapeutic outcomes (Engel, 1977). Research evidence is casting doubt on its assumptions of body/mind dualism and the absolute primacy of biological factors in the genesis and treatment of disease processes. For example, the treatment of illness and prognosis for recovery can be significantly affected by the practitioner-patient relationship, and patients' expectations concerning pain and discomfort (Taylor, 1986). Even infectious diseases are now viewed as being influenced by psychosocial factors (through their potential influence on health habits and the functioning of an individual's immune system) (Plaut & Friedman, 1981). Examples from the literature concerning specific medical problems also points to the importance of psychological factors and treatments, and their impact on physiology.
Cholesterol and Heart Disease

Elevation of cholesterol level in the blood is a major risk factor for the development of coronary heart disease, the leading cause of death in our society (Michaels, 1982). Cholesterol level in the blood has been conceptualized as determined by both genetic and behavioral factors. Since genetics cannot be controlled, treatment has centered on behavioral factors (diet, weight control, exercise, and medications). But now it appears that psychological factors may also be important. For example, one study of certified public accountants revealed a striking elevation of their cholesterol levels between January 1 and April 15, the time when tax returns are due (Eliot & Buell, 1983). (This change occurred independently of any dietary changes). The blood cholesterol level of medical students has also been found to rise significantly before academic exams (Eliot & Buell, 1983). In addition, men with high cholesterol levels have reduced them by one-third through the regular practice of meditation, a result that cannot regularly be achieved through the use of any drug (Cooper & Aygen, 1982). Friedman (1982) has also shown that if heart attack survivors learn to modify their behavior through a program of relaxation techniques, ensuing death rate and rate of recurrent heart attack is lessened, relative to the rates of a control group who did not learn these skills. Although one recent study has raised questions about the impact of a set of behaviors collectively called "Type A personality" (Ragland & Brand, 1988), the majority of studies during the last twenty years suggest that psychological as well as biological
factors may be important in the genesis of and recovery from heart attacks (Booth-Kewley & Friedman, 1987).

Asthma, Allergies, Emotions, and Suggestion

Psyche and soma are also intimately interconnected in cases of asthma. In his book on diseases of the chest, Hinshaw (1969) writes that "Fear is both a cause and consequence of asthma. Treatment that serves to quiet fear, be it pharmacologic or psychologic, is good treatment (1969, p.332). In addition to the emotional component, in some cases beliefs appear to be capable of triggering asthma. Several experiments with both adults and children (Dekker, Pelser, & Groen, 1957; Luparello, 1968; McFadden, 1969; Phillip, Wilde, & Day, 1972; Weiss, Martin, & Riley, 1970) have shown that the mere suggestion to an asthmatic subject that he or she is inhaling an allergic agent can provoke an attack. Ader (1981) has also documented historical examples of a picture of a hay field evoking hay fever and an artificial rose inducing an asthmatic attack in very sensitive subjects. It is also interesting to note that hypnosis has been used with great success in the treatment of some asthma suffers (DiPiano & Salzberg, 1979), as well as some individuals with allergic condition (Bowers & Kelly, 1979).

Psyche and Chemotherapy

Using a combination of progressive muscle relaxation and imagery with a group of chemotherapy patients has also significantly reduced the frequency, severity, and duration of anticipatory nausea and vomiting connected with cancer treatment (Morrow and Morrell, 1982). In another study of the hair loss which frequently accompanies the use
of anti-cancer drugs, some patients were given a placebo instead of the chemotherapy drug they expected. Twenty five percent of the patients who received the placebo while expecting the drug still lost their hair. (Fielding, 1983). Although a review of the literature on placebo effects and the power of "nonspecific" psychological factors is beyond the scope of this paper (see Shapiro, 1978 for a review), it generally attests to the potential power of psychological factors in impacting physiological processes.

Further evidence of the intimacy of the relationship between psyche and soma, and the impact of psychological and social factors on health outcomes will be presented when the literature on stress and health is discussed in the following chapter. But overall, in light of the empirical findings of the last several decades, it seems appropriate to conclude that the biomedical model has proven to be scientifically and clinically inadequate in explaining many disease processes (Engel, 1977; Thoresen & Eagleston, 1984).

The Biopsychosocial Model

In contrast the traditional biomedical approach, both research and treatment within the health-psychology interface are based on the interactional biopsychosocial model (Jenkins, 1985; Thorenson & Eagleston, 1984). As its name suggests, within this model mental and physical levels of experience are not conceptualized as independent or separate; instead, an interaction of multiple biological, psychological, social, and cultural/ideological factors is posited in a manner similar to Bandura's (1978) concept of reciprocal determinism. The biopsychosocial model maintains that both macro-level
processes (such as social support and personality characteristics) and micro-level processes (such as chemical imbalances) interact to produce health and illness (Engel, 1977). It moves away from a mechanistic emphasis on cause and effect relationships and clear-cut cures, and towards an organismic philosophy more congruent with systems theory, with its focus on context and interactional relationships (Thoresen & Eagleston, 1984).

Interest in the biopsychosocial model has rekindled interest in the old public health philosophy of attempting to promote health and prevent disease (Ford, 1985, Matarazzo, 1982). While in the past these efforts focused on vaccinations and improved sanitation, they now focus on changing risk factors which result in a greater probability of chronic disease. This trend has also been fueled by economic considerations. The cost of health care is the most rapidly growing sector of the American economy, topping the 200 billion dollar mark in 1980, and now accounting for over 10% of the annual GNP (Bowdewys & Nolan, 1985). Since today's most prevalent diseases are chronic in nature, and require continual treatment and monitoring, there is great interest in reducing the drain on resources caused by the treatment of preventable health problems (Matarazzo, 1982).

Although the study of specific diseases (and the behavioral risk factors associated with their occurrence) is and will continue to be an important area of study, the study of pathology (and even the prevention of specific pathologies) appears to be an incomplete perspective from which to study human health and well being. The focus on specific diseases and risk factors can leave questions unasked,
important hypotheses not studied, and can obscure interesting aspects of research data. For example, while certain specific behaviors do significantly increase the probability of that an individual will die from heart disease, it is also true that the majority of people who have heart attacks do not have any of the four major risk factors, and many individuals with several risk factors do not die from heart attacks (Dossey, 1988). In one suggestive study, the number one risk factor predictive of a heart attack was low job satisfaction, followed closely by overall happiness (Department of Health, Education, and Welfare, 1973). Many "life-style behaviors" (i.e., risk factors) are deeply engrained personal patterns. Some have strong emotional and cognitive components; some are dysfunctional coping strategies (Taylor, 1986). In any event, many are not easily modified without individualized treatment programs based on an understanding of individuals and their unique life situations and dynamics (Farquhar, Maccoby, & Solomon, 1984). So, while research into the affects and modification of various health behaviors will continue to be important, health research also needs to progress on other fronts.

In addition, when one moves beyond the dependent variable of mortality and examines other data, a different picture also emerges. For example, the likeliest diagnosis for the majority of patients who see physicians is some type of psychosomatic or stress disorder (Shealy, 1979). As the literature presented in the next chapter demonstrates, the study of how individuals cope with and adapt to stressors, be they chronic life situation, major life events, or daily hassles, is an important area of study with implications for the lives of all individuals.
Hypothesized Model

In line with Betz's (1986) call for counseling psychologists to conduct more basic research into human behavior, this study sought to contribute to this literature by investigating a theoretical model including several variables hypothesized to be important in influencing the health and well-being of individuals (see Figure one). Independent variables in the hypothesized structural model were: 1) personal dispositional orientation (or generalized tendencies of perception, thinking, and responding); 2) social support (quality and function of interpersonal relationships); and 3) stress (the events and conflicts with which one must cope). In congruence with the emerging view of the significance of interactions between physiological and psychological processes, and the importance of viewing the individual as a complex whole, dependent variables were levels of both physical ease/dis-ease and psychological well-being. While this model clearly does not exhaust the pool of possible variables impacting health and well-being, nor dimensions for measuring their impact, these three independent and two dependent variables represent five of the most significant categories of variables presently under investigation in the literature of the stress, coping, and their impact on physical and mental health.

Covariance Structure Modeling

One of the daunting problems facing investigators interested in theory-building within the framework of the biopsychosocial model is the myriad of variables with the potential to influence psychological well-being and physical health. Unraveling such a complex network of
Figure 1. Theoretical Variables
influences necessitates the use of research methodology which enables these variables to be examined in a way which provides a clearer and more integrated picture of their relationships. Covariance structure modeling (or structural equation modeling), which represents a integration of research traditions within psychometrics, biometrics, and econometrics, appears to provide a potentially valuable methodological framework within which theory-building and development can be carried-out (Bentler, 1980).

Although it is complex, difficult, and demanding to use (Anderson & Gerbing, 1988; Fassinger, 1987), this method of causal modeling also has a variety of unique advantages which make its use in the area of health psychology appropriate and attractive. Among these advantages are the use of multiple measures, the allowance for and quantification of measurement error, and the incorporation of latent variables within the method (Fassinger, 1987; Long, 1985). The two components of a structural covariance model (the measurement and structural models) provide information concerning the psychometric validity of the model's measured variables, their relationship to theoretical constructs of interest (latent variables), and also permits the analysis of causal relationships between these latent variables (Lavee, McCubbin, & Patterson, 1985; Long, 1985). This allows both the theoretical strengths and weaknesses of the model, as well as the construct validity of its measured variables, to be examined and tested.

In addition to providing a broader conceptual overview of an area of study than is possible with a methodology such as multiple
regression (because it allows for relationships among variables to be simultaneously analyzed), it offers a more justifiable theoretical approach to model testing. For example, it does not assume that a complex construct such as social support can be validly and reliably represented by a single measure, nor are measures assumed to be without error (Lavee, et al, 1985; MacCallum, personal communication, April, 1989). Covariance structure modeling also provides information on potentially appropriate modifications of a model. This exploratory aspect of methodology aids theory development and evolution.

Conclusion

In summary, this research provides information about the effects of stress and personal and social resources on psychological well-being and physical health. The investigation was conducted in two parts, one which examined changes in health and well-being associated with adaptation to a new environment, and one which focused on more stable levels of health and well-being. Given the staggering costs to both individuals and society associated with breakdowns in physical and mental health, and the potential benefits which could accrue from a clearer understanding of variables which influence health and well-being, the development of a more comprehensive and integrated understanding of these influences seems to be an important undertaking.

This research represents one step in the journey towards such an understanding. Its goal was not to crystalize theory in a mature area of study, but rather to explore the relationships of a complex network of variables which have been researched in more specific but less
integrated ways in the past. Hopefully, it will help shed light on a somewhat broader area of the landscape of human health and well-being, and help suggest how this terrain could be explored in the future.
CHAPTER II

LITERATURE REVIEW

This chapter will focus on reviewing the literature relevant to this investigation. First, the literature concerning life stresses will be discussed, focusing on conceptualizations of stress and its impact on health. This will lead into a review of the literature concerning coping with stress. This discussion will include an analysis of the coping process, typologies of coping strategies, and factors hypothesized to mediate the stress-illness relationship (i.e., variables associated with more healthy and adaptive coping). These factors include specific personal dispositional orientations and social support. Different conceptualizations of health and subjective well-being will then be discussed.

Stress: Response Model

As mentioned in the previous chapter, one of the largest and most active areas of research and practice within the health/psychology interface has been that of stress and its impact on the health (Gentry & Kobasa, 1984; Ader & Cohen, 1984). Historically, the term "stress" has meant different things, and been defined in different ways, by different investigators. Original formulations of stress date back to Selye's (1936; 1956) observations and theoretical writings concerning a
generalized pattern of physiological response to environmental demands which he termed the general adaptation syndrome. Selye (1982, p.2) defines stress as "the nonspecific (that is common) result of any demand upon the body". His approach is based on objective indicators (e.g. bodily and chemical changes) of adjustment and adaptation. This focus on objective, physical changes has led others (e.g. Thorensen & Eagleston, 1984) to label his approach a "response" model of stress.

Selye found that in response to a wide variety of stressors, the body reacted with a characteristic syndrome: enlargement of the adrenal glands, destruction of tissues, gastrointestinal ulcers, and decreased immune system functioning (Selye, 1956, 1982). The first stage of this syndrome, the alarm reaction, involved the mobilization of bodily resources to regain homeostasis. The second stage, which would occur in the face of continued exposure to the stressor, was an enhanced state of recovery and adaptation called the "stage of resistance", in which the changes manifest during the alarm reaction phase would diminish or disappear. If exposure to the stressor continued, due to the finite nature of adaptional energy available, resistance would eventually decrease. The "stage of exhaustion" would occur, in which the physical pathologies characteristic of the alarm reaction stage irreversibly reestablish themselves, leading inevitably to death.

Selye also believed that the chronic stressors of present-day industrial society, being less time-limited, are more difficult to respond to in either the alarm or resistance stages, leaving the 20th century human being more vulnerable to "diseases of adaptation (or stress-related diseases). Although stress is viewed in primarily
negative terms, Selye was careful to underscore the functional, adaptive nature of the GAS stages. He pointed out that everyone goes through the first two stages many times during life, and added that the stage of exhaustion, if reversible, need not damage the organism (Selye, 1956). More recently, he even proposed the concept of “eustress”, which he defines as demands for adaptation experienced as agreeable or beneficial, without the harmful consequences of damaging stress (Selye, 1976; 1981). Still, he was somewhat vague about the concept of eustress, and spent comparatively little time in his writings developing it.

**Stimulus Model**

For a long time, physicians had observed an association between very severe stressors (wars, natural disasters, etc.) and illness, although the relationship was far from perfect, ranging from rapid to moderate to minimal or no deterioration when exposed to severe stress (Sarason & Sarason, 1984). As interest in the impact of stress increased, social scientists began attempting to quantify the impact of specific stressor events which were less cataclysmic in nature. Advocates of this approach to the study of stress include Holmes and Rahe (1967), who devised the first scale designed to measure the life changes and stressful events of everyday life and analyze their role in illness onset. These events are viewed as stimuli which produce stress, hence the labeling of this approach as a stimulus model of stress (Thoresen & Eagleston, 1984). While this approach originally included the effect of both positive and negative life events, later conceptualizations have focused on the impact of negative life events.

Stress researchers have created a typology which consists of four major types of stressful life events: (1) cataclysmic phenomena (extremely stressful events which impact a large number of people); (2) individual life events (which are viewed as discrete, time limited events); (3) chronic, ongoing life conditions; and (4) daily hassles (relatively minor, everyday difficulties) (Lazarus & Cohen, 1977; Kanner et al., 1981). Research has tended to focus on the life events category, although recently there has been an increase in interest into the impact of daily hassles (Kanner et al., 1981; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982).

Antonovsky (1979; 1987) suggested that life events scales have underestimated the ubiquity of stressors in the human experience, and give a distorted picture of human experience in which exposure to stressors ranges from very low to very high. He contends that the range is rather "from fairly serious and life-long... to unbelievable hell on earth" (1979, p.77). In addition to the four categories discussed previously (cataclysmic events, individual life events, chronic stressor, and daily hassles), he discussed a variety of stressors which are often ignored (and left unmeasured) within the life events research. These include: experiences of others in our social network; intrapsychic conflicts and anxieties, life-phase specific social crises, along with other normative life-crises (role entries and exists, inadequate socialization, underload or overload),
conflict inherent in social and community relationships; and the gap between culturally inculcated goals and socially structured means (Antonovsky, 1979). Genetic, microbiological, and other physical stressors also exist in addition to the multitude of psychosocial stressors. If one accepts the contention that multiple, significant stressors are an inherent aspect of human living, quantifying stressors and total life stress becomes less significant, and focus shifts to the factors which enable individuals to cope more adaptively with inevitable significant levels of stressful situations.

Although life events research has consistently shown significant correlations between stressful events and illness, correlations have not been high. Rabkin & Struening (1976) report that correlations rarely exceed the .30 level. Researchers have therefore begun to search for alternative and more promising ways of assessing stress and the processes mediating health outcome (DeLongis et al., 1982; Wiebe & McCallum, 1986). The result has been a trend towards more physiologically oriented quasi-experimental designs in which the effects of a specific stressors (e.g. bereavement, unemployment) are evaluated, movement towards a transactional conceptualization of stress, and research into factors which may mediate the stress-illness relationship (Wiebe & McCallum, 1986; Gentry & Kobasa, 1984).

**Psychoneuroimmunology**

Most of the quasi-experimental research into the stress-illness relationship has been conducted with investigative approaches consisting of studies in which the effects of a specific stressor (e.g. death of a spouse) are evaluated. Stress is viewed as
suppressing various immune system functions, thereby leaving the organism more vulnerable to disease (Kennedy, Kiecolt-Glaser & Glaser, 1988). Much of this physiologically-oriented research is occurring within the emerging interdisciplinary field of psychoneuroimmunology (PNI). This field, which studies interactions between the nervous, endocrine, and immune systems and psychosocial factors (Ader, 1981) has been a cutting edge of the expansion of knowledge concerning the intimate relationship between physical and psychological aspects of human functioning (Dossey, 1988). Cunningham (1981) provides a schematic representation of some of the many levels that information from the mind may pass through in order to produce an effect in the body (see Figure 2). He contends that traditional psychology (by which he seems to mean behaviorist theory) generally considers box one (environmental stimulus) and box ten (behavior). Most experimental (animal) and quasi-experimental stress research tends to compare levels one and two (perception) to levels 8 and 9 (effects on the immune system and disease processes or recovery). Much of PNI research concerns the remaining levels, and has focused on a variety of cellular and hormonal immune processes. (This study attempted to correlate levels 1, 2, and 3 with levels 9 and 10.) Although a satisfactory review of the literature on interactions of the nervous, endocrine, and immune systems is beyond the scope of this review, Figure 3 (Cunningham, 1981) is included to give a flavor of the complexity of potential relationships.

Documentation is increasing of the deleterious effect of some specific stressors on immune system functioning (levels 1 and 8). A
Figure 2. Effects of environment on health and behavior
Figure 3. Interactions between nervous and immune systems
variety of both human and animal studies have demonstrated that both physical and psychosocial stressors can modify the immunologic mechanism of the host organism, and alter the course of infection and disease (Kennedy, Keicolt-Glaser, & Glaser, 1988; Mojan, 1981). For example, adrenaline, which secreted in increased amounts during periods of psychological and physiological stress, can inhibit immune functioning (Crary, 1983). In addition, persons who cope poorly with stressful situations show defects in cell-mediated immunity (which protects against cancer and infectious diseases (Bahnson, 1980; Locke & Hornig-Rohan, 1983).

A variety of other studies have provided further evidence of the immunologic consequences of acute and chronic stressors (Kennedy et al., 1988). For example, periods of suppression of a variety of immune effects were associated with academic examinations in first and second year medical students. Their data also indicate that one's interpersonal relationships can significantly influence both physical and psychological functioning. Poorer immune functioning has been found to be associated with higher degrees of loneliness in medical students (Kiecolt-Glaser, et al., 1984), and with levels of depression and attachment in individuals experiencing disruption of their marital relationships (Kennedy et al., 1988). The prolonged stress of being a caregiver for a relative with Alzheimer's disease has also been shown to have negative consequences for immune functioning (Kiecolt-Glaser, Glaser, Shuttleworth, Dyer, Ogroscki, and Speicher 1987) and psychological well-being (Essdofer, Kennedy, Wisnieski & Cohen, 1983). Other studies have found that the health of individuals who experience
grief, depression, or anxiety often suffers (Schlifer, 1983), and that
individual difference variables such as strength of need for power and
control, or the need for friendships and close relationships, are
associated with differences in immune functioning during academic
examinations (Jemmott, Borysenko, & McClelland, 1983). In addition,
recent data (Kiecolt-Glaser et al., 1985; Kiecolt-Glaser et al., 1986)
suggest that immune system functioning may be strengthened with the
help of psychological interventions, such as relaxation training. To
summarize, evidence is growing that an individual's perception of and
reaction to both cognitive and noncognitive stimuli may have either
positive or negative consequences on immunocompetence.

