LONGITUDINAL CAUSAL ANALYSIS OF SUBJECTIVE WELL-BEING AND ITS MAJOR CORRELATES: A MODIFIED TOP-DOWN FORMULATION

SUSAN C. STONE

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by

Susan C. Stone

Department of Psychology

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Abstract

Data from a four-year longitudinal study of 407 adults across the lifespan were used to examine the causal pathways between the higher-order subjective well-being construct and its primary lower-order correlates. Correlates included six life domain satisfactions, three personal dispositions, and two measures of general stress.

A series of partial and multiple regression analyses were used to assess the presence and direction of causal linkages between variables in a "top-down" propensity model of subjective well-being. Results did not consistently support "bottom-up" or "top-down" effects. They did indicate modification of the proposed "top-down" formulation to include direct links from personal dispositions to life domain satisfactions.

Given the lack of consistent findings in the literature and in the present data set, the possible existence of bi-directional links between subjective well-being and domain satisfactions was discussed.

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Table of Contents

Table of Contents

List of Tables

List of Tables

List of Figures

List of Appendices

Introduction

Overview

Since Diener's (1984) appeal for more "theoretical structure to guide empirical work" in the area of subjective well-being (SWB), considerably more psychological research has been conducted in the direct context of SWB theory. Theories of SWB are concerned with the attainment of happiness and seek to explain the mechanisms by which people come to label themselves as happy.

Theories of subjective well-being can be divided roughly into process and structure models. Whereas structure models attempt to delineate the relationships between the various components of SWB, process models are concerned with relationships between SWB and other variables. Both approaches to explanation have been influenced to a large degree by the social indicators movement of the 1950's and 1960's in the United States. Two important sets of data resulted from early quality of life (QoL) research, which attempted to assess the psychosocial status of the American public.

Norman Bradburn's work on happiness was responsible for the enduring finding that short-term happiness is composed of positive and negative affect (Bradburn & Caplovitz, 1965; Bradburn, 1969). Besides these two components of happiness, he also provided data on the relationship between happiness and a number of its sociodemographic correlates.

Building on his findings, the Institute for Social Research (ISR) at the University of Michigan completed a comprehensive national probability survey in 1971 which was designed to assess the quality of American life from less objective means than had previously characterized social indicators research (Andrews & Withey, 1976; Campbell, Converse, & Rodgers, 1976).

Based on this survey, ISR researchers found evidence for a third, cognitive component of SWB and evaluated a more exhaustive list of life satisfaction domains which were hypothesized to correlate with SWB (e.g., work, family life, health). Campbell et al. (1976) also initiated an exploration into the intra-individual factors which might relate to subjective evaluations of well-being. They investigated (1) cognitive processes involved in the determination of life domain satisfactions in relation to the objective circumstances of domain life and (2) personal

resources, such as intelligence or physical attractiveness, which were thought to influence SWB judgements.

This massive body of research was best summarized by one of the authors as merely "scratching the surface" of the problem (Bradburn, 1969). Although the efforts of early QoL researchers undoubtedly furthered the understanding of the structure and process of SWB, their real contribution lay in the multitudinous lines of inquiry which were opened for subsequent researchers. Most contemporary theories of SWB contain elements derived from the findings of ISR researchers or Norman Bradburn (e.g., Kozma, Stones, & McNeil, 1991; Michalos, 1986).

In addition to the social indicators movement, the field of social gerontology has figured prominently in the development of SWB theory (George, 1981). In fact, the initial conceptualization of life satisfaction arose from the work of applied gerontologists in the 1940's who studied personal and social adjustment in old age (Bortner & Hultsch, 1970; Ryff & Essex, 1991). Although this research was initially approached from the perspective of coping with the successive loss that accompanies aging (Hoyt & Creech, 1983), the concept of "successful aging" gradually became accepted as a more appropriate way of approaching research

on the process of adaptation to aging (Baltes & Baltes, 1990).

Palmore (1987) has defined successful aging as comprising three factors: longevity, health and happiness. Inventories which were originally designed to assess adjustment in the aged began to be studied in their own right as measures of well-being, life satisfaction, or happiness (Horley, 1984; Hoyt & Creech, 1983). Thus, from the two divergent research perspectives of social indicators and applied social gerontology emerged an empirical endeavour on the nature and attainment of happiness.

Although an integrative theory of SWB will necessarily specify its components, the relationship between components, and how the various components relate to other variables, researchers have traditionally narrowed research questions to either an examination of the components (structure) or correlates (processes) of SWB.

Contemporary process models of SWB can be separated further into micro- and macro-process theories. Whereas micro-process theories deal with intra-individual cognitive

processes involved in the determination of SWB, macro-process theories address the relationship between SWB and its major correlates. By far the most fundamental issue remaining unresolved within the macro-process approach is the question of causality. The purpose of this study is to illuminate the causal nature of the relationship between SWB and its major correlates.

First, the stability of SWB will be evaluated, followed by a review of the major correlates of SWB. Macro-process theories will then be considered with particular reference to causality. Finally, hypotheses will be advanced to test the relative merits of several of the main types of causal theories currently in the research literature.

Two notes are in order prior to embarking on this review. First, in relation to structure, consensus has not been reached with regard to an exhaustive SWB component set. However, enough support has been obtained for positive affect, negative affect, and the cognitive component labelled 'satisfaction' as first-order factors and global SWB, 'happiness', or 'psychological well-being' (PWB) as second-order factors that loose acceptance of this structure will be made for purposes of the present review (see Chamberlain, 1988, for a review).

Second, and related to the first note, the following terms will be used interchangeably to denote the second-order, global SWB construct: SWB; PWB; life satisfaction; morale; and happiness. Agreement also has yet to be reached regarding terminology in this research area. However, several researchers have cited evidence for the psychometric comparability of these constructs and concluded that each shares a common core typically referred to as SWB (Diener, 1984; Kozma et al., 1991; Larsen, 1978; Lohmann, 1980; Stones & Kozma, 1980, 1985, 1989).

Stability of Subjective Well-Being

Subjective well-being, like other psychological constructs, can be analyzed on two different measurement levels. The idiographic approach involves the analysis of individual reports of SWB. In contrast, the nomothetic approach involves the analysis of SWB levels across individuals.

From a nomothetic perspective, the moderate temporal stability of SWB has been clearly established. Table 1 lists 16 longitudinal studies and their associated retest reliabilities (where available) for a range of SWB measures. Overall, retest coefficients range from .38 to .92. Thus,

Table 1

Stability Coefficients for Various SWB Measures

Study	Retest Interval	Reliability
Wessman & Ricks (1966)	2 years	.67
Campbell, et al. (1976)	8 months	.38 to .76
George & Maddox (1977)	5 years	.79
Palmore & Kivett (1977)	4 years	.40 to .56
Kozma & Stones (1980)	6 months - 1 year	.70
Atkinson, 1982	2 years	.68
Mussen, Nonzik, & Eichorn (1982)	40 years	.28 to .70
Baur & Okun (1983)	3 years	.61
Kozma & Stones (1983a)	18 months	no significant interval change
Reker & Wong (1984)	2 years	.79
McNeil, Stones, & Kozma (1986a)	18 months	no significant interval change
Stones & Kozma (1986a)	18 months	.71
Costa et al. (1987)	9 years	no significant interval change
Headey & Wearing (1989)	2, 4, & 6 years	.55 to .6
Headey & Wearing (1991)	6 years	.92, .64 and .65
Lewinsohn, Redner, & Seeley (1991)	8 months	.63 and .76
Chamberlain & Zika (1992)	6 months	.5 to .6

the proportion of variance in SWB attributed to dispositional (and/or stable environment) factors ranges from 14 to 85 percent, most often hovering about 45%. With respect to bivariate 'difference' comparisons, it appears that mean levels of SWB do not change appreciably in a variety of samples over periods as long as nine years.

However, when individual levels of SWB are analyzed over time, some change is invariably evident. For example, Headey and Wearing (1991) reported a change of more than one standard deviation in one quarter of their sample. In addition, most retest correlations fall below the reliabilities for each measure, indicating some true change in levels of SWB.

Correlates of Subjective Well-being

The aim of research which examines the correlates of SWB is to account for the variance in ratings of SWB. Why do some people rate themselves as happy while others rate themselves as unhappy? What factors influence these individual differences?

One main impetus for early QoL research was the growing realization that typical 'hard' social indicators of

objective life circumstances (e.g., unemployment, crowding, crime) did not always correspond to the subjective experience of individuals (Campbell & Converse, 1972). Today, researchers continue to examine subjective satisfaction in various domains of life with respect to its objective counterpart since this can provide valuable information on the psychological processes involved in the determination of SWB.

Accordingly, the following review of correlates of SWB will evaluate the relationship between objective and subjective life domain indicators of SWB. The remaining correlates to be reviewed are: demographic variables, environmental influences, and individual dispositions. When data are available, comment will also be made on the temporal stability of these correlates and their relationship to SWB. This is not meant to be an exhaustive review of all possible correlates of SWB but will cover some of the main types of correlates that are used to test current macro-process models of SWB.

Life Domain Indicators

Early research on the relationship between SWB and various objective and subjective life domain assessments

contained a number of shortcomings. Often studies did not adequately distinguish between objective and subjective measures in their evaluation of effects. Certain domains, such as income or housing, lend themselves to this distinction more readily than others (e.g., health) because objective measures of these life domains are readily available. For example, people can readily state their objective annual income, but their objective health status is difficult to verify because health is at least partially a subjective state.

In addition to the lack of distinction between objective and subjective life domain measures, multivariate techniques, which can control for the intercorrelations between correlates of SWB, were not always utilized. Nevertheless, results have been relatively consistent across all domains in showing a stronger correlation between SWB and subjective assessment of life domains as compared with the more objective corresponding assessment. (Andrews & Withey, 1976; Campbell et al., 1976; Diener, 1984; Emmons & Diener, 1985; Fengler & Jensen, 1981).

For example, in the health domain, reviews of the early work found consistent results showing simple zero-order correlations between SWB and primarily objective health

indicators in the range of .2 to .5. (Larsen, 1978; Okun, Stock, Haring, & Witter, 1984; George & Landerman, 1984; Zautra & Hempel, 1984). However in all cases cited, this relationship strengthened as one progressed from more objective to less objective assessment of health.

In reviewing the relevant research for older adults, Kozma et al. (1991) reported the following discrepancies between the percentages of variance accounted for in SWB by subjective and objective life domain assessments: 10% to 20% for subjective health versus 4% to 7% for objective health; 3% to 30% for subjective housing versus 1% to 4% for objective housing; 1% to 30% for subjective finances versus 1% to 4% for income; 1% to 13% for subjective marriage versus 1% to 4% for objective marital status; and 3% to 25% for subjective employment versus 0% to 1% for objective employment.

Generally, these figures are consistent with research on more diverse age samples (Andrew & Withey, 1976; Argyle, 1987; Campbell et al., 1976). One exception noted in the literature is a study by Mullis (1992) in which various measures of objective financial status were compared in their ability to predict SWB. Although a stronger relationship with SWB was found than in studies using the

typical 'current income' measures, the authors were surprised that their newly developed 'life-time income' measure of economic well-being accounted for only 7% variance in SWB.

In certain respects these discrepancies are not surprising. One might expect that it isn't what you have but how happy you are with what you have that is going to be related to how happy you are in general (i.e., happiness comes from within). Conversely, an equally credible assertion would be that objective conditions, such as poverty or illness, would have a significant effect on one's happiness (presumably by lowering domain satisfactions).

These two points of view can be conceptualized in terms of the causal linkages between satisfaction in various life domains and overall SWB. Diener (1984) labelled the competing theoretical approaches "top-down" (TD) to denote the higher-order happiness construct affecting one's satisfaction in various lower-order life domains and "bottom-up" (BU) to represent the causal pathway from the sum of life domain satisfactions "up" to levels of overall SWB (see Figures 1 and 2).

Figure 1

General Top-down Model Relating Subjective well-being to its Major Correlates

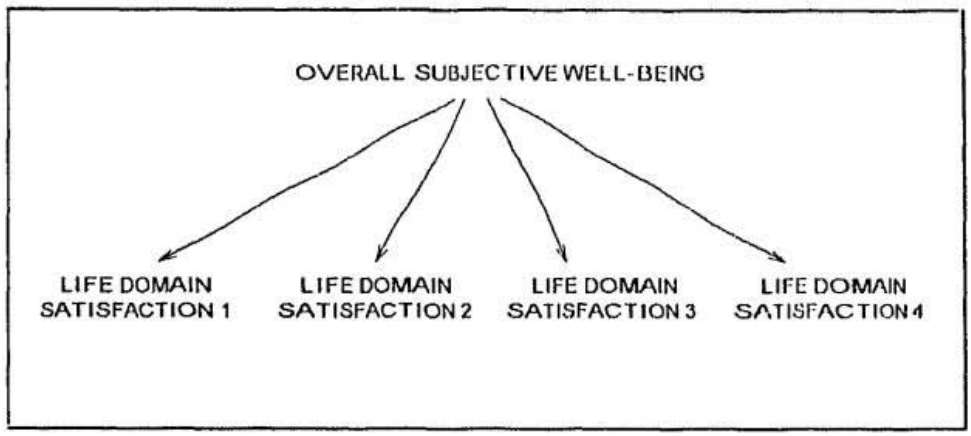
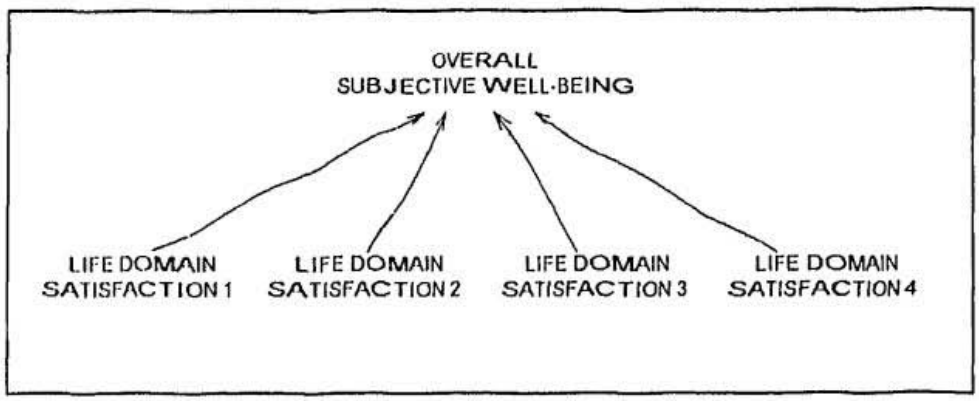


Figure 2

General Bottom-up Model Relating Subjective well-being to its Major Correlates



Another consistent characteristic of life domain assessments is the fact that intercorrelations between domain satisfactions are usually quite high (Diener, 1984; Headey, Holmstrom, & Wearing, 1985; Lance, Lautenschlager, Sloan, & Varca, 1989; Lewinsohn, Redner, & Seeley, 1991; Rodgers, Herzog, & Andrews, 1988). For example, Lewinsohn et al. (1991) found satisfaction with the following areas of life to be highly intercorrelated: self, friends, spouse and family life, work or school, neighbourhood and community, and sports and recreational facilities. When subjected to a principal component analysis, all satisfaction items had high loadings on the first principal component, accounting for a substantial portion of the variance in SWB. The authors concluded that all of the life satisfaction items were essentially measures of the same underlying dimension, which they called life satisfaction.

Despite such high intercorrelations, the predictive ability of domain ratings does increase when relationships are assessed in a multivariate fashion. A predictor array consisting of housing satisfaction, activity, perceived health, marital status, life events, and financial satisfaction was reported to account for 36% of the variance in SWB ratings of an elderly sample (Kozma & Stones, 1983a).

In two other elderly samples, between 40% and 50% of the variance in SWB was explained. Self-ratings of health, education, activity, and income accounted for 40% and 50% of the variance in SWB ratings for women and men, respectively (Markides & Martin, 1979). Michalos (1986) explained 45% of the variance in life satisfaction from the following 6 domain satisfactions: health (beta = 0.29); spouse (beta = 0.22); financial security, self-esteem (self) and housing (each beta = 0.15) and friendships (beta = 0.13). The inclusion of satisfaction with self (self-esteem) may have inflated the multiple correlation since, strictly speaking, it is more often conceptualized as an intrapsychic mediating variable than as a domain of life (Argyle, 1987; Waltz, 1986).

Using a large probability sample, Bharadwaj & Wilkening (1977) regressed self-ratings of satisfaction in 14 life domains on general SWB for the total sample and for subsamples divided by age, sex, and income. Their results indicated that between 20% and 40% of the explained variance in SWB ratings was predicted by the 14 life satisfaction domains.

To summarize, the total variance accounted for in SWB by satisfaction in various life domains ranges from 20 to 50 percent. Impressive as these results appear, there remain substantial portions of SWB variance unaccounted for by the combination of satisfactions in some of the most important domains of life.

Little doubt exists that certain life domain satisfactions are better predictors of SWB than others. The general finding is that the less public (i.e., related to the larger society) and more private, or personal, the domain, the stronger the relationship with SWB (Andrews & Withey, 1976; Bharadwaj & Wilkening, 1977; Bradburn, 1969; Campbell et al., 1976; Glatzer, 1991; Leelakulthanit & Day, 1992).

It is also apparent that the relative importance of domains in accounting for SWB variance is dependent on the specific sample or subsample assessed (Argyle, 1987; Balatsky & Diener, 1993; Bharadwaj & Wilkening, 1977; Kozma & Stones, 1983a; Markides & Martin, 1979; Near & Rechner, 1993; Quirouette & Gold; Stull, 1988;). For example, health appears to be more important in aged samples (Bharadwaj & Wilkening, 1977; Kozma et al., 1991; Larsen, 1978; Michalos, 1986) whereas friendship and leisure figure prominently in

domains of most importance to the SWB of nationally representative samples (Andrews & Withey, 1976; Campbell et al., 1976; Headey et al., 1985; Headey, Veenhoven, & Wearing, 1991). Even within the same sample, changes in the relative importance of life domain satisfactions in predicting SWB have been noted over time (Kozma & Stones, 1983a).

Research addressing temporal change in objective and subjective domain indicators of SWB has been quite scarce. Apparently few researchers have been interested in the question of what accounts for changes in the mean levels of satisfaction in life domains. The presumption has been that change in objective circumstances is primarily responsible for change in subjective assessments however the degree of this correspondence is unknown.

According to McNeil, Stones, and Kozma (1986a) no longitudinal studies on the stability of life domain satisfaction had been done up to that point. Over an 18-month period, they found no significant change in mean level of satisfaction ratings for housing, religion, and finances. Unfortunately, no objective measures of these domains were

obtained. Objective and subjective measures of health showed change but in opposite directions. McNeil, Stones, and Kozma suggested that an increase in the use of medications lead to an increase in health satisfaction despite a deterioration in the objective health of their elderly sample. Costa et al. (1987) found subjective ratings of health to remain stable over a nine year period. They assumed some deterioration in objective health with age during the same time period for their large sample of subjects aged 25-74.

