A LONGITUDINAL ANALYSIS OF CONTROL BELIEFS AS MODERATORS OF THE RELATIONSHIP BETWEEN STRESS AND WELL-BEING IN LATER LIFE

BY

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A Thesis submitted to
the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirement of the degree

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Acknowledgements

I'm a firm believer that the interesting and arduous process of writing a thesis is not a one-person task. In light of this, I would like to express my sincere thanks to the following wonderful individuals:

~ Dr. Rod Clifton and Dr. Dan Bailis, the members of my thesis committee, for the endless hours you spent teaching me the methodological skills I needed to complete the task;

~ Dr. Judy Chipperfield, my advisor, for the prompt and succinct feedback that made May 2004 graduation possible;

~ Dale, for doing all the driving after I "burnt the midnight oil";

~ Tiffany, for the endless barrage of cups of tea;

~ Selina, for borrowing me your comfy bed now and again; and

~ My cat Boychuk, the brains behind the operation.

Thank you all very much.

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Abstract

In a five-year longitudinal study of 229 community-living individuals ages 72 to 99 years, the complex association between stress and well being was examined. The purpose of this research was to assess potential buffers of the relationship, specifically primary- and secondary-control beliefs. Based on previous research it was expected that the negative relationship between perceived stress and well-being five years later would become weaker at higher levels of control. Multiple regression was used to test the hypothesized relationships. Since age, gender, income, marital status, and prior illness restriction and life satisfaction could conceivably influence the stress-health relationship, these variables were statistically controlled. Primary control was assessed in terms of perceived influence over various life domains, while secondary control was measured in two ways: finding benefit and downgrading importance. Two categories of well-being were examined, namely physical and psychological well-being. Consistent with predictions, downgrading buffered the relationship between stress and depression, suggesting that downgrading may be beneficial to older people. Finding-benefit also interacted with stress to negatively predict illness restriction, however, collinearity did not allow for a buffer interpretation. Further, under conditions of lower stress, high levels of primary control corresponded to greater happiness. In all three findings the presence of each of the control belief-stress interactions depended upon the specific outcome being assessed.

Introduction

How can we experience optimal well-being with increasing age? The answer seems to depend on how one defines well-being. For some, well-being refers solely to *physical* health, as suggested by well-publicized findings in which 60-year-old Swedes were reported as being generally fitter than 30-year-old Canadians (Shephard, 1969). Others construe well-being as *psychological* health, perhaps in the form of happiness or lack of depression. Although both types of well-being are conceptually and empirically distinct, stress has been shown to affect them both adversely (for instance, Esch, Stefano, Fricchione, & Benson, 2002; Glass, Kasl, & Berkman, 1997). Thus, one way to experience optimal well-being in later life may involve finding ways to reduce stress or weaken its negative effect on well-being. This comprised the broad objective of the present thesis.

Thesis Overview

In the interests of finding at least one way of facilitating optimal well-being in later years, this study attempted to integrate the literatures on perceived control, stress, and health in older individuals. In particular, the emphasis in this study was on examining links between stress and well-being among older community-dwelling individuals. It was expected that control beliefs would buffer the relationship between stress and well-being. That is, high control beliefs were expected to weaken the relationships between stress and well-being. This prediction was examined within two contexts that will subsequently be explained in greater detail: (a) primary control beliefs about direct influence over events, and (b) secondary control beliefs involving adaptive thought processes.

An underlying assumption in the present thesis was that some environments become less directly controllable with increasing age. Long-lasting circumstances such as aging itself, may create an environment that has less opportunity for control. Similarly, short-term stresses may precipitate an environment offering little opportunity for direct action, or "primary control" (Holmes & Rahe, 1967). For example, there may be little one can do to proactively change the death of a spouse or becoming seriously ill. However, previous research suggests that feelings of control may not only come as a result of primary control, but also through adaptive compensatory psychological processes collectively termed "secondary control" (for instance, Heckhausen & Schulz, 1998; Rothbaum, Weisz, & Snyder, 1982). Prior research further suggests that it is under conditions of low primary control that individuals try their hardest to maintain perceptions of control in general (for instance, Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). This indirectly implies that for individuals under stress who are able to maintain high levels of compensatory secondary control, the impact of stressful situations may be lessened (Heckhausen & Schulz, 1998). Thus, the main focus of the present thesis was to examine the buffering effects of control beliefs on the stress-well-being relationship.