Interactional Model

In line with evidence discussed above, and the "cognitivist" and
"person-environment" trends within psychology during the past several
decades, the transactional model of stress adds cognitive appraisal to
the conceptualizations of stress present in the response and stimulus
models. Emphasis is placed on viewing stress as an interaction between
a unique individual and a particular situation. Lazarus and Folkman
(1984, p.19) define stress from this perspective as "a particular
relationship between the person and the environment that is appraised
by the person as taxing or exceeding his or her resources and
endangering his or her well-being." This approach emphasizes an
individual's perceptions concerning a particular situation, his or her
appraisal of resources and strategies available to deal with the
demands of the situation, and evaluation of the significance and
meaning of the situation (implications for well-being) (Lazarus &
Folkman, 1984). "Stress" is conceptualized more as an internal, psychological state, and the importance of the "objective" nature of a particular situation is downplayed. As the result of this approach, life events scales have been modified in order to include each individual's appraisal of the significance and meaning of events (e.g. Sarason & Sarason, 1984).

Antonovsky (1987), while basically adopting an interactional perspective, has advocated extending the definition of stressors to all stimuli that are taxing, whether or not they are perceived as endangering or threatening. He argues for the importance of distinguishing between stressors, tension, and stress. Stressors can be defined as any "demand made by the internal or external environment of an organism that upsets its homeostasis, restoration of which depends on a nonautomatic and not readily available energy expending action" (Antonovsky, 1979, p. 72). Tension is the response of the organism to a stressor, and can be accompanied by either positive or negative affect. Antonovsky points out that not only do some individuals seek out experiences which expose them to tension, but that sometime by placing a special load on ourselves, and demanding more than routine, automatic energy response, we can foster the emergence of unknown capacities and potentials. This potentiation of resources, which may add to one's repertoire for dealing with stressors, may be viewed as a positive result of tension. Tension, then, must be distinguished from stress, which Antonovsky (1979) defines as a contributing factor in pathogenesis (i.e. the various negative physiological and psychological responses documented above).
Tension can be either salutogenic, in terms of affect experience or the potentiation of behavioral competencies, or it can lead to stress. Matheny, Aycock, Pugh, Curlette, and Cannella (1986) adopt a similar definition. They recognize a precipitating component (internal or external demands), a perceptual component (appraisal), and a physiological component (the stress response).

This study adopted the following definitions in an attempt to minimize the confusion in terminology associated with this area of study. What Matheny et al. (1986) refer to generically as the precipitating component will be referred to as stressors or demands. The perceptual component, appraisal, will be explored in more detail below. Adopting Antonovsky's definition, the response of the individual will be referred to as tension, which if it cannot be adapted to or managed effectively, eventually leads to a stress response. In a larger sense then, the term "stress" is most appropriately used as a general label for a large, complex, interdisciplinary area of study, rather than a particular reaction or event (Monat & Lazarus, 1985).

Given the presence of significant levels of psychosocial and biological demands or stressors throughout the life-span for the vast majority of individuals, the crucial question becomes: what determines whether a state of tension will be transformed into a state of stress, as opposed to having neutral or positive consequences? What are the determinants of successful tension management, or coping?
Coping

Definitions

While stress and its damaging effects have been studied extensively, until recently, less attention has been devoted to the ways in which people respond positively to stressors (Monat & Lazarus, 1985). Traditionally, many psychodynamically-oriented theorists (e.g. Menninger, 1963; Vaillant, 1977), have conceptualized a hierarchy of adaptational strategies. Within this framework, "coping" responses represent mature ego processes, while "defenses" represent immature and less adaptive variations of the same cognitive processes.

Folkman & Lazarus (1984) criticize these approaches for their tendency to assign positive or negative value to various internal processes without empirical knowledge concerning the adaptational outcome of the many diverse patterns of coping. They define coping as "the process of managing demands (external or internal) that are appraised as taxing or exceeding the resources of the person" (1984, p.283). Such efforts may be conscious or unconscious, healthy or unhealthy (Matheny et al., 1986). They do require mobilization of effort, and drawing upon normally unused resources to handle the demands which cannot be handled in a routine or automatic manner (Folkman & Lazarus, 1984).

Since the range of behaviors that are appropriate for managing all potentially stressful situations is very broad, investigators have struggled with devising an adequate system for classifying coping processes. The most completely developed and widely cited coping typology is that of Folkman & Lazarus (1980, 1984). They suggest a taxonomy of coping which emphasizes two major categories:
problem-focused and emotion-focused coping. Problem-focused coping includes efforts to modify a troubled person-environment relationship by doing something constructive about the demand conditions. This includes both aggressive efforts (e.g., confronting an individual responsible for the problem) as well as rational, deliberate efforts to solve the problem (e.g., information gathering). Emotion-focused coping refers to efforts directed at regulating the individual's affective responses to the situation (i.e., physiological disturbance or subjective distress). Examples include distancing, escape-avoidance, positive reappraisal, and various relaxation strategies. These coping processes were traditionally referred to as "defenses", and are geared to make the person feel better (as opposed to altering stressful conditions). Still, the same coping strategy can serve both coping functions on different occasions, and sometimes even simultaneously (e.g. denial or utilization of social support) (Folkman & Lazarus, 1984, Lazarus, 1981). Individuals have been found to employ complex combinations of problem-focused and emotion-focused coping methods in dealing with stressful situations, depending on the specific conditions being faced, available options, and personality factors. (Monat & Lazarus, 1985).

Still, this taxonomy is general rather than specific, and the finding that individuals use both strategies close to 100% of the time (Lazarus & Folkman, 1984) points to the need for a more detailed way of classifying coping strategies. Stone and Neale (1984) note that despite the surge of interest in coping evident in the literature, neither an agreed upon typology of coping strategies, nor an adequate
method of assessing coping is presently available. More recently, Matheny et al. (1986) delineated a taxonomy of 17 specific coping behaviors, which they list under the categories of preventative and combatative coping. Although it appears to be a potentially useful classification system, different investigators will likely continue to use a variety of different approaches, often based on the assessment method they have selected as the best measure of the coping construct.

Assessment of Coping

Two different approaches to the study of coping have been used by various investigators. Until recently, the most common approach was that of studying coping as a personality trait or style (Lazarus & Folkman, 1984). Since this approach attempts to measure what a person says he or she usually does in certain types of stressful situations, it has several major weaknesses as a measure of coping. First, since instruments are not used repeatedly to assess coping in different stressful encounters, they provide no evidence of consistency across diverse situations. This is a major problem since actual consistency across stressful encounters appears to be moderate or low (Folkman & Lazarus, 1980, 1984). This is due to the fact that characteristics of the situation, such as its ambiguity or an individual's "stake" in the situation, can have a major impact on appraisal processes. Second, existing trait measures do not reflect the multidimensional quality of actual coping (e.g. Cohen & Lazarus, 1979; McCrae, 1984). Third, coping is a process that changes over time as stressful encounters unfold. And, in terms of adaptational outcome, a coping strategy which
serves a positive function at one stage of a stressful encounter can have negative consequences at other times (e.g. denial) (Hofer, Wolff, Friedman, & Mason, 1977; Lazarus, 1981).

Because of these problems with the trait approach, most recent research has taken a process approach to the study of coping. Typically, subjects are asked to reconstruct stressful situations, and then provide information concerning what they actually thought, felt, and did using a checklist of coping behaviors (e.g., Aldwin & Revenson, 1987; Folkman & Lazarus, 1980; Macrae, 1984; Parkes, 1986; Stone & Neale, 1984). The best known and most widely used example of such an assessment checklist is Folkman & Lazarus's (1980) Ways of Coping (WOC) checklist.

The process approach, while valuable and necessary, also has limitations. The first problem is the lack of a generally accepted measure of coping (McCrae, 1984; Stone & Neale, 1984). While the WOC is the most widely used instrument, there is, as yet, no standard way of scoring it (McCrea, 1984). Items may be grouped using a variety of theoretical categories or empirically, by factor analysis (e.g. Folkman et al., 1986). For example, Moos and Billings (1982) add an appraisal-focused coping category to the problem and emotion focused categories delineated by Folkman and Lazarus, and further subdivide each category into three subtypes. And factor analytic studies of the WOC have typically revealed between five to eight factors, with two being problem focused and the rest emotion focused (e.g. Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Nor do all investigators agree that the 68 question WOC encompasses all possible
coping options. McCrae (1984) for example, added an additional 50 questions to the WOC. Finally, this approach is costly and time-consuming (Monat & Lazarus, 1985).

So, although coping is an attractive concept due to its potential for helping design active, preventative behavioral interventions, it is difficult to incorporate into the theoretical model under study in this proposal. Although categorization of coping strategies is underway, individuals have not been shown to use a particular style of coping with a variety of situations, nor has an acceptable measure been devised for rating the quality of particular coping strategies with regards to particular adaptational outcomes. Therefore, this review will next detail research on the two major categories of variables thought to mediate the relationship between stress and physical and psychological well-being—personal dispositional characteristics and social support.

**Personal Characteristics**

As mentioned above, the realizations that (1) stressful events are an unavoidable part of life, and (2) many people maintain a reasonably good level of health in spite of stressful events, have lead to a search for social and psychological factors which might mediate the relationship between stress and illness. In addition to the study of specific coping strategies, the search has begun to focus on personal characteristics and resources. This section of chapter two will focus on factors operating at the individual and social levels of analysis. First, three conceptionalizations which are the most highly developed and geared towards explication of how personal
characteristics are a necessary part of the stress/health equation—the concepts of hardiness, coherence, and optimism—will be considered. Basically, these concepts attempt to specify how an individual's general orientation towards life (or characteristic beliefs, expectations, and motivation) influences appraisal, coping, and physiological response to life's demands. Measures of coherence and optimism will comprise the measurement instruments for the latent variable of personal dispositional characteristics in the proposed research. The discussion will then focus on the last independent latent variable in this study—social support.

**Hardiness**

Arguably the best known personality construct advanced as a mediator of the effects of life demands is Kobasa's concept of hardiness (Kobasa, 1979, 1982; Kobasa, Maddi, & Kahn, 1982; Gentry & Kobasa, 1984). Derived from existential personality theory, this construct emphasizes the importance of one's choices and actions (as opposed to traits), and views the inevitable changes and stressful events inherent in life as offering opportunities for personal growth and development. Kobasa (1985) describes hardiness as being comprised of three factors: (1) commitment (emotional engagement with significant areas of one's life); (2) control (similar to Rotter's (1966) concept of internal locus of control); and (3) challenge (viewing change as a challenge rather than a threat, and cognitive flexibility in responding to change). In sum, a "hardy" individual would possess a sense of personal control of external stressful events, a sense of involvement, commitment, and purpose in daily
activities, and the ability to view life's changes and demands as challenges and opportunities for growth. Kobasa (1985) argues that this type of stress appraisal and coping style mitigates the potential unhealthy effects of stressful events and helps prevent them from leading to organismic strain and illness.

Kobasa and her colleagues conducted a series of studies to test this model. The initial test investigated the impact of stressors on the health of a group of public utility executives (Kobasa, 1979). Discriminant analysis revealed that executives high in life events and physical distress were less hardy than those high in life events and low in physical distress. Analysis of a second group from the same sample also showed that 77% of the high stress/low illness and 60% of the high stress/high illness groups were categorized correctly on the basis of their hardiness scores. Next, Kobasa et al. (1982) using a prospective design, once again found that individuals with higher levels of measured hardiness experienced fewer illness symptoms despite the same level of stressful life events. In yet other studies, Kobasa (1982) and Kobasa et al. (1982, 1984) have noted a protective influence of hardiness on the physical and mental health status of lawyers, career Army officers, and women medically screened for cervical cancer. In all three studies, the commitment and control components played a robust role in reducing levels of stress-related illness; the results concerning the challenge component of hardiness were mixed.

Finally, studies which examined the effect of hardiness along with other resistance resources (such as physical exercise, and social
support) have generally found both concurrent and prospective probabilities of illness decreases as the level of resistance resources increases (Kobasa et al., 1982; Kobasa and Puccetti, 1983). Other investigators (e.g. Wiebe & McCallum, 1986) have also suggested that, in addition to directly mediating the effects of stressors on health, hardiness may mediate the negative effects of stressful events on health behaviors.

Unfortunately, methodological problems have plagued the research on hardiness. First, the number of subscales used to measure hardiness has varied across studies (Funk & Houston, 1987). In addition, there have been both long and short versions of the Hardiness scale, a fact which may be somewhat problematic due to research indicating a low correlation (.37) between the short and long version of the challenge subscale (Hull, Van Treuren, & Virnelli, 1987). Perhaps the most serious criticism involves the unitary nature of the hardiness concept. For example, of the five studies which report results separately for the challenge, control, and commitment subscales suggest that the subscales are not equally effective in predicting health (Hull et al, 1987). Commitment had the predicted effect in all five studies, control in four of five, and challenge in only one (and effects opposite of those predicted in another).

Another problem is posed by the fact that all three dimensions traditionally have been measured using negative indicators (alienation from self, alienation from work, feelings of powerlessness, need for security, and external locus of control). As Funk and Houston (1987) point out, this creates substantial conceptual and empirical
difficulties. For example, shyness has been found to correlate only moderately with sociability (Cheek & Buss, 1981), and there is even substantial evidence (as will be discussed later) that positive and negative affect are only weakly correlated (Bradburn, 1969). It is not at all clear, therefore, that low levels of alienation are equivalent to commitment, or that a low level of need for security is equivalent to being a high "challenge" individual. There is also some controversy concerning the statistical analyses used in some hardiness studies. For example, many of the effects of hardiness found when ANOVA's were used to analyze data were not found when multiple regression was used (Funk & Houston, 1987). If ANOVA is used, the assumption of independence among factors is violated, given the correlation of hardiness with variables such as social support and stressful life events.

In a series of seven studies involving the factor analysis of both long and short forms of the hardiness questionnaire, items from both challenge subscales: (1) were found to load inconsistently on the challenge factor (which was always the last factor extracted); (2) had low internal reliability coefficients; and (3) appeared to lack validity (i.e., they did not correlate with variables which correlate with overall hardiness, commitment, and control, and did correlate with variables of questionable relevance to the hardiness construct (Hull et al., 1987). This is particularly problematic due to the fact that hardiness scores are computed as a composite using a formula which equalizes the input of all three dimensions (since there are two subscales each for control and commitment, and only one for
challenge). As the result, short of reanalyzing the original data, it is difficult to determine which aspects of hardiness were responsible for the effects obtained in the majority of hardiness studies (Sheler and Carver, 1985). Hull et al. (1987) also point out that literatures exist concerning the concepts of alienation and control, and suggest that, especially in light of the psychometric superiority of the commitment and control subscales, their independent effects should be explored by future research (as opposed to obscured in a composite index).

In response to criticisms of their Hardiness Scale(s), Kobasa and colleagues have recently developed a new, 50 question Hardiness Test. Still, given the objections raised above, and a lack of available psychometric data to support the new test, the present study will focus on two other promising concepts.

**Sense of Coherence**

Antonovsky (1979, 1987) advances the concept of sense of coherence as an answer to what he terms the salutogenic question. Instead of seeking to explain why people get sick with a specific disease, a salutogenic orientation focuses on the origins of health, and asks why some individuals are located towards the positive end of the health ease/dis-ease continuum, or why they move towards this end (Antonovsky, 1987). As will be discussed later, Antonovsky (1979) presents evidence to support his contention that at any one time, at least one third and quite possibly the majority of the population of any modern industrial society is characterized by some morbid, pathological condition. Illness, therefore, is not a relatively rare deviance.
As discussed during the review of conceptualizations of stress, Antonovsky rejects the idea that low levels of life stressors lead to good health. Originally, his theoretical interest centered on what he termed generalized resistance resources (GRR's) (e.g. money, ego strength, social support, cultural stability)--any phenomena effective in combating the wide variety of stressors. In his 1979 book, *Health, Stress, and Coping*, he proposed the sense of coherence concept (SOC). Antonovsky contended that what was common to all GRR's was they facilitate making sense out of countless life stressors. He defines sense of coherence as a

"global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources available to one meet the demands posed by those stimuli; and (3) these demands are challenges, worthy of investment and engagement" (1987, p. 19).

After conducting and analyzing 51 in-depth interviews with individuals who had experienced major trauma (such as being in a concentration camp) but had reportedly coped quite well, Antonovsky identified three themes which he believes to be the components of SOC: comprehensibility, manageability, and meaningfulness. Comprehensibility refers to the extent to which one perceives the stimuli one confronts as making cognitive sense. Information is perceived as ordered, consistent, structured, and clear, rather than as noise--chaotic, disordered, random, accidental, and inexplicable.
Manageability is defined as the extent to which one perceives that one's resources are adequate to meet the demands posed by the stimuli which bombard one. This includes resources under one's own control or resources controlled by legitimate others (one's spouse, friends, colleagues, God, leaders, physicians, etc.) whom the individual trusts and feels he/she can count on. The third component, meaningfulness, refers to extent to which one feels that life makes sense emotionally. It represents the motivational element of SOC, the sense that at least some problems and demands posed by life are worth investing energy in, are worthy of commitment and engagement. Antonovsky (1987) believes that successful coping depends all three components.

It is interesting to analyze the similarities and differences between the concepts of hardiness and coherence. Kobasa and Antonovsky, working independently, both published their first writings on their respective constructs in 1979. Kobasa's work began with study's of American male executives, while Antonovsky, although studying several American populations during his career, has conducted most of his recent work with a variety of Israeli populations. Since they represent the two most clear and developed models of a salutogenic approach to the study of stress and coping, a comparison of their ideas seems appropriate.

First, their concepts of meaningfulness and commitment seem very similar. What Kobasa and Maddi (1982) call commitment (commitment to self and vigorous involvement in one's life) seems very similar to Antonovsky's (1987) meaningfulness (life areas which one cares about, which make sense emotionally, and in which events are viewed as
challenges worthy of commitment). Antonovsky views this component as the most crucial to successful coping, and it is interesting to note that the commitment subscale of the hardiness questionnaires have consistently been the most strongly related to health outcomes (Hull et al., 1987).

The second component of SOC, comprehensibility, does not appear to have an equivalent construct within the hardiness model. Kobasa's concept of challenge (an orientation to change rather than stability, operationalized by the Security Scale), appears very different from Antonovsky's cognitive emphasis on seeing the world as consistent, ordered, and predictable. As reviewed above, the challenge component has been psychometrically the least valid and reliable, and has not been found to relate to health outcomes (Hull et al., 1987). The question of whether or not these results stem from psychometric or theoretical weakness remains unanswered.

Finally, the concepts of manageability and control, while related, differ on the nature of sense of coping confidence. Kobasa (1979, 1982) operationalizes control by using Rotter's (1966) Internal-External Locus of Control Scale, a scale which uses a forced choice format between alternatives of total personal control and control of events by outside forces. Antonovsky (1987) contends this approach is culturally narrow, as it disregards the possibility of interdependence and trusting reliance on others. While this individualistic emphasis may be appropriate for a population of white, upper-middle class American male executives, it is likely to have less relevance in cultures where the family or community, rather than the
individual, confronts major life problems and demands. For example, Weisz, Rothbaum, and Blackburn (1984) have analyzed differences in the sense of control felt by Americans and Japanese as expressed in the areas of childrearing, religion, and psychotherapy. Americans tend to emphasize and value primary control, in which individuals seek to enhance their rewards by altering existing realities. To the Japanese, by contrast, primary control has traditionally been less highly valued and anticipated. Instead, secondary control has assumed a more central role in everyday life. This includes identification with powerful others, which enhances one's sense of strength or power, as well as avoidance of feelings of uncertainty, anxiety, and disappointment by attempting to accurately predict events and conditions so as to control their impact. Sue and Sue (1984) also provide a critique of the culturally limited nature of the locus of control concept. Antonovsky's (1987) manageability concept seems to represent an attempt to deal with the idea of control in a less narrow, culture-bound manner.