Landua (1992) used a modified Markov model to evaluate the individual stability of objective and subjective health assessments over four waves of German panel data from 1984-1987. For analysis, he divided the sample into subjects who had health complaints at any time during the four surveys (ill) versus those who did not (healthy). Subjects were then divided into groups which changed ("movers") or did not change ("stayers") in their subjective evaluation of health. Results indicated that 26% of the ill group were stayers while 13% of the healthy group were. The ill group were assumed to be in a permanent state of bad health while the so-called healthy group were believed to suffer less severe but none-the-less substantial enough health symptoms to cause 87% of this sample to change. Proportional differences between groups were not tested for significance, nor were

the estimations of change based on the Markov model. Thus, studies which have focused on the domain of health have shown inconsistent findings.

Similarly, inconsistent results have been obtained on the stability of satisfaction in the job domain. Job satisfaction has been found to remain relatively stable over periods as long as 5 years, even with changes in occupations or employers (Gerhart, 1987; Schneider & Dachler, 1978; Staw & Ross, 1985). However, Farkas & Tetrick (1989) found that the job satisfaction of U.S. Navy employees changed significantly over a period of 19 months.

Using 2-year longitudinal data from the Australian Perceived Quality of Life surveys, Headey, Glowacki, Holmstrom and Wearing (1985) evaluated satisfaction change in four life domains: health, standard of living, job, and marriage/sex. Although the amount of absolute domain satisfaction change was not reported, the authors did find strong associations between life event change and satisfaction in corresponding domains.

The use of LISREL structural equation modeling (SEM) provided the following gammas linking respective domain

events and domain satisfaction change: 0.54 for health; 0.40 for standard of living; 0.36 for job; and 0.25 for marriage/sex. Some spillover effects were also noted. Standard of living events were found to effect change in marriage/sex satisfaction (Gamma = 0.20) and job events predicted both health and standard of living satisfaction change (Gammas = 0.12 and 0.17, respectively).

Atkinson (1982) separated his sample into those who had experienced life change in the two-year interval between assessments and those who did not. In addition to overall SWB, satisfaction in five life domains was evaluated. For four out of five domains, results indicated that retest correlations were significantly lower in the group reporting change than in the no change group. Unfortunately, change was not differentiated with respect to specific life domains so the domain-specific reactivity of life domain satisfaction could not be evaluated.

Interestingly, Atkinson (1982) found that for the total sample, life domain satisfaction was as stable, if not more stable than evaluations of life in general. He also reported data from Campbell et al.'s (1976) 8-month longitudinal survey which indicated equal or greater stability of domain satisfaction in comparison to the stability of overall SWB.

Whether these findings reflect measurement artifacts or the actual relative stability of satisfaction in life domains remains to be seen.

When Atkinson (1982) separated groups according to the experience of life change, scores on only one of the four overall SWB measures were significantly different between groups. How life satisfaction domain measures can simultaneously be more stable over time than general SWB measures and more reactive to life change is worth further investigation.

The relative stability of domain satisfactions over time appears to be at least equal to that of overall SWB but further work is needed to confirm these preliminary findings. Results from these studies are equivocal with respect to how reactive domain satisfactions are to changes in objective domain conditions. Like overall SWB, it seems that mean levels of domain satisfaction remain moderately stable although change does occur in individual levels over time.

Summary. Although in most cases, a positive correlation between objective and subjective assessments of life domains exists, it is not strong and sometimes does not reach

significance (Andrews & Withey, 1976; Gutek, Allen, Tyler, Lau, & Majchrzak, 1983; Kozma et al., 1991; Landua, 1992; Larsen, 1978; Levkoff, Cleary, & Wetle, 1987). Over 50% of the variance in subjective domain assessments cannot be accounted for by variance in the objective condition. Furthermore, the correlation between subjective assessment of life domains and happiness is stronger than that between objective life domain conditions and happiness.

It appears that factors other than the actual conditions of life, or the sum of one's satisfaction with these discrete life domains, are at play in the process of arriving at one's self-perception of happiness. The direction of causality is another matter, requiring longitudinal designs, and will be addressed more thoroughly in a subsequent section. However, it is worth mentioning that since the aim of early social indicators research was to see how the environment affected people's well-being, its influence on subsequent SWB research may have inadvertently biased researchers' expectancies with respect to the direction of influence of domain satisfactions and SWB.

Demographic Variables

The amount of SWB variance accounted for by housing, income, marital status, and employment has been noted above in direct comparison to the subjective assessment of these demographic variables (p. 12). The range of variance explained by each of these objective life domain variables was reported to be between zero and 4% (Kozma et al., 1991). Early studies have shown age, sex, education, and ethnicity to correlate with SWB (Andrews & Withey, 1976; Campbell et al., 1976).

Demographic variables, taken together, have accounted for up to 10% of SWB variance (Michalos, 1986). Andrews and Withey (1976) explained 11% of SWB variance from the following variables: age, sex, education, race, family income, and stage of family life-cycle. In their Bangkok sample, Leelakulthanit and Day (1992) found sex, marital status, race, employment status, education, income, and age to explain 12% of SWB variance. Somewhat higher figures (15%) have been reported when more sociodemographic variables (e.g., political conservatism) have been used (Grichting, 1983).

When life domain satisfactions are included in predictor arrays for regression analyses, demographic variables do not often contribute any further explained

variance (e.g., Michalos, 1986), indicating that the effect of many demographic variables on SWB is indirect (Diener, 1984; Kozma et al., 1991). Demographic variables such as age (George, Okun, & Landerman, 1985), and sex (Markides & Martin, 1979; Okun et al., 1984) have been shown to moderate the impact of other correlates of SWB. Similarly, the relationship between SWB and other demographic variables, such as education or marital status, is believed to be of a spurious nature (Argyle, 1987; Kozma et al., 1991). Thus, few of these variables have shown any direct relationship with SWB. Using path analysis, neither Liang and Warfel (1983) nor Headey (1993) found a direct relationship between education and SWB. In addition, Headey (1993) could not confirm any direct effects for either sex, age, or social status on SWB.

Although demographic variables typically do not account for any unique SWB variance above that explained by life domain satisfactions, some consistent findings have been found in terms of sample description. The majority of research has not shown any sex differences in mean levels of SWB when relevant variables are controlled (Diener, 1984; Larsen, 1978; Lewinsohn et al., 1991; Palmore & Kivett, 1977; Veenhoven, 1984). With regard to marital status, a number of reviews have concluded that on average, married

people are happier than those who are unmarried, divorced, or widowed (Argyle, 1987; Diener, 1984; Kozma et al., 1991).

Within countries, higher mean income levels tend to be associated with higher mean levels of SWB (Argyle, 1987; Campbell et al., 1976; Diener, 1984; Douthitt, MacDonald, & Mullis, 1992; Leelakulthanit & Day, 1992; Mullis, 1992). Much debate has focused on the relationship between income and SWB in cross-country comparisons. Diener, Sandvik, Seidlitz, and Diener (1993) have recently criticized previous research on methodological grounds. Using a more diverse sample of countries and longitudinal data, they concluded that SWB shows a curvilinear increase with income within the U.S.A. and a moderately strong linear relationship between SWB and GNP across countries.

Like the income-SWB relationship in cross-country comparisons, agreement has been difficult to reach on the relationship between age and SWB. Previous inconsistent results can be attributed to three main sources: (a) the use of cross-sectional age cohort comparisons versus analysis of maturational change in SWB with aging, (b) the finding that the satisfaction component of SWB tends to increase with age but affective intensity decreases, and (c) inadequate statistical control of confounding variables (Argyle, 1987;

Campbell et al., 1976; Diener, 1984; Diener, Sandvik, & Larsen, 1985; Doyle & Forehand, 1984; Herzog & Rodgers, 1981; Larsen, 1978).

Longitudinal studies have shown rather consistent results that indicate no maturational change in mean levels of SWB (Baur & Okun, 1983; Costa et al., 1987; George & Maddox, 1977; Kozma & Stones, 1983a; Mussen, Honzik, & Eichorn, 1982; Palmore & Kivett, 1977; Reker & Wong, 1984). However, as one might expect, many studies have found a moderating effect of age on related variables.

Research on races, particularly blacks and whites, is another area in which researchers experience a great deal of confusion and equivocal findings (Krause, 1993). The only longitudinal examination to date has found that race is not a significant predictor of avowed happiness over a 5-year period in a sample of elderly men (Burton, Rushing, Ritter, & Rakocy, 1993). In their 25% black sample, race was found to have an indirect effect on happiness through education and social roles. Using an elderly subsample of a national probability sample, Krause (1993) came to a similar conclusion after analyzing a complex socioeconomic conceptual model through SEM.

Michalos (1982) accounted for 53% of the variance in SWB in terms of satisfaction in 12 domains and 7 demographic variables. However, the contribution of the demographic variables was of a moderating nature, by influencing the relative importance of the domain satisfactions for different demographic groups.

Summary. Many demographic variables reduce to nonsignificance when they are examined in a multiple regression format which includes other relevant variables. When they do retain an independent contribution to SWB variance, it is usually of limited order and in the form of a moderating effect.

Environmental influences: Life events, hassles, and uplifts

As previously noted, objective measures of life domains have not been found to explain much variance in SWB. From a "bottom-up" intuitive perspective, these results have been regarded as surprising. This finding led SWB researchers to evaluate alternate conceptualizations and measures of objective life circumstances. Consulting the existing literature revealed a large body of research on the stress-illness relationship.

This research concerned the negative effects of life changes on the development of both physical illness and psychological distress (Holmes & Rahe, 1967; Dohrenwend & Dohrenwend, 1974; Selye, 1956). Given the well-being/ill-being relationship, there was obvious reason to believe that the life events conceptualization of environmental influences may predict SWB.

Life events. Many examples of life events involve social role and life demand changes which accompany typical life-span development (e.g., death of a spouse, illness, loss of employment, marriage, birth of a child). Overall, results have been consistent in obtaining moderate zero-order correlations between certain life events and SWB (Brett, Brief, Burke, George & Webster, 1990; Cohen, 1988; Cohler & Boxer, 1984; Filipp & Klauer, 1991; Stones & Kozma, 1984; Zautra & Reich, 1983).

Hassles and uplifts. Hassles and uplifts were devised to address a reported requirement of balance in the valence and duration of life events included in typical life event lists (Kanner, Coyne, Schaefer, & Lazarus, 1981; Zautra & Reich, 1983). In comparison to major life events, these measures focus on the assessment of more minor, daily events in life that may produce negative stress (hassles) or

positive outcomes (uplifts). Examples of typical hassles would include misplacing keys or having transportation problems. Typical uplifts include making new friends or being complimented.

Chamberlain and Zika (1992) conducted a 3-6 month longitudinal study to assess the relationship between various measures of well-being and two predictor variables. The Hassles Scale (Kanner et al., 1981) was used to assess minor stressors which represented one of the predictors in the study. The authors report that when prior well-being was partialled out, the additional variance in current well-being accounted for by current hassles was limited (1-9%) but prior hassles had no such unique effect. Current hassles were still found to predict current well-being after variance due to both prior well-being and prior hassles had been removed. From their analyses, the authors concluded that current, and not prior, daily stressors contribute to levels of SWB.

Recall from the domain indicators section that life event change has been found to effect change in domain satisfactions to a greater degree than it does in SWB. Headey et al. (1985) used a measure that included both life events and hassles in their study of the relationship

between SWB and domain satisfactions. In one structural equation model that was tested, direct links between life stress and 2-year change in SWB did not reach significance and were subsequently dropped from the final model. Indirect links from life stress through domain satisfactions to SWB were supported.

Zika and Chamberlain (1987) found low to moderate zero-order correlations between hassles and SWB in two samples and these relationships endured when the effects of a number of personality variables were removed in multiple regression analyses. The unique relationship between hassles or life events and SWB will require inclusion of all relevant SWB correlates to assess any mediating pathways and confounding variables.

Daily events versus life events. Studies comparing the differential predictive ability of hassles and life events on psychological distress or health outcomes have consistently found hassles to be the more powerful predictor (see Chamberlain & Zika, 1990, for a review; Johnson & Bornstein, 1993; Lu, 1991). Studies using SWB as the outcome variable are less common but obtain similar results.

Lewinsohn et al. (1991) utilized measures of hassles and major life events and found significant zero-order correlations between both measures and SWB in two samples. However, in multiple regression analyses, only micro-stressors remained significant, contributing 1.4% and 2.5% in each sample. Similar results were obtained by Holahan, Holahan, and Belk (1984) with an elderly sample.

Chamberlain and Zika (1990) also found similar results: Hassles predicted SWB when the effects of life events were partialled out. When they repeated the regression analysis in the reverse order, life events did not significantly predict any of their well-being measures. Furthermore, no evidence for an interaction effect between the two measures was obtained, suggesting that each exerts an independent influence on SWB.

According to Kozma et al. (1991), each life stress index is differentially suited to the different time frames of SWB measurement. The hassles measure predicts greater proportions of variance in current SWB whereas life events are better at predicting subsequent levels of SWB.

Individual Dispositions

The correlates to be reviewed under this heading include established personality traits (i.e., extraversion and neuroticism), as well as psychological resources or dispositions which reflect individual differences in characteristic ways of interacting with the environment.

Extraversion and neuroticism. According to McCrae (1983), extraversion (E) typically accounts for between 5% to 10% of the variance in SWB and 10% to 20% of SWB variance can be explained by neuroticism (N). Percentages of variance explained by these personality traits vary greatly between studies, perhaps due to differences in sample characteristics and measures of SWB. For example, extraversion has recently been reported to explain from 3% to 23% of SWB variance (Argyle & Martin, 1991; Headey, 1993).

Headey and Wearing (1991) found uncorrected 8-year stabilities of .63 for E and .67 for N. Costa and McCrae (1980) cite a 12-year test-retest coefficient of .70 for N and a 6-month test-retest coefficient of .79 was obtained for E (McCrae & Costa, 1983). These figures are comparable to the stability estimates of reliable measures of SWB (see Table 1). With regard to individual change, Magnus, Diener,

Fujita, and Pavot (1993) found twenty percent of respondents changed more than one standard deviation on E and 31% changed as much on N over a 4-year period. Interestingly, these figures are on par with the reported change in happiness over time (Headey & Wearing, 1991).

Although these well-studied personality traits are purported to be responsible for the stability in SWB (Costa, McCrae, & Zonderman, 1987), it is interesting that on average, they do not account for any more than 15% of the variance in SWB (Kozma et al., 1991). Furthermore, as noted above, SWB appears to be as stable as these personality traits.

Finally, although E and N appear to be as effective as SWB is itself in predicting later SWB (Costa & McCrae, 1980; Costa, McCrae, & Norris, 1981; Costa, McCrae, & Zonderman, 1987), the interrelationship between the three constructs is unknown. Costa (1983, p.73) made the following description of the relationship between high E or N people and SWB:

Individuals who are cheerful, warm, and excitement-seeking are likely to experience a lifetime of positive affect; those who are depressive, anxious, and hostile are likely to remain unhappy.

Putting aside the references to stability, the above description is tautological and points to the need for further work to perhaps tease-out a component structure for the combined measures.

Purpose. The construct of life purpose is future-oriented and reflects a general intention to fulfil functions or achieve goals in life (Reker, Peacock, & Wong, 1987). Life purpose is most often assessed with the Purpose in Life Test. The psychometric properties of a revised version of the scale were evaluated by Harlow, Newcomb, & Bentler (1987). Factor analysis revealed 4 primary factors in addition to a large general factor: lack of purpose in life; positive sense of purpose; motivation for meaning; and existential confusion. Purpose in life was strongly related to happiness (r = .84).

Reker and Peacock's (1981) Life Attitude Profile (LAP) has also been used to assess life purpose, although not as extensively as the Purpose in Life Test. Seven subscales measure: life purpose (zest for life, fulfilment, contentment, satisfaction); will to meaning (striving to find meaning in personal existence); future meaning (determination to make the future meaningful); life control (freedom to make life choices, exercise of responsibility);

existential vacuum (lack of purpose and goals); death acceptance (lack of fear or anxiety about death); and goal seeking (desire to achieve new goals). In addition to a number of interesting age-related changes on these subscales, Reker et al. (1987) found all subscales except "will to meaning" to be significantly correlated in the expected direction with SWB.

Control. Shupe (1985) defines perceived control as the expectation of having control over one's environment. The construct has been operationalized in two distinct, yet related forms: (1) as a general individual disposition to view environmental events as being within one's control, labelled on a continuum from internality to externality; and, (2) as a specific characteristic of an environment, for example, the amount of control seniors may exercise in a nursing home environment.

Many studies have found a significant positive relationship between internality and a host of adaptive health characteristics, including SWB (see Shupe, 1985, for a review). Reid and Ziegler (1981) report correlations between control and life satisfaction in the range of .32 to .54 in a number of studies using their Desired Control Scale. Furthermore, their measure of control predicts later

SWB following intervals of 6 to 18 months (r = .23 to .44). Reker et al. (1987) found a significant correlation between SWB and life control, as measured by the Life Attitude Profile.

Optimism. In their review of the relationship between personal optimism and physical and mental health, Reker and Wong (1985) suggest the construct is closest, and perhaps synonymous, to the construct of hope. They propose 3 major components of personal optimism, all related to future life concerns: (1) subjective expectancies; (2) feelings; and (3) goal-strivings. Scheier and Carver (1989, p. 1027) view optimism as the "favourability of the person's generalized outcome expectancies."

A significant correlation between optimism and well-being was obtained by Sweetman, Munz, and Wheeler (1993). Their well-being measure was a combination of SWB and ill-being but optimism was more closely related to the SWB portion of the measure. Scheier et al. (1989) were interested in the effects of dispositional optimism on recovery from heart surgery. Optimism assessed prior to surgery significantly predicted SWB 6-months post-surgery. In comparison to pessimists, optimists were significantly

more likely to have returned to their normal life activities at 6-months post-op. They also resumed both physical and recreational activities more quickly than did pessimists. These behavioral indicators of SWB are reflected in a highly significant correlation between prior optimism and post-op SWB.

Hardiness. The construct of hardiness was introduced by Kobasa (1979) and is hypothesized to consist of three general characteristics: (1) commitment, or approaching life with a sense of meaning and being actively involved in one's work or daily activities; (2) control, or a feeling of being able to influence events; and, (3) challenge, or viewing unexpected change as an opportunity for growth versus threat. Together these characteristics are believed to buffer the impact of stress by way of a cognitive mediational role between stress and illness. Hardiness has been found to share 7% variance with optimism ($p < .05$) Sweetman et al. (1993).

McNeil, Stones, Kozma, and Hannah (1986) found that hardiness accounted for 12% of the variance in the SWB of an elderly sample. Sweetman et al. (1993) did not obtain a significant correlation between the two constructs when a combined well-being/ill-being outcome measure was used.

However, only a 27% response rate was obtained from their select sample of midwest attorneys.