Psychosocial Predictors of Well-Being: Conceptual and Measurement Issues

To date, two widely-studied psychosocial predictors of well-being are perceived control and stress. A discussion of the measurement and conceptualization of control and stress is provided, followed by a review of the literature on control beliefs, stress, and physical and psychological well-being.

Control beliefs. 'Control beliefs' is an umbrella term comprising a wide array of constructs including locus of control, perceptions of contingencies, and perceived control, the latter being defined as "the perceived ability to significantly alter [or influence] events" (Burger, 1989, p. 246). Presumably, the *belief* that one has direct influence over a life event (perceived influence) leads to the psychological state of perceived control (Chipperfield, Campbell, & Perry, 2004). For that reason, the terms 'perceived control' and 'perceived influence' are sometimes used synonymously by researchers.

A history of perceived control. The psychological construct of perceived control did not become popular in empirical research until the late 1950s. Before that time, social psychology was less popular than behaviorism, or studying the *outward* behavior of individuals. At that time, behaviorism was more commonly used to justify the existence of psychosocial phenomena than social psychology. Behaviorism suggests that in social situations, individuals can be classified either as origins of their own behavior, or pawns manipulated by external agents (Decharms, Carpenter, & Kuperman, 1965).

Fritz Heider (1958) helped lay the groundwork for the psychological construct of control by proposing that social behavior depends on two sets of conditions: factors within the person (internal) and factors within the environment (external). By the mid-1960's, researchers were becoming increasingly interested in the cognitions underlying behavior. At that time, Rotter published the landmark Locus of Control Monographs (Rotter, 1966). These were summaries of several experiments that found differences between subjects who perceived reinforcement as being contingent on their own behavior, versus subjects who perceived reinforcement as being contingent on chance or experimenter control (i.e., internal versus external control of reinforcement). Rotter specifically suggested that individual beliefs about controlling the environment were either internal or external. That is, individuals with an internal locus of control believed that *they* were the agents in control of their behavior, reinforcement, or outcomes, whereas individuals with an external locus of control believed that *something else* was the agent in control of their lives. Rotter's (1966) classification of individuals as internals and externals led to internal-external comparisons of individuals becoming increasingly popular in research from that point forward.

Six years later, Glass and Singer (1972) published a book called *Urban Stress*, in which they studied environmental pollution such as litter, noise, and so forth. At that time, they determined that uncontrolled versus uncontrolled sound (i.e., "white noise") had an adverse effect on individuals. Glass and Singer (1972) were concerned with the extent to which aversive environmental stimuli were predictable or unpredictable. It is predictability (i.e., contingency) that connects the previous research with perceived control.

Past studies have shown that noncontingent aversive stimuli are more detrimental than contingent aversive stimuli, in that noncontingent aversive stimuli result in learned helplessness whereas contingent aversive stimuli do not (Abramson, Garber, & Seligman, 1980). Moreover, according to Abramson et al. (1980), a complete lack of perceived control in humans results in reactive depression and learned helplessness. This suggestion stems from the original learned helplessness studies which were classical conditioning experiments done on animals (Seligman & Maier, 1967; Overmier & Seligman, 1967). Specifically, following the sound of a bell, dogs were exposed to electric shock. Some of the dogs were taught to press a panel when the bell sounded, which resulted in them successfully avoiding the shock. These animals had learned to exert control to avoid the shock. Other dogs were not taught the action of panel pressing and thus, had no control over receiving the electrical shock. The dogs having no control over experiencing the shock "learned to be helpless". That is, they came to know that the occurrence of the electrical shock was noncontingent on their behavior and subsequently learned to give up, enduring the electrical shock without exhibiting the expected normal escape-avoidance behavior. Moreover, the helpless animals failed to learn the escape-avoidance behavior even when given the opportunity to do so later.