Coherence, Appraisal and Coping

Antonovsky contends that SOC impacts health through its effect on appraisal and coping processes. For example, Folkman et al. (1986) define cognitive appraisal as process through which a person evaluates whether a particular encounter with the environment is relevant to his or her well-being, and if so, how. They further categorize this process as including primary appraisal (an evaluation of what is at stake in the encounter- its potential in term of loss, harm, threat, or benefit, and secondary appraisal (the person evaluates resources
and options for overcoming problems or improving prospects of benefits). Antonovsky (1987) theorizes that during the primary appraisal stage an individual with a strong SOC would have several advantages. First, he or she would be more likely to define stimuli either as nonstressors, or as stressors which are more irrelevant and benign, thereby lowering the level of tension the person experiences and must deal.

More importantly, an individual with a strong SOC would have advantages in tension management (i.e., keeping tension from resulting in a stress response) in comparison with individuals with a weak SOC. These would become apparent with problem-focused and emotion-focused coping. An individual with a weak SOC, having perceived the stressor in a more negative way, would be less likely to select the coping strategy most appropriate to deal with the stressor. Such a person would be more likely to focus on the emotional aspects of the problem, such as anxiety and unhappiness. At the level of secondary appraisal, this leaves the weak SOC individual less able to utilize potential resistance resources, and less able to deal confidently on the instrumental aspects of the problem. As Antonovsky (1987, p.147) sums it up, "an orientation towards one's world that sees stimuli as meaningful, comprehensible, and manageable provides the motivational and cognitive basis for behavior that is more likely to resolve the problems posed by stressors than one that sees the world as burdensome, chaotic, and overwhelming."
Optimism

A second contemporary model which seeks to determine the impact of general dispositional orientations on health and coping is Scheier and Carver's (1985) model of generalized outcome expectancies. This model explores the impact of individual differences in optimism (the expectation that good things will happen) and pessimism (anticipation of negative outcomes). Scheier and Carver's model contends that such individual differences have important implications for the manner in which individuals regulate their behavior.

Their model, and its applications to health and coping issues, grew out of previous laboratory work in the area of behavioral self-regulation (Carver & Scheier, 1981, 1983). Basically, they hypothesize that assessments of the obstacles which impede progress towards a goal result in specific outcome expectancies concerning the likelihood of goal attainment. Expectancies are viewed as a significant determinant of subsequent behavior, with favorable expectations leading to continued or increased effort, while unfavorable expectations are likely to lead to decreased effort or total disengagement (Scheier & Carver, 1985). Therefore, obstacles that arise during day-to-day self-regulatory activities should be less disruptive and have less adverse consequences for optimists (Reich & Zautra, 1981).

While the idea that beliefs about the probable outcomes of behaviors affect their actions is not unique (e.g. Bandura, 1977; Rotter, 1954; Seligman, 1975), expectancy judgments have been studied at many different levels of specificity, ranging from very specific to
very general. Most expectancy-based theories assume that the prediction of an outcome is best when the level of specificity of the expectancy of interest closely matches that of the outcome. If this is the case, generalized expectancies, such as dispositional optimism, should be important in cases where outcomes are general in scope (assessed via multiple measures, or multiply-determined (Scheier & Carver, 1985). They might also be expected to play a role in determining outcomes that slowly unfold over time, or for which the person has had no previous experience (Scheier, Weintraub, & Carver, 1986). (Adaptation to student life at a large university would seem to exemplify these characteristics). Finally, it is important to realize that it is the optimistic expectancies themselves, independent of their specific origins (i.e. God, luck, personal ability, etc.) that are viewed as important (Scheier & Carver, 1985). As with the manageability component of SOC, this would seem to increase the cross-cultural relevance of the construct (since it can include expectations based on a variety of different belief systems).

A series of research studies has examined the relationship of dispositional optimism to a variety of outcomes. In one study, optimistic students were found less likely to be bothered by physical symptoms than less optimistic students, even after statistically correcting for initial symptom-report levels (Scheier & Carver, 1985). Statistical analysis of the possibility of reverse causation (i.e., predicting changes in optimism at time two based on physical well-being at time one revealed no such effect. In another study, level of optimism was strongly related to fewer complications during
heart surgery, as well as a faster rate of recovery (Scheier & Carver, 1987). Optimistic patients also were less focused on the emotional aspects of their experience, and more likely to engage in problem-focused coping strategies.

Scheier et al., (1986) also found dispositional optimism to be a prospective predictor of successful adaptation to stressful encounters. Optimism was associated with the use of more active, problem-focused coping strategies, and the seeking of social support, while pessimism was associated with an increased focus on emotionally distressing aspects of the situation. In another study which controlled statistically for previous levels of depression-related symptoms, optimistic women were found to be less susceptible to the development of postpartum depression (Carver & Gaines, 1987). Level of optimism was also found to reliably predict the success or failure of stabilized alcoholics in completing an aftercare program intended to assist them with reintegration into the working world (Strack, Carver, & Blaney, 1987).

Optimism and sense of coherence are related models which propose that personal dispositional orientations are important in helping determine the responses of individuals to a variety of stressful situations, with a resulting impact on health outcomes. Both models suggest general orientations toward life which result in more flexible and successful coping and adaptation. While neither suggests the development of a specific coping style (used consistently across a variety of situations), both suggest a selection of coping strategies more appropriate for a particular situation based on differing
patterns of cognitive appraisal and differing levels of motivational energy. These differences in coping patterns are hypothesized to have impact on health due to their mediation of a variety of processes (e.g. cardiovascular reactivity and immune system functioning) through which psychosocial stressors affect physical and psychological health and well-being. In addition, by leading to more effective and appropriate coping, they may lessen the extent to which individuals engage in coping activities which are themselves damaging to health (Monat & Lazarus, 1985).

Social Support

One of the most intriguing and potentially important developments in the study of the role of psychosocial factors in health and illness is the growing evidence that, along with personality characteristics, socioenvironmental conditions (that is, the nature, type, and extent of one's social relationships) may mediate the relationship of stressful life events and physical and psychological well-being (Sarason, Sarason, Potter, and Antoni, 1985; Schradle & Dougher, 1985). It is generally argued that people will fare better when faced with stressful life conditions if they have adequate social support, and that the lack of social support may contribute to physical illness and psychological disorders (Schaefer, Coyne, & Lazarus, 1981). There are now a number of empirical studies suggesting that low social support has been a factor in health outcomes such as increased neurosis (e.g. Henderson et al., 1980), increased levels of mortality (Berkman and Syme, 1979), and complications from pregnancy (Barrera, 1981; Nuckolls, Cassel, & Kaplan, 1972). Miller and Ingham (1976) also
found that social support reduced the likelihood of physical and psychological symptoms under stress.

Social support also has been pointed to as a crucial factor in coping with physical disability and illness (Wallston et al., 1983). It has been found to be related to levels of self-esteem and life satisfaction of burn victims (Porrit, 1979), morale and social functioning following the hemodialysis treatment among individuals with kidney disease (Dimond, 1979), favorable outcomes following heart attacks (Finlayson, 1976), and reduction of emotional distress and problems resulting from injuries sustained in auto accidents (Porrit, 1979). Social support also may influence health outcomes by facilitating adherence to treatment programs (Baekeland & Lundwall, 1975).

Models

While evidence linking lower levels of social support with higher frequencies of physical and psychological disorders has been accumulating steadily, the nature of this relationship continues to be debated. Two major hypotheses explaining its role have been advanced. The first model conceptualizes social support as a "buffer" which protects the individual from the potentially negative effects of stressful events and conditions (Cohen & Wills, 1985). From this perspective, available social support may prevent or reduce the impact of stressful events on physical and psychological health by increasing the individual's adaptive coping while reducing negative stress responses (Cohen & Wills, 1985).

The second model proposes that social support's relationship with physical health and psychological well-being is not related to
mediations of stressful life events. This effect is hypothesized as occurring through an influence on health-related behaviors and/or direct impact on emotional and physiological processes (via the immune system). Research finding this direct effect of social support on health and illness has generally compared socially isolated individuals with others who enjoy at least a moderately high level of support (Berkman & Syme, 1979). This leaves open the possibility of a threshold level of support above which additional social support would have little additional impact on an individual's health (Cohen & Wills, 1985).

Research support for the stress-mediation model of social support has been mixed. Many studies have supported this hypothesis (see Mitchell, Billings, & Moos, 1982 for a review), while other reviews of this literature have found a large number of insignificant findings have been ignored by a selective focus on a smaller number of significant effects (Mitchell, 1984). Reviews of the literature have tended to conclude that research support for the hypothesis that social support has a direct impact on physical health and psychological well-being has been more consistent (Lin, 1986; Mitchell et al., 1982). Still, since some studies have also yielded evidence which provides support for both models, the controversy surrounding them remains unresolved.

Definitions

Despite growing support for the hypothesis that social support and social resources are significant buffers of stressful life events and important moderators of psychological and physical well-being
(e.g. Cobb, 1976; Dean & Lin, 1977; Turner, 1981) the study of social support has been made difficult by idiosyncratic conceptualizations and operationalizations of the concept (Schaefer et al., 1981; Barrera, 1986). For example, some of the most frequently cited studies treat social network, psychosocial assets, and perceived social support as interchangeable concepts (Schaefer et al., 1981). Some authors have defined social support in informational terms (e.g. Cobb, 1976), some in terms of tangible support (e.g. Craven & Wellman, 1973), and others in terms of gratification of social and emotional needs such as esteem, approval and belonging (e.g. Kaplan, Cassel, & Gore, 1977). Social support also has been describe as the number of friendships, nearby relatives, and organizational involvements (Enkenrode & Gore, 1981), and operationalized as being married or having a confidant (Wilcox, 1981).

Some of the original studies of social support focused on "social networks", and measured variables such as their composition and structure (number of people involved, frequency of contact, etc.) or content of particular relationships (e.g. friendship vs kinship) (Schaefer et al., 1981). While one major study of this type did predict mortality rates in a large population followed for 9.5 years (Berkman & Syme, 1979), this approach has several weaknesses. First, it sheds no light on the question of how social support affects health. Second, it ignores the quality of social relationships, instead operating under the dubious assumptions that benefits are proportional to the size of one's social network, and that having a relationship is equivalent to getting support (Cohen & Hoberman, 1983). Given the
demands, conflicts, and general life stress often associated with social relationships, the cost/benefits balance is likely to vary among different individuals, situations, and social roles (Schaefer et. al. 1981). Social ties can be beneficial, neutral, or even harmful depending on the specific situation (Fisher & Phillips, 1982). Many of the earlier studies overlooked this possibility of individual differences in support preference and the possibility of maladaptive support (Heller & Mansbach, 1983).

The study of perceived social support, on the other hand, focuses on the nature and quality of social relationships as they are evaluated by individuals. If one assumes that the buffering qualities of social support are cognitively mediated (e.g. that it operates by affecting one's interpretation of a stressor, knowledge of coping strategies, and self-concept), then a measure of perception of the availability of support would be a more appropriate measure. Appraisal of the nature of a stressor is based on a person's beliefs about available support as opposed to its actual availability (Cohen & Hoberman, 1983; Cohen Mermelstein, Kamarack, & Hoberman, 1985). In fact, although they have not been conclusive, studies using the perceived availability of support have provided data generally consistent with the buffering hypothesis, suggesting that the perception that others will provide needed aid helps protect people from the potentially damaging effects of stressful events (Cohen & Hoberman, 1983; Kessler & McLeod, 1985). For the purposes of this study, social support was operationalized in terms of perceived support (or appraisals of support). This operational definition
appears most congruent with evidence which suggests that a person's appraisal of support may be more important the actual interpersonal contacts of the individual (Antonucci & Israel, 1986).

**Functions of Social Support**

Regardless of the specific conceptualization of social support, it would appear to have two basic elements: number of available others to whom one can turn in times of need, and perception of and degree of satisfaction with available support (Sarason et al, 1985). Beyond these two basic elements, it becomes important to identify how specific functional components of social support lead to positive health outcomes (Cohen & Hoberman, 1983; Schaefer et al., 1981). It is these functional components which should function as resources which enable the individual to cope more effectively with stressful life conditions, thus leading to more successful adaptation, and greater levels of health and well-being.

Originally, most investigators of social support assumed that emotional support and feelings of intimacy derived from social relationships were the keys to understanding its impact on health and well-being (Schaefer et al., 1981). For example, Weiss (1974) lists attachment, social integration, opportunity for nurturance, reassurance of worth, a sense of reliable alliance, and obtaining guidance as the mechanisms through which social relationships influence well-being. Other writers (e.g. Cobb, 1976; Dean & Lin, 1977; Henderson et al., 1978) distinguished between the expressive, affiliative functions of
social support and the instrumental, material functions, but tend to emphasize the former and ignore the latter.

In reality, social support may have a number of independent components serving a variety of supportive functions. Schaefer et al. (1981) suggest it is important to distinguish between three separate functions of social support: emotional, tangible, and informational. Cohen and McKay (1984) developed a typology of functions interpersonal relationships, specifically focused on the manner in which others could affect responses to stressful events. They propose four categories of support functions: tangible support, appraisal support, self-esteem support, and belonging support. Tangible support refers to instrumental aid (e.g. loans, gifts, doing a chore for someone, etc.); appraisal support refers to availability of someone to talk to about one's problem (giving advice, providing information, helping problem solve, etc.); self esteem support refers to the availability of a positive comparison when comparing oneself to others, and belonging support to the availability of with whom people one can do things.

It has been suggested that these aspects of social support could affect stress and coping processes in a number of ways. For example, emotional support could encourage a person to sustain or renew coping efforts that increase the likelihood of stress management or mastery (Gore, 1978). Demonstrations of affection, positive regard, or one's social value could help boost self-esteem, making a person less vulnerable to depression and increasing their happiness regardless of stress (Schaefer et al., 1981). Appraisal support might include the
suggesting of alternate solutions or aiding in the reappraisal of a situation. Finally, some situations may best be resolved through some sort of tangible aid.

Empirical support for the idea that social support affects coping processes is beginning to emerge. Sarason & Sarason (1986) found that a social support intervention (the experimenter's offer of help if it was needed) functioned as an asset in enabling individuals to persist in a task under frustrating conditions. Dunkel-Schetter, Folkman, and Lazarus (1987) found that during a six-month period, the coping strategies used were most related to informational support received, and appraisal of stressful situations was most strongly related to the receipt of assistance or aid.

Social Support and Personal Characteristics

Although the majority of research in the area of social support has focused on its relationship with health, and on improving its assessment, some researchers have recently begun to focus on its relationship with personality research (Heller & Swindle, 1983; Sarason, Sarason, Hacker, & Basham, 1985; Sarason & Sarason, 1986). This includes questions such as the extent to which certain personality characteristics and behaviors might be typical of individuals with high or low social support, and questions concerning the stability of perceptions of social support throughout life. While social support has traditionally be conceptualized as an environmental variable, it may also be viewed as being partially determined by an individual's social skills, behaviors, and affective patterns. For
example, some studies indicate that low social support correlates with depression, hostility, and anxiety, all affective states which are not appealing to others (Sarason, Sarason, & Shearin, 1986).

Results of research in this developing area of the social support literature have been mixed. Sarason et al., 1985, found that individuals high and low in social support differed in their knowledge of socially skilled behavior, and in the degree to which their behavior in two types of situations was perceived as socially skilled by themselves and others. Individuals with higher social support were also rated as more physically attractive. Sarason et al. (1986) also found that self-reports of availability of and satisfaction with social support tend to be stable over long periods of time, even during a period of developmental change. Dunkel-Schetter et al. (1987) found that personal characteristics were related to differences in level of emotional support received by individuals during a six-month community survey. On the other hand, Cohen, Sherrod, and Clark (1986) found that the stress-buffering effects of social support were unaffected by controls for the possible influences of levels of social competence, self-disclosure, and social anxiety.

While the proposed research may not yield data on the relationship of social support to specific social skills, it will provide some data on the stability of levels of perceived social support, as well as the relationship of social support to two measures of personal dispositional characteristics and differences in affective status. The research literature in the area of stress and coping, as well as research into possible mediators such as personal
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56

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characteristics and social support, clearly suggest that they affect each other (e.g. the impact of stress on health is mediated by social support, which is affected by personal characteristics, and itself affects coping). Their importance as individual variables, along with their possible relationships to each other, highlight the importance of including each of the three independent variables (stress, personal dispositional orientation, and social support) in the structural model of the proposed research. The rest of this chapter will be devoted to a discussion of dependent latent variables, physical and psychological health and well-being.

**Health and Well-Being**

Health is defined by Webster’s Dictionary (1973, p.528) as "the condition of being sound in body, mind, or spirit; especially freedom from physical disease or pain" and also as "the general condition of the body." This research attempted to assess the impact of stress, personal dispositional characteristics, and social support in two areas of human functioning: the physical and the psychological. It is obvious from the literature reviewed above that clearly separating the physical, psychological, and social aspects of human experience is an impossible task. For example, job dissatisfaction or the end of a significant relationship may lead to a psychological experience of depression and/or anxiety, with resultant physical and behavioral symptoms such as changes in immune or digestive system functioning. Conversely, ingesting particular substances can alter blood sugar or neurotransmitter levels, with a wide range of either salutory or negative affects on one’s emotional stability and cognitive processes.
These effects can eventually have significant social consequences. Still, although the different levels of experience are intimately interrelated, they are not identical, and they may be conceptually distinguished from each other (Dossey, 1987). Philosophically, the proposed research views physical and psychological health as constructs which focus on two related spheres of human functioning, both part of overall health and well-being.

Models of Health

As the generality of the dictionary definition makes clear, health itself is difficult to define. In fact, generally it is necessary to be satisfied with definitions of nonhealth, which is described using terms such as disease, illness, and sickness. Disease is a biomedical concept referring to the deviation of specific physiological symptoms or processes from normal bodily functioning so as to threaten the integrity of the organism by a reduction in capacities or a shortened life-span (Twaddle & Hessler, 1977, Thorensen & Eagleston, 1984). Illness refers more to subjective feelings states (pain, weakness, nausea, etc.) which may be viewed as being caused by a disease, or conceivably as causing a disease. Sickness refers to a social identity, status, or role assumed by people who are labeled as unhealthy (Thorensen & Eagleston, 1984).

"Health", on the other hand, is more difficult to define. Antonovsky (1979) distinguishes between the clinical (or pathological) model and a breakdown, or health ease/dis-ease continuum model. The clinical model of health, which grows out of a biomedical perspective, uses observable and objective criteria to place individuals in one of
Susser (1974) also points out that "normality" has three conceptions: the pathological, the statistical, and the social. In the sense of pathology, normal is perceived as dichotomous, in that the disease is either present or absent. In the statistical sense, normality is defined in terms of the distribution of a characteristic in a population. Social "normality" is defined by values. Susser also contends that health involves multiple levels, including the organic, the functional, and the social. In a similar way, Strupp & Hadley (1977) and Mechanic (1980) point out the difficulties inherent in attempting to define "normal" psychological health and mental illness. They convincingly demonstrate the importance of considering not only statistical information, but also the values and feelings of the individual, and the social and cultural context in which the individual is embedded. Taken as a whole, the literature points out the need for a multidimensional conceptualization of health, and the difficulties inherent in dichotomous classification categories such as "healthy" or "sick".

While not advocating the elimination of the pathological or clinical model, and giving it credit for past and continuing accomplishments, Antonovsky (1979) points to its weakness as a totally dominant paradigm of health. First, it postulates a dichotomous, qualitative distinction between a state of disease and a state of non-disease, while in reality there is no fundamental distinction between "healthy" and "sick" people. Second, it focuses on a "disease process" rather than the whole person. Finally, it narrowly focuses on
two categories: healthy or sick. The physician looks for signs which suggest a disturbance of organs or body fluids characterized by structural alterations or bodily change, and applies the appropriate diagnostic label. In terms of research, the focus is on factors involved in the etiology or treatment of specific diseases. For psychologists, the classification of individuals by DSM-III-R criteria is an example of this approach (Thorensen & Eagleston, 1984). It is also possible to define individuals as "healthy" if they fail to meet diagnostic criteria for a disease, lack subjective feelings of illness or a sick role identity.