Self-esteem. Diener (1984, p. 558) cited eleven studies which together indicate that self-esteem is one of the best predictors of SWB. In their review of the SWB - esteem relationship research, Kozma et al. (1991) emphasize the variability in the magnitude of correlations obtained (range = .13 to .61) and suggest the use of a standardized measure. Headey, Holmstrom, and Wearing (1985) obtained significant betas linking self-esteem to three life domain satisfactions and SES but no direct links were found between self-esteem and SWB.

Summary. It should be apparent from the preceding review that many of the above constructs share similar, if not identical, components: hope, meaning in life, control. Further work is required to tease out the unique effects of each component in these multidimensional constructs.

All constructs would appear or have been suggested to involve predispositions to cognitively evaluate the environment in certain ways. For some (i.e., control, hardiness), the cognitive component has been described as the primary change element which mediates the relationship

between life circumstances and SWB. Whether they determine SWB or result from it remains to be seen. In part because personality is believed to be engraved in our neuroanatomy and in part because cognitions are believed to determine affect and not vice versa, the often unchallenged assumption is that dispositions cause happiness.

Models of Subjective Well-Being

To a large extent, the previous review of correlates was carried-out to lay the groundwork for an understanding of contemporary macro-process models of SWB. These models attempt to explain the relationships between SWB and some of its major correlates. As previously stated, the most critical research question is the direction of causality within these models. Ignorance of the answer has been called a "black hole in current research" (Headey & Wearing, 1992). Therefore, the present section on SWB models will be organized around the three main types of causal models; bottom-up, top-down, and bi-directional.

Bottom-Up Model

The difficulty with many studies which obtain results supportive of the bottom-up model of SWB is that they are

correlational in nature. "Explaining" or "accounting" for portions of variance in SWB from the combination of satisfaction in various life domains does not tell us anything about the direction of causality. Thus, findings that the BU linear additive model accounts for between 20 and 50 percent of the variance in SWB do not address the top-down/bottom-up distinction, although numerous researchers have either implicitly or explicitly cited this type of evidence for BU support.

To date, the majority of approaches to the study of life domain satisfactions and SWB has been from a bottom-up perspective (Andrews & Withey, 1976; Atkinson, 1982; Campbell et al., 1976; Headey et al., 1985; Landua, 1992; Lawton, 1983; Liang, 1982; Lohr, Essex, & Klein, 1988; Michalos, 1986; Waltz, 1986; Wheeler, 1991). Moreover, several studies have been designed to specifically address the TD/BU distinction and have reported findings supportive of BU effects.

Headey, Holmstrom, and Wearing (1985) explained 80.8% of the variance in well-being with a structural equation model based on a single wave (1983) of the Australian Perceived Quality of Life panel survey. The model included

the following variables: five life satisfaction domains; two personality traits (self-esteem and personal competence); demographic variables (sex, SES); and four social network variables.

This model is characterized as bottom-up in that domain satisfactions have direct causal links to SWB and the remaining variables exert their influence on SWB indirectly through domain satisfactions. When additional direct links to SWB were inserted, no increase in the fit of the model to the data was obtained. Their TD formulation involved personality variables directly affecting SWB, which in turn, determined levels of domain satisfactions. The authors reported that this model did not fit the data as well as their BU formulation.

Using LISREL structural equation modeling, Headey, Glowacki, Holmstrom, and Wearing (1985) compared dynamic BU and TD models. Their outcome measure involved a combination of well-being and ill-being indices to represent PWB. Life events were hypothesized to effect change in domain satisfactions, which combined to predict change in SWB in their BU model. In their TD model, life events were purported to directly cause global SWB change, which in turn predicted change in domain satisfactions. The TD model fit

the data poorly whereas the BU model accounted for 70.2% of the variance in SWB change.

An alternative TD model asserts that domain satisfactions are dually influenced by global SWB (from the 'top') and life events. Unfortunately, they did not test for this TD formulation. Instead, they did not find any direct links from life events to SWB and concluded that TD support was not evident. Recall that they did find strong links between domain life events and corresponding change in domain satisfactions, but this does not invalidate all TD models.

Krause (1991) has proposed the same type of TD model and unfortunately, did not test alternative TD models. Besides demographic control measures, the variables tested in his models were: objective illness; objective financial loss; health satisfaction; financial satisfaction; and global life satisfaction. The elderly sample was obtained from a single wave of the Michigan Survey Research Center's Quality of Life survey. First, evidence was obtained for domain-specific stress. That is, financial loss and illness episodes were not significantly correlated and the test of a model (M3) where these latent constructs were allowed to

correlate freely did not improve the model's fit to the data.

With respect to the TD/BU model comparison, Krause (1991) hypothesized only moderate correlations (BU) as opposed to high correlations (TD) between financial satisfaction, health satisfaction, and global life satisfaction. A test of a model (M4) where structural disturbance terms associated with these variables were allowed to correlate freely revealed a significant improvement in the fit of the model to the data over the fit of model M3 ($p < .001$). Nevertheless, model M3 does not specifically address differential TD/BU predictions so this significant improvement in model M4's fit to the data has little bearing on the TD/BU distinction.

With regard to the strength of correlations, analyses revealed a correlation of .42 between satisfaction with health and satisfaction with finances; .52 between health satisfaction and global satisfaction; and .62 between financial satisfaction and global satisfaction. Since Krause's (1991) TD formulation states that domain satisfaction reflects the sole influence of global satisfaction with domain events directly influencing global

satisfaction, he interpreted these correlations as too weak to support a TD formulation of SWB.

Summary. A larger number of domains should be tested in future with as many direct tests between TD and BU model formulations as possible. The real value of SEM increases substantially with the number of alternative models which are tested (Glymour, Scheines, Spirtes, & Kelly, 1987; Joreskog & Sorbom, 1979). Furthermore, some would argue that a superior test of causality is obtained from longitudinal data analyses, which allow for differential hypotheses both within and across waves (Stones & Kozma, 1986b).

Top-Down Model

The moderate long-term stability of mean levels of SWB has been reviewed previously with reference to test-retest correlations (Table 1). Another approach to the investigation of SWB stability is to include prior SWB in multivariate predictor arrays of present well-being. Utilizing such an approach with elderly subjects, Kozma and Stones (1983a) found an average of 86% of the explained variance in present SWB to be accounted for by 18-month prior SWB scores. This corresponds to between 45% and 57% shared variance between phases. This finding was replicated

in a later study when 51% of phase 2 SWB variance was explained by phase 1 SWB scores, 18 months prior (Stones & Kozma, 1986a). The best single predictor of current well-being has consistently shown to be prior well-being (Chamberlain & Zika, 1992; McNeil, Stones, & Kozma, 1986b; Kozma & Stones, 1983a).

Central to the TD/BU debate is the amount of variance accounted for by each model. According to Stones and Kozma (1989), the minimum required correlation to support a BU formulation is equal to the square root of the stability coefficient for the SWB dependent measure. High variability in the psychometric properties of SWB measures is evidenced from the stability coefficients listed in Table 1, with values ranging from .38 to .92. If a conservative estimate of .65 is taken as the average of these stability coefficients, the correlation required to support a BU model would be .81. As the authors duly note, even multiple correlations infrequently exceed .6 (a fact that hasn't changed since 1989!).

Nevertheless, multiple correlations which include domain satisfactions have come close enough to the required level for many researchers to assume BU support. Stones and Kozma (1989) elaborate on one possible reason for this

moderately high degree of prediction, or shared variance: Domain satisfactions comprise a happiness propensity component and a life domain circumstance component. Although evidence for these components remains scarce, confirmation of this domain satisfaction component structure would be the first alternative parsimonious explanation for the linear additive BU model data.

Data from the Swedish/Adoption Twin Study of Aging suggests that genetic influences account for as much as 36% of the variance in life satisfaction (McClearn, Pedersen, Plomin, Nessleroade, & Friberg, 1991; cited in Bergeman, Plomin, Pedersen, & McClearn, 1991). Thus, to complicate matters further, genetic influences may mediate some of the associations between SWB and its correlates. The finding also points to the fact that at least a portion of SWB may be largely immutable, similar to biologically determined traits.

A top-down propensity theory of SWB has been put forward by Stones and Kozma (1980, 1986b). In comparison to the TD formulations of Krause (1991) and Headey, Glowacki, Holmstrom, and Wearing (1985), their propensity formulation states that domain satisfactions are directly influenced by

global SWB in addition to the corresponding objective domain circumstances. Life events and hassles do not directly affect SWB.

Furthermore, the formulation differs from the traditional view that personal dispositions directly influence SWB (e.g., Costa & McCrae, 1980). Stones and Kozma (1980, 1986b) believe SWB is a higher-order construct which directly influences attitudinal variables (e.g., locus of control), and behavioral styles (e.g., activity level), as well as life domain satisfactions.

Specifically, Stones and Kozma (1986a) propose three major predictions of the propensity formulation. The first one relates to the temporal stability of happiness, on which supporting research has been documented throughout this review. The second prediction is that the component structure of the construct is stable. Given the current lack of consensus on the lower-order components of SWB, inconsistent results are not surprising (Chamberlain, 1988; Lawrence & Liang, 1988; Lawton, Kleban, Dean, Rajagopal, & Parmelee, 1992; McCulloch, 1991). The final prediction of the propensity formulation of SWB is that happiness measures from diverse sources should converge. Although studies of cross-situational and cross-informant consistency are

relatively rare, the evidence does point to a moderate degree of convergence from different sources (Diener, 1994; Kozma & Stones, 1983b; Pavot & Diener, 1993).

In a direct empirical test of their propensity formulation, Stones and Kozma (1986b) made 18 predictions that were thought to differentiate their TD model from traditional BU models. Using 18-month longitudinal data from an elderly sample, they tested the presence and direction of causal links between SWB and five of its lower-order correlates: housing satisfaction, financial satisfaction, perceived health, locus of control, and activity level. Both TD and BU models contained links representing temporal stability among the lower-order variables.

Besides path analysis, the authors made extensive use of a preparatory procedure to test for the existence of omitted model linkages, the Simon-Blalock Technique (Asher, 1976). The technique involves predicting partial correlations of zero between two variables which are not linked in a model. If the partial correlation turns out to be significant and does not violate the theoretical assumptions of the model, the model should be revised to include the previously omitted linkage. The opposite logic

can be applied to proposed linkages which ultimately results in a test for spuriousness.

The high intercorrelations between domain satisfactions have already been noted. A TD account of this fact is that the high intercorrelations are due to the common causal influence of global happiness on each lower-order variable. That is, the intercorrelations are spurious and consequently, removing the common effect of happiness should reduce the intercorrelations to nonsignificance. Of the five significant intercorrelations found, all five reduced to nonsignificance in the partial correlation. Thus, at least some linkages between happiness and lower-order variables must be top-down.

One BU prediction is that if happiness results from the sum of satisfaction in various life domains, then the stability of happiness over time results from the stability of these lower-order variables over time. The zero-order stability of global happiness was .71 (18-month retest coefficient) and was only minimally reduced to .66 to .70 after partialling out effects due to lower-order correlates at both times of measurement.

From a similar BU perspective, any significant correlations between happiness at Time 2 and lower-order variables at Time 1 would be due to the stability of the lower-order variables over time. Thus, partialling out the effect of happiness at Time 1 should not affect any cross-phase correlate(1) - happiness(2) relationships according to the BU formulation. All three significant correlations which were found between lower-order variables at Time 1 and happiness at Time 2 reduced to nonsignificance when Time 1 happiness was partialled out.

Results from these two tests of BU predictions indicate that the stability of lower-order variables cannot be responsible for either the stability of global happiness or the frequently noted correlations between lower-order variables and later happiness. The possibility of a third variable (e.g., personality) exerting a stabilizing influence both on happiness and on the lower-order variables was not investigated.

Another cross-phase analysis which could differentiate TD from BU predictions is between happiness at Time 1 and

lower-order variables at Time 2. According to the propensity TD model, happiness at Time 1 can exert an influence on Time 2 lower-order variables via two discrete mediating pathways: (1) happiness(1) affects lower-order variables(1) which in turn affect subsequent lower-order variables(2); and (2) happiness(1) affects happiness(2) which in turn determines lower-level variables(2). Therefore, statistically removing either pathway should not influence any correlations between Time 1 happiness and Time 2 correlates.

In contrast, the prediction from the BU model is that such cross-phase correlations are spurious, resulting entirely from the mediating role of lower-order variables at Time 1, which affect both Time 1 happiness and levels of Time 2 correlates. Of the four significant cross-phase correlations, three retained significance when the effects due to prior lower-order correlates were removed. Since one of the proposed pathways from the TD formulation was removed with no effect in 3/4 cases, results supported TD predictions. In summary, based on extensive logical and statistical comparisons, the propensity TD formulation of SWB explained the data better than a BU formulation.

Underhill and Stones (in press) took a similar approach to testing their TD formulation, but this time with cross-

sectional data. Like the propensity model, their TD model predicts that life circumstances directly affect domain satisfactions and related lower-order variables. Likewise, personal dispositions are believed to be determined by levels of SWB. The variables measured included; SWB, objective health, subjective health, long-term life events, hassles, personal meaning and personal optimism. Unlike many researchers, they conceived of hassles as "perceived stress" and long-term life events as "objective stress."

After partialling out the effects of SWB, all four significant zero-order intercorrelations between perceived stress, perceived health, meaning and optimism were reduced to nonsignificance. Hence, a TD influence is supported once more. This finding also suggests that personal dispositions are indeed influenced by SWB. Furthermore, a multivariate multiple regression analysis with SWB, health and life events entered as predictors of the remaining variables confirmed all of the predictions of their TD model with one exception. A non-significant linkage between SWB and perceived health ($p < .06$) was obtained, although the authors commented that the probability that a linkage exists remains high enough to warrant inclusion in the model.

Like Underhill and Stones (in press), Brief, Butcher, George, and Link (1993) focused on the domain of health. Data were analyzed from 3 waves of a six-year longitudinal study on aging. Variables assessed included objective health, perceived health, the personality trait Negative Affectivity (NA), and three indices of SWB (life satisfaction, positive affect and negative affect). Through path analysis of cross-sectional as well as longitudinal data, results did not confirm the hypothesized direct linkages between NA or objective health and SWB. Interestingly, a direct link was found between NA and perceived health.

Unfortunately, no attempt was made to test for the spuriousness of this relationship, as Underhill and Stones (in press) did with their dispositional measures. Underhill and Stones (in press) found that the significant correlations between perceived health and both meaning and optimism were each due to the common influence of SWB on all variables.

Brief et al. (1993) did find evidence for a direct link between perceived health and SWB in all analyses. For the longitudinal path analysis, perceived health at Time 2 and SWB at Time 3 were used. Relating this pattern to the

previous analyses by Stones and Kozma (1986b), one could hypothesize that the significant correlation between the lower-order variable (i.e., perceived health) and later SWB is spurious, owing entirely to the correlations of each with SWB at Time 2. Again, no such tests for spuriousness were conducted. Given that the path analysis was based on longitudinal data and compared prior perceived health to later SWB, the authors assumed BU causality.

Summary. Differential support for a BU model of SWB has not been demonstrated. With the recent reliance on complex statistical packages (i.e., LISREL), it is important that the basic logic of science is not lost in the fervour of new technology. The conclusions of studies with appropriate designs, samples and measures are being limited by a limitation in analyses: Tentative assumptions should be clearly stated as such; tests of spuriousness need to be conducted before model-fitting to reduce potential specification errors; and as many systematically varied alternative models as possible should be compared.

Bi-Directional Models

Bi-directional (BD) models are the middle-ground in the TD/BU debate. As opposed to the previous models cited, which were all recursive, bi-directional models include both TD and BU linkages between SWB and its correlates. Three relatively recent studies have either directly tested a BD model (Lance, Lautenschlager, Sloan, & Varca, 1989; Lance, Clack, & Michalos, 1994) or tested for separate BU, TD, or BD relationships (Headey, Veenhoven, & Wearing, 1991).

Some controversy surrounds whether in fact it is possible to test models with reciprocal linkages (it has been difficult enough with unidirectional models!). Perhaps the critical element in the debate is semantic, or more accurately, material for philosophy of science. Certainly most would agree that it is not possible to prove the existence of such relationships, but the distinctions become finer when one speaks of testing, or inferring reciprocal causation. The authors of the BD model studies show due caution by labelling their studies "exploratory" (Headey et al., 1991, p. 83) or their results "suggestive" of causation (Lance et al., 1989, p. 87). With this in mind, the studies which attempt to infer two-way causation will be reviewed for any light that they may shed on the TD/BU process distinction.

A complex statistical procedure for testing two-way causation with three or more waves of SWB data was utilized by Headey et al. (1991). Their sample was obtained from four waves (1981-1987) of the Australian Perceived Quality of Life panel study. Variables measured included: SWB; six domain satisfactions; Extraversion and Neuroticism; and three demographic indices.

To identify the 3-wave model for SEM purposes, they imposed certain cross-phase equality constraints. The constraints essentially mean that an assumption of "equilibrium" or stability exists in the relationships between life satisfactions and SWB across phases. These assumptions appear valid when life change has not exerted an effect on any domain satisfactions. Thus, the model may only apply under these conditions.

In their LISREL analysis, three demographic measures (SES, sex, age) and the two personality traits were treated as exogenous variables, hence controlling for their effects in subsequent analyses. In this model, personal dispositions are seen as causing SWB and not vice versa, as Underhill and Stones (in press) have conceived. Treating them as exogenous in the analyses does, however, rule-out any spurious relationships between SWB and domain satisfactions as a

possible result of their presence. Unfortunately, it does not allow for any investigation of interrelationships between personality, SWB and the domain satisfactions.

Results implied spurious relationships between SWB and both health and friendship satisfaction due to the effects of E and N: Neither TD nor BU linkages were significant. Job satisfaction, leisure satisfaction, and standard of living satisfaction were all found to be determined by SWB, in a TD manner. Finally, the relationship between marriage satisfaction and SWB was characterized as both TD and BU.

Spuriousness could also be due to variables besides E and N, not included in the model. The above findings rest on this assumption in that correlated error terms were included in the structural model and excluding them does negate the results. Perhaps a more informative approach would be to test directly for spuriousness and omitted linkages (e.g., Simon-Blalock Technique) prior to SEM analysis. This may also have the added benefit of allowing more relationships to be identified for the structural model.

Both Lance et al. (1989) and Lance et al. (1994) analyzed full models against their data, allowing for the

combined effects of life domain satisfactions to be assessed in relation to SWB. Both studies were cross-sectional in nature.

Lance at al. (1989) focused on three life domains in the lives of married university professors: marriage, social activities and job. In addition to age and SWB, measures of satisfaction and the perceived adequacy of social support in each of the domains were assessed. Because only single measures of certain variables were obtained, the authors tested path models (i.e., single indicator) as opposed to latent variable models (i.e., multiple indicator). For BU, TD and BD models, the perceived adequacy of social support in each domain was predicted to cause associated levels of domain satisfaction in a BU manner. The models were differentiated by the causal direction of linkages between SWB and the domain satisfactions, with the BD model including both TD and BU linkages.

Several overall goodness-of-fit indexes revealed some superiority of the TD model over the BU model but the BD model was found to fit the data better than either recursive model. In all models, perceived social support significantly predicted respective domain satisfactions ($p<.01$). For the BU model, BU linkages between domain satisfactions and SWB

were all significant ($p<.01$) but age did not affect SWB. Likewise, all TD linkages between domain satisfactions and SWB were significant at the $p<.01$ level in the TD model. In this case, age was a significant predictor of SWB ($p<.01$).

The BD model included a significant TD effect from SWB to social activity satisfaction and a BU effect from marital satisfaction to SWB (both $p<.01$). Bi-directional effects were found between job satisfaction and SWB with the TD effect significant at the $p<.01$ level and the BU effect significant at the $p<.05$ level. Age was found to affect SWB in this model ($p<.05$). Of interest here are the possible effects due to the restrictiveness of the sample: All subjects were married with the same type of job and one would think, SES and social lives.

Unfortunately, another restrictive sample was used by Lance et al. (1994) (i.e., university students) but this time, a larger number of domain satisfactions was assessed. The 11 domain satisfactions included: health, finances, family relations, paid employment, friendships, housing, living partner, recreation activity, religion, transportation and education. In addition, have-want discrepancies from Michalos' (1985) multiple discrepancies

theory (MDT) were included as exogenous instrument variables for the domain satisfactions and global SWB in the SEM procedure. Self-esteem was also assessed to serve as a second exogenous instrument variable for SWB.

Multiple discrepancies theory is an example of what has been referred to in this paper as micro-process theories (p. 5). Discrepancies are cognitive comparisons that people make between aspects of their lives and a host of relative standards. It is believed that SWB is determined by the sum of these discrepancies in life domains. Thus, it is a linear additive BU model of SWB, as are most. But the micro-process described is not designed to address causality per se. Rather, it is a cognitive mediating process between objective life circumstances and subjective satisfaction in life domains or life in general. It is doubtful that these discrepancies fulfil all the criteria for serving as exogenous instruments in SEM. For example, the requirement that they cannot be caused by SWB is certainly unknown.

Bearing in mind the questionable assumptions of the analysis, results of the SEM procedure revealed both BU and TD linkages for 8 of the 11 life domains and only TD influences for the remaining 3 life domains. Comparison of the magnitude of the standardized structural parameter

estimates for TD and BU effects, however, point to a uniformly stronger TD influence for all 11 domains. All TD gammas are roughly twice as large as those for BU effects, indicating greater support for a TD model of SWB.

Summary. Three studies which directly compared BU, TD, or BD links between SWB and domain satisfactions were reviewed. Given the aforementioned difficulty with inferring reciprocal causation and with fulfilling SEM assumptions, results should be interpreted as quite tentative and preliminary. With this in mind, the results of all three studies do point to the predominant causal direction as one of SWB determining, rather than being determined by, domain satisfactions.

Hypotheses

This study will investigate the relative merits of the TD and BU models of SWB using measures of some of the major correlates of SWB: domain satisfactions; objective life domain circumstances; personal dispositions; and general environmental influences. A longitudinal design is used to evaluate the stability of happiness and a number of specific cross-phase predictions which have been designed to distinguish between BU and TD model predictions. It is

expected that the results of both Stones and Kozma (1986b) and Underhill and Stones (in press) will be replicated. In particular, the following hypotheses are advanced.

1. Any significant within-phase intercorrelations between lower-order variables will be substantially reduced once the effects of SWB at that phase are removed, thus indicating some TD influence. Lower-order variables will include personal dispositions, general stress, and domain satisfactions in an effort to replicate Underhill & Stones (in press) findings.

It is unlikely that all significant within-phase intercorrelations will reduce to zero or to nonsignificance because, in addition to SWB, domain satisfactions and other lower-order variables are likely to be multiply-determined by stress in several life domains (Headey et al., 1985; Krause, 1991; Underhill & Stones, in press). Thus, some level of correlation may continue to exist between satisfaction in two separate life domains after the effects of SWB are removed because of the dual influence of one life domain stress on the two domain satisfactions.

2.(a) The temporal stability of SWB will be evaluated over time through correlational analysis across phases of

the study. It is expected that stability coefficients for both SWB and domain satisfaction will be moderate. Temporal stability is a necessary condition of a propensity as formulated by Stones and Kozma (1986a).

2.(b) Furthermore, prior happiness is expected to predict later happiness when the effects of prior and current domain satisfactions are removed. This stability coefficient should not be substantially lower than the zero-order retest correlation, indicating that SWB is not due to the stability of domain satisfactions.

3.(a) Any significant cross-phase correlations between prior domain satisfactions and later SWB will be due to the effects of prior SWB and not to the stability of domain satisfactions, as predicted by the BU model. This will be tested by partialling out the effect of prior SWB with the expectation that such correlations will reduce to nonsignificance.

3.(b) Any significant cross-phase correlations between prior SWB and later domain satisfactions will persist when the effect of prior domain satisfactions is removed. Recall that this result is expected because of the hypothesized

existence of two TD indirect pathways from prior SWB to later domain satisfactions.

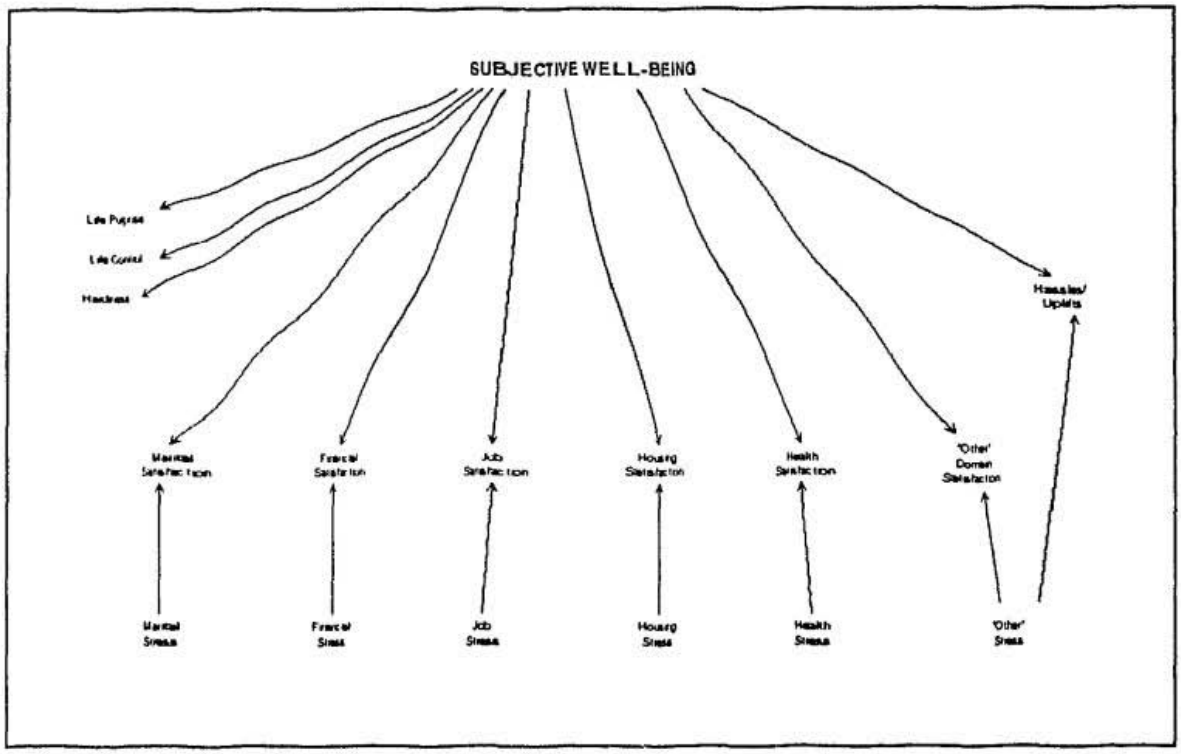
4. Domain satisfactions will be predicted by a combination of (1) within-phase domain-specific stress and general stress, and (2) prior and current SWB. Subjective well-being will still contribute unique variance in domain satisfaction scores above the effects of dispositional variables. Furthermore, prior SWB will predict later domain satisfaction scores, even when prior domain satisfaction scores are included in the multiple regression predictor array.

This last prediction is essentially equivalent to hypothesis 3b. It will be tested once more with multiple regression procedures in addition to the partial correlation analyses described above. It is important to include prior domain satisfaction scores as potential predictors. If they are not included, one cannot be certain that any significant relationships found between prior SWB and later domain satisfactions would be the result of the common influence of prior domain satisfactions not included in the regression.

5. Figure 3 outlines the proposed structural model representing a top-down theoretical account of the data

Figure 3

Proposed Top-down Structural Model

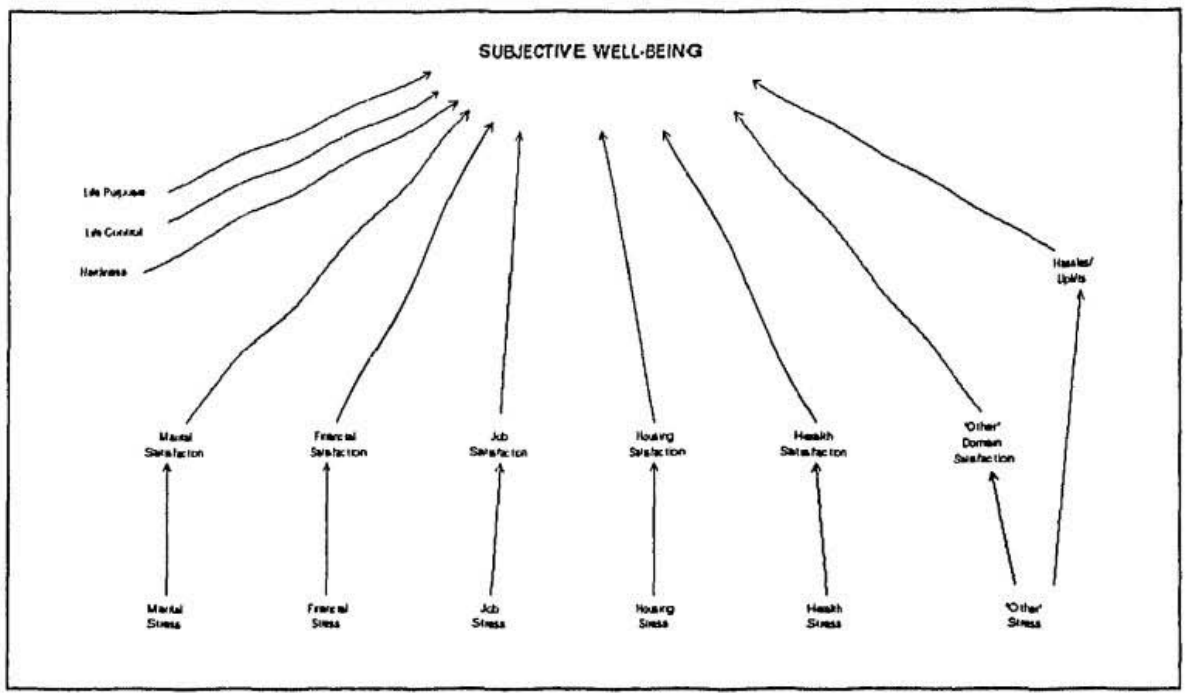


while Figure 4 shows a proposed bottom-up interpretation. Of note is the fact that domain satisfactions are determined by both SWB and objective domain circumstances in the top-down model. For purposes of clarity and because the focus of hypothesis testing will be on the SWB - domain satisfaction relationships, only the stress-satisfaction relationships for the same life domains have been illustrated. Cross-domain stress-satisfaction linkages have been omitted.

It is hypothesized that the TD model will fit the current data significantly better than the BU model. This will be tested using LISREL structural equation modeling procedures. Several alternative models, including the bi-directional type, will also be compared to increase the number of alternatives in the model-fitting process.

Figure 4

Proposed Bottom-up Structural Model



Method

Subjects

The convenience sample was drawn from a number of organizations in the capital city of Newfoundland, Canada as part of a longitudinal study on aging. The local organizations which participated in the study were:

(1) Canadian Security and Intelligence Service(CSIS)
(2) medium security penitentiary
(3) electrical utility company
(4) Royal Canadian Mounted Police (RCMP)
(5) Royal Newfoundland Constabulary
(6) Memorial University

In each case, the employer provided the names and business numbers of their employees. Employees included both administrative staff and front-line workers. In addition, membership lists from a variety of local service organizations for seniors were provided by the respective group organizers. A total of 407 subjects completed three sets of questionnaires and related procedures between 1988

and 1994 as part of the larger investigation. Other procedures involved tests of cholesterol and blood pressure.

The present author was not involved in the actual data collection, which spanned over four years. Thus, the present study can be considered an archival analysis. All subjects who agreed to participate and who completed three sets of questionnaires were included in the present sample.

Measures

Subjective well-being. Global SWB was assessed by two measures in order to assess the latent global SWB variable in subsequent LISREL structural equation modeling procedures; the 24-item multidimensional Memorial University of Newfoundland Scale of Happiness (MUNSH; Kozma & Stones, 1980) and the five-item unidimensional Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; Larsen, Diener, & Emmons, 1985)(see Appendix A). Although the MUNSH is one of the most comprehensive measures of SWB available, it lacks a purely cognitive life satisfaction component. Therefore, the SWLS was also used to more fully assess the multidimensional nature of SWB. Given that both measures have been shown to be adequate indicators of the higher-order global SWB construct (Kozma & Stones, 1980;

Larsen, Diener, & Emmons, 1985), it is expected that both measures will function similarly in the following partial-correlation analyses.

The Munsh comprises both long- and short-term affective and life experience happiness components. It has repeatedly shown high internal consistency and moderate stability. Coefficient alpha for the scale has been reported as .86 and an 18-month stability coefficient as .71 (Kozma & Stones, 1980; Stones & Kozma, 1986a). Although designed to measure SWB in the elderly, the scale has since shown comparable validity across the adult years (Kozma & Stones, 1983b; Kozma, Stones, & Kazarian, 1985).

The Satisfaction with Life Scale (SWLS) is a purer measure of the long-term SWB component and therefore, may be a better estimate of the characteristic SWB that is the focus of this study (Diener, Emmons, Larsen, & Griffin, 1985; Larsen, Diener, & Emmons, 1985). It contains five statements rated on a seven-point Likert scale indicating degree of agreement. Internal consistency (alpha = .87) and temporal stability (2-month r = .82) for the scale are high (Diener et al., 1985).

Domain satisfactions. The six domain satisfactions were assessed by single-item measures and include the following domains: marital, financial, occupational/job, housing, health, and a domain to assess any remaining aspects of life, labelled "other" (see Appendix B). Responses were recorded on a seven-point Likert scale ranging from "very dissatisfied" to "very satisfied."

Personal Dispositions. Three exemplars of personal dispositions included hardiness, purpose, and control. Copies of the measures used to assess these constructs can be found in Appendix C. Hardiness was chosen as a representative disposition because of its consistent association with stress and general well-being. Hardiness was assessed by the 20-item Hardiness Scale (McNeil et al., 1986). Fourteen items were answered on a four-point Likert scale indicating degree of agreement with statements such as "Most of life is wasted in meaningless activity." The remaining six items involved a forced-choice format involving the choice of the attitude more characteristic of the respondent. For example, one pair of attitudes contained in the forced-choice portion of the scale is "What happens to me is my own doing" versus "Sometimes I feel that I don't have enough control over the direction my life is taking."

The remaining two representative measures of personal dispositions were utilized to further assess the nature of these more recent dispositional constructs' association with SWB. Two subscales of the Life Attitude Profile (LAP: Reker & Peacock, 1981) served as measures of purpose and control. The Life Purpose (LP) dimension subscale consists of nine items measured on a seven-point Likert scale to reflect zest for life, fulfilment, and satisfaction. The Life Control (LC) dimension is a six-item subscale which measures the freedom to make all life choices, the exercise of personal responsibility, and the perception of internal control of life events. It is also measured on a seven-point Likert scale.

Reker et al. (1987) report respective coefficient alphas of .83 and .67 for LP and LC. One-month stability coefficients are reported to be .83 and .61 for the LP and LC subscales, respectively. In the present study, the response format was changed to a three point scale and one item from the LP subscale was removed since it was shown to have an inadequate factor loading (< .5) on the LP dimension in validation analyses (Reker, 1991).

Environmental Influences. Two main types of environmental influences were assessed: general hassles/uplifts and domain-specific stressors (see Appendix D). Hassles and uplifts were assessed by the Short-Form Hassles and Uplifts Scale (Krachun, 1990). Items for this scale were selected from the revised 53-item Hassles and Uplifts Scale (Delongis, Folkman, & Lazarus, 1988) based on their inter-item correlations with the full scale. Ten hassles and 12 uplifts which could have occurred in the previous 30 days were listed. Responses could range from "haven't had" to "had" in three degrees of intensity: somewhat, moderately, or extremely strong. Domain-specific environmental influences were assessed by single-item questions for each of the six life domains. Subjects indicated the degree of stress that they experienced in each domain on a seven-point bipolar scale labelled from "little/no stress" to "a large amount of stress."

Procedure

Potential subjects from employee and membership lists were contacted by telephone for consent to participate in the study. Those who agreed to be involved in the research were mailed the set of questionnaires with stamped envelopes for returning by mail. They were paid $5.00 for each set

returned. On average, questionnaires were completed every 24 months over a period of four years, resulting in three waves of longitudinal data.

Results

Descriptive Statistics

Four hundred seven completed questionnaires were available for the three time frames of the study. The initial refusal rate for participation in the study was 20%. Out of 600 subjects who initially agreed to participate, one-hundred ten subjects dropped out by phase 2 and a further eighty-two subjects by phase 3.

Of the final sample, 62% were male and 38% were female. The average age was 44 years at Time 1 and 48 years at Time 3. Ages ranged from the early to advanced adult years (range = 20 - 86 years). Their education spanned the primary grades to graduate training, with 53% to 60% of respondents evidencing some post-secondary education over the four-year period of the study.

At any one phase, 75% to 81% of respondents were married. Income measures were not obtained but it is estimated that the sample might be of higher income than the average income for Newfoundland, given that 87% of the respondents were regularly employed. Descriptive statistics for all study variables are presented in Table 2.