As a supplemental or complementary model, Antonovsky (1979) advocates the consideration of a continuum model. First, he presents a convincing array of epidemiological evidence which suggests that, at any one time, at least one third, and possibly the majority of any modern industrial society is characterized by some morbid, or pathological condition. Put differently, "deviance, clinically or epidemiologically defined, is "normal"" (Antonovsky, 1979, p. 15). This conclusion is based on an analysis of data concerning rates of chronic diseases, "notifiable diseases" (e.g. sexually transmitted diseases, measles, hepatitis, chickenpox), acute conditions, disabilities, and mental illnesses). By focusing on cases of specific diseases, rather than location of individuals on a health/disease continuum, we assume most people are healthy. The reality may be that illness, defined as the presence of clinically serious symptoms, is the statistical norm (Antonovsky, 1979; Zola, 1966).
Susser (1974) also points out that "normality" has three conceptions: the pathological, the statistical, and the social. In the sense of pathology, normal is perceived as dichotomous, in that the disease is either present or absent. In the statistical sense, normality is defined in terms of the distribution of a characteristic in a population. Social "normality" is defined by values. Susser also contends that health involves multiple levels, including the organic, the functional, and the social. In a similar way, Strupp & Hadley (1977) and Mechanic (1980) point out the difficulties inherent in attempting to define "normal" psychological health and mental illness. They convincingly demonstrate the importance of considering not only statistical information, but also the values and feelings of the individual, and the social and cultural context in which the individual is embedded. Taken as a whole, the literature points out the need for a multidimensional conceptualization of health, and the difficulties inherent in dichotomous classification categories such as "healthy" or "sick".

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specific diseases and "magic bullet" cures for those diseases, rather than searching for ways to help people successfully cope with and adapt to a stressful environment.

The salutogenic model, on the other hand, postulates a multidimensional health-illness continuum between two non-existent poles of absolute health and absolute illness (Antonovsky, 1979; 1987). Antonovsky provides a theoretical example of a model which attempts to specify an individual's location on such a continuum, based on four assessment criteria: (1) pain level; (2) degree of functional limitation; (3) prognostic implications; and (4) action implications (i.e. type of intervention). Whether or not this specific model is adopted, it illustrates a concern with questions about generalized factors in ease and disease which are relevant to all conditions. The study of health ease, therefore, seeks to explain the facilitation of movement towards the most salutary end of the ease-disease continuum (i.e., formulation of theories of successful coping).

**Counseling Psychology and Salutogenesis**

Counseling psychology is the psychological specialty which traditionally has been the most closely identified with the paradigm of capitalizing on strengths and positive qualities of individuals. Counseling psychology has been described as a specialty whose practitioners help people "improve psychological well-being, resolve crises, and increase ability to solve problems and make decisions (Fretz, 1982). Counseling psychologists have been vocal in their support for a developmental model which includes an emphasis on
psychoeducational interventions with relatively healthy people, as opposed to a medical pathology-oriented model dominated by remedial treatment efforts (Hill, 1977; Klippel & DeJoy, 1984). Osipow (1977) argues for a continued focus on the unique aspects of counseling psychology, which he identifies as the emphasis on prevention, vocational concerns, and a developmental emphasis. Brown & Heath (1984) present an example of such an emphasis in their study of coping with critical life events. Counseling psychology's heritage of psychoeducational strategies, interest in interactions between people and environments, and respect for the individual as an agent of change all speak to the congruence between the philosophy of counseling psychology and a salutogenic perspective towards the study of physical and psychological health (Eagleston & Thoresen, 1987; Klippel & DeJoy, 1984). The present investigation is rooted in this view of health, and will hopefully make a contribution to its advancement.

**Psychological Well-Being**

In contrast to the focus on physical functioning which characterizes the "health" literature, the realm of psychological well-being refers to subjective judgments made by individuals concerning the overall quality of one's inner experience. In congruence with a salutogenic model, the literature on subjective well-being is concerned with how or why people experience their lives in positive ways (Diener, 1984). It includes both cognitive judgments and affective reactions, and studies which use such terms as happiness, satisfaction, morale, and positive affect (Diener, 1984).
As such it appears to be an appropriate counterbalance to the focus on physical and mental symptoms, illnesses, and diseases which typifies much of the medical and psychological literature.

Andrew and Withey (1976) and Lawton (1983) identify psychological or subjective well-being as being composed of four aspects: (1) neuroticism or negative affect (e.g. anxiety, worry, pessimism, depression); (2) happiness (a cognitive judgment of the pervasiveness of positive affects over a relatively long but indefinite time interval); (3) positive affect (a contemporary and time-limited feeling of active pleasure, a description of an emotional state more than a cognitive judgment); and 4) congruence between desired and attained goals (life satisfaction). This area, then, has three qualities. It is subjective, it includes positive measures, and it typically includes a global assessment of all aspects of an individual's life (Diener, 1984).

At present, a major controversy in this literature involves the relationship between positive and negative affect (Diener, 1984). Bradburn (1969), in his study of psychological well-being, found that positive and negative affect were correlated with different variables, and were relatively independent of each other. Happiness was conceptualized as being a global judgment based on a comparison of positive and negative affect. Bradburn's findings that positive and negative affect are independent supported the long-standing arguments of humanists and psychologists such as Rogers (1952) and Maslow (1968) that the concern with psychopathology ignores the positive aspects of life, as well as the idea that the absence of negative affect is not the same as positive affect.
Bradburn's findings sparked controversy within the field—a controversy which has not yet been resolved (Diener, 1984). Although his findings have been replicated numerous times with varying populations using his scale (e.g. Harding, 1982; Perry & Warr, 1980), his conclusions have been challenged on a number of grounds, especially concerning possible deficiencies in his scale (Diener, 1984). At present, there are studies which replicate Bradburn's findings using different measures and methodologies (e.g. Zevon & Tellegen, 1982; Diener & Emmons, 1985), as well as findings which directly contradict them (e.g. Brenner, 1975; Kammann, Christie, Irwin, & Dixon, 1979). Recently, Diener, Larsen, Levine, & Emmons (1985) have suggested a theoretical conceptualization which may provide a framework for integrating these diverse findings (which are based on diverse methodologies).

While a complete discussion of the literature on the relationship of positive and negative affect is beyond the scope of this chapter, and not necessary to the consideration of this study, the literature reviewed above suggests the importance of considering both positive and negative emotional experience when conceptualizing psychological health and well-being. While few (if any) investigators in the areas of stress, coping, personal dispositional orientations, or social support have used outcome measures which tap the positive as well as negative realms of human experience, there are theoretical reasons for hypothesizing a relationship between the concepts. Most studies have found a relationship between self-reported health and subjective well-being (Larson, 1978; Nafziger, 1986; Zautra & Hemple, 1984), and
the literature on mind/body relationships reviewed above suggests that cognitive and affective factors may have concrete physiological affects. Personal dispositional orientations, social support, and stress are all hypothesized to affect task performance, coping, and overall adaptation (e.g. Antonovsky, 1987; Sarason & Sarason, 1986; Scheier & Carver, 1985), factors which should have some impact on levels of subjective well-being. Since psychological well-being and health are both complex, multidetermined concepts, the relationship (if one exists) between the independent latent variables and dependent variables remains to be determined. This study investigated a theoretical model which describe and explored these relationships.
CHAPTER THREE

METHOD

Participants and Procedures

A total of 229 male and female undergraduates taking introductory psychology at the Ohio State University served as the sample for this study. During the first week of autumn quarter, introductory psychology students beginning their studies at Ohio State University were solicited through an announcement posted on the experiment sign-up board. A copy of the solicitation statement is reproduced in Appendix A. In return for their participation, subjects received credit towards fulfilling the experimental requirement of their introductory course. Participation was limited to students beginning their first year of study at the University. Therefore, it was expected that the majority of participants would be from 18 to 21 years old.

Since this study focused on the success with which students deal with the stressors inherent in a new environment, subjects completed all the dependent measures both at the beginning of the quarter (weeks one or two) and the latter part of the quarter (weeks seven and eight, following midterm examinations). This allowed the investigator to examine the relationship between relevant personal variables and changes in physical health and psychological well-being. Measures of personal dispositional orientation and social support were completed.
at time one. In order to reduce the length of first questionnaire, the longest stress measure (which was retrospective) was completed at time two, while the longest measure of personal dispositional orientation was deleted from the questionnaire packet. The amount of time necessary to complete the first questionnaire ranged from 25 - 50 minutes, while a 20 - 45 minute range was noted for the questionnaire administered at time two.

Administration of the measures occurred in groups of 15 - 35 students. The investigator read a brief description of the study to the participants (see Appendix A), who were then given a packet containing the instruments discussed above. Each instrument was labelled with an identification number to prevent separation of instruments. Order of presentation of instruments was counterbalanced in order to preclude order presentation effects in the results.

Participants were requested to give their name and an address and telephone number where they could be reached. This information allowed each individual’s session one results to be matched with their results from session two. Each individual’s name was matched with his or her test number on a list kept confidential by the investigator. Once this list was created, the individual’s name, address and telephone number were removed from the completed questionnaire, thus precluding the identification of a particular individual’s responses by anyone other than the principal investigator. Once each participant’s session one questionnaires had been matched with their session two responses, this identification list was destroyed.
Prior to leaving session one, participants were asked to return for session two during the 7th or 8th week of the quarter. An effort was made to schedule individuals on the same day of the week and time of day during which they completed the original questionnaire. Reminder post-cards were sent one week prior to beginning of follow-up sessions. Reminder phone calls were also placed to individuals who did not return for their second session, or who had given an incomplete address. All individuals were given a list of alternate times which were available for completing the questionnaire if they so desired. Upon completion of the second questionnaire, participants were debriefed using a handout which describes the purposes and hypotheses of the study. The debriefing text is included in Appendix B. The investigator offered to answer any questions from participants, who were also offered the opportunity to receive a summary of the results of the study if they wished. Of the 229 students who filled-out the first questionnaire, over 95% (N = 219) returned to complete the second questionnaire.

Data Analysis

After data collection was completed, the data were coded and analyzed using the multivariate approach of covariance structure modeling. This analysis provides estimations of the parameters (path coefficients) in the model, and several estimations of goodness-of-fit between the model and the sample data (Fassinger, 1987). This type of analysis allows the plausibility of theoretical models to be evaluated with respect to a specific population or populations.
A covariance structure model hypothesizes a very specific pattern of relationships between latent variables and their indicators (measured variables). A model is comprised of two components, the structural and measurement models. The measurement model consists of the relationships between observed or measured variables and the latent or unobserved variables for which they serve as indicators (Long, 1985). If the selection of measures in psychometrically sound, each latent variable should be available for study as a common factor or dimension shared by its indicators (Long, 1986). The pattern of relationships hypothesized among latent variables (the theoretical constructs of interest) is referred to as the structural model. A covariance structure model is composed the specified causal structure among a set of unobserved latent variables and their observed indicators or measurement variables which results from the merging of these two components (Fassinger, 1987). The model can then be tested for fit in a particular population or populations.

In the path diagrams which visually illustrate a model, latent variables are represented as circles, while their indicators (the measurement variables) are represented as rectangles. The hypothesized path diagram of the covariance model to be used in this study is illustrated in Figure A. This model consisted of five latent variables:

three independent variables (personal dispositional orientation, social support, and stress) and two dependent variables (physical health and psychological well-being). Thirteen measures served as the measurement variables which were used to estimate the structural
Figure 4. Hypothesized Model
Figure 4 (continued)

Key:

<table>
<thead>
<tr>
<th>Independent Latent Variable</th>
<th>Measure/Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDO = Personal Dispositional Orientation</td>
<td>1) SOC = Sense of Coherence</td>
</tr>
<tr>
<td></td>
<td>2) LOT = Life Orientation Test (optimism)</td>
</tr>
<tr>
<td>STR = Stress</td>
<td>1) PSS1 = Perceived Stress Scale (first administration)</td>
</tr>
<tr>
<td></td>
<td>2) PSS2 = Perceived Stress (second administration)</td>
</tr>
<tr>
<td></td>
<td>3) LES = Life Events Survey (negative life events)</td>
</tr>
<tr>
<td>SS = Social Support</td>
<td>1) ISEL = Interpersonal Support Evaluation List</td>
</tr>
<tr>
<td></td>
<td>2) SSQS = Social Support Questionnaire (satisfaction, six question version)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Latent Variable</th>
<th>Measure/Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWB = Psychological Well-Being</td>
<td>1) BDI = Beck Depression Inventory</td>
</tr>
<tr>
<td></td>
<td>2) AFM2 = Affectometer 2</td>
</tr>
<tr>
<td></td>
<td>3) LSI = Life Satisfaction Index</td>
</tr>
<tr>
<td></td>
<td>4) HM = Happiness Measure</td>
</tr>
<tr>
<td>HEA = Physical Health</td>
<td>1) CHIPS = Cohen-Hoberman Inventory of Physical Symptoms</td>
</tr>
<tr>
<td></td>
<td>2) SRH = Self-rated Health (index composed of D/T and Faces scales)</td>
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</table>
model. The Sense of Coherence scale and the Life Orientation Test served as indicators of personal dispositional orientation, the Perceived Stress Scale (time one and time 2), and the Life Events Scale served as indicators of stress, and the Interpersonal Support Evaluation List and Social Support Questionnaire (short version) served as indicators of social support. The model also included four measure of psychological well-being (the Beck Depression Inventory, the Affectometer-2, the Happiness Measure, and the Life Satisfaction Index), and two measures of physical health, the Cohen-Hoberman Inventory of Physical Symptoms, and a index composed of two self-ratings of physical health.

After defining a covariance structure model and collecting data, a correlational or covariance matrix detailing the relationships among measured variables was computed. This matrix was then used as input to the covariance structure analysis computer program. In this study, two different matrixes were analyzed. In part one of the study, change scores on the dependent measures were used as indicators to study a model of changes in psychological well-being and physical health associated with adaptation to and coping with the environmental contingencies presented by a large university. For example, an individual's happiness score at time 1 minus the same individual's score at time 2 would result in a change score used in the analysis. In part two of the study, scores on the dependent measures (at time 2) served as indicators overall levels of psychological well-being and physical health. In each case, a correlational matrix for 13 measured variables was computed to serve as input for the LISREL program.
The next step in covariance structure modeling involves the comparison of the estimated population matrix (derived from the model specified by the investigator) with the matrix computed from sample data (Long, 1983). Several different indexes can be computed to evaluate extent to which the estimated population matrix (based on the theoretical model of interest) fits sample data.

One measure, computed by LISREL, is the chi-square statistic. This statistic provides an inferential test of the hypothesis that the model does not hold in the population (i.e., a significant chi-square leads to the rejection of the hypothesis that the model is plausible in the population). In practice, however, a non-significant chi-square is rare. The inferential chi-square test of the null hypothesis is a very rigid test; its values are distorted by large sample sizes. It demands that the model fit nearly perfectly, a demand very few models can meet (Bentler & Bonett, 1980; MacCallum, 1989, personal communication). As the result of these limitations, it is not considered a valid test in most cases (Joreskog & Sorbom, 1986; Marsh, Balla, & McDonald, 1988).

To overcome the problems posed by the use of the chi-square statistic, qualitative or descriptive goodness-of-fit indexes have been devised. Bentler and Bonett's (1980) "Q" statistic, for example, compares the chi-square and degrees-of-freedom of a hypothesized model with those of the null model (a "worst case" model which holds that all measured variables are uncorrelated in the population of interest). When the model holds in the population, Q will be close to 1 (Q = 1 would suggest a perfect fit). As the magnitude of Q increases,
the fit of the model worsens. A "Q" in the ones or twos is considered
to be reasonable; as Q moves into the 3's and 4's, fit is not as good.
The rho statistic uses the Q of the theoretical, null, and a defined
ideal or perfect model (one in which the chi-square is equal to the
degrees of freedom, or Q = 1). A rho statistic in the low .90's is
considered good, while .85 and below is considered to be fairly poor
fit (MacCallum, 1989, personal communication). The other two remaining
widely used qualitative indexes are the Delta and the Root Mean Square
Residual (RMS). A delta in the .90's is also an indicative of good
fit, although this statistic behaves less consistently than rho (Marsh
et al., 1988; MacCallum, 1989). The RMS, provided by LISREL, is a
measure of overall residual variance remaining after each parameter of
the hypothesized model is fit to sample data.

Following the testing of the theoretical model of interest, data
analysis using structural covariance modeling often involves a
specification search in which an attempt is made to improve the fit of
the initial model. In conducting the specification search, the
investigator followed the conclusions of MacCallum (1986). MacCallum
points to research which suggests that following certain principals
greatly increases the likelihood of a valid specification search.
First, any changes made to the original model must be substantively
justified, and must result in a significant improvement in
goodness-of-fit. Secondly, the search should be as restrictive as
possible (i.e., the number of changes made should be kept to a
minimum), but should also continue even after a plausible model has
been reached. These two criteria demand that the original model correspond closely to the "true" model.

Recent research by Silva and MacCallum (1988) has suggested that a "saturated" model (i.e., one in which all possible paths between the latent variables are specified as "free" or significant) is the type of model most likely to lead to a valid and error-free specification search. Anderson and Gerbing (1988) also have recently suggested a systematic strategy of exploratory model-testing in which five structural submodels (ranging from the "saturated" submodel \([M_s]\) to an "empty" or null structural submodel \([M_n]\)) are tested. The hypothesized theoretical model of interest \([M_t]\), along with two additional "next most likely" submodels (one unconstrained compared to the theoretical model of interest \([M_u]\) and one more constrained \([M_c]\)) are also tested. This set of five structural submodels is nested in a sequence such that \(M_n < M_c < M_t < M_u < M_s\). In this study, the theoretical model of interest is a saturated model, creating a simpler situation \(M_n < M_c < M_t\) in which the "next most-likely" model would have to be a constrained version of the original model.

The LISREL program also provides some additional detailed information which can be used in the revision process. Modification indices \((MI's)\), computed for each "fixed" parameter in the model, report the minimum reduction (improvement) in the chi-square value which would occur if a parameter were freed for estimation (Fassinger, 1987). This is equivalent to adding a path to the model. Generally, an MI of above nine or ten is considered significant, although these values need to be evaluated relative to the size of the model's chi-square.
LISREL also generates t-values for every "free" parameter in the model. These values are significance tests of the free parameters, and provide information concerning ways in which the model might be made more parsimonious (though the elimination of potentially non-significant paths in the model. Values less than 2.0 indicate that the investigator may consider modifying the model by "fixing" the parameter (i.e., removing the path from the model).

Squared multiple correlations (SMC's) for each equation in the model are also generated by LISREL. For indicators (measured variables), these reveal the portion of the variance in each measure accounted for by the latent variables in the model; for dependent latent variables, the SMC indicates the proportion of variance accounted for by the other latent variables in the model (Fassinger, 1987). The squared multiple correlations therefore allow both the accuracy of each indicator and the strength of the relationship between the latent variables to be evaluated.

The steps involved in this study's structural covariance analysis can be summarized as follows:

1) a series of equations and matrices were generated to describe the structural and measurement model of physical health and psychological well-being tested in the present study;

2) the covariance structure of the model was compared to the observed (sample data) covariance matrix to determine goodness-of-fit according to the various inferential and qualitative indices of fit;

3) theoretically justified and substantively meaningful modifications in the structural and measurement models were made in order to improve fit;
4) the modified models were re-analyzed, making theoretically justified successive revisions in order to maximize fit, until the process became theoretically untenable (within the context of current empirical knowledge and theory concerning specification searches).

5) these procedures were carried out in two stages: 1) a prospective analysis in which the measurement model of the dependent variables consisted of changes in the measures between time 1 and time 2; and 2) an analysis which examined the more stable aspects of physical health and psychological well being by using scores on the measures at time two as indicators of the two dependent latent variables.

Multiple Regression

Several simultaneous multiple regression analyses were also carried out in order to gain more detailed knowledge concerning the contribution made by specific independent measured variables to the explanation of variance in change scores and time two scores of the six dependent measures used in this study. A series of t-tests were also conducted to test for the possible presence of systematic differences between men and women on any of the independent or dependent measures used in this study.

Measures

The following section describes the indicators which were used to measure each of the five latent variables postulated in the structural model represented in Figure 4. The discussion will proceed according to the order of the latent variables from left to right: the independent variables Personal Dispositional Orientation, Social
Support, and Stress; then the dependent variables Physical Health and Psychological Well-Being. These sections will include discussions of each measured variable (represented by the rectangles in Figure 1) proposed for use as an indicator of a specific latent variable.