Table 2

Descriptive Statistics of Study Variables
(Phase 1-3)

VARIABLE	MEAN	STANDARD DEVIATION	n	RANGE	# OF ITEMS
1. AGE					
AGE1	44.469	16.328	407	(20-81)	1
AGE2	46.455	16.388	407	(22-86)	1
AGE3	48.280	16.275	407	(24-86)	1
2. EDUCATION					
EDUCAT1	-----	----	402	(1-6)	1
EDUCAT2	-----	----	392	(1-6)	1
EDUCAT3	-----	----	398	(1-6)	1
3. SEX					
SEX1	-----	----	407	(1-2)	1
SEX2	-----	----	407	(1-2)	1
SEX3	-----	----	407	(1-2)	1
4. MARITAL STATUS					
MSTAT1	-----	----	405	(1-6)	1
MSTAT2	-----	----	405	(1-6)	1
MSTAT3	-----	----	407	(1-6)	1
5. MARITAL STATUS SATISFACTION					
MARSAT1	5.832	1.493	404	(1-7)	1
MARSAT2	5.849	1.464	404	(1-7)	1
MARSAT3	5.928	1.413	402	(1-7)	1
6. FINANCIAL STATUS SATISFACTION					
FINSAT1	5.135	1.470	406	(1-7)	1
FINSAT2	5.169	1.339	406	(1-7)	1
FINSAT3	5.167	1.372	407	(1-7)	1

Table 2

Descriptive Statistics of Study Variables
(Phase 1-3)

VARIABLE	MEAN	STANDARD DEVIATION	n	RANGE	# OF ITEMS
7. OCCUPATIONAL (JOB) SATISFACTION					
OCSAT1	5.503	1.374	354	(1-7)	1
OCSAT2	5.473	1.287	354	(1-7)	1
OCSAT3	5.458	1.315	325	(1-7)	1
8. HOUSING SATISFACTION					
HOUSAT1	5.748	1.381	405	(1-7)	1
HOUSAT2	5.869	1.159	405	(1-7)	1
HOUSAT3	5.958	1.123	407	(1-7)	1
9. HEALTH SATISFACTION					
HLTHSAT1	5.685	1.400	406	(1-7)	1
HLTHSAT2	5.601	1.371	406	(1-7)	1
HLTHSAT3	5.474	1.434	405	(1-7)	1
10. SATISFACTION WITH OTHER ASPECTS OF LIFE					
OTHSAT1	5.672	1.112	405	(1-7)	1
OTHSAT2	5.678	1.043	405	(1-7)	1
OTHSAT3	5.625	1.100	403	(1-7)	1
11. MARITAL STATUS STRESS					
MARSTR1	2.606	1.750	404	(1-7)	1
MARSTR2	2.766	1.868	404	(1-7)	1
MARSTR3	2.644	1.784	402	(1-7)	1
12. FINANCIAL STATUS STRESS					
FINSTR1	2.796	1.659	406	(1-7)	1
FINSTR2	3.000	1.667	406	(1-7)	1
FINSTR3	2.941	1.702	405	(1-7)	1

Table 2

Descriptive Statistics of Study Variables
(Phase 1-3)

VARIABLE	MEAN	STANDARD DEVIATION	n	RANGE	# OF ITEMS
13. OCCUPATIONAL (JOB) STRESS					
OCSTR1	3.494	1.821	354	(1-7)	1
OCSTR2	3.491	1.844	354	(1-7)	1
OCSTR3	3.562	1.888	329	(1-7)	1
14. HOUSING STRESS					
HOUSTR1	2.261	1.157	406	(1-7)	1
HOUSTR2	2.359	1.560	406	(1-7)	1
HOUSTR3	2.291	1.639	405	(1-7)	1
15. HEALTH STRESS					
HLTHSTR1	2.473	1.647	406	(1-7)	1
HLTHSTR2	2.635	1.710	406	(1-7)	1
HLTHSTR3	2.750	1.761	404	(1-7)	1
16. STRESS FROM OTHER ASPECTS OF LIFE					
OTHSTR1	2.646	1.439	404	(1-7)	1
OTHSTR2	2.762	1.467	404	(1-7)	1
OTHSTR3	2.719	1.541	398	(1-7)	1
17. MEMORIAL UNIVERSITY SCALE OF HAPPINESS					
MUNSHT1	15.651	8.012	407	(-18-24)	24
MUNSHT2	16.523	8.025	407	(-18-24)	24
MUNSHT3	15.734	6.717	402	(-16-22)	24

Table 2

Descriptive Statistics of Study Variables
(Phase 1-3)

VARIABLE	MEAN	STANDARD DEVIATION	n	RANGE	# OF ITEMS
18. SATISFACTION WITH LIFE SCALE					
SWLST1	26.064	5.611	407	(7-35)	5
SWLST2	26.227	5.669	406	(6-35)	5
SWLST3	26.620	5.290	405	(7-35)	5
19. LIFE PURPOSE					
PURPOST1	11.292	2.825	404	(0-14)	9
PURPOST2	11.263	2.860	395	(1-14)	9
PURPOST3	12.772	3.202	395	(2-16)	9
20. LIFE CONTROL					
CONTRLT1	10.144	2.380	404	(2-12)	6
CONTRLT2	9.975	2.411	406	(2-12)	6
CONTRLT3	9.935	2.425	399	(2-12)	6
21. HARDINESS					
HARDT1	16.076	5.644	406	(1-40)	20
HARDT2	14.862	5.261	407	(2-34)	20
HARDT3	14.590	5.004	405	(1-32)	20
22. HASSLES					
HASSLT1	17.143	5.102	405	(10-37)	10
HASSLT2	16.415	4.815	386	(10-35)	10
HASSLT3	16.047	4.942	403	(1-34)	10
23. UPLIFTS					
UPLIFTT1	32.499	5.829	381	(18-46)	12
UPLIFTT2	30.983	6.728	352	(12-48)	12
UPLIFTT3	31.491	6.467	403	(12-48)	12

Hypothesis 1

Recall that hypothesis 1 was stated as follows: Any significant within-phase intercorrelations between lower-order variables will be substantially reduced once the effects of SWB at that phase are removed. Lower-order variables related to personal dispositions, general stress, and domain satisfactions were included in an effort to replicate Underhill and Stones (in press) findings.

The total intercorrelation matrix for each of the three waves of the study is presented in Appendices E to G. With the exception of some correlations involving uplifts, hassles, hardiness, or control, all within-phase intercorrelations between lower-order variables are highly significant ($p < .001$). Because a large number of correlations were employed in testing hypotheses, a significance level of .001 was utilized to lessen the chance of Type I errors in interpreting all zero-order and partial correlations.

Tables 3 to 8 depict a comparison of the within-phase zero-order correlations and their corresponding partial correlations when SWB is controlled. First, intercorrelations between domain satisfactions will be

reported, followed by the dispositional and general stress lower-order variables.

Lower-order Variables: Domain Satisfactions. Of 15 significant zero-order intercorrelations between domain satisfactions at each phase of the study, all were substantially reduced when current MUNSH and SWLS scores were partialled out (Tables 3 to 5). Recall that subjective well-being was controlled by partialling-out both MUNSH and SWLS scores to fully reflect the global SWB construct. With respect to intercorrelations between domain satisfactions, hypothesis 1 received overwhelming support. The reduction in intercorrelations ranged from 18% to 99%, with an average reduction of 50% when the effects of SWB were removed.

Interestingly, four correlations reduced to nonsignificance at each of the three phases: *marsat-ocsat; hlthsat-marsat; hlthsat-finsat; hlthsat-housat*. These relationships involve top-down influence from SWB to each variable.

Lower-order Variables: Dispositional and General Stress. Out of 32 significant Time 1 intercorrelations, 30 were substantially reduced when Time 1 MUNSH and SWLS scores were partialled out (Table 6). The remaining two

Table 3

Time 1 Pairwise Zero-order Intercorrelations Between Domain Satisfactions Followed by Partial Correlations With MUNSH, SWLS, and Both Partialled Out

	MARSAT1	FINSAT1	OCSAT1	HOUSAT1	HLTHSAT1
FINSAT1	.3993** .2613** .2371** .2159**	--------			
OCSAT1	.2204** .0582 * .0247 .0018	.3932** .2865** .2427** .2325**	--------		
HOUSAT1	.3809** .2564** .2146** .2051**	.5234** .4416** .3968** .3922**	.3631** .2633** .2058** .2002**	--------	
HLTHSAT 1	.2778** .1151+ .1137+ .0779	.3027** .1699* .1461* .1265+	.3474** .2349** .2106** .1964**	.3028** .1851** .1470* .1374*	--------
OTHSAT1	.4285** .2300** .2078** .1655**	.4281** .2670** .2102** .1873**	.4148** .2693** .2106** .1929**	.5051** .3902** .3209** .3143**	.5058** .3733** .3601** .3336**

+ p < .05; * p < .01; ** p <= .001

Table 4

Time 2 Pairwise Zero-order Intercorrelations Between Domain Satisfactions Followed by Partial Correlations With MUNSH, SWLS, and Both Partialled Out

	MARSAT2	FINSAT2	OCSAT2	HOUSAT2	HLTHSAT2
FINSAT2	.4383** .3201** .2900** .2730**	------			
OCSAT2	.3273** .1498* .1475* .1033	.3590** .2453** .2194** .2030**	-------		
HOUSAT2	.5088** .4320** .4045** .3979**	.5112** .4517** .4229** .4178**	.3923** .3055** .2814** .2714**	-------	
HLTHSAT2	.3855** .1971** .2127** .1582*	.2699** .1219+ .1030+ .0777	.3824** .2303** .2404** .1996**	.2793** .1613** .1411* .1245+	-------
OTHSAT2	.5182** .3470** .3513** .3028**	.5137** .4087** .3812** .3674**	.4385** .2815** .2833** .2422**	.3726** .2616** .2304** .2169**	.5443** .3950** .4120** .3661**

+ p < .05; * p <= .01; ** p <= .001

Table 5

Time 3 Pairwise Zero-order Intercorrelations Between Domain Satisfactions Followed by Partial Correlations With MUNSH, SWLS, and Both Partialled Out

	MARSAT3	FINSAT3	OCSAT3	HOUSAT3	HLTHSAT3
FINSAT3	.3734** .2764** .1508* .1492*	------			
OCSAT3	.3342** .2164** .1444* .1365+	.3639** .2418** .1531* .1494*	-------		
HOUSAT3	.4147** .3336** .2339** .2324**	.5574** .4916** .3983** .3976**	.3875** .2836** .2103** .2076**	-------	
HLTHSAT3	.2206** .0548 .0238 .0057	.2983** .1372* .0935 .0871	.3287** .1486* .1695* .1171+	.3051** .1648** .1274+ .1228+	-------
OTHSAT3	.4130** .2847** .2025** .1948**	.4771** .3529** .2551** .2553**	.4251** .2604** .2332** .1939**	.4437** .3289** .2409** .2404**	.5219** .3525** .3855** .3282**

+ p < .05; * p < .01; ** p <= .001

Table 6

Time 1 Pairwise Zero-order Intercorrelations Between Lower-order Study Variables Followed by Partial Correlations With MUNSH1, SWLS1, and Both Scores Respectively Controlled

	purpostt1	contrlt1	hardt1	hasslt1	upliftt1
contrlt1	.4672** .2735** .2839** .2318**	--------	--------	--------	--------
hardt1	-.2141** -.0158 -.1138+ -.0191	-.1150+ .0184 -.0266 .0165	--------	--------	--------
hasslt1	-.2929** .1212+ -.0418 .1463*	-.2939** -.0747 -.1252+ -.0691	.4351** .3339** .3909** .3359**	--------	--------
upliftt1	.3554** .2897** .2803** .2724**	-.2056** .1283+ .1203+ .1076+	-.1158+ -.0531 -.0716 -.0546	-.0400 .0998 .0690 .1095+	--------
marsat1	.3615** .0823 .1188+ .0295	.2481** .0626 .0562 .0164	-.1696** -.0320 -.0842 -.0351	-.2827** -.0318 -.0996+ -.0151	.0861 -.0168 -.0229 -.0419
finsat1	.3165** .0727 .0586 .0054	.2763** .1260+ .0936 .0719	-.2187** -.1088+ -.1415* -.1161+	-.3826** -.2072** -.2267** -.1936**	.0846 -.0031 -.0235 -.0342
ocsat1	.4008** .2232** .1959** .1687*	.2350** .0915 .0552 .0370	-.2744** -.1815** -.2087** -.1909**	-.2412** -.0441 -.0628 -.0243	.1599* .0877 .0693 .0615

+ p < .05; * p < .01; ** p <= .001

Table 6 - continued

Time 1 Pairwise Zero-order Intercorrelations Between Lower-order Study Variables Followed by Partial Correlations With MUNSH1, SWLS1, and Both Scores Respectively Controlled

	purpostt1	contrlt1	hardt1	hasslt1	upliftt1
housat1	.3193** .1122+ .0641 .0391	.2303** .0889 .0369 .0249	-.1483* -.0410 -.0608 -.0464	-.3072** -.1342* -.1332* -.1160+	.0936 .0161 -.0126 -.0132
hlthsat1	.3652** .1500* .1710** .1085+	.3175** .1789** .1721** .1444*	-.1716** -.0571 -.0983+ -.0601	-.2966** -.0989+ -.1468* -.0860	.2322** .1633** .1577* .1462*
othsat1	.5301** .2588** .2598** .1847**	.3521** .1520* .1182+ .0794	-.2329** -.0777 -.1362* -.0878	-.3569** -.0655 -.1249+ -.0392	.2189** .1208+ .1029+ .0869

+ p < .05; * p < .01; ** p <= .001

intercorrelations involve a change of sign between the zero-order and partial correlations. The sign change would appear to indicate some type of interaction between SWB and the respective variables. The complexity of these two interactive relationships currently precludes analysis of the degree of reduction in the strength of their respective zero-order correlations. Of the 30 zero-order correlations which did not change sign, the average reduction was 68% of the zero-order correlation (range = 23% to 98%).

For Time 2, 2 of 35 significant zero-order intercorrelations involved a similar sign change when SWB was partialled out. Of the remaining 33 significant intercorrelations, all were substantially reduced when Time 2 MUNSH and SWLS scores were partialled out (Table 7). The average reduction was 58% of the original zero-order correlation (range = 23% to 92%). Table 8 shows that seven zero-order correlations did not reach significance and two that were significant involved a subsequent sign change following partial-correlation procedures at Time 3.

All of the remaining 31 significant intercorrelations at Time 3 were substantially reduced after Time 3 MUNSH and

Table 7

Time 2 pairwise zero-order intercorrelations between lower-order study variables, followed by partial correlations with MUNSH1, SWLS1, and both scores respectively controlled

	purpostt 2	contrlt2	hardt2	hasslt2	upliftt2
contrl t2	.4906** .2735** .3796** .2726**	--------	--------	--------	--------
hardt2	-.3111** -.1118+ -.2212** -.1180+	-.1701** -.0262 -.1023+ -.0262	--------	--------	--------
hasslt2	-.4719** -.0855 -.2337** -.0431	-.2859** -.0304 -.1490* -.0238	.4359** .3152** .3828** .3182**	--------	--------
upliftt 2	.3340** .2364** .2280** .2079**	.2342** .1449* .1627* .1399*	-.0763 .0047 -.0195 .0048	-.0554 .1129+ .0811 .1328+	--------
marsat2	.4899** .2196** .2493** .1506*	.1719** -.0652 .0048 -.0802	-.1958** -.0374 -.0981+ -.0384	-.3877** -.1330* -.1925** -.1025+	.1222+ .0014 -.0064 -.0317
finsat2	.3873** .1988** .1621** .1254+	.1613** .0008 .0226 -.0124	-.2801** -.1827** -.2090** -.1889**	-.5370** -.4308** -.4193** -.4129**	.0889 .0017 -.0216 -.0325
ocsat2	.4688** .2648** .2794** .2134**	.2479** .0742 .1233+ .0655	-.2759** -.1596* -.2040** -.1630*	-.3787** -.1778** -.2186** -.1540*	.2678** .1883** .1821** .1670*
housat2	.3559** .2063** .1652** .1439*	.1695** .0389 .0528 .0285	-.2508** -.1665** -.1852** -.1708**	-.3729** -.2504** -.2401** -.2270**	.0590 -.0164 -.0384 -.0468
hlthsat 2	.4980** .2606** .3083** .2154**	.3173** .1356* .1997** .1288**	-.1807** -.0295 -.0925 -.0299	-.3921** -.1594* -.2270** -.1374*	.1994** .0993 .0998 .0777
othsat2	.5734** .3306** .3638** .2715**	.3134** .1030+ .1732** .0937	-.2607** -.1074+ -.1724** -.1108+	-.4855** -.2539** -.3141** -.2285**	.2471** .1446* .1319* .1172+

+ p < .05; * p < .01; ** p <= .001

Table 8

Time 3 Pairwise Zero-order Intercorrelations Between Lower-order Study Variables Followed by Partial Correlations With MUNSH1, SWLS1, and Both Scores Respectively Controlled

	purpostt 3	contrlt3	hardt3	hasslt3	upliftt3
contrl t3	.5086** .2853** .3528** .2535**	--------	--------	--------	--------
hardt3	-.2417** -.0828 -.1206+ -.0587	-.0862 .0483 .0208 .0660	--------	--------	--------
hasslt3	-.4094** -.0693 -.1632** -.0093	-.3400** -.1157+ -.1665** -.0814	-.3576** .2634** .2792** .2487**	--------	--------
uplift t 3	.3456** .2003** .2615** .1928**	.2859** .1702** .2109** .1636**	-.0066 .0806 .0555 .0866	-.0575 .1285* .0712 .1450*	--------
marsat3	.3175** .1094+ .0413 .0159	.1945** .0317 -.0117 -.0294	-.0948 .0000 .0292 .0378	-.3080** -.1501* -.0908 -.0768	.1239+ .0193 .0108 -.0004
finsat3	.3514** .1361* .0394 .0261	.2447** .0796 .0200 .0106	-.2520** -.1690** -.1443* -.1409*	-.5208** -.4071** -.3452** -.3530**	.0869 -.0308 -.0519 -.0599
ocsat3	.4559** .2480** .2546** .1909**	.3032** .1263+ .1357+ .0868	-.2624** -.1700* -.1727* -.1500*	-.4025** -.2283** -.2270** -.1797**	.2400** .1293+ .1517* .1191+
housat3	.3497** .1667** .0825 .0751	.2494** .1042+ .0546 .0465	-.2310** -.1537* -.1301* -.1265+	-.4326** -.3136** -.2516** -.2540**	.1521* .0542 .0424 .0363
hlthsat 3	.4070** .1045+ .2161** .0703	.3495** .1485* .2104** .1284+	-.1632** -.0361 -.0679 -.0226	-.3696** -.1417* -.2064** -.1142+	.2352** .1034+ .1541* .0967
othsat3	.5401** .2887** .3170** .2233**	.3682** .1575* .1805** .1124+	-.2457** -.1278+ -.1357* -.1022+	-.5187** -.3299** -.3405** -.2799**	.2712** .1388* .1736** .1280+

+ p < .05; * p < .01; ** p <= .001

SWLS scores were controlled. The average reduction was 64% with a range of 32% to 98%. As was the case in the analysis of domain satisfaction intercorrelations, hypothesis 1 has received overwhelming support based on intercorrelations between personal disposition and general stress variables.

Summary. On average, the zero-order intercorrelations of lower-order variables were reduced by at least half when the effects of current SWB were removed. This can be considered a substantial reduction, indicating top-down effects from SWB to domain satisfactions, personal dispositions and general stress variables. This finding supports Underhill and Stones' (in press) results which indicated top-down effects on dispositional (personal meaning and optimism) variables, general stress (hassles), and health satisfaction.

Hypothesis 2a

If SWB functions as a propensity, one should expect moderate temporal stability in the construct. The zero-order retest correlations for the two measures of SWB are listed in Tables 9a and 9b. With a retest interval of four years, both measures of SWB were highly stable with a stability coefficient of .54 for the MUNSH and .64 for the SWLS (both

Table 9a

Zero-order Stability Coefficients of the MUNSH Subjective well-being Measure for the Three Waves of the Study Followed by SWB Stability Coefficients When Current and 2- to 4-year-prior Domain Satisfactions are Controlled by Partial Correlation (Hypotheses 2a & 2b)

	MUNSHT2		MUNSHT3	
	ZERO-ORDER STABILITY	PARTIAL SATS T1 AND T2	ZERO-ORDER STABILITY	PARTIAL ALL PRIOR AND CURRENT SATS
MUNSHT1	.5675**	.3470**	.5402**	.3345**
MUNSHT2	----------	----------	.6009**	.4356**

** p < .001

Table 9b

Zero-order Stability Coefficients of the SWLS Subjective well-being Measure for the Three Waves of the Study Followed by SWB Stability Coefficients When Current and 2- to 4-year-prior Domain Satisfactions are Controlled by Partial Correlation (Hypothesis 2a & 2b)

	SWLST2		SWLST3	
	ZERO-ORDER STABILITY	PARTIAL SATS T1 AND T2	ZERO-ORDER STABILITY	PARTIAL ALL PRIOR AND CURRENT SATS
SWLST1	.6112**	.3988**	.6373**	.3643**
SWLST2	----------	----------	.6630**	.4894**

** p < .001

$p < .001$). As predicted, for Times 1 to 2, 2 to 3, and 1 to 3, all stability coefficients are moderate and highly significant ($p < .001$). Supporting previous research, all domain satisfactions were also found to be moderately stable, with highly significant stability coefficients ($p < .001$; Table 10).

Hypothesis 2b

The stability of SWB is not due to the stability of domain satisfactions. Thus, prior happiness is still expected to predict later happiness when the effects of prior and current domain satisfactions are removed through partial correlation procedures. The results of such analyses are shown in Tables 9a and 9b. Although the zero-order correlations are reduced when the stability of domain satisfactions are partialled out, all partial stability coefficients retain their significance ($p < .001$). Even the stability coefficient between Time 1 and Time 3 remains significant when Times 1 to 3 domain satisfactions are removed. Again, this finding supports a top-down model of SWB because the long-term stability of SWB was not found to be due to the stability of domain satisfactions.

Table 10

Stability Coefficients of Six Domain Satisfactions for Three Waves of the Study

	MARSAT 1	MARSAT 2	FINSAT 1	FINSAT 2	.SAT	OCSAT 2
MARSA T2	.6140*	-----	-----	-----	-----	-----
MARSA T3	.5850*	.6190*	-----	-----	-----	-----
FINSA T2	-----	-----	.5617*	-----	-----	-----
FINSA T3	-----	-----	.5024*	.5827*	-----	-----
OCSAT 2	-----	-----	-----	-----	.5285*	-----
OCSAT 3	-----	-----	-----	-----	.5261*	.5538 *

	HOUSAT 1	HOUSAT 2	HLTSAT 1	HLTSAT 2	OTHSAT 1	OTHSA T2
HOUSA T2	.4186*	-----	-----	-----	-----	-----
HOUSA T3	.3768*	.5189*	-----	-----	-----	-----
HLTSA T2	------	------	.5364*	------	------	-----
HLTSA T3	------	------	.5137*	.6472*	------	-----
OTHSA T2	------	------	------	------	.4437*	-----
OTHSA T3	------	------	------	------	.4393*	.4336 *

all * p < .001

Hypothesis 3a

This hypothesis states that any significant cross-phase correlations between prior domain satisfactions and later SWB will be due to the effects of prior SWB rather than the stability of domain satisfactions. When prior SWB is partialled out, the relationship between prior domain satisfactions and later SWB was predicted to reduce to nonsignificance. Results indicate that all such zero-order cross-phase correlations were significant ($p < .001$) and all zero-order correlations except *othsat2-swls3* reduced to nonsignificance when all prior MUNSH and SWLS scores were partialled out (Tables 11a-11f; last column). Thirty-five out of 36 cross-phase relationships indicated a top-down influence from SWB to domain satisfactions.

Hypothesis 3b

Based on the top-down formulation of SWB, two indirect pathways are thought to link prior SWB and later domain satisfactions: (1) One pathway goes from prior SWB, through later SWB, and "down" to later domain satisfactions. (2) The second pathway goes from prior SWB "down" to prior domain satisfactions, and then to later domain satisfactions. The bottom-up formulation of SWB states that the relationship

Table 11a

Cross-phase Correlations Between six Time 1 Domain Satisfactions and Time 2 MUNSH Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Prior MUNSH, Prior SWLS, and Both Sets of These Prior Scores

TIME 1-2	MUNSHT2 (Z E R O - ORDER)	MUNSHT2 (PARTIAL MUNSHT1)	MUNSHT2 (PARTIAL SWLS1)	MUNSHT2 (PARTIAL MUNSHT1 & SWLST1)
MARSAT1	.3569**	.1279*	.1769**	.1040+
FINSAT1	.2250**	-.0054	.0104	-.0409
OCSAT1	.1942**	-.0216	-.0132	-.0567
HOUSAT1	.2077**	.0009	-.0106	-.0392
HLTSAT1	.2911**	.0874	.1263+	.0658
OTHSAT1	.4116**	.1383*	.1766**	.0999+

+ p <= .05; * p <= .01; ** p <= .001

Table 11b

Cross-phase Correlations Between six Time 1 Domain Satisfactions and Time 2 SWLS Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Prior MUNSH, Prior SWLS, and Both Sets of These Prior Scores

TIME 1-2	SWLST2 (ZERO-ORDER)	SWLST2 (PARTIAL MUNSHT1)	SWLST2 (PARTIAL SWLS1)	SWLST2 (PARTIAL MUNSHT1 & SWLST1)
MARSAT1	.3984**	.2167**	.1644**	.1416*
FINSAT1	.2779**	.0961	-.0038	-.0200
OCSAT1	.2742**	.1102+	.0130	.0001
HOUSAT1	.2380**	.0690	-.0589	-.0681
HLTSAT1	.3002**	.1283*	.0765	.0559
OTHSAT1	.4392**	.2227**	.1056+	.0797

+ p <= .05; * p <= .01; ** p <= .001

Table 11c

Cross-phase Correlations Between six Time 1 Domain Satisfactions and Time 3 MUNSH Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Time 1 MUNSH, Time 1 SWLS, and Both Sets of These Prior Scores

TIME 1-3	MUNSHT3 (ZERO-ORDER)	MUNSHT3 (PARTIAL MUNSHT1)	MUNSHT3 (PARTIAL SWLS1)	MUNSHT3 (PARTIAL MUNSHT1 & SWLST1)
MARSAT1	.2734**	.0301	.0764	.0009
FINSAT1	.1936**	-.0317	-.0226	-.0713
OCSAT1	.2469**	.0593	.0591	.0252
HOUSAT1	.1966**	-.0006	-.0177	-.0439
HLTSAT1	.3305**	.1505*	.1796**	.1288*
OTHSAT1	.3909**	.1275+	.1561*	.0844

+ p <= .05; * p <= .01; ** p <= .001

Table 11d

Cross-phase Correlations Between six Time 1 Domain Satisfactions and Time 3 SWLS Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Time 1 MUNSH, Time 1 SWLS, and Both Sets of These Prior Scores

TIME 1-3	SWLST3 (ZERO-ORDER)	SWLST3 (PARTIAL MUNSHT1)	SWLST3 (PARTIAL SWLST1)	SWLST3 (PARTIAL MUNSHT1 & SWLST1)
MARSAT1	.3812**	.1983**	.1260+	.1118+
FINSAT1	.3607**	.2038**	.0995+	.0905
OCSAT1	.3688**	.2305**	.1334+	.1263+
HOUSAT1	.3005**	.1496*	.0134	.0080
HLTSAT1	.3080**	.1415*	.0748	.0621
OTHSAT1	.4795**	.2838**	.1483*	.1342*

+ <= .05; * p <= .01; ** p <= .001

Table 11e

Cross-phase Correlations Between six Time 2 Domain Satisfactions and Time 3 MUNSH Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Times 1 & 2 MUNSH, Times 1 & 2 SWLS, and Both Sets of These Prior Scores

TIME 2-3	MUNSHT3 (ZERO-ORDER)	MUNSHT3 (PARTIAL MUNSHT1 & MUNSHT2)	MUNSHT3 (PARTIAL SWLST1 & SWLS2)	MUNSHT3 (PARTIAL MUNSHT1, MUNSHT2, SWLST1, & SWLST2)
MARSAT2	.3072**	-.0676	.0506	-.0867
FINSAT2	.2322**	-.0368	.0014	-.0587
OCSAT2	.3215**	.0612	.1178+	.0432
HOUSAT2	.2212**	-.0077	.0262	-.0238
HLTSAT2	.4340**	.1651**	.2558**	.1547*
OTHSAT2	.4113**	.0831	.1799**	.0643

+ <= .05; * p <= .01; ** p <= .001

Table 11f

Cross-phase Correlations Between six Time 2 Domain Satisfactions and Time 3 SWLS Scores. These Zero-order Correlations are Then Compared With Partial Correlations Which Control for Times 1 & 2 MUNSH, Times 1 & 2 SWLS, and Both Sets of These Prior Scores

TIME 2-3	SWLST3 (ZERO-ORDER)	SWLST3 (PARTIAL MUNSHT1 & MUNSHT2)	SWLST3 (PARTIAL SWLST1 & SWLS2)	SWLST3 (PARTIAL MUNSHT1, MUNSHT2, SWLST1,& SWLST2)
MARSAT2	.4197**	.1726**	.0758	.0682
FINSAT2	.4018**	.2370**	.1315*	.1282+
OCSAT2	.3765**	.1889**	.0894	.0842
HOUSAT2	.3626**	.2141**	.1327*	.1299*
HLTSAT2	.3967**	.1676**	.1026+	.0960
OTHSAT2	.5034**	.2890**	.1928**	.1898**

+ <= .05; * p <= .01; ** p <= .001

between prior SWB and later domain satisfactions is spurious, owing to the dual effect of prior domain satisfactions on prior SWB and later domain satisfactions. From a bottom-up perspective, this relationship should reduce to zero when prior domain satisfactions are partialled out.

In contrast, a top-down formulation predicts that the partial correlations would remain significant due to the presence of two pathways from prior SWB to later domain satisfactions. Results of partial correlations to test this hypothesis are presented in Tables 12a to 12c. All zero-order cross-phase correlations are highly significant, even over the four year interval from Time 1 SWB to Time 3 domain satisfactions. Nine out of twelve significant zero-order correlations between Time 1 SWB and Time 2 domain satisfactions persisted after Time 1 domain satisfactions were partialled out (Table 12a). Of interest are the remaining three non-significant partial correlations whose probability levels range from .002 to .003. Thus, though not significant by the present $p < .001$ criteria, these relationships remain quite strong nonetheless.

Results from the analysis of Times 2-3 and 1-3 are not as supportive of top-down effects. As indicated in Table 12b

Table 12a

Cross-phase Correlations Between Time 1 SWB (MUNSH and SWLS) and six Time 2 Domain Satisfactions. These Zero-order Correlations are Then Compared With Partial Correlations Which Partial out the Corresponding Time 1 Domain Satisfaction Scores

TIME 1-2	MUNSHT1		SWLST1	
	ZERO-ORDER	PARTIAL SAT1	ZERO-ORDER	PARTIAL SAT1
MARSAT2	.4564**	.2449**	.4248**	.2009**
FINSAT2	.3459**	.1574*	.3685**	.1505*
OCSAT2	.3302**	.1700*	.3678**	.1814**
HOUSAT2	.3203**	.1983**	.3193**	.1590**
HLTSAT2	.4108**	.2557**	.3818**	.2160**
OTHSAT2	.4423**	.2615**	.4499**	.2523**

+ <= .05; * p <= .01; ** p <= .001

Table 12b

Cross-phase Correlations Between Time 2 SWB (MUNSH and SWLS) and six Time 3 Domain Satisfactions. These Zero-order Correlations are Then Compared With Partial Correlations Which Partial out Corresponding Time 2 Domain Satisfaction Scores

TIME 2-3	MUNSHT2		SWLST2	
	ZERO-ORDER	PARTIAL SAT2	ZERO-ORDER	PARTIAL SAT2
MARSAT3	.3061**	-.0035	.3828**	.1088+
FINSAT3	.3007**	.1200+	.3205**	.1014+
OCSAT3	.3116**	.1043	.3323**	.1294+
HOUSAT3	.2120**	.0658	.2857**	.1204+
HLTSAT3	.4005**	.1421*	.3799**	.1379*
OTHSAT3	.4257**	.2576**	.4045**	.2341**

+ p <= .05; * p <= .01; ** p <= .001

Table 12c

Cross-phase Correlations Between Time 1 SWB (MUNSH and SWLS) and six Time 3 Domain Satisfactions. These Zero-order Correlations are Then Compared With Partial Correlations Which Partial out Corresponding Time 1 & 2 Domain Satisfaction Scores

TIME 1-3	MUNSHT1		SWLST1	
	ZERO-ORDER	PARTIAL SAT1 AND SAT2	ZERO-ORDER	PARTIAL SAT1 AND SAT2
MARSAT3	.3876**	.0698	.3891**	.0926
FINSAT3	.3630**	.1523*	.4077**	.1864**
OCSAT3	.3600**	.1577*	.3865**	.1513*
HOUSAT3	.3090**	.1285*	.3740**	.1980**
HLTSAT3	.3629**	.0855	.3458**	.0804
OTHSAT3	.4014**	.1429*	.4321**	.1684**

+ p <= .05; * p <= .01; ** p <= .001

for phases 2-3, only 2 of 12 (*SWB2-othsat3* for MUNSH and SWLS) significant cross-phase correlations endured when the corresponding prior domain satisfaction was controlled. Analyses of correlations across Times 1-3 indicate that 3 of the 12 significant cross-phase correlations persisted following partial correlation of all relevant prior domain satisfactions (Table 12c). Although not significant by the present criteria, five additional Time 1-3 partial correlations remain strong ($p < .009$).

Summary. Hypothesis 3b received mixed support when tested through partial correlation procedures. Of a possible 36 zero-order correlations, 14 persisted when prior domain satisfaction scores were controlled. Surprisingly, no consistent causal patterns emerged across time frames for any domain except *'other'*. Correlations between prior SWB and later satisfaction in this domain do not appear to be spuriously associated due to bottom-up effects from prior *'other'* satisfaction. For the remaining five life domains, the majority of zero-order correlations indicate spuriousness due to prior bottom-up effects.

Hypothesis 4

Hypothesis 4 states that domain satisfaction scores

will be explained by current and prior SWB, current general stress, and current domain-specific stress. It was tested by multiple regression procedures for the three time frames of the study (i.e., phases 1-2, 2-3, and 1-3). All relevant within-phase variables (as well as several cross-phase variables) were entered as predictors of each domain satisfaction in an effort to assess as much unique variance as possible contributed by each variable while still accounting for the presence of other potential predictors.

Thus, all dispositional variables were included to ensure that any TD effects from SWB to domain satisfactions could not be attributable to related dispositions. Similarly, as stated previously, prior domain satisfaction scores were included to ensure that any significant prior SWB-later domain satisfaction relationships could not be attributable to the proposed BU effect from domain satisfactions to SWB (see hypothesis 3b).

For each time frame, predictors were entered in the order of their contribution to the multiple correlation coefficient. This process continued until the overall F ratio failed to reach significance. Results are summarized according to the six domain satisfaction dependent variables (Tables 13a-13f). For Time 1-2, the predictor array

included: (1) Time 1 and 2 MUNSH and SWLS scores; (2) corresponding Time 1 domain satisfaction score; and (3) dispositions, general stress, and corresponding domain-specific stress at Time 2.

Corresponding exactly to Time 1-2, predictors included in regression analyses for Time 2-3 were: (1) Time 2 and 3 MUNSH and SWLS scores; (2) corresponding Time 2 domain satisfaction score; and (3) dispositions, general stress/uplifts, and corresponding domain-specific stress at Time 3. Finally, analyses of Time 1-3 included the following variables as potential predictors of Time 3 domain satisfactions: (1) MUNSH and SWLS scores at each of three phases; (2) corresponding Time 1 and Time 2 domain satisfaction scores; and (3) Time 3 dispositions, general stress/uplifts, and corresponding domain-specific stress.

Tables 13a to 13f list all significant ($p < .001$) indicators of each domain satisfaction dependent variable, based on the above-noted initial predictor arrays. With the exception of occupational satisfaction for phases 1 to 3, all domain satisfactions were found to be predicted by a combination of domain stress and current or prior SWB (MUNSH or SWLS), as hypothesized.