The structural equation modeling methodology provides an implicit test of the adequacy of each measure used in the analysis. While in this study most measures were multi-item scales which seemed to possess acceptable reliability and validity, in one case limitations imposed by time and available resources necessitated the use of a two question index as one of the two measures of a latent dependent variable (physical health).

**Personal Dispositional Orientation**

**Sense of Coherence Questionnaire**
The Sense of Coherence questionnaire (SOC; Antonovsky, 1983) was used to measure coherence. This is one of the general dispositional orientations hypothesized to be associated with level of physical health and psychological well-being due to its facilitation of the use of more effective coping strategies and better tension management. First field tested in its Hebrew version with an Israeli national sample, both the Hebrew and English versions of the SOC have since been used with a variety of other samples, although published research on the scale is just beginning to appear (Antonovsky, 1987). Constructed to measure sense of coherence and its three theoretical components (comprehensibility, manageability, and meaningfulness), the SOC is a 29 item questionnaire which uses a seven point rating scale,
resulting in a theoretical range of 29-203. A copy of the SOC is can be found in Appendix C, and more information on the measure can be found in Appendix D.

The SOC was constructed using Guttman\'s facet design technique, an organized and systematic approach to scale construction (see Shym, 1978). The specific facets and their elements used in developing the SOC are reproduced in Appendix D. In addition to the advantage of being designed with multi-cultural applicability in mind, the SOC has been shown to be effective in distinguishing among the members of different populations. Internal consistency reliability scores (Cronbach\'s alpha) have ranged from .84 to .93 in the 11 samples from which data are available (Antonovsky, 1987).

Data compiled during the last five years also give preliminary evidence of convergent and discriminant validity. The SOC has been found to be significantly correlated (.64) with another independently constructed sense of coherence scale (Rumbant, Anderson, & Kaplan, in press). It also has been found to correlate moderately with measures of related but differing theoretical constructs (e.g. Rotter\'s Internal-External Locus of Control scale [.39]; Sarason\'s Test Anxiety scale [−.21]). Predicted differences have been found in mean SOC scores among samples which theoretically should be expected to differ (for example, Israeli army officer trainees vs. U.S. undergraduates vs. alcoholics), while differences between similar groups have been much smaller (Antonovsky, 1987). Content validity has been assessed by having each item evaluated for appropriateness and facet design by four researchers familiar with the sense of coherence concept.
Life Orientation Test

The Life Orientation Test is a 12 item scale designed to measure generalized outcome expectancies (dispositional optimism) (LOT; Scheier & Carver, 1985). Using a five point continuum, respondents are asked to indicate the extent of their agreement or disagreement with each item. After appropriate reversals to compensate for direction of item wording, scores are summed to create a composite optimism score. Reliability evidence includes a Cronbach's alpha of .76 for a sample of 624 subjects, and test-retest coefficients of .79 (4 week interval) and .72 (13 week interval) (Carver & Gaines, 1987). Convergent and discriminant validity of the measure has been supported by comparisons with measures of locus of control, self-esteem, hopelessness, depression, and alienation. While correlations with these and other measures were significant in the predicted direction, a factor analysis of LOT items (along with the items of these other measures) indicated that the LOT items formed their own factor, one which was reasonably independent of other factors (Scheier & Carver, 1985). A copy of the LOT may be found in Appendix E.

Social Support

Interpersonal Support Evaluation List (ISEL)

The ISEL consists of 40 statements concerning the perceived availability of potential social resources. The items are counterbalanced for desirability, with half concerning positive and half negative social relationships (Cohen & Hoberman, 1983). Subjects are asked to answer questions on a four point scale ranging from definitely true to definitely false. The ISEL has 4 separate ten item
subscales designed to assess the perceived availability of four separate functions of social support: (1) perceived availability of material aid; (2) appraisal (perceived availability of someone to talk to about one's problems); (3) self-esteem (perceived availability of positive comparison when comparing oneself to others); and (4) belonging (the perceived availability of someone with whom one can do things). Items were developed on theoretical grounds to cover the range of supportive social resources that could facilitate coping with stressful events. They were selected from a larger pool of items based on high correlations with items of their own subscale, and minimal correlation with other subscales.

The ISEL is moderately correlated with other existing structural, past support, and perceived availability measures of social support in both student and general population samples (Cohen et al., 1985). ISEL subscales have been found to correlate with other measures of related constructs (e.g. the self-esteem subscale with Rosenberg's Self-esteem scale), while theoretically unrelated subscales had much weaker correlations (Cohen, Mermelestein, Kamarck & Hoberman, 1985). Internal reliability alpha coefficients have ranged from .77 to .90 in a variety of studies, and test-retest reliability was .87 for a four-week interval. A copy of the ISEL is reproduced in Appendix F.

Social Support Questionnaire

The Social Support Questionnaire (SSQ; Sarason, Levine, Basham, & Sarason, 1983; Sarason & Sarason, 1984) is designed to measure two basic elements of social support, size of an individual's support network, and satisfaction with available support. Each SSQ item asks
subjects to list the available people to whom they can turn and rely on in a given set of circumstances, and then indicate on a seven point scale how satisfied they are with available support. The SSQ yields two scores: 1) a number score (SSQN = mean number of persons listed per question); and 2) a satisfaction score (SSQS = mean satisfaction rating). Since the two subscales are typically only modestly correlated (.20's -.30's), a fact which suggests they are would not be part of a unitary social support factor, only the SSQS was used as an indicator of social support in this study (Sarason, Shearin, Pierce & Sarason, 1987).

The full length SSQ has a high degree of internal reliability (.94-.97 for each subscale), and test-retest reliability (.90 SSQ-N and .83 SSQS). The pattern of correlations between the SSQ and other social support and personality measure is one which demonstrates its convergent and discriminant validity (Sarason et al., 1983, Sarason et al., 1987).

The brief version of the SSQ (SSQ-6), consists of six of the original 27 items. Tested in a variety of samples, the SSQ-6 was highly correlated with the SSQ (.95-.97 for the number scale, and .95-.96 for the satisfaction scale). The pattern of correlations between the SSQ-6 and a variety of personality and social support measures also was very similar to the pattern displayed by the SSQ (Sarason et al., 1987). Internal reliability for the SSQS-6 scale has ranged from .90-.93 in all samples tested. A copy of the SSQ-6 can be found in Appendix G.
Stress

Life Experiences Survey

The Life Experiences Survey (LES; Sarason, Johnson & Siegel, 1978), a widely used measure of life stress, was used as a measure of major stressful life events. A 56-item self-report measure, it allows respondents to report events during a specified period of time (see Appendix H). Items consist of life changes common to individuals generally, as well as ten events commonly experienced by students. Three additional spaces are also included which allow the reporting of events not mentioned on the scale. Respondents rate both the impact and desirability of events on a seven point scale ranging from extremely positive (+3) to extremely negative (-3). The LES yields a positive change score (sum of positively rated events), and negative change score (sum of negatively rated events), and a total change score (Sarason & Sarason, 1984).

Following the lead of Wiebe and McCallum (1986), three LES items which overlap with measures of health (e.g. "major change in sleeping habits", and "change in eating habits") were not used in this study. This decision was made to help diminish the problem of the artificial inflation of correlations between life events scales and health measures. In addition, several items which seemed inappropriate for a population of beginning college students (e.g. retirement, end of formal schooling, son or daughter leaving home) also were deleted. Separate items regarding 1) changes in wife’s or husband’s work, and 2) separation from spouse due to conflict or due to nonconflict reasons (travel, work, etc.) also were combined into a single items
involving 1) changes in spouse's work and 2) a generic separation from spouse item. Deleted items were replaced by eight items from the College Student Life Events Scale (CSLES) chosen by the investigator using criteria of relevance, significance, and lack of overlap with LES items. In the present study, subjects were asked to respond to items with reference to the preceding six months.

The LES has been found to be relatively free of social desirability bias (correlations range from -.05 - +.05), and does not appear to be influenced by respondent moods at the time of scale completion (Sarason et. al, 1978). Test-retest reliability studies (5-6 week time interval) yielded reliability coefficients of between .56 and .88. While the lower boundary of this range seems unimpressive, it should be noted that a in 5-6 week interval, subjects may experience a variety of both positive and negative events that may be reflected in responses given at the time of retesting. Also, in the present study, students were asked to report on a six month period of time, as opposed to the twelve month self-report period typically requested of individuals filling out life event scales. This hopefully reduced some of the error variance due to inaccurate recalling of life events reported in the life stress literature (Schroeder & Costa, 1984).

Perceived Stress Scale

The Perceived Stress Scale (PSS Cohen et al., 1983) was used as another measure of the extent to which study participants consider their lives to be stressful. A 14-item self-report inventory, the PPS is designed to measure individuals' appraisal of their ability to cope
with stress during a two week period of time. Because it does not associate appraisal with specific events, the PSS is sensitive to the non-occurrence of events as well as to continuing life circumstances, to stress resulting from events occurring in the lives of friends and relatives, and to expectations concerning future events (Cohen, 1985). For each item, respondents report how often during the past two weeks they felt a particular way (e.g. nervous, stressed, overloaded, not in control, etc.). The PSS utilizes a 5-point scale (never, almost never, sometimes, fairly often, very often). In three samples, alpha reliability ranged from .84-.86. A two-day test-retest reliability of .85 is also reported (Cohen et al., 1983). A copy of the PSS can be found in Appendix I.

**Psychological Well-Being**

**Beck Depression Inventory**

The Beck Depression Inventory (BDI; Beck, 1967) consists of 21 items covering affective, cognitive, motivational, and physiological areas of depressive symptomatology. Each item is scored from "not at all depressed" to "most depressed" on a 0 to 4 scale, with an individual's total score being the sum of her or his score on each item.

While high scores on paper and pencil measures of depression such as the BDI typically have been interpreted to reflect greater depression, it should be specified that symptoms of major depression (according to Research Diagnostic Criteria [RDC] and the DSM-III R) are not the only ones being tapped (Dohrenwend, Oskenberg, Shrout, Dohrenwend, & Cook, 1981). In addition to individuals who are
clinically depressed, individuals who are anxious or who do not meet criteria for any identifiable psychological syndrome endorse items indicative of high levels of depression (Stukenberg, 1987; Wilder, Gurland, & Bennet, 1984). Link and Dohrenwend (1980) liken the state of those who endorse depression items, but do not meet depression criteria, to Jerome Frank's (1973) concept of demoralization. Still other researchers have found that the BDI demonstrates a high degree on concurrent validity, and can differentiate depression from anxiety (Beck, Steer & Garbin, 1988). Since the present study is concerned with general psychological well-being or demoralization rather than identifying individuals meeting specific criteria for clinical depression, the BDI appears to be an appropriate measure.

Beck et al. (1988), reviewing 25 years of research on the BDI, report internal consistency coefficients ranging from .78 - .95 resulting from a series of 32 studies. Reliability and validity has been demonstrated in college populations (Bumberry, Oliver, & McClure, 1978; Beck et al., 1988).

**Affectometer 2**

The Affectometer 2 (AFM-2; Kammann and Flett, 1983) is a 40 item self-report scale of happiness or sense of well-being based on measuring the balance of positive and negative affect, in a pattern similar to Bradburn's (1969) Affect Balance Scale (ABS). Like the ABS, it has separate items for measuring both positive and negative affect, and assesses overall level of well-being as the extent to which good feelings predominate over bad feelings (Positive Affect - Negative Affect). However, whereas the ten ABS items were chosen solely by
Bradburn and his colleagues, the Affectometer items were selected empirically from a candidate pool of 435 adjectives and sentences. It also asks the respondent how often a feeling was present on a five category graded response scale ranging from "not at all" to "all the time", as opposed to the ABS yes/no format.

The Affectometer 2 items (20 sentences and 20 adjectives) were selected from the original 96 Affectometer 1 items (Kammann & Flett, 1983). Research had revealed a high degree of item homogeneity (alpha coefficient of .96), and no distinct groups of items revealed by factor analysis (Kammann and Flett, 1983). They report alpha coefficients of .88 and .93 for the sentences and adjectives subscales, with an overall alpha of .95 for the total scale. Test-retest reliability coefficients (two week period) of between .80 -.85 are reported based on several studies of the Affectometer 1.

While test-retest reliability data have yet to be published on the AFM-2, it seems likely, based on its strong correlation with the AFM, that the scale has a higher degree of psychometric soundness than the ABS and a variety of single item well-being scales (Kammann & Flett, 1983; Larsen et al., 1985). The AFM also has a high level of convergence with other widely used measures of subjective well-being (an average of .70), and permits the measurement of both positive and negative affect, while overcoming some of empirical problems which have plagued the ABS (Diener, 1984; Larsen et al., 1985).

**Satisfaction with Life Scale**

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) was created to meet the need for a multi-item scale to
measure life satisfaction as a cognitive-judgmental process. While several other scales of general life satisfaction have been developed, most are either single item scales, or are appropriate only for a geriatric population (Diener et al., 1985). In addition, other available life satisfaction scales appear to measure affect rather than maintain an exclusive focus on life satisfaction (Diener et al., 1985).

The SWLS (see Appendix J) is a five item scale in which subjects rate each item on a 7 point scale ranging from strongly agree to strongly disagree. Reliability testing with five samples has yielded internal reliability coefficients in the .87-.93 range, with test-retest reliabilities of .82 and .83 in two separate samples (for a two-month period). This finding supports the idea that life satisfaction tends to be a relatively more stable and consistent component of subjective well-being than affect. The SWLS also shows a good pattern of convergence with other scales of subjective well-being, and was moderately correlated with interviewer ratings of life satisfaction based on structured interview data (.47) and satisfaction with major life domains (.57) (Diener et al., 1985; Larson, Diener, & Emmons, 1985). The SWLS does not appear to evoke a social desirability response set (.02 correlation with the Marlow-Crowne social desirability measure).

The Happiness Measures

The Happiness Measures (HM; Fordyce, 1973, 1987) are two self-reporting items measuring emotional well-being: (1) an 11 point, happiness/unhappiness scale, and 2) a question asking for the time
spent in "happy", "unhappy", and "neutral" moods. Together, the scale and the percentage estimates provide what Diener (1984) contends are the important qualities of a well-being instrument: measures of both frequency and intensity of affect. The two measures are combined ([scale score x 10 + happy %] / 2) to yield a combination score which has demonstrated acceptable reliability and validity.

Fordyce (1987) reports test-retest coefficients for the combination score of .98 (2 days); .86 -.88 (two weeks); and .81 (one month). The HM also has demonstrated a strong and consistent convergence with other recognized measures of happiness, and well-being, as well as the ability to consistently discriminate between various "normal" samples and those of various "troubled" populations. And finally, in comparisons with close to thirty different measures of personality and values, the HM has shown a strong relationship with a variety of characterists which exemplify a "happy personality" (Fordyce, 1987). Diener (1984) and Larson et al. (1985), in their reviews of well-being measures, found the HM to be stronger in terms of reliability and validity than other brief measures of well-being, and also found it to be stronger in both areas than the ten item Bradburn scale. In light of this psychometric data, they advocate its wider use.

Physical Health

Cohen-Hoberman Inventory of Physical Symptoms

The Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) was utilized as a measure of physical symptoms (see Appendix L). The CHIPS lists 33 common physical symptoms, excluding
any symptoms which are obviously psychological in nature. Each item is rated on a five point scale ("not at all" to "extremely") on how much that particular problem bothered the respondent during the previous two weeks.

Cohen and Hoberman report a Chronbach's alpha of .88 for CHIPS, and also report it to be significantly correlated (.29 and .22) with use of student health facilities by two samples of college students during a five-week period following completion of the scale.

Global Self-Reported Health

Global self-rated health (SRH) was measured by an index composed of a Delighted-Terrible (D-T) and a Faces question used by Andrews & Witney (1976) in their national survey. The D-T format, with its explicit labels for each scale category, was found to be the most reliable and valid approach for assessing various specific dimensions of well-being in Andrews and Withey's (1976) comprehensive study of national well-being. (The "Faces" format, which assessed the same questions using a nonverbal format, placed a close second in validity). The authors also found that an index composed of two questions (e.g. a life satisfaction question using both the D-T and Faces format) was a more valid measure than a response to a single question. This index, then, asked for a rating of health using one question in the D-T and Faces formats. A health index was computed based on total score to the same question asked in two different formats. Studies of similar (and probably less discriminating) self-rated health measures have found them to correlate with more
objective health indices such as number of physician visits, impairments reported in medical records, and time spent in the hospital (Linn & Linn, 1980; Mossey & Shapiro, 1982).

While Andrews and Withey (1976) found that their D-T format reduced the positive skewing and clumping of results which often plagued other single item well-being assessment scales, they found evidence which suggested two additional categories might further improve their scale. This study incorporated their suggestion by adding one positive and one negative category to the D-T scale. See Appendix M for the revised version of D-T scale and the Faces scale.

**Demographic Variables**

Participants were asked to give information concerning their racial/ethnic background, age, and gender. Participants also were asked to indicate their present annual income, as well as that of their parents. Participants also were requested to report their city or town of residence just prior to enrolling at OSU.
CHAPTER IV

RESULTS

Descriptive Statistics

An analysis was undertaken of the demographic composition of the study sample, individuals beginning their first quarter of academic work at Ohio State University. Table 1 provides the results of this analysis. Available comparison demographic data from the autumn 1988 freshman class at Ohio State also is provided (data for the OSU student body as a whole is provided in cases where freshman class data was not available). The study sample was primarily caucasian (87.7%); blacks (7%) and Asian-Americans (3.9%) were the only minority groups represented to any significant degree. Comparison data suggests that the sample was fairly representative in terms of ethnicity of OSU's freshman student body during the quarter when data were collected.

Demographic data also revealed that over three-quarters of the sample participants (78.2%) were 18 years of age, with 93.1% being in the 17-19 year old group. A little over two-thirds of study participants were female (68.1%), a percentage which represents a difference from overall freshman class figures, where a roughly 50/50 split prevailed (males = 51.2%, females = 48.8%).

The majority of study participants lived in Ohio prior to their enrollment at OSU (88.6%). The sample seems to be fairly
TABLE 1

Demographic Information*

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Study Sample</th>
<th>OSU Freshman class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td>18.4 (range 18-32)</td>
<td>18.3</td>
</tr>
<tr>
<td>Ethnicity (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian American</td>
<td>3.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Black</td>
<td>7.0</td>
<td>6.5</td>
</tr>
<tr>
<td>Caucasian</td>
<td>87.7</td>
<td>88.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Native American</td>
<td>.4</td>
<td>.2</td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>68.1</td>
<td>48.8</td>
</tr>
<tr>
<td>Male</td>
<td>31.9</td>
<td>51.2</td>
</tr>
<tr>
<td>Distance moved to OSU (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbus area (&lt; 100 miles)</td>
<td>28.5 (total=88.6)</td>
<td>84.5**</td>
</tr>
<tr>
<td>Ohio (&gt; 100 miles)</td>
<td>60.1</td>
<td></td>
</tr>
<tr>
<td>Adjacent state</td>
<td>4.8 (total=10.9)</td>
<td>9.8**</td>
</tr>
<tr>
<td>Rest of United States</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Outside United States</td>
<td>.4</td>
<td>5.7**</td>
</tr>
<tr>
<td>Mean Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>$ 2,986</td>
<td></td>
</tr>
<tr>
<td>Parents</td>
<td>$ 51,368</td>
<td></td>
</tr>
</tbody>
</table>

* Data provided by the Registrar's Office of Ohio State University
** Overall OSU student body data - freshman class data not available
representative of OSU's total student body in this regard, with the larger percentage of foreign students in the total student population probably reflecting the presence of graduate students in these figures. Reported mean income of the parents of study participants was $51,368, although only 73.4% of all study participants provided this information. Overall, the modal participant in this study was an 18 year old white female. Comparison figures suggest that the sample was fairly representative of the freshman class as a whole, with the exception of the overrepresentation of women in the sample.