Table 13a

Multiple Regression of Predictors With Marital Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Marsat-2	marsat-1	.6011	.6011
(Time 1-2)	marstr-2	.7011	-.3995
	swls-2	.7342	.2473
	munsh-2	.7418	.1507
	control-2	.7493	-.1227
	purpose-2	.7531	.1221
Marsat-3	marsat-2	.6404	.6404
(Time 2-3)	marstr-3	.7010	-.3053
	swls-3	.7159	.1649
	munsh-2	.7226	-.1220
Marsat-3	marsat-2	.6396	.6796
(Time 1-3)	marstr-3	.6998	-.3040
	marsat-1	.7310	.2710
	swls-3	.7407	.1369
	munsh-2	.7475	-.1255

all $P < .001$

Table 13b

Multiple Regression of Predictors With Financial Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Finsat-2	finstr-2	.6432	-.6432
(Time 1-2)	finsat-1	.7135	.3370
	hassles -2	.7470	-.2641
	swls-2	.7610	.1688
	control-2	.7657	-.0933
Finsat-3	finstr-3	.6332	-.6332
(Time 2-3)	finsat-2	.7226	.3892
	swls-3	.7604	.2692
	swls-2	.7683	-.1553
	hassles-3	.7718	-.0931
Finsat-3	finstr-3	.6329	-.6329
(Time 1-3)	finsat-2	.7223	.3890
	swls-3	.7603	.2703
	finsat-1	.7690	.1416
	swls-2	.7762	-.1499
	hassles-3	.7795	-.0903

all P < .001

Table 13c

Multiple Regression of Predictors With Occupational Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Ocsat-2	ocsat-1	.5273	.5273
(Time 1-2)	purpose-2	.6443	.3810
	ocstr-2	.6721	-.2016
	swls-2	.6820	.1560
	uplifts-2	.6873	.0930
Ocsat-3	ocsat-2	.5293	.5293
(Time 2-3)	swls-3	.5875	.2759
	ocstr-3	.6203	-.2130
	purpose-3	.6295	.1351
	hardiness-3	.6363	-.0987
	munsh-3	.6432	-.1142
Ocsat-3	ocsat-2	.5264	.5264
(Time 1-3)	ocsat-1	.5999	.3365
	ocstr-3	.6464	-.2513
	purpose-3	.6689	.1906
	uplifts-3	.6758	.1043
	hardiness-3	.6824	-.1003

all $P < .001$

Table 13d

Multiple Regression of Predictors With Housing Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Housat-2	houstr-2	.4139	-.4139
(Time 1-2)	housat-1	.5050	.3011
	swls-2	.5583	.2480
	hassles-2	.5686	-.1279
Housat-3	housat-2	.5309	.5309
(Time 2-3)	houstr-3	.6361	-.3669
	swls-3	.6682	.2332
	swls-2	.6776	-.1566
	hassles-3	.6827	-.0985
Housat-3	housat-2	.5285	.5285
(Time 1-3)	houstr-3	.6340	-.3665
	swls-3	.6668	.2344
	housat-1	.6789	.1425
	swls-2	.6882	-.1565
	hassles-3	.6931	-.0983

all $P < .001$

Table 13e

Multiple Regression of Predictors With Health Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Hlthsat-2	hlthstr-2	.6027	-.6027
(Time 1-2)	munsh-2	.6900	.3489
	hlthsat-1	.7417	.3036
	purpose-2	.7507	.1692
Hlthsat-3	hlthsat-2	.6385	.6385
(Time 2-3)	hlthstr-3	.7212	-.3658
	munsh-3	.7407	.1927
Hlthsat-3	hlthsat-2	.6384	.6384
(Time 1-3)	hlthstr-3	.7213	-.3661
	munsh-3	.7407	.1925
	hlthsat-1	.7492	.1357
	purpose-3	.7523	.0941

all P < .001

Table 13f

Multiple Regression of Predictors With Other Satisfaction for Relevant Study Phases

	Predictors	Multiple-R	Beta
Othsat-2	munsh-2	.5827	.5827
(Time 1-2)	othstr-2	.6465	-.3023
	swls-2	.6729	.2633
	hassles-2	.6920	-.2097
	purpose-2	.7038	.1981
	othsat-1	.7101	.1094
Othsat-3	swls-3	.5679	.5679
(Time 2-3)	othstr-3	.6282	-.2951
	purpose-3	.6618	.2608
	hassles-3	.6830	-.2049
	othsat-2	.6932	.1403
	uplifts-3	.7040	.1324
Othsat-3	swls-3	.5687	.5687
(Time 1-3)	othstr-3	.6289	-.2951
	purpose-3	.6618	.2588
	hassles-3	.6829	-.2043
	othsat-1	.6936	.1391
	uplifts-3	.7039	.1290
	othsat-2	.7106	.1185

all $P < .001$

General stress, in the form of hassles or uplifts, showed no unique contribution to the variance in marital satisfaction scores. However, hassles were found to account for significant portions of the variance in *finsat*, *housat*, and *othsat* for each time frame of analysis. Uplifts did not evidence consistent effects, predicting only *ocsat* and *othsat* for two of the three time frames of analysis.

As predicted, SWB was found to account for unique portions of domain satisfaction variance, above the effects of personal dispositions. In fact, with the exception of the *ocsat* analysis for Time 1-2, SWB accounted for a greater amount of variance in domain satisfaction scores than any of the disposition variables which were measured. Purpose appears to be a reliable indicator of *ocsat* and *othsat*, predicting significant portions of domain satisfaction variance for all time frames of analysis.

Inclusion of prior domain satisfaction scores was done to assess the unique contribution of prior SWB to later domain satisfactions. Given that both within-phase and prior SWB were included in the predictor arrays, it is not surprising that prior SWB did not often account for unique portions of variance in later domain satisfaction scores above the effects of within-phase SWB.

Prior SWB was however found to contribute unique variance to later *housat* and *finsat* at two time frames of analysis. These effects were found despite the inclusion of prior domain satisfactions in the predictor array. The bottom-up model is not supported here in that the prediction from a bottom-up perspective is that no such relationships between prior SWB and later domain satisfactions would be found when prior domain satisfactions are also included as regression predictor variables.

Summary. Multiple regression procedures did not support a BU formulation for the *housat* and *finsat* domains and the above partial correlation procedures (hypothesis 3b) supported TD effects only for the *othsat* domain. Mixed results were found by both methods of analysis.

Hypothesis 5

Unfortunately, hypothesis 5 could not be successfully tested using the full LISREL model which includes both latent and observed variables. For a variety of reasons, difficulty was encountered in getting the proposed models to run. Perhaps the most important reason was inadequate specification of enough parameters in the eight matrices used to define each measurement model in LISREL. It is often

recommended that one begin with SEM analysis of simple models and gradually build to models with more variables and more complex associations, such as reciprocal linkages (Glymour et al., 1987). Perhaps the complex nature of the proposed models precluded the identification of enough parameters. This could have been avoided by starting with a simpler model with fewer variables.

The two measures of SWB that were used to assess the latent variable of 'subjective well-being' did function in all previous analyses as expected. Perusal of Tables 3-9 and 11-13 indicates that the MUNSH and SWLS do indeed measure a large portion of common variance in the latent SWB construct. The two measures were found to function in the same manner in all analyses but as predicted, the SWLS does appear to tap the long-term aspect of SWB better. However, the MUNSH was found to assess an important additional part of the construct, as seen by the results of the multiple regression analyses (Table 13). The MUNSH predicted unique portions of *marsat*, *ocsat*, *hlthsat*, and *othsat* domain satisfaction variance, above that accounted for by the SWLS.

Ex Post Facto Analyses

Consistent with the aforementioned recommendation to

test for causal linkages prior to embarking on SEM procedures, a number of additional partial correlation analyses were performed using the Simon-Blalock technique in preparation for testing hypothesis 5. As before, the significance level was set at $p < .001$.

The link from prior to later SWB was once again supported because partialling out corresponding dispositional variables did not reduce the stability coefficients of the MUNSH or SWLS measures across all time frames of the study. With respect to purpose, control, and hardiness at least, the stability of SWB cannot be attributed to the stability of related dispositional measures.

Top-down effects from SWB to personal dispositions were not supported. The stability of purpose, control, or hardiness was not reduced when the corresponding effects of the MUNSH or SWLS were partialled out. This result contradicts the findings of Underhill and Stones (in press), Stones and Kozma (1986b), and the partial correlation results from hypothesis 1 of the present study whereby partialling out SWB did reduce the intercorrelations between lower-order variables which included personal dispositions.

The TD and BU models proposed by Stones and Kozma (1986b) contained linkages representing temporal stabilities among their lower-order variables. Although not specifically tested in their study, these proposed linkages were tested directly in the present study using post hoc partial correlation procedures.

Recall that hypothesis 1 addressed the presence of within phase correlations between domain satisfactions. Tests for the presence of across phase correlations refer to the stability of domain satisfactions and whether this stability could be due to the stability of SWB or other lower-order variables. Linkages from prior to later domain satisfactions were not found to be due to either SWB, purpose, control, hardiness, or domain stresses, alone or in combination, across any phases of the study. That is, no reduction in the temporal stability of domain satisfactions occurred when any or all of these variables were partialled out.

In certain respects, neither the current TD or BU models are supported by these findings. The prediction based on a bottom-up model is that the cross-phase correlations between domain satisfactions will reduce to nonsignificance when domain stresses are partialled out. That is, the

stability of domain satisfactions results from stable environmental influences. In contrast, the prediction from the TD formulation is that the stability of domain satisfactions is due in large part to the stability of SWB, but also to stable environmental influences. That is, partialling out both SWB and the appropriate domain stress variable will reduce the temporal stabilities of the domain satisfactions. Neither of these predictions were supported. In addition to SWB and domain stress, the dispositional variables which were measured were not found to be responsible for domain satisfaction stability.

Discussion

Given the inconsistent results of previous research which has attempted to uncover the direction of causality between subjective well-being and domain satisfactions, it is not surprising that mixed support for a top-down model was obtained in the present study. Perhaps the answer lies in either bi-directional SWB-domain satisfaction linkages or the conditions under which a particular domain will function in either or both directions.

The reason that an alternative bi-directional model is suggested is that few consistencies were found among the various tests of causality for individual domains. For example, the domain *othsat* evidenced bottom-up effects from the partial correlation analyses of hypothesis 3a and top-down effects from hypothesis 3b partial correlation analyses. Consistent effects were rarely found for individual domains across phases of the study, even when the same statistical procedure was utilized.

Bottom-up model

Although the proposed top-down formulation was not consistently supported in the present study, considerable

evidence was presented to refute the bottom-up model. The stability of SWB was not found to result from the stability of domain satisfactions (hypothesis 2b). This finding supports the results of Stones and Kozma (1986b). From post hoc analyses, it was found that domain satisfaction stability was not reduced when domain stresses were partialled out, as the prediction from the BU model would assert.

Also replicating Stones and Kozma's (1986b) findings, the link from prior domain satisfaction to later SWB was found to be a spurious association due to the top-down effects of prior SWB on prior domain satisfactions (hypothesis 3a). Thus, evidence for a bottom-up effect from prior to later domain satisfactions and then 'up' to later SWB was not obtained. In multiple regression analyses, prior SWB was found to predict later *housat* and *finsat* (hypothesis 4). This result was obtained when the predictor array included the corresponding prior domain satisfaction. This finding contradicts predictions based on the bottom-up model.

Top-down model

From multiple regression analyses, results indicated

that domain satisfactions can be predicted by a combination of current/prior SWB, domain-specific stresses, and most times, general stress (hypothesis 4). All domain satisfactions were found to be affected by SWB in a top-down manner, as shown by the substantial reduction of their intercorrelations with other lower-order variables when SWB was partialled out (hypothesis 1).

Although the proposed top-down model was supported in many respects, the top-down relationship between SWB and personal dispositions was not fully supported. Based on post hoc analyses, the stability of purpose, control, and hardiness was not found to be due to the effects of SWB. Although within phase intercorrelations between dispositions and remaining 'lower-order' variables did substantially reduce when SWB was partialled out (hypothesis 1), it appears that the temporal stability of personal dispositions is not due to the effects of SWB.

Underhill and Stones (in press) obtained support for a model that did not include linkages from personal dispositions to domain satisfactions. Results from the present multiple regression analyses, however, indicate that personal dispositions do in fact share a direct relationship with domain satisfactions, above the effects of SWB. Headey,

Holmstrom, and Wearing (1985) also found support for linkages from personality to domain satisfactions, but not between personality and SWB.

Based on the present multiple regression analyses, it appears that certain dispositions are more important in predicting some domains than others. For example, life purpose accounts for a significant portion of the variance in *ocsat* and *othsat* but not in the remaining domain satisfactions.

In Underhill and Stones' model, hassles were treated in the same manner that domain satisfaction variables were treated in the present study (i.e., occupying the same position in the model). Based on the regression analyses of hypothesis 4, it appears that hassles or uplifts should occupy a position on par with personal dispositions. That is, hassles or uplifts differentially predict certain domain satisfactions.

Consistently, hassles were found to account for significant portions of unique variance in *finsat*, *housat*, and *othsat*. This direct link between hassles and domain satisfactions is supportive of previous work which found direct links from hassles/life events to domain

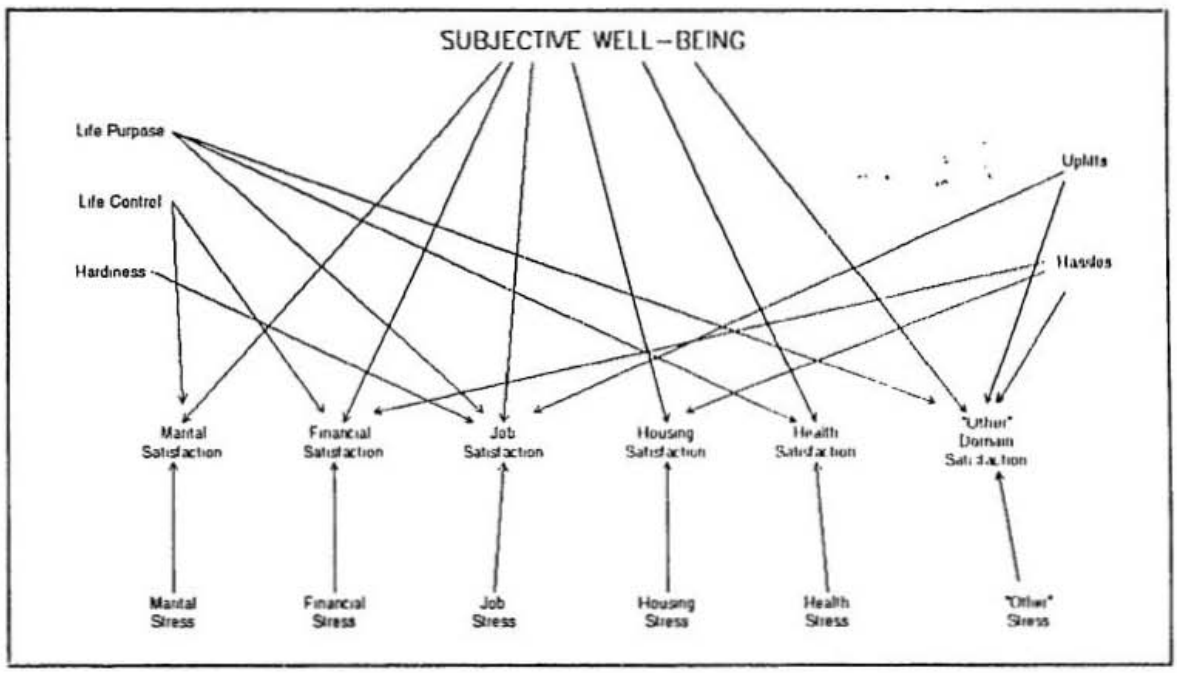
satisfactions but no direct links to SWB (Headey, Glowacki, Holmstrom, & Wearing, 1985).

The modified TD propensity formulation of SWB is presented in Figure 5. In this model, general stress and dispositional variables are seen as having direct, and possibly moderating effects on SWB-domain satisfaction relationships. Life domain satisfaction is viewed as a composite of SWB, domain stress, and the additive or interactive effects of general stress and dispositions. This model should be tested with a new data set using direct tests of moderating relationships, such as hierarchical multiple regression analysis. Although not successfully carried out in the present study, it is also suggested that this model be tested through latent variable modeling procedures to minimize measurement error. In addition, the use of SEM should not be abandoned with regard to testing for bi-directional linkages, since it seems quite likely that such links exist.

Future efforts should focus on the use of preparatory procedures to test for model linkages prior to structural equation modeling analysis. Through the use of such procedures, the unexpected finding that the stability of domain satisfactions was not due to stable environmental

Figure 5

Modified Top-down Propensity Formulation of Subjective Well-Being. Note: For clarity, assumed correlations between stress in one domain and satisfaction in another domain are not depicted.



influences, personal dispositions, SWB, or a combination of all three was obtained. Unless other variables which can explain domain satisfaction stability are uncovered, the present conception of domain satisfactions which is accepted by TD, BU, and BD theorists, will have to be modified. The present data suggest that domain satisfactions exhibit inherent temporal stability. This finding warrants further investigation with additional measures of domain satisfactions.

With regard to limitations in the present methodology, it is expected that some effects of common method variance are at play. In particular, the fact that all measures were self-reported is likely to have inflated correlations. More importantly, the domain stress measures were self-reported and also phrased in a similar manner to the life domain satisfaction measures. Responses to the domain stress questions were subject to the same response "biases" and effects as the domain satisfaction measures, such as a top-down effect from SWB or from individual dispositions. Such potential confounding should be avoided in future investigations of the SWB - domain satisfaction relationship by designing less subjective measures of life domain stress than those utilized in the present study.

Conclusion

In the present longitudinal study, 65% to 77% of the variance in domain satisfaction scores was accounted for by prior and current SWB, prior domain satisfaction, current domain stress, current personal dispositions, and current hassles/uplifts. Given that prior SWB still predicted *housat* and *finsat* scores above the effects of prior domain satisfactions, some unique causal effect from SWB to domain satisfactions was shown above the possible bottom-up effects of prior domain satisfactions.

Surprisingly, post hoc analyses revealed that the stability of domain satisfactions was not due to the individual or combined effects of SWB, domain stresses, or dispositions. The possibility of inherent temporal stability in domain satisfactions was discussed. In addition, some paradoxical findings on the direction of causality between SWB and domain satisfactions were obtained. Thus, a straightforward top-down model, like the one initially proposed (Figure 3), did not sufficiently account for the data. Based on the results, the existence of bi-directional effects appears likely.

A modified top-down formulation was presented as an

interim advancement over the proposed propensity formulation of Underhill and Stones (in press) and Stones and Kozma (1986b). The modified formulation includes potential moderating effects of personal dispositions and hassles/uplifts on domain satisfactions and awaits future examination.

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Appendix A

The following questions are concerned with several aspects of well-being. Whenever a statement is true for you, please circle the "Y" (yes); if it is untrue for you, circle the "N" (no); if you can't decide about a question, circle the "?" (don't know).

In the past month have you ever felt:

1.	On top of the world?	Y N ?
2.	In high spirits?	Y N ?
3.	Particularly content with your life?	Y N ?
4.	Lucky?	Y N ?
5.	Very lonely or remote from people?	Y N ?
6.	Bored?	Y N ?
7.	Depressed or very unhappy?	Y N ?
8.	Flustered because you didn't know what to do?	Y N ?
9.	Bitter about the way your life has turned out?	Y N ?
10.	Generally satisfied with the way your life has turned out?	Y N ?

The next set of questions have to do with more general life experiences. As in the preceding set, circle the "Y" for a "yes" answer, the "N" for a "no" and the "?" for "don't know".

11.	This is the dreariest time of my life.	Y N ?
12.	I am just as happy as when I was younger.	Y N ?
13.	Most of the things I do are boring and monotonous.	Y N ?
14.	The things I do are as interesting to me as they ever were.	Y N ?
15.	As I look back on my life I am fairly well satisfied.	Y N ?
16.	Things keep getting worse as I get older.	Y N ?
17.	Do you often feel lonely?	Y N ?
18.	Little things bother me more this year.	Y N ?
19.	Do you like living in this city (town, etc.)?	Y N ?
20.	I sometimes feel that life isn't worth living.	Y N ?
21.	I am as happy now as I was when I was younger.	Y N ?
22.	Life is hard for me most of the time.	Y N ?
23.	Are you satisfied with your life today?	Y N ?
24.	My health is at least as good as most people's my age.	Y N ?

Appendix A
The Memorial University of Newfoundland Scale of Happiness (MUNSH; Kozma & Stones, 1980)

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

7 - Strongly agree
6 - Agree
5 - Slightly agree
4 - neither agree nor disagree
3 - Slightly disagree
2 - Disagree
1 - Strongly disagree

------ (A) In most ways my life is close to my ideal.

------ (B) The conditions of my life are excellent.

------ (C) I am satisfied with my life.

------ (D) So far I have gotten the important things I want in life.

------ (E) If I could live my life over, I would change almost nothing.