Table 2 presents the means and standard deviations of the 19 variables used in testing this study's two hypothesized models. Means for the dependent measures at time two are reported, along with mean amount of change occurring in the dependent measures from time one to time 2 (change scores were calculated by subtracting an individual's score on a measure at time two from his or her score at time one). Available normative data for the measures used in this study also are presented for comparison purposes. Overall, sample means for the twelve measures did not deviate greatly from the range predicted by available normative data. This suggests that this sample's mean scores are reasonably similar to those of other available student samples, and in some cases the larger population of American adults. In general, sample participants report moderately high levels of social support and life satisfaction, and do not appear to be troubled by high levels of emotional distress. There were not any large changes in means scores on the dependent measures from time one to time two; the small mean changes which did occur were in a positive direction in
TABLE 2

Mean Scores and Standard Deviations (Sample and Normative Data)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Study Sample</th>
<th>Normative Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>SOC</td>
<td>135.8</td>
</tr>
<tr>
<td></td>
<td>LOT</td>
<td>20.6</td>
</tr>
<tr>
<td></td>
<td>ISEL</td>
<td>95.8</td>
</tr>
<tr>
<td></td>
<td>SSQS-6</td>
<td>32.1</td>
</tr>
<tr>
<td></td>
<td>PSS(1)</td>
<td>23.9</td>
</tr>
<tr>
<td></td>
<td>PSS(2)</td>
<td>24.7</td>
</tr>
<tr>
<td></td>
<td>LES</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>CHIPS</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>SRH</td>
<td>11.7</td>
</tr>
<tr>
<td></td>
<td>BDI</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AFM-2</td>
<td>112.3</td>
</tr>
<tr>
<td></td>
<td>LSI</td>
<td>24.1</td>
</tr>
<tr>
<td></td>
<td>HM</td>
<td>67.6</td>
</tr>
<tr>
<td></td>
<td>CHIPS (change)</td>
<td>2.25</td>
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<td>SRH (change)</td>
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<tr>
<td></td>
<td>BDI (change)</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>AFM (change)</td>
<td>-.52</td>
</tr>
<tr>
<td></td>
<td>LSI (change)</td>
<td>-.33</td>
</tr>
<tr>
<td></td>
<td>HAP (change)</td>
<td>-1.01</td>
</tr>
</tbody>
</table>

*Data from student samples
five of the six measures (e.g. fewer reported physical symptoms, less depression, more positive affect).

T-tests also were conducted for each of the measures used in the study to determine whether the scores of males and females were significantly different. There were not statistically significant differences on any of the measures of PDO, social support, stress, or psychological well-being. The only statistically significant difference occurred on the CHIPS, with men reporting fewer troublesome physical symptoms than women (male mean = 16.4, female mean = 20.4; p = .0002). The only significant differences in change scores also occurred on the CHIPS, with men reporting a greater reduction in physical symptoms than women (male mean change = 2.83, female mean change = 1.98; p = .0004). Overall, these analyses support the conclusion that with the exception of reported physical symptoms, there were no significant differences (in domains relevant to this study) between the men and women who participated.

**Part One**

The first part of the study examined a theoretical model for predicting changes in levels of physical health and psychological well-being occurring in the lives of students beginning their first quarter of academic study at a large university. Table 3 provides the correlational matrix used as input to the LISREL program which analyzed this model. As Table 3 makes clear, many of the correlations between indicators of the independent latent variables and the change scores of indicators of the dependent latent variables are fairly
TABLE 3

Pearson Correlation Coefficients for Variables Used in Part One

<table>
<thead>
<tr>
<th>CHIPc</th>
<th>SRHc</th>
<th>LSIc</th>
<th>HAPc</th>
<th>BDIC</th>
<th>AFMC</th>
<th>SOC</th>
<th>LOT</th>
<th>PS1</th>
<th>PS2</th>
<th>LES</th>
<th>ISEL</th>
<th>SSQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRHc</td>
<td>-0.18</td>
<td>1.0</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSIc</td>
<td>-0.05</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAPc</td>
<td>-0.10</td>
<td>0.13</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDIC</td>
<td>0.30</td>
<td>-0.21</td>
<td>-0.32</td>
<td>-0.41</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFMC</td>
<td>-0.15</td>
<td>0.24</td>
<td>0.43</td>
<td>0.47</td>
<td>-0.56</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC</td>
<td>-0.18</td>
<td>0.004</td>
<td>0.10</td>
<td>0.09</td>
<td>-0.17</td>
<td>0.06</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOT</td>
<td>-0.11</td>
<td>0.07</td>
<td>0.10</td>
<td>0.06</td>
<td>-0.10</td>
<td>-0.07</td>
<td>0.66</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PS1</td>
<td>0.19</td>
<td>0.04</td>
<td>-0.06</td>
<td>-0.11</td>
<td>0.20</td>
<td>-0.01</td>
<td>0.72</td>
<td>0.63</td>
<td>1.0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PS2</td>
<td>-0.03</td>
<td>0.18</td>
<td>0.26</td>
<td>0.14</td>
<td>-0.21</td>
<td>0.40</td>
<td>-0.53</td>
<td>0.48</td>
<td>0.67</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LES</td>
<td>-0.10</td>
<td>0.06</td>
<td>0.20</td>
<td>0.24</td>
<td>-0.18</td>
<td>0.31</td>
<td>-0.37</td>
<td>0.31</td>
<td>0.37</td>
<td>0.50</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>ISEL</td>
<td>-0.13</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.02</td>
<td>-0.10</td>
<td>0.08</td>
<td>0.60</td>
<td>0.46</td>
<td>-0.42</td>
<td>-0.25</td>
<td>-0.23</td>
<td>1.0</td>
</tr>
<tr>
<td>SSQ</td>
<td>-0.08</td>
<td>0.05</td>
<td>0.07</td>
<td>0.12</td>
<td>-0.07</td>
<td>0.08</td>
<td>0.40</td>
<td>0.32</td>
<td>-0.27</td>
<td>-0.14</td>
<td>-0.09</td>
<td>0.53</td>
</tr>
</tbody>
</table>

+ coefficients are rounded-off to two decimal places

* p< .01

** p< .001

*** p< .0001
small. Even with the large sample size, the majority did not reach statistical significance. In cases where the correlational relationships were statistically significant, most were not very strong. In addition, the correlations between change scores on the dependent measures themselves were generally in the weak to moderate range. The strongest correlations between changes in dependent measures were those involving the BDI and the AFM.

Attempts to test the hypothesized model for predicting changes in physical health and psychological well-being were unsuccessful. Attempts to run the program resulted in a variety of difficulties, including error messages related to non-convergence (or non-improvement of initial LISREL estimates), unidentified parameters, and non-positive definite matrices). This appeared to be due to the weakness of the relationships comprising the correlational matrix, which in turn reflected the lack of significant or systematic changes in scores on the dependent measures between time one and time two. In other words, the relationships between parameters specified by the hypothesized theoretical model did not appear to be an accurate representation of those parameters in the sample data. The generally weak pattern of correlational relationships in the input matrix suggested that the hypothesized model was not valid model of changes in health and well-being in this sample; a fact which made it highly unlikely that the LISREL program could even produce the information necessary for directing revisions of the model. Therefore, the model tested in part one of the study was rejected (i.e., viewed as not being plausible in this population).
Regression Analyses

In order to study the contributions of specific independent measures to the prediction of variation in change scores on the dependent measures, a series of simultaneous regression analyses were conducted on the change scores for each of the six dependent measures used in this study. These analyses examined the unique contribution of each predictor variable to the explanation of variance in change scores on the dependent measures. Since the correlational matrix suggests these relationships were unlikely to be strong, one indicator was selected to represent each of the study’s latent independent variables. Separate analyses were run using SOC and the LOT representing personal dispositional orientation; the results were very similar in terms of statistically significant variables, their level of significance, and the amount of variance explained by the model. The ISEL was selected as a measure of social support, and for reasons which will be detailed later, both the PSS1 and the LES were included as predictors.

Change scores on each of the dependent measures were used to divide the total sample into the subsamples used in the analyses. For each measure an analysis was conducted on scores of: 1) those individuals reporting a positive change (or no change) between time one and time two (e.g., a lower score on the BDI at time two vs time one), and 2) those individuals reporting negative change (or no change) on a measure (e.g. more depressive symptomology, or a higher score on the BDI at time 2 vs time one).
Results of these analyses are presented in Table 4. The only consistent pattern revealed by these analyses is a statistical significant relationship between negative life events and negative change on the dependent measures (e.g., more depression, more physical symptoms, less positive affect, lower life satisfaction). There also was a less consistent negative relationship between higher negative life events scores and positive change on three of the dependent measures. In general, the four predictor variables also failed to account for much of the "change" variance; only on the analysis of change on the BDI did the percentage of variance explained by the four predictor variables reach 20%.

Part II

The second part of the study examined a theoretical model of the relationship between the same independent latent variables and levels of physical health and psychological well-being (as measured towards the end of the students' first quarter at OSU, at time two). This part of the study was geared towards developing a better understanding of the relationships between personal dispositional orientation, stress, and social support, and the more stable aspects of health and well-being (as opposed to their validity as predictors of changes in these variables over time).

Initial Model

The correlational matrix used as input to the LISREL program for this part of the study is presented in Table 5. This table reveals that most of the correlations between indicators are highly
### TABLE 4

Simultaneous Multiple Regression Analysis of Change in Dependent Indicators

<table>
<thead>
<tr>
<th>Dependent Measure</th>
<th>Significant Variables</th>
<th>Total Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Measure</td>
</tr>
<tr>
<td>BDI (negative change)</td>
<td>111</td>
<td>LES</td>
</tr>
<tr>
<td>BDI (positive change)</td>
<td>127</td>
<td>PSS</td>
</tr>
<tr>
<td>AFM (negative change)</td>
<td>97</td>
<td>LES</td>
</tr>
<tr>
<td>AFM (positive change)</td>
<td>124</td>
<td>LES</td>
</tr>
<tr>
<td>HAP (negative change)</td>
<td>115</td>
<td>LES</td>
</tr>
<tr>
<td>HAP (positive change)</td>
<td>134</td>
<td>LES</td>
</tr>
<tr>
<td>LSI (negative change)</td>
<td>118</td>
<td>LES</td>
</tr>
<tr>
<td>LSI (positive change)</td>
<td>125</td>
<td>-</td>
</tr>
<tr>
<td>LSI (positive change)</td>
<td>125</td>
<td>ISEL</td>
</tr>
<tr>
<td>CHIPS (negative change)</td>
<td>92</td>
<td>LES</td>
</tr>
<tr>
<td>CHIPS (positive change)</td>
<td>119</td>
<td>LES</td>
</tr>
<tr>
<td>SRH (negative change)</td>
<td>130</td>
<td>-</td>
</tr>
<tr>
<td>SRH (positive change)</td>
<td>139</td>
<td>-</td>
</tr>
</tbody>
</table>

** p<.001  
*** p<.0001
TABLE 5

Correlation Coefficients for Variables Used as LISREL Input in Part II

<table>
<thead>
<tr>
<th></th>
<th>CHIPS</th>
<th>SRH</th>
<th>LSI</th>
<th>HAP</th>
<th>BDI</th>
<th>AFM</th>
<th>SOC</th>
<th>LOT</th>
<th>PS1</th>
<th>PS2</th>
<th>LES</th>
<th>ISEL</th>
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<tbody>
<tr>
<td>SRH</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>LSI</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SOC</td>
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<tr>
<td>LOT</td>
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<tr>
<td>SSQ</td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

+ coefficients rounded-off to 2 decimal places for presentation purposes.
(note: all correlations are significant at the .0001 level unless otherwise specified)

ns = not significant

** = p< .001
significant, most at the .0001 level. The majority of these correlations are of moderate strength, with a minority being fairly strong or relatively weak.

Attempts to test the hypothesized model, as originally specified, also presented some problems, although they were less serious than those occurring in part one of the study. The LISREL program was able to generate initial estimates and converge on a solution. Although the program did not run without generating error messages, it did provide enough information to allow for revisions of the model to be undertaken. Table 6 presents a summary of overall goodness-of-fit information for the five models tested in part two of this study.

In an attempt to find a model which would run on LISREL without the production of error messages, Model A (the "next-most likely" constrained structural submodel) was tested (see Figure 5). The original model had produced several indications of where the revision process should begin. An error message related to the beta matrix (which provides information on the relationship between the two dependent latent variables) and the presence of large standard errors for elements of the beta matrix suggested the need to revise this part of the structural model. In addition to these LISREL indicators, this revision seemed theoretically justifiable as the least severe structural modification of the model possible, since it still retained the hypothesized significant impact of the three independent latent variables on the two dependent latent variables.

Model A ran without error messages. As detailed in Table 6, Model A is in the marginal range in terms of goodness-of-fit. The chi-square
# TABLE 6

Summary of Overall Goodness-of-Fit Information for Models Tested in Part II

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi Square</th>
<th>df</th>
<th>p</th>
<th>Q</th>
<th>rho</th>
<th>delta</th>
<th>RMS</th>
<th>SMC</th>
<th>HEA</th>
<th>PWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>202.34</td>
<td>56</td>
<td>0.0</td>
<td>3.610</td>
<td>.889</td>
<td>.895</td>
<td>.054</td>
<td>.882</td>
<td>.936</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>175.85</td>
<td>55</td>
<td>0.0</td>
<td>3.197</td>
<td>.907</td>
<td>.908</td>
<td>.052</td>
<td>.832</td>
<td>.897</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>130.59</td>
<td>54</td>
<td>0.0</td>
<td>2.420</td>
<td>.940</td>
<td>.932</td>
<td>.044</td>
<td>.789</td>
<td>.904</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>115.83</td>
<td>53</td>
<td>0.0</td>
<td>2.185</td>
<td>.950</td>
<td>.940</td>
<td>.040</td>
<td>.812</td>
<td>.929</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>103.34</td>
<td>52</td>
<td>0.0</td>
<td>1.987</td>
<td>.958</td>
<td>.946</td>
<td>.035</td>
<td>.486</td>
<td>.933</td>
<td></td>
</tr>
<tr>
<td>Null</td>
<td>1921.78</td>
<td>78</td>
<td>0.0</td>
<td>24.638</td>
<td>-</td>
<td>-</td>
<td>.469</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Explication of Model Revisions**

Model A --- revision of structural model; paths between latent dependent variables PWB and HEA removed from model.

Model B --- measurement model revised; path between indicator BDI and latent variable HEA opened.

Model C --- measurement model revised; path between indicator PSS1 and latent variable PDO opened.

Model D --- measurement model revised; path between error terms for indicators PSS1 and PSS2 opened.

Model E --- measurement model revised; path between indicator SRH and latent variable PWB opened.
Figure 5. Model A
of 202.34 (df=56, p=0.0) leads us to reject the null hypothesis that Model A holds in the population (i.e., that it is as a plausible model). Qualitative or descriptive goodness-of-fit indexes for model A all fall a little short of the range considered to indicate good fit (Q = 3.61, rho = .889, D = .895, RMS = .054). (Formulas for computing Q, rho, and delta are given in Appendix P). The squared multiple correlations (the amount of variance in each dependent latent variable accounted for by the model) for both the health and well-being variables are high, however (HEA = .882 and PWB = .936, respectively).

Table 7 also presents data concerning the strength of the measurement model. First, the squared multiple correlations for the measured variables (the proportion of the variance of the indicator accounted for by the latent variable) are all above .3, suggesting they all are acceptable indicators. Still, some are clearly stronger than others. For example, the SMC's for the four indicators of psychological well-being range from .648 to .878, while the SMC's for the two indicators of physical health, CHIPS and SRH, are only .333 and .389, respectively. SMC's for the indicators for personal dispositional orientation (SOC=.736, LOT=.598) are both relatively high, but information regarding the indicators of stress and social support is more mixed. Specifically, the SMC for the LES (.346) suggests it is not loading as strongly on the "stress" latent variable as are the PSS1 and PSS2 (.604 and .702, respectively). In addition, the SMC's for the indicators of social support suggest that the SSQS (.395) is not as strong a measure of social support as the ISEL (.725).
TABLE 7

Detailed Fit Information for Models of Health and Well-Being

<table>
<thead>
<tr>
<th>Model</th>
<th>Significant Modification Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>LY 5 1, LX 3 1, LX 4 1, LX 3 3, LX 4 3, TE 5 1, TD 3 1</td>
</tr>
<tr>
<td>B</td>
<td>LY 1 2, LY 2 2, LX 3 1, LX 4 1, LX 3 3, LX 4 3, TD 3 1 TD 4 3</td>
</tr>
<tr>
<td>C</td>
<td>LY 1 2, LY 2 2, TD 4 3</td>
</tr>
<tr>
<td>D</td>
<td>LY 1 2, LY 2 2</td>
</tr>
<tr>
<td>E</td>
<td>none</td>
</tr>
</tbody>
</table>

Note: In Models A, B, C, D, and E, t-values for GA 1 1, GA 2 1, GA 1 3 were non-significant (absolute value <2)

Squared Multiple Correlations - Model A

<table>
<thead>
<tr>
<th>Independent Indicators</th>
<th>Latent variable</th>
<th>Variance accounted for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model A</td>
<td>Model E</td>
</tr>
<tr>
<td>SOC</td>
<td>PDO</td>
<td>PDO</td>
</tr>
<tr>
<td>LOT</td>
<td>PDO</td>
<td>PDO</td>
</tr>
<tr>
<td>PSS1</td>
<td>STR</td>
<td>STR, PDO</td>
</tr>
<tr>
<td>PSS2</td>
<td>STR</td>
<td>STR</td>
</tr>
<tr>
<td>LES</td>
<td>STR</td>
<td>STR</td>
</tr>
<tr>
<td>ISEL</td>
<td>SS</td>
<td>SS</td>
</tr>
<tr>
<td>SSQ</td>
<td>SS</td>
<td>SS</td>
</tr>
</tbody>
</table>

Dependent Indicators

| CHIPS | HEA | HEA | .333 | .614 |
| SRH   | HEA | HEA,PWB | .389 | .390 |
The other detailed fit information generated for model A suggested a variety of potential revisions which could be implemented to improve the model's fit. The major significant modification indexes were all related to the measurement model (see Table 7). The first modification of the measurement model made was to "free" parameter LY 5 1. This allowed the BDI to serve as an indicator of physical health (as well as psychological well-being). Since seven of the 21 questions of the BDI are specifically related to physical functioning, it seemed understandable that the BDI would load on a physical health factor as well as a psychological well-being factor. This revision resulted in Model B (see Figure 6), with an improved chi-square of 175.85 (df= 55). Goodness of fit data also reflected this improvement in fit (Q= 3.19; rho= .907; delta= .908; RMS= .052).

Model C

While Model B represented an improvement over Model A, several significant MI's remained, including a large (42.26) value for parameter LX 3 1. This parameter was freed for estimation, resulting in Model C (see Figure 7). Theoretically, this revision suggests that the perceived stress scale can be viewed as a measure of personal disposition orientation as well as stress. This seems reasonable given the large subjective element inherent in a measure of perceived stress, an element that could be related to personal dispositional orientation (e.g. perceptions of the world as being comprehensible and manageable). As shown in Table 8, this revision also leads to a significant improvement in the model's goodness-of-fit. The chi-square value for Model C was 130.59 (df=54). Qualitative fit indexes now
Figure 6. Model B
Figure 7. Model C
suggest that Model C fits the sample data reasonably well (rho = .94; delta = .932; RMS = .044).

**Model D**

Although a plausible model of physical health and psychological well-being for this sample was attained by the two revisions resulted in Model C, the specification search was continued due to the possibility of additional significant and justifiable modifications (as advised by MacCallum, 1986). Next, parameter TD 4 3 (unique variance of PSS1 and PSS2) were freed to allow their correlation in the model, resulting in Model D (see Figure 8). While this type of modification must be made with caution, correlated measurement errors often do occur when the same measure is used as part of a longitudinal study (Anderson & Gerbing, 1988). Model D has a smaller chi-square value (115.83, df= 53); qualitative fit indexes are also improved (rho = .95; delta = .94; RMS = .040).

**Model E**

One final revision was made, with parameter LY 2 2 being freed for estimation. Theoretically, this suggests that an overall self-rating of satisfaction with one's health and physical condition can serve both as an indicator of physical health and psychological well-being. The resulting model, Model E (see Figure 9), yielded an additional improvement in fit. The chi-square value for Model E was 103.34 (df=52). The rho and delta values rose to .958 and .946, respectively, while the RMS value dropped to .035. While some non-significant t-values remained, suggesting the possibility that a more parsimonious model might be possible, the number of revisions
Figure 8. Model D

Figure 2. Model D
Figure 9. Model E
already made had stretched the limits of a valid specification search (MacCallum, 1986). Model E is therefore presented as the final model of physical health and psychological well-being for this sample.

**Regression Analyses**

Simultaneous regression analyses also were carried out on all six dependent indicators. Since the correlations involved were relatively robust, all six indicators of independent variables were included as predictors in the analysis. As Table 8 reveals, these measures were consistently predictive of significant and unique portions of the variance in all four of the measures of psychological well-being. As a whole, they also explained between 57% - 74% of the variance in levels of well-being. The six independent measures were less impressive as predictors of scores on the two measures of physical health. Only the PSS and the LES were statistically significant predictors, and the amount of variance accounted for by the six variables was smaller (29% - 32%).

**Post-hoc Analyses**

A several post-hoc analyses also were conducted in order to glean a more complete understanding of the relationships between variables suggested by the study's data. First, Models A, C, and E were reanalyzed using only one measure of perceived stress (time 2) as an indicator of stress. The results (see Table 9) were very similar to those in the original analyses in terms of goodness-of-fit. Detailed fit information did not suggest that PSS2 should serve as an indicator of PDO.
TABLE 8

Simultaneous Regression Analysis of Six Dependent Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Significant Predictor</th>
<th>F</th>
<th>Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI2</td>
<td>LOT</td>
<td>13.85***</td>
<td>64.2%</td>
</tr>
<tr>
<td></td>
<td>LES</td>
<td>35.80****</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSS2</td>
<td>45.10****</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISEL</td>
<td>5.13*</td>
<td></td>
</tr>
<tr>
<td>AFM2</td>
<td>SOC</td>
<td>7.52**</td>
<td>74.1%</td>
</tr>
<tr>
<td></td>
<td>LOT</td>
<td>22.02****</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LES</td>
<td>7.89**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSS2</td>
<td>73.88****</td>
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<tr>
<td></td>
<td>ISEL</td>
<td>14.38***</td>
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<td>HAP2</td>
<td>LOT</td>
<td>30.02****</td>
<td>56.6%</td>
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<tr>
<td></td>
<td>LES</td>
<td>7.10**</td>
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</tr>
<tr>
<td></td>
<td>PSS2</td>
<td>22.57****</td>
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<tr>
<td></td>
<td>ISEL</td>
<td>9.05**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SSQ</td>
<td>5.95*</td>
<td></td>
</tr>
<tr>
<td>LSI2</td>
<td>SOC</td>
<td>4.41*</td>
<td>62.0%</td>
</tr>
<tr>
<td></td>
<td>LOT</td>
<td>7.64**</td>
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<tr>
<td></td>
<td>LES</td>
<td>7.45**</td>
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<tr>
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<td>PSS2</td>
<td>41.15****</td>
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<tr>
<td></td>
<td>ISEL</td>
<td>4.50*</td>
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<td>SSQ</td>
<td>9.34**</td>
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</tr>
<tr>
<td>CHIPS2</td>
<td>LES</td>
<td>29.31****</td>
<td>32.7%</td>
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<tr>
<td></td>
<td>PSS2</td>
<td>6.82**</td>
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<tr>
<td>SRH2</td>
<td>PSS2</td>
<td>17.49****</td>
<td>28.7%</td>
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</table>

* p < .05  
** p < .01  
*** p < .001  
**** p < .0001
TABLE 9

Post Hoc Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi-square</th>
<th>df</th>
<th>p</th>
<th>Q</th>
<th>rho</th>
<th>delta</th>
<th>RMS</th>
<th>HEA</th>
<th>PWB</th>
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<tbody>
<tr>
<td>A2</td>
<td>118.73</td>
<td>45</td>
<td>0.0</td>
<td>2.638</td>
<td>.933</td>
<td>.929</td>
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<tr>
<td>B2</td>
<td>93.86</td>
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<td>.944</td>
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<td>.951</td>
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</table>

Path Models

<table>
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<tr>
<th>Model</th>
<th>Chi-square</th>
<th>df</th>
<th>p</th>
<th>Q</th>
<th>rho</th>
<th>delta</th>
<th>RMS</th>
<th>HEA</th>
<th>PWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asoc</td>
<td>103.34</td>
<td>25</td>
<td>0.0</td>
<td>4.134</td>
<td>.896</td>
<td>.926</td>
<td>0.069</td>
<td>.680</td>
<td>.714</td>
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<td>Bsoc</td>
<td>61.15</td>
<td>24</td>
<td>0.0</td>
<td>2.548</td>
<td>.948</td>
<td>.956</td>
<td>0.067</td>
<td>.579</td>
<td>.688</td>
</tr>
<tr>
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<td>23</td>
<td>0.212</td>
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<td>.98</td>
<td>0.020</td>
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<td>.689</td>
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<td>0.0</td>
<td>31.020</td>
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<tr>
<td>Alot</td>
<td>102.64</td>
<td>25</td>
<td>0.0</td>
<td>4.106</td>
<td>.891</td>
<td>.923</td>
<td>0.066</td>
<td>.688</td>
<td>.752</td>
</tr>
<tr>
<td>Blot</td>
<td>60.03</td>
<td>24</td>
<td>0.0</td>
<td>2.500</td>
<td>.948</td>
<td>.955</td>
<td>0.064</td>
<td>.592</td>
<td>.726</td>
</tr>
<tr>
<td>Elot</td>
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<td>23</td>
<td>0.215</td>
<td>1.219</td>
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<td>.980</td>
<td>0.018</td>
<td>.482</td>
<td>.728</td>
</tr>
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<td>0.0</td>
<td>29.590</td>
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</tr>
</tbody>
</table>

Explication of Post-hoc Models

Models A2, B2, E2 --- Same as Model A, Model B, and Model E, respectively; indicator PSS1 dropped from model.

Explication of Path Models

Model Asoc --- Indicators SOC, PSS1, LES, and ISEL used as "stand-alone" variables; rest of model identical to Model A.

Models Bsoc and Esoc --- Structural model same as model Asoc; rest of model same as Model B and Model E, respectively.

Models Alot, Blot, Elot --- Indicator LOT substituted for indicator SOC; otherwise identical to Models Asoc, Bsoc, and Esoc.
TABLE 9 (continued)

Detailed Fit Information

Post Hoc Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Modification indexes (significant)</th>
<th>t-values (nonsignificant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model A2</td>
<td>LY 5 1, TE 5 1</td>
<td>GA 1 1, GA 2 1, GA 1 3</td>
</tr>
<tr>
<td>Model B2</td>
<td>LY 1 2, LY 2 2</td>
<td>GA 1 1, GA 2 1, GA 1 3</td>
</tr>
<tr>
<td>Model E2</td>
<td></td>
<td>GA 1 1, GA 2 1, GA 1 3</td>
</tr>
</tbody>
</table>

Path Models

| Models Asoc and Alot | LY 5 1, LY 2 2 BE 1 2 BE 2 1, TE 5 1 | GA 1 1, GA 1 4 |
| Models Bsoc and Blot | LY 2 2                                  | GA 1 1, GA 1 4 |
| Models Esoc and Elot | -                                       | GA 1 1, GA 1 4 |
Two path analyses of the Model E also were conducted, using one indicator of PDO (SOC in the first analysis, and LOT in the second), the ISEL, PSS1, and LES and "stand-alone" measures. This analysis views perceived stress being a variable separate from negative life events and personal dispositional orientation. Both analyses revealed models with excellent goodness-of-fit, including non-significant chi-squares (see Table nine) and rho values in the .99's. However, these numbers may be somewhat inflated due to the assumptions of path analysis (i.e., that the measures of the four independent variables are free of measurement error.)
CHAPTER V
DISCUSSION

Introduction
The present study was designed to test a theoretical model of psychological well-being and physical health. Specifically, the purpose was to examine the relationship of personal dispositional orientation (PDO), stress (STR), and social support (SS) to well-being and health, and to changes in well-being and health resulting from the necessity of coping with a new environment. It was hypothesized that the three independent variables (PDO, STR, and SS) would all have a direct effect on the dependent variables, psychological well-being (PWB) and physical health (HEA). It was also hypothesized that personal dispositional orientation, stress, and social support would be significantly related to each other, as would the two dependent variables. The model was tested with 229 college students beginning their first quarter of study at a large university. Part one of the study examined the model in terms of changes in health and well-being which occurred during adaptation to the environmental challenges presented by life at the university, while part two tested the model using levels of health and well-being reported toward the end of students' first quarter of study.

To test the overall proposed model, a measurement model, composed of two to four indicators of each theoretical variable, was developed.
The full model was tested using LISREL VI, a widely used structural covariance modeling computer program. Multiple regression analyses and several post-hoc path analyses were also conducted to generate additional information concerning the relationship between variables being studied in the present investigation.

**Analysis of Findings: Part 1**

In part one of the study, the proposed model was not supported by data from the sample. Generally, correlations between indicators of the independent variables and the dependent variables were weak. Correlations between changes in the dependent measures themselves were only somewhat more robust. The input data could not be analyzed using LISREL; in addition, revisions of the model did not seem feasible or justifiable due to the weak relationships between variables. The model was therefore rejected as a plausible model of changes in health and well-being occurring in this sample.

Multiple regression analyses of the relationship of several of the independent variables to changes in scores on the dependent variables found that only the measure of negative life events was consistently predictive of a significant and unique portion of the variance in change scores. In addition, the independent measures did not predict much of the variance in dependent measure scores. These results fit the general pattern of lack of support for the model and its hypothesized relationships between variables.

There are several possible explanations for the lack of support for the model in part one of this study. First, it may be that the theoretical variables examined in this study do not play an important
role in influencing changes in psychological well-being or physical health. The majority of studies which have examined the relationship between variables such as stress, social support, or personal characteristics have been cross-sectional rather than prospective; it may be that cross-sectional designs have given a somewhat distorted picture of the role of these variables in influencing changes in individuals' health and well-being.

However, this explanation is in conflict with the results of most published prospective studies (e.g. Berkman & Syme, 1979; Carver & Gaines, 1987; Kennedy et. al, 1988; Kiecolt-Glasser et. al, 1984; Scheier & Carver, 1985) which have found variables such as social support, optimism, and external stressors to be predictive of changes in a variety of health and well-being outcome measures. So, while the possibility cannot be dismissed that these variables are not important factors in shaping health outcomes, several other explanations may also be advanced to account for the findings of the present study. These involve limitations specific to this study.

Part 1: Limitations

One of the most problematic features of part one of this study was the overall absence of significant and systematic changes in psychological well-being or physical health during the six week period between the first and second administrations of the dependent measures. The model tested in part one of the study was based on the assumption that participants would be leaving home for the first time, and would be forced to cope with some significant stressors. Theoretically, individuals with a more positive personal dispositional
orientation and greater levels of perceived social support (and satisfaction with that support) would cope more successfully with this challenge. This success would result in an increased sense of psychological well-being, and fewer stress-related physical symptoms.

Sample data, however, revealed very small mean changes on the dependent measures. Means for five of the six dependent measures changed in a direction indicative of increased health and well-being (self-rated satisfaction with health was the only exception; here the mean change was very small). Only 14 individuals changed in a negative direction on all six dependent measures; only 20 changed in a positive direction on all indicators.

This suggests several possibilities. Number one, experience of the majority of sample participants during the initial stages of adaptation to the university environment may not have characterized by the types of negative stressors which have been found to affect health and well-being. For example, a non-statistical sampling of some specific responses on the LES suggested a tendency for respondents to rate items involving leaving home, moving to Columbus, and beginning school as being positive rather than negative life events. Also, nearly 30% of the sample lived in Columbus or the Columbus area, and nearly 90% of the sample lived somewhere in Ohio, prior to enrolling at Ohio State. So it may be that the move was not as disruptive, and adaptation not as difficult, as had been assumed by the investigator.

Secondly, the period of time between administrations of the two study questionnaires may not have been long enough allow significant changes in physical health or psychological well-being to occur for
the majority of students. The second administration occurred towards the end of the quarter, after mid-terms but before finals. Most students may not yet have faced the more intense and long-term academic pressures and/or failure experiences which might be more likely to impact their health and well-being. They might have still been experiencing a "honeymoon" period in which their enjoyment of the positive aspects of their new life situations was more salient than its negative (or potentially negative) aspects. Perhaps if it had been possible to administer a follow-up questionnaire after several quarters, different results would have been found.

It may also be that this model would have found more support if it had been tested in a sample from a different population of individuals. For example, some previous studies of social support and stress have involved caregivers of victims of Alzheimer's disease, bereaved spouses, and individuals divorced against their wishes. These individuals were subject to stressors which were more chronic, negative, and uncontrollable in nature. In addition, the studies monitoring the impact of these situations on their physical and psychological health typically lasted one to two years (or longer). It may be that despite popular press reports to the contrary (e.g. della Cava, 1989), levels of stress experienced by the majority of students is not substantial enough to have a significant impact on their health and well-being.

It should also be noted that the majority of stress-health studies have examined health outcomes such as immunocompetence (e.g. Kennedy et al., 1988; Kiecolt-Glaser et al., 1987) or more chronic
health problems such as heart disease (e.g. Scheier & Carver, 1987), high blood pressure, or even death (e.g. Berkman & Syme, 1979). It may be that the measures of physical health used in this study—symptoms related to more acute and temporary physical problems, and overall ratings of satisfaction with health—were not sensitive enough to detect the hypothesized changes during the six week period under study.

Given the apparent lack of significant changes on dependent measures, the results found in part one of the study also may have been influenced by "regression-to-the-mean". Theoretically, an individual scoring either very high or very low on any of the dependent measures is likely to score closer to the mean when he or she completes the measure a second time (Anastasi, 1982). A statistical survey of extreme scores suggested the possibility that this occurred. For example, individuals scoring in the severely depressed range on the BDI tended to improve at least slightly; while individuals scoring very high on the AFM, for example, could not report significant positive changes in affect, and were likely to either stay the same or decline slightly. This exemplifies a limitation of this type of prospective study; regression-to-the-mean could result in a clinically depressed individual improving slightly (and yielding a positive change score), while a happy, well-adjusted person at the other end of the spectrum declines slightly and displays negative change. Regression-to-the-mean seems likely to have been problematic in the present study, where the period between time one and time two administrations was relatively short, and apparently not
characterized by significant negative stressors which might overwhelm the resources students had available for use in the coping process.

In sum, it may be that the model tested in part one of the study would find some support if tested in a longer study, or one utilizing a sample from a different population. Several other limitations involve the conceptual nature of the latent variables (and the specific measures used as their indicators); these problems with the model will be discussed as part of the analysis of part two of the study.

Analysis of Findings: Part II

Part two of the study complemented part one by testing the proposed model of the relationship of personal dispositional orientation, stress, and social support to overall levels of physical health and psychological well-being. Information generated by the LISREL program suggested the model needed revision, so several modifications were made. The structural model was revised by eliminating the paths between the two dependent variables. Several modifications of the measurement model also were made. The Beck Depression Inventory (BDI) and self-rated health index (SRH) were allowed to serve as indicators of both physical health and psychological well-being, the perceived stress scale (first administration, [PSS1]) was allowed to serve as an indicator of both stress and personal dispositional orientation, and the error terms for the first and second administrations of the Perceived Stress Scale (PSS1 and PSS2) were allowed to covary. The final model, represented in Figure 9, was presented as the most plausible model of health and
well-being for the present study's sample. The overall goodness-of-fit information for the final model was very good, indicating strong overall fit of the model to the data.

The one of the major advantages of using structural covariance modeling methodology is its capacity for theory-testing. It allows an investigator to evaluate the overall strength of a model, and suggests ways in which the model might be revised. While it provides information on the significance of specific relationships within the model, the meaning of some of the specific values generated by LISREL (e.g. parameter values) should be interpreted cautiously (Silva, personal communication, May, 1989). Still, a synthesis of the information generated by the present study's structural covariance modeling, multiple regression, and path analyses allows some conclusions concerning the relationships between specific variables to be drawn.

Relationships Between Independent Variables

As hypothesized in the original model, each of the three independent latent variables was significantly related to the other two. Specifically, higher levels of personal dispositional orientation was negatively related to levels of stress and positively related to social support; Social support was positively associated with Personal Dispositional Orientation (PDO) and negatively associated with Stress, and Stress was negatively related to both PDO and Social Support. These results give a clear indication of the complexity of research on health and well-being conducted within the framework of the biopsychosocial model. The variables involved seem to interact
according to the principles of reciprocal determinism described by Bandura (1978); their relationships may be difficult to capture in a linear cause-and-effect model. For example, perceptions of and reactions to specific life events may depend on an individual's underlying personal dispositional orientation, or on an appraisal of available social support. Levels of optimism or sense of coherence may also be shaped by the social support and resources available to the individual; a pattern of positive or negative life events could also shape one's PDO.

The relationships between these variables were not only statistically significant, but also characterized by some conceptual and psychometric overlap. Perceptions of overall stress or specific life events have a subjective component related to an individual's personal expectation and beliefs; being optimistic is easier if one has social resources sufficient to cope with stressors or has fewer negative life events with which to cope. One of the revision is this study's model (allowing PSS1 to serve as an indicator of both PDO and Stress) appears to be an example of the difficulties created by this type of conceptual and psychometric overlap. These findings also serve to remind investigators of the limitations inherent in an exclusive focus on any one variable.

**Relationships Between Independent and Dependent Variables**

Hypotheses concerning the relationships between independent and dependent variables were partially supported by the results of this study. The excellent goodness-of-fit of the final model, which posits direct influences by personal dispositional orientation, stress, and
social support on both psychological well-being and physical health, provides support for these hypothesized relationships. In several cases, however, detailed fit information (i.e., non-significant t-values) suggested that some of these relationships were less important than others to the model's overall goodness-of-fit; regression analyses also provided additional information concerning the hypothesized relationships.

**Personal Dispositional Orientation, Health and Well-Being**

Although the final model included a path from Personal Dispositional Orientation to both Physical Health and Psychological Well-Being, non-significant t-values for these parameters suggest they were not of great importance to the model, and might have been eliminated without a significant decrease in overall goodness-of-fit. This, in turn, suggests that personal dispositional orientation may not have been a significant influence on the health and well-being of participants in this study.

Regression and path analyses, however, provided contradictory information which supported the hypothesized relationship between Personal Dispositional Orientation and Psychological Well-being. In the regression analyses, optimism was significantly predictive of a unique portion of the variance in all four measures of psychological well-being. In addition, sense of coherence also predicted a significant and unique portion of the variance in two of these measures (the LSI and the AFM-2). This is noteworthy due to the fact that the strong correlation between these two variables, which were hypothesized to be indicators of the same latent variable, made a fair
amount of overlap likely (and the prediction of significant unique variance less likely.

Neither variable was a significant predictor of variance in either of the two physical health measures. Path analyses reflected a similar pattern, with detailed fit information suggesting that they were significantly related to psychological well-being, but not to physical health.

These findings can be interpreted in several ways. First, it may be that sense of coherence and optimism are predictive as individual variables, while PDO, representing the common factor they share, is not. While these two variables were selected as the most promising representatives of a broad and generic personal dispositional orientation variable, they are not conceptually identical. While both are theorized to relate to health and well-being through their positive impact on coping processes, the nature of the factor they hold in common is not clearly defined. While it could represent a variable important to coping, health, and well-being, it is also possible that PDO is too general a theoretical construct, and that the more focused constructs of coherence and optimism are more valid and useful. It could also be argued that, despite strong correlation of the SOC and the LOT with all four measures of psychological well-being (PWB), their influence on PWB is indirect, through their influence on Stress and Social Support.