Appendix A
The Satisfaction with Life Scale (SWLS; Diener et al, 1985)

Appendix B

Please indicate (circle) the degree of satisfaction with each of the following conditions (1 = very dissatisfied; 7 = very satisfied):

	very dissatisfied						very satisfied
Marital status	1	2	3	4	5	6	7
Financial status	1	2	3	4	5	6	7
Occupation (Job)	1	2	3	4	5	6	7
Housing	1	2	3	4	5	6	7
Health	1	2	3	4	5	6	7
Other aspects of life	1	2	3	4	5	6	7

Appendix B
Domain Satisfaction Questionnaire

Appendix C

The items below consist of attitudes with which you may or may not agree. As you will see, many of the items are worded very strongly. This is so you can decide the DEGREE to which you agree or disagree (i.e., how much you agree or disagree). Please indicate on the answer sheet your reaction to each item according to the following scale:

0 - Not at all true
1 - A little true
2 - Quite true
3 - Completely true

Please read the items carefully. Be sure to base all of your answers on the way you feel now. Do not spend too much time on any one item and please make sure you answer all questions.

1. Most of my life is wasted in meaningless activity. ____
2. I find it difficult imaging having any enthusiasm about work. ____
3. It doesn't matter if people work hard at their jobs; only a few profit. ____
4. Ordinary work is too boring to be worth doing. ____
5. The belief in individuality is only justifiable to impress others. ____
6. Unfortunately, people don't seem to know that they are only creatures after all. ____
7. The young owe the old complete economic security. ____
8. A retired person should be free of all taxes. ____
9. New laws should not be passed if they damage one's income. ____
10. There are no conditions which justify endangering the health, food, and shelter of one's family or of one's self. ____
11. Pensions large enough to provide for dignified living are the right of all when age or illness prevents one from working. ____
12. Those who work for a living are being manipulated by the bosses. ____
13. Thinking of yourself as a free person leads to great frustration and difficulty. ____
14. Often I really do not know my own mind. ____

For the following items, please indicate by circling the appropriate letter which of the two statements in each item BETTER represents your attitude.

15. a) Becoming a success is a matter of hard work: luck has little or nothing to do with it.
    b) Getting a good job depends mainly on being in the right place at the right time.

16. a) As far as world affairs are concerned, most of us are victims of forces we can neither understand nor control.
    b) By taking an active part in political or social affairs the people can control world events.

17. a) Most people don't realize how much their lives are controlled by accidental happenings.
    b) There is really no such thing as "luck".

18. a) Sometimes I can't understand how supervisors arrive at work evaluations.
    b) There is a direct connection between how hard I work and the evaluations I get.

19. a) Many times I feel that I have little influence over the things that happen to me.
    b) It is impossible for me to believe that chance of luck plays an important role in my life.

20. a) What happens to me is my own doing.
    b) Sometimes I feel that I don't have enough control over the direction my life is taking.

Appendix C
The Hardiness Scale (McNeil et al, 1986)

Appendix C

Please continue with the following questions concerning life attitude:

1. My life is running over with good things.....Y..N..?
2. My life is in my hands and I am in control.....Y..N..?
3. Life to me seems very exciting.....Y..N..?
4. I determine what happens in my life.....Y..N..?
5. Basically, I am living the kind of life I want to live.....Y..N..?
6. I believe I am absolutely free to make all my life choices.....Y..N..?
7. I get a great thrill out of just being alive....Y..N..?
8. My accomplishments in life are largely determined by my own efforts.....Y..N..?
9. Every day is constantly new and different.....Y..N..?
10. I regard the opportunity to direct my life very important.....Y..N..?
11. I have discovered a satisfying life purpose....Y..N..?
12. It is possible for me to live my life in terms of what I want to do.....Y..N..?
13. In thinking of my life, I see a reason for existing.....Y..N..?
14. The meaning of life is evident in the world around us.....Y..N..?

Appendix C
Life Purpose (# 1,3,5,7,9,11,13,14) and Life Control (# 2,4,6,8,10,12) dimensions of The Life Attitude Profile (LAP; Reker & Peacock, 1981)

Appendix D

Hassles are irritants that can range from minor annoyances to fairly major pressures, problems and difficulties.

If you have not had the hassles listed below during the past 30 days, then you should check the first space - it is labelled "HAVEN'T HAD". If you <u>have</u> had the hassles, then you should try to estimate how strong it was (or is) for you by checking one of the three remaining spaces.

Please try not to omit any of the hassles.

HASSLE	HOW STRONG? HAVEN'T HAD	SOME WHAT	MODER-ATELY	EXTRE-MELY
1. Too many responsibilities	____	____	____	____
2. Too many interruptions	____	____	____	____
3. Fear of rejection	____	____	____	____
4. Not enough personal energy	____	____	____	____
5. Concerns about inner conflicts	____	____	____	____
6. Feel conflicted over what to do	____	____	____	____
7. Regrets over past decisions	____	____	____	____
8. Concerns about getting ahead	____	____	____	____
9. Not enough money for entertainment and recreations	____	____	____	____
10. Noise	____	____	____	____

Uplifts are events that make you feel good.

If you have not had the uplifts listed below during the past 30 days, then you should place an "X" in the first space - it is labelled "HAVEN'T HAD". If you <u>have</u> had the uplifts, then you should try to estimate how strong it was (or is) for you by "X-ing" one of the three remaining spaces.

		HOW STRONG?			
	UPLIFTS	HAVEN'T HAD	SOME WHAT	MODER-ATELY	EXTRE-MELY
1.	Resolving conflicts over what to do	____	____	____	____
2.	Sharing something	____	____	____	____
3.	Having enough money for entertainment and recreation	____	____	____	____
4.	Recreation (sports, games, etc.)	____	____	____	____
5.	Using skills well at work	____	____	____	____
6.	Being complimented	____	____	____	____
7.	Expressing yourself well	____	____	____	____
8.	Having fun	____	____	____	____
9.	Pleasant smells	____	____	____	____
10.	Making decisions	____	____	____	____
11.	Fresh air	____	____	____	____
12.	Meeting a challenge	____	____	____	____

Appendix D
<u>Short-Form Hassles and Uplifts Scale (Krachun, 1990)</u>

Appendix D

Please indicate the amount of stress placed on you by each of the following conditions (1 = little or no stress; 7 = a large amount of stress):

Marital status	1.....2.....3.....4.....5.....6.....7
Financial status	1.....2.....3.....4.....5.....6.....7
Occupation (Job)	1.....2.....3.....4.....5.....6.....7
Housing	1.....2.....3.....4.....5.....6.....7
Health	1.....2.....3.....4.....5.....6.....7
Other aspects of life	1.....2.....3.....4.....5.....6.....7

Appendix D
Domain Stress Questionnaire

APPENDIX E

	age1	sex1	marsat1	finsat1	ocsat1
sex1	.2548*	-----			
marsat1	.0915	-.0288	-----		
finsat1	.2889**	.0875	.3993**	-----	
ocsat1	.1482**	-.1122*	.2204**	.3932**	-----
housat1	.2439**	.0491	.3809**	.5234**	.3631**
hlthsat1	-.0887	-.0791	.2778**	.3027**	.3474**
othsat1	.1013*	.0516	.4285**	.4281**	.4148**
marstr1	-.1597**	-.0941	-.6018**	-.3160**	-.1971**
finstr1	-.2903**	-.0574	-.2314**	-.5323**	-.1750**
ocstr1	-.2711**	-.1455**	-.1036	-.2737**	-.3769**
houstr1	-.1732**	-.0703	-.1509**	-.3114**	-.2230**
hlthstr1	.1208*	.0823	-.1269*	-.1284**	-.1394**
othstr1	-.0483	.0586	-.2374**	-.1961**	-.2036**
munsht1	.1516**	-.0555	.4646**	.4036**	.3713**
swlst1	.0415	-.0586	.4631**	.4591**	.4334**
purpost1	.0216	.0006	.3615**	.3165**	.4008**
contrlt1	-.0373	-.0402	.2481**	.2763**	.2350**
hasslt1	-.3644**	.0653	-.2827**	-.3826**	-.2412**
upliftt1	-.1978**	.0044	.0861	.0846	.1599**
hardt1	-.2978**	-.1304**	-.1696**	-.2187**	-.2477**

* p < .05; ** p < .01

Appendix E

Pairwise intercorrelations of study variables - Phase 1

	housat1	hlthsat1	othsat1	marstr1	finstr1
hlthsat1	.3028**	-----			
othsat1	.5051**	.5058**	-----		
marstr1	-.2369**	-.2486**	-.3345**	-----	
finstr1	-.2681**	-.1087*	-.2038**	.4881**	-----
ocstr1	-.1889**	-.1629**	-.2424**	.2789**	.3841**
houstr1	-.4842**	-.1844**	-.3169**	.3509**	.5600**
hlthstr1	-.1125*	-.6343**	-.2684**	.3365**	.3454**
othstr1	-.2283**	-.3556**	-.4348**	.4838**	.4610**
munsht1	.3648**	.3965**	.5588**	-.4617**	-.3192**
swlst1	.4572**	.4004**	.6103**	-.4211**	-.2447**
purpost1	.3193**	.3652**	.5301**	-.3433**	-.2375**
contrlt1	.2303**	.3175**	.3521**	-.2954**	-.1879**
hasslt1	-.3072**	-.2966**	-.3569**	.3764**	.4560**
upliftt1	.0936	.2322**	.2189**	-.1850**	-.0853
hardt1	-.1483**	-.1716**	-.2329**	.2030**	.2377**

p < .05; ** p < .01

Appendix E

Pairwise intercorrelations of study variables - Phase 1

	ocstr1	houstr1	hlthstr1	othstr1	munsht1
houstr1	.3008**	-----			
hlthstr1	.2475**	.4088**	-----		
othstr1	.3954**	.4920**	.5946**	-----	
munsht1	-.2702**	-.3288**	-.3088**	-.4063**	-----
swlst1	-.1667**	-.2927**	-.2536**	-.3833**	.7032**
purpost1	-.2524**	-.3279**	-.2626**	-.3924**	.6602**
contrlt1	-.1727**	-.1934**	-.1763**	-.2487**	.4261**
hasslt1	.3930**	.3368**	.3102**	.4453**	-.5581**
upliftt1	-.0712	-.1779**	-.2354**	-.2749**	.2166**
hardt1	.2466**	.1773**	.1095*	.1007*	-.3071**

* < .05; ** < .01

	swlst1	purpost1	contrlt1	hasslt1	upliftt1
purpost1	.5984**	-----			
contrlt1	.4392**	.4672**	-----		
hasslt1	-.4392**	-.2929**	-.2939**	-----	
upliftt1	.2286**	.3554**	.2056**	-.0400	-----
hardt1	-.1892**	-.2141**	-.1150*	.4351**	-.1158*

* p < .05; ** p < .01

Appendix E

Pairwise intercorrelations of study variables - Phase 1

APPENDIX F

	age2	sex2	marsat2	finsat2	ocsat2
sex2	.2579**	-----			
marsat2	.1821**	.0498	-----		
finsat2	.3378**	.1271*	.4383**	-----	
ocsat2	.1100*	-.0096	.3273**	.3590**	-----
housat2	.2617**	.0555	.5088**	.5112**	.3923**
hlthsat2	.0510	-.0953	.3855**	.2699**	.3824**
othsat2	.1558**	-.0085	.5182**	.5137**	.4385**
marstr2	-.1718**	-.0383	-.5861**	-.3682**	-.3181**
finstr2	-.2965**	-.0616	-.2960**	-.6160**	-.3067**
ocstr2	-.3254**	-.1454**	-.1193*	-.3303**	-.3734**
houstr2	-.1076*	-.0223	-.2616**	-.3469**	-.2565**
hlthstr2	.0376	.0937	-.1846**	-.2414**	-.2267**
othstr2	-.0988*	.1526**	-.2430**	-.3128**	-.2865**
munsht2	.0568	-.0276	.4983**	.3599**	.4203**
swlst2	-.0465	-.0766	.4989**	.4218**	.4239**
purpost2	.0439	.0304	.4899**	.3873**	.4688**
contrlt2	-.0757	-.0389	.1719**	.1613**	.2479**
hasslt2	-.3522**	.0269	-.3877**	-.5370**	-.3787**
upliftt2	-.1330*	.0887	.1222*	.0889	.2678**
hardt2	-.2783**	-.1205*	-.1958**	-.2801**	-.2759**

* < .05; ** p < .01

Appendix F

Pairwise intercorrelations of study variables - Phase 2

	housat2	hlthsat2	othsat2	marstr2	finstr2
hlthsat2	.2793**	-----			
othsat2	.3726**	.5443**	-----		
marstr2	-.2947**	-.2837**	-.3285**	-----	
finstr2	-.3376**	-.1869**	-.3541**	.6241**	-----
ocstr2	-.1995**	-.1435**	-.2774**	.3666**	.4743**
houstr2	-.4299**	-.0988*	-.1651**	.5297**	.6004**
hlthstr2	-.1230*	-.5702**	-.2708**	.4247**	.3861**
othstr2	-.1589**	-.3049**	-.4197**	.5638**	.5906**
munsht2	.3054**	.4711**	.5266**	-.3968**	-.3123**
swlst2	.3661**	.4411**	.5160**	-.3705**	-.2782**
purpost2	.3559**	.4980**	.5734**	-.3824**	-.3385**
contrlt2	.1695**	.3173**	.3134**	-.1878**	-.2067**
hasslt2	-.3729**	-.3921**	-.4855**	.3824**	.4816**
upliftt2	.0590	.1994**	.2471**	-.1558**	-.1394**
hardt2	-.2508**	-.1807**	-.2607**	.1950**	.2569**

* p < .05; ** p < .01

Appendix F

Pairwise intercorrelations of study variables - Phase 2

	ocstr2	houstr2	hlthstr2	othstr2	munsht2
houstr2	.3516**	-----			
hlthstr2	.3189**	.4596**	-----		
othstr2	.4074**	.5529**	.5917**	-----	
munsht2	-.2506**	-.2038**	-.2755**	-.3157**	-----
swlst2	-.2349**	-.2287**	-.3171**	-.3291**	.6816**
purpost2	-.1991**	-.2980**	-.3159**	-.3237**	.7166**
contrlt2	-.1269*	-.1775**	-.1929**	-.1659**	.4463**
hasslt2	.3769**	.2619**	.2985**	.3800**	-.5915**
upliftt2	-.1806**	-.0876	-.1901**	-.1613**	.2429**
hardt2	.3057**	.2726**	.2443**	.2331**	-.3315**

* p < .05; ** p < .01

	swlst2	purpost2	contrlt2	hasslt2	upliftt2
purpost2	.6547**	-----			
contrlt2	.3366**	.4906**	-----		
hasslt2	-.4848**	-.4719**	-.2859**	-----	
upliftt2	.2557**	.3340**	.2342**	-.0554	-----
hardt2	-.2264**	-.3111**	-.1701**	.4359**	-.0763

* p < .05; ** p < .01

Appendix F

Pairwise intercorrelations of study variables - Phase 2

APPENDIX G

	age3	sex3	marsat3	finsat3	ocsat3
sex3	.2402**	-----			
marsat3	.0828	-.0272	-----		
finsat3	.4014**	.1435**	.3734**	-----	
ocsat3	.1709**	.0267	.3342**	.3639**	--------
housat3	.2772**	.0717	.4147**	.3574**	.3875**
hlthsat3	-.0009	-.0339	.2206**	.2983**	.3287**
othsat3	.1531**	.0009	.4130**	.4771**	.4251**
marstr3	-.2245**	.0169	-.4994**	-.3617**	-.2127**
finstr3	-.3690**	-.0819	-.2462**	-.6244**	-.2682**
ocstr3	-.3683**	-.0922	-.1270*	-.3392**	-.3994**
houstr3	-.1407**	.0029	-.2755**	-.3990**	-.2225**
hlthstr3	.1349**	.0733	-.1491**	-.1703**	-.2564**
othstr3	-.0421	.0551	-.2207**	-.2824**	-.2717**
munsht3	.0770	.0185	.3543**	.3785**	.4266**
swlst3	.0398	-.0294	.4829**	.5437**	.4595**
purpost3	.0492	.0427	.3175**	.3514**	.4559**
contrlt3	-.1151*	-.0406	.1945**	.2447**	.3032**
hasslt3	-.3451**	.0432	-.3080**	-.5208**	-.4025**
upliftt3	-.1734**	.0400	.1239*	.0869	.2400**
hardt3	-.2079**	-.1107*	-.0948	-.2520**	-.2624**

* p < .05; ** p < .01

Appendix G

Pairwise intercorrelations of study variables - Phase 3

	housat3	hlthsat3	othsat3	marstr3	finstr3
hlthsat3	.3051**	-----			
othsat3	.4437**	.5219**	-----		
marstr3	-.3607**	-.1948**	-.3653**	-----	
finstr3	-.4189**	-.1395**	-.3116**	.5933**	-----
ocstr3	-.2993**	-.2681**	-.3162**	.4383**	.5437**
houstr3	-.4856**	-.1868**	-.3540**	.5893**	.6313**
hlthstr3	-.1987**	-.5567**	-.3315**	.3730**	.3660**
othstr3	-.2651**	-.2379**	-.4514**	.5274**	.5493**
munsht3	.3437**	.4970**	.5272**	-.2821**	-.3263**
swlst3	.4888**	.4176**	.5481**	-.3211**	-.3750**
purpost3	.3497**	.4070**	.5401**	-.2273**	-.2432**
contrlt3	.2494**	.3495**	.3682**	-.2141**	-.2242**
hasslt3	-.4326**	-.3696**	-.5187**	.3921**	.5237**
upliftt3	.1521**	.2352**	.2712**	-.0555	-.0182
hardt3	-.2310**	-.1632**	-.2457**	.0724	.2155**

* p < .05; ** p < .01

Appendix G

Pairwise intercorrelations of study variables - Phase 3

	ocstr3	houstr3	hlthstr3	othstr3	munsht3
houstr3	.4682**	---------			
hlthstr3	.3215**	.5357**	---------		
othstr3	.4822**	.6293**	.6241**	---------	
munsht3	-.3406**	-.2958**	-.3491**	-.3523**	--------
swlst3	-.2926**	-.3493**	-.3319**	-.3790**	.6564**
purpost3	-.2517**	-.2410**	-.2521**	-.2939**	.6861**
contrlt3	-.2075**	-.1786**	-.2830**	-.3006**	.4751**
hasslt3	.4732**	.3589**	.2594**	.3817**	-.5346**
upliftt3	-.0979	-.0849	-.1760**	-.1132*	.3012**
hardt3	.2187**	.1120*	.1064*	.1443**	-.2677**

* p < .05; ** p < .01

	swlst3	purpost3	contrlt3	hasslt3	upliftt3
purpost3	.5975**	-----			
contrlt3	.4220**	.5086**	-----		
hasslt3	-.4948**	-.4094**	-.3400**	-----	
upliftt3	.2376**	.3456**	.2859**	-.0575	-----
hardt3	-.2477**	-.2417**	-.0862	.3576**	-.0066

* p < .05; ** p < .01

Appendix G

Pairwise intercorrelations of study variables - Phase 3