Several other factors specific to the concepts of coherence and optimism must also be considered. First, Antonovsky (1987; September, 1988, personal communication) conceptualizes sense of coherence as
still being somewhat fluid in adolescents, and becoming more stable as individuals mature and develop as adults. Not only might one's sense of coherence (and overall personal dispositional orientation) become more stable later in life, but its potential impact might be greater at a later stage of life due to the total number of situations in which it might have influenced coping outcomes. Several of the previous investigations which found optimism related to health and well-being outcomes also involved adult populations (e.g. recovery from heart surgery, childbirth, completion of an alcohol treatment program), although several used student samples. Whether or not the stability and predictive utility of coherence, optimism, or PDO would be significantly different for a population of 18-19 year old college students as compared to a population of adults remains unknown.

In addition, while LISREL has many advantages to recommend its use, such as testing the overall fit of a theoretical model, attaching too much significance to specific pieces of information (e.g. a non-significant t-value) may be a mistake. This precaution seems especially appropriate in the analysis of the PDO - PWB relationship, given the contradictory findings resulting from regression and path analyses (based on analysis of coherence and optimism as discrete variables).

It is difficult to determine what conclusions should be drawn based on this mix of structural covariance modeling, regression, and path analysis data. Personal Dispositional Orientation did not seem to be a significant influence on the physical health of study participants. Evidence concerning the nature of the relationship of
PDO to psychological well-being was ambiguous, and no firm conclusions can be drawn.

**Stress, Health and Well-Being**

The study provided stronger support for the hypothesis that stress would be significantly and negatively related to psychological well-being and physical health. Analysis of the proposed model found the paths from Stress to both Psychological Well-Being (PWB) and Physical Health (HEA) to be significant. Regression analyses revealed that both negative life events and perceived stress were predictive of a significant and unique portions of the variance in all six dependent measures except Self-Rated Health (SRH), for which life events were not a significant predictor. In addition, path analyses using life events and perceived stress as different factors resulted in excellent goodness-of-fit data, and found each to be a significant influence on both PWB and HEA.

Taken as a whole, these findings support the study's hypothesis that stress is a significant negative influence on levels of physical health and psychological well-being. The exact nature of the latent variable Stress, and relationship between its indicators of negative life events and perceived stress is less clear, however, and will be discussed later in this chapter.

**Social Support, Health, and Well-Being**

Study data provided partial support for the relationships between social support and health and well-being hypothesized in the proposed model. In all covariance structure models tested, the t-values computed by LISREL suggested that the path from Social Support to PWB
was significant, while its path to HEA was not. Although previously mentioned precautions concerning conclusions based on some specific information provided by LISREL apply here, in this case regression and path analyses revealed the same pattern. The ISEL was predictive of a significant and unique portion of the variance in all four PWB measures; in addition, the SSQ was also a significant predictor of variance on the Life Satisfaction Index (LSI) and the Happiness Measure (HM). Neither measure was a significant predictor of variance in measures of physical health.

While the data's support for the hypothesized influence of social support on psychological well-being was congruent with past research, the lack of support for its hypothesized relationship with physical health requires some explanation. While it may be that this conclusion is generalizable to other populations and a broader range of situations, there also are reasons to question its generalizability. Social support has been found to play a more vital role as a stress-buffer in situations such as being a caregiver for a spouse with Alzheimer's disease, where stress is more chronic and severe than that experienced by most freshman students. It also may be that after some threshold level, social support does not have a significant impact on health. Since most of the participants in this study seem fairly satisfied with the moderately high level of available support they perceive themselves as having, it may be that a sample with greater heterogeneity in perceptions of support would have yielded different results. As was mentioned in the analysis of the PDO-physical health relationship, these results also may be related to
the measures of physical health used in this study, a topic which will be discussed in the next section.

In conclusion, this study found support for the hypothesis that social support has a direct influence on psychological well-being. Data did not support the hypothesized relationship between social support and physical health, although the generalizability of this conclusion may be limited to the particular population studied and by the health outcome measures used.

Relationship Between Dependent Variables

Data from the present study did not support the hypothesized relationship between psychological well-being and physical health. In fact, the elimination of the paths between these two variables was the only revision made to the original structural model tested in part two of the study. The task of explaining this finding also is complicated by data which suggested that two of the dependent measures used in this study should be allowed to serve as indicators of both Physical Health and Psychological Well-Being. These findings are suggestive both of the complexity of the relationship between these two variables, and the psychometric difficulties connected with their measurement.

Again, several possible explanations for these findings can be advanced. First, it is possible that the consistent association between these two variables found in previous studies can be better explained by a model which includes the effects of variables such as personal dispositional orientation, social support, and stress. For example, while health status has been consistently found to be one of
the strongest predictors of psychological well-being in populations of older adults (see Larson, 1978; Nafziger, 1986) and in the general population (see Diener, 1984), many of the studies reviewed do not include variables such as stress or personal dispositional orientation.

Secondly, these two variables present any investigator with some serious conceptual and psychometric difficulties. These issues are particularly critical to anyone using structural covariance modeling methodology. LISREL analyzes, in a simultaneous fashion, the pattern of covariation between all the measured variables used as input to the program. It then evaluates the congruence of that pattern with the pattern specified by the hypothesized model (Long, 1983). In practice, the LISREL program is very sensitive to any deviations from this pattern. For example, not only do measured variables need to be good indicators of their respective latent variables, but each indicator must display a pattern of relationship with other indicators similar to that displayed by the other indicators of its "own" latent variable, or goodness-of-fit suffers and error messages may result. In the present study, for example, an indicator of PWB should be more highly correlated with other indicators of PWB than those of any other latent variable, and should display the same strength of correlation with indicators of Physical Health (HEA) displayed by all other PWB measures.

This presents problems for areas of study in which variables conceptually overlap, and in which measures do not load on only one unitary factor. This appears to have been the case in the present
study, where the theoretical variables of interest were broadly defined and difficult to separate completely from each other. For instance, measures of depression, life satisfaction, and affect served as indicators of PWB. While all four measures loaded strongly on the latent variable PWB, depression is not solely a psychological construct, but also has a physical component. The BDI reflects both the psychological and physical aspects of depression; seven of its 21 questions ask about physical functioning (e.g. weight loss, appetite, and sleeping patterns). This resulted in stronger correlations with the two measures of physical health than those of the other three PWB indicators. These different correlational patterns necessitated a revision of the proposed model, with the BDI serving as an indicator of both PWB and HEA.

The latent variable Physical Health and its indicators also presented conceptual and psychometric problems. While both physical symptoms and a self-rated index of overall health status would seem to tap different aspects of a general health variable, in this study they were not strongly related (r = .36). Their squared multiple correlations (SMC's) suggested they were acceptable but not particularly strong indicators of a physical health variable; less variance in each measure was accounted for by a common factor than was accounted for by unique factors. When this is the case, the nature of the latent variable which results is difficult to specify (Haertel & Thoresen, 1987).

In addition, self-rated health (SRH) was more strongly correlated all four indicators of PWB than it was with reported physical
symptoms (measured by the CHIPS). Theoretically, this suggest that variance in self-rated health is accounted for by the PWB variable as well as the HEA variable. These data also suggest that several more specific physical health latent variables may be more useful in studies employing structural covariance modeling methodology than a broad Physical Health variable such as was used in this study.

These findings reflect the difficulty inherent in attempting to cleanly separate physical and psychological processes into conceptually distinct categories. As noted in chapters one and two, the web of interactions between physical and psychological processes is so complex that much of it still remains a mystery; division of human functioning into "physical" and "psychological" aspects may be more a function of scientific convenience than reality. While psychological well-being and physical health are clearly not identical constructs, they remain difficult constructs to define and measure. Structural covariance modeling methodology is sensitive to and highlights such conceptual and psychometric problems, and investigators wishing to use this analytical technique will need to continue to work at solving them.

Limitations

Although overall goodness-of-fit data indicate that the final model fits the data fairly closely, several problems still exist within the model. Previous sections of this chapter have already dealt with some of these limitations, but several others also need to be mentioned. A situation similar to that discussed above concerning psychological well-being and physical health variables also was
encountered with the Stress latent variable. Findings suggest that perceived stress and negative life events may be somewhat disparate aspects of an overall stress variable. First, the perceived stress measure taken at time one was allowed to serve as an indicator of both Stress and Personal Dispositional Orientation latent variables. In addition, the LES did not load very strongly on the Stress latent variable, with over 60% of its variance being accounted for by unique factors rather than the Stress variable.

Although the life events measure does contain a subjective element, perceived stress appears to be an even more subjective evaluation of stress. Perceived stress is an appraisal of the overall stressfulness of a limited period of time (Cohen, 1985). It does not focus on specific events and appears to reflect the overall success or failure of an individual's coping attempts. It should therefore have more in common with theoretical concepts such as sense of coherence and optimism. The findings of this study suggest that perceived stress may be conceptualized as a measure which contains aspects of both personal orientation and stress.

Perceived stress also may be viewed as a separate latent variable. Path analyses utilizing both perceived stress and life events as separate variables achieved excellent goodness-of-fit, and both measures explained unique and significant portions of the variance in five of the six dependent measures. It may be that perceived stress and life events should have been treated as separate latent variables rather than indicators of a broad Stress variable.
The overlap between latent variables (such as PWB/HEA and PDO/Stress) and measures (e.g. BDI, SRH, and PSS1) is a limitation of the present study; it resulted in the need for several revisions of the proposed model. The theoretical variables used in this study were defined broadly in an attempt to capture different aspects of these multidimensional constructs. Unfortunately, the LISREL computer program apparently runs more smoothly when dealing with the kinds of focused and distinct variables capable of meeting the statistical criteria necessary to be considered "common factors" within factor analysis. While the results of this study were informative concerning the relationships between these variables, the conceptual and psychometric issues raised must be dealt with if structural covariance modeling methodology is to be used effectively to facilitate theory-building in this area.

Although it would have required greater financial resources than were available to the investigator, a biological measure of health status (such as a measure of immune system functioning) would have been a welcome addition to the measures serving as an indicator of Physical Health. It would have provided a more objective and concrete measure of health status and helped to link this study to research in the more biologically oriented areas of health psychology. However, due to the imperfect nature of the correlation between immune system functioning and actual illness and reports of physical symptoms, such a measure also might have lead to further problems when conducting a LISREL analysis of the Physical Health variable.
This study also was limited by data-collection time demands placed on the investigator by the use of structural covariance modeling. This model was limited to the study of five theoretical constructs, each of which encompasses a broad area of research. Attempting to find several reliable and valid measures of each of these construct which could be administered in a reasonable period of time was a challenging task. This necessitated the omission of other variables which also could have been included in a theoretical model of health and well-being (e.g., coping and health behaviors). For example, it could be that individuals with a higher sense of coherence or optimism may have developed specific coping strategies which help them deal more successfully with certain situations, thus reducing the impact of external stressors on their health and well-being. Unfortunately, the addition of these variables to the model would have required that the number of subject hours available for the study be doubled, tripled, or even quadrupled. So, while more constructs (and multiple measures of those constructs) may be necessary to adequately portray the relationship between social and personal resources and health and well-being, this study was forced to examine a simpler model.

Even so, one of the primary advantages of utilizing covariance structure modeling is the ability to test theories about causal relationships between variables, and thus help spur the development of more comprehensive theories. Although future research may determine that the model examined in this study should have included additional theoretical constructs, it still has provided valuable information
Directions for Future Research

The findings gleaned from the present study have several implications for theory and research into health and well-being. First, it exemplifies the difficulties inherent in testing theories arising from the biopsychosocial model. While covariance structure modeling has important theory-testing advantages which could help integrate research in this area, work in several areas seems important to facilitation of continued progress.

First, the importance of continued psychometric advancement with regard to the measurement and understanding of concepts such as physical health, well-being, and stress, is clear. If covariance structure modeling is to be utilized in this process, it may be that the latent variables examined should be more specific than broad, generic variables such as "physical health", "personal dispositional orientation", or "stress". For example, concepts such as sense of coherence, optimism, or hardiness, could be studied (as opposed to personal dispositional orientation); perceived stress and life events examined instead of stress.

Where psychometrically justified, investigators could use subscales of measures such as the SOC (e.g. comprehensibility, manageability, and meaningfulness) or the ISEL (e.g. tangible support, appraisal support, self-esteem support, and belonging support) as multiple indicators of latent variables such as sense of coherence and perceptions of available interpersonal support. This would allow the
examination of more clearly defined latent variables, and allow the results of model-testing to be interpreted with more confidence.

Another worthwhile approach could be the examination of specific parts of a larger model such as the one proposed in this study. This would allow the relationships between multidimensional variables and their measures to be examined in greater depth. For example, a study examining the relationship between physical health and psychological well-being might be profitably undertaken. This could allow for a greater range of physical health variables to be studied (e.g. self-ratings of health, physical symptoms, immune system functioning, health service utilization, functional limitations). Greater conceptual clarity concerning the relationship between these different aspects of physical health, and their relationship to psychological well-being, might result from such a study.

The same is true of stress and coping; words which may be more appropriate as labels for fields of study rather than theoretical variables. Perhaps the present study's independent variables could be examined in terms of their relationship with coping outcomes other than health and well-being. Coping was implicitly assumed to mediate the relationship between personal dispositional orientation, stress, social support, and the dependent variables in the present study. However, the nature of this relationship was not explicitly tested, so studying the nature of these relationships in greater depth seems appropriate. A clearer taxonomy of types of stressors might help determine if sense of coherence, optimism, or specific aspects of social support are related to positive coping outcomes involving
particular stressors. In any event, the examination of less comprehensive models in greater depth might be an appropriate strategy for the immediate future.

Testing multiple models in the manner advocated by Anderson and Gerbing (1988) (described in chapter three) also appears to be an appropriate strategy if structural equation modeling is being used by an investigator. While theory-testing in this area is just beginning, structural covariance modeling is a confirmatory analysis technique. The approach of testing several models (all specified in advance), rather than just one hypothesized model, would allow this statistical technique to accommodate somewhat to the exploratory nature of work in this area.

For investigators wishing to examine the relationship between physical health, psychological well-being, and the variables hypothesized to influence them, the advantages of interdisciplinary collaboration seem clear. As many writers in the field of health psychology (e.g. Cunningham, 1981; Gentry, 1984; Stone, 1987) have suggested, both psychologically and physiologically-oriented researchers interested in producing quality research can benefit from the knowledge, perspectives, and resources of their counterparts. In the long run, insights into the relationships between physical, social, and psychological variables are more likely to result from interdisciplinary cooperation than from intradisciplinary efforts.

Finally, future prospective models should be tested over longer periods of time, and with a variety of populations coping with different sets of stressors and challenges. In addition, the continued
development and testing of interventions based on variables hypothesized to influence health and well-being must continue. This might include providing a particular type of social support and measuring its impact on health and well-being, or the development of coping skills training programs. This potentially will enable individuals to benefit from the insights developing within the field of health psychology, while at the same time providing "real world" feedback which can stimulate theory development.

Conclusion

Issues concerning personal and social factors which affect health and well-being have important implications not only for society as a whole, but also for our lives as individual human beings. During the last few decades, the amount of research into these issues has grown, with the recognition of their importance. The present study represents an effort to integrate some of the voluminous and fragmented bodies of research into health, well-being, stress, coping, social support, and personal dispositional orientation. It applied a new and promising research methodology, covariance structure modeling, in an attempt to gain insight into the complex pattern of relationships between these variables. Although the proposed model did not appear to be a plausible model of changes in health and well being in this sample, with some revisions it appeared to fit data concerning levels of health and well-being fairly well.

While these findings need to be interpreted cautiously, and the resulting model requires further testing and refinement by future studies, this study represents a beginning attempt to integrate a
large body of research literature by exploring the relationships among variables hypothesized to be important influences on physical and psychological status. Hopefully this exploration of the nature of these relationships has contributed to the advancement of our theoretical understanding of how personal and social resources interact to influence health and well-being.
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152


APPENDIX A

SOLICITATION ANNOUNCEMENT AND INITIAL INSTRUCTIONS
Solicitation Information

Title: The role of personal and social resources in health and well-being.

Description: Participants will complete a questionnaire during the second and sixth or seventh week of the quarter. Participants will receive a total of two hours of experimental credit (one credit for each session).

Requirements: Participants must be beginning their first quarter of study at Ohio State. Please arrive promptly to ensure adequate time to complete the questionnaire.

Instructions For Initial Session

This experiment involves completing a questionnaire about recent experiences in your life and your recent thoughts and feelings. For participating in this study, you will receive one hour of experimental credit. You will also be requested to return for a second session during the sixth or seventh week of the quarter to complete a similar questionnaire. At that time you will receive an additional hour of experimental credit.

Please print your name, and an address and telephone number where you can be reached, on the slip of paper attached to the front on your questionnaire. This will enable me to reach you to remind you of the time and place of second session. (An attempt will be made to schedule a session at this time on the same day of the week, but a variety of times will be available). Your responses on the questionnaire will be kept strictly confidential. The slip of paper will be detached from your questionnaire, and kept separately along with the three digit code number placed on each questionnaire. In addition to allowing me to reach you later in the quarter, this will also make it possible to match your first and second questionnaires. Once the two questionnaires have been matched, your name and number will be discarded, thereby ensuring that your responses will be kept anonymous.

While each section of the questionnaire has its own individualized instructions, generally it is important to keep a steady pace throughout the questionnaire. Usually your initial response is the most accurate, so please do not spend too much time reflecting any individual question. Simply respond honestly by choosing the answers which best reflect your views.

Participation in this study is voluntary, and you may withdraw at any time without any penalty. If you have any questions, please feel free to ask them. You may start whenever you feel ready.
APPENDIX B

DEBRIEFING STATEMENT
Thank you very much for your participation in this study. The purpose of this study was to examine the influence of personal characterists and social support on students' adaptation to the stressors inherent in the life changes experienced during their first year at Ohio State. Specifically, it was hypothesized that certain ways of viewing the world, and a high level of supportive social relationships, would help offset the potentially negative impact of stressful events on students' physical health and psychological well-being.

The questionnaires in this study measured personal dispositional orientation (sense of coherence and optimism), levels of perceived social support, recent life events, perceived stress, physical symptoms, self-rated health, and psychological well-being. Previous research has suggested that social support, stress, and personality are all related to physical and psychological health, but few studies have examined all these variables in a single study to begin building a model of their relationships with each other. It is hoped that this study will advance our understanding of the complex factors which influence our overall health and well-being.

Your responses will be coded and statistically analyzed as a group in order to determine if the predictions made above were supported. If you would like a summary of the results this study (when it is completed), please leave your name and address with the experimenter. Also, please feel free to ask the experimenter to clarify any other specific questions which you may have concerning this study. Once again, thank you for your participation.
APPENDIX C

SENSE OF COHERENCE QUESTIONNAIRE
PLEASE NOTE:

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These consist of pages:

166-169
171
173
175-178
180-181
183-185
187-188
190
192-193
text from Appendix L
196

UMI
APPENDIX D

FACET DESIGN AND COMPOSITION OF THE SOC
APPENDIX E

LIFE ORIENTATION TEST
APPENDIX F

INTERPERSONAL SUPPORT EVALUATION LIST
APPENDIX G

SOCIAL SUPPORT QUESTIONNAIRE - SHORT FORM
APPENDIX H

LIFE EXPERIENCES SURVEY
APPENDIX I

PERCEIVED STRESS SCALE
APPENDIX J

SATISFACTION WITH LIFE SCALE
APPENDIX K

COHEN-HOBERMAN INVENTORY OF PHYSICAL SYMPTOMS
APPENDIX L

DELIGHTED-TERRIBLE AND FACES SELF-REPORT SCALES
Delighted Terrible Scale (revised)

Please indicate how you feel about your health and physical condition.

I feel:

9 8 7 6 5 A 3 2 1

Delighted Mostly satisfied Mostly satisfied Mostly dissatisfied Terrible
Pleased Slightly satisfied and Slightly dissatisfied Unhappy

Faces

Here are some faces expressing various feelings. Below each is a letter.

Which face comes closest to expressing how you feel about your health and physical condition? ______
APPENDIX M

FORMULAS FOR COMPUTING QUALITATIVE GOODNESS-OF-FIT INDEXES