To validate his learned helplessness theory with human subjects, Seligman's research evolved from the objective manipulation of contingencies in animals (Seligman & Maier, 1967; Overmier & Seligman, 1967) to an attributional analysis of learned helplessness in humans (Abramson, et al., 1980). Similar to the earlier results obtained with animals, this attributional analysis suggested that noncontingent feedback (i.e., unpredictability) resulted in reactive depression and learned helplessness in humans.

Opposite to the notion of noncontingency, perceived control implies predictability and much more, namely responsibility and capability. Simply put, being able to predict an outcome affords an individual a certain degree of perceived control. To the extent that outcomes contingent on proactive behavior reflect primary control, previous research suggests that primary control is one way to avert learned helplessness and reactive depression (Seligman & Maier, 1967; Overmier & Seligman, 1967; Abramson, et al., 1980).

To briefly highlight the main points in the previous history of perceived control thus far, researchers began to study the perceived control construct in its own right in the mid-1960's (Rotter, 1966). Seligman and Maier's (1967) conception of learned helplessness then became popular, explaining the behavioral manifestation of a complete lack of perceived control. By the mid-1980's, however, an understanding of perceived control evolved with the advent of Weiner's (1985) Attributional Theory of Achievement Motivation and Emotion. Specifically, Weiner's (1985) theory deals with actively controlling negative events, and although the theory does not include perceived control per se, to the extent that direct influence over negative events is associated with the psychological state of perceived control (Chipperfield et al., 2004), Weiner's theory can be used to explain perceived control. Specifically, according to Weiner (1985), lack-of-effort attributions for negative, unexpected, or important life events are associated with the notion that such events are unstable and therefore changeable, leading to the increased success expectancy of being able to directly control the given negative event (i.e., perceived control).

Modern researchers still examine phenomena related to Rotter's (1966) internal-external locus of control construct (for example, Holt, Clark, Kreuter, & Rubio, 2003), and although considered dated by some (e.g., Weiner, 1983), the notion of internal versus external locus of control nonetheless forms the basis for today's understanding of perceived control. Rothbaum, Weisz, and Snyder (1982) significantly influenced the study of perceived control by suggesting two alternate avenues to gaining a sense of control: primary- and secondary-control.

Two Routes to Perceived Control: Primary- and Secondary-Control

According to Rothbaum et al. (1982), primary control comprises the proactive attempts of individuals to influence or alter their environments in ways that are aligned with their wishes. An example of this might be an older individual who has difficulty walking, deciding to use a cane. Rothbaum et al. (1982) also suggest that an alternate pathway to feelings of control involves the use of secondary control beliefs and/or strategies. Secondary control involves changing the way one thinks in order to adapt to the environment. Downgrading the importance of having a serious illness or alternately, reinterpreting the diagnosis of the serious illness in a positive light are examples of secondary control. Further, Rothbaum et al. (1982) suggest that secondary control beliefs/strategies are most likely to occur after attempts at primary control have failed, and that secondary control may act as a stopgap for the downward spiral to learned helplessness.

Heckhausen and Schulz (1998) have also examined primary and secondary control, from a different theoretical perspective, emphasizing how individuals strive for control by using different strategies. In the face of age-related declines in opportunities to exert primary control, it is the compensatory nature of secondary control strategies (Heckhausen & Schulz, 1995) that may be vital to the health and well-being of aging individuals. More specifically, secondary control strategies may compensate for the waning perceptions of primary control associated with increasing age, and could subsequently prove to be more effective than primary control for aged individuals. In light of the well-documented relationship between perceived control and well-being, and with regard to the irreversibility of many age-related declines, compensatory secondary control could, in some cases, gradually replace primary control as a main facilitator of health and well-being in later life. Thus, the role of secondary control as a potential buffer of the stress-health relationship is of prime interest in this study.

Rothbaum et al. (1982) suggest that there are four distinct types of secondary control: predictive, illusory, vicarious, and interpretive control. Predictive control is gaining a perception of control by knowing what is going to happen in the future; for example, by knowing the time of a pre-scheduled medical appointment. Illusory control involves gaining perceptions of control by believing in luck, fate, chance, and so on. For example, someone perceiving control over the outcome of a blood test by carrying his or her good luck charm. Vicarious control is gaining feelings of control by believing in the power of others, exemplified by perceiving control over an illness due to beliefs in the power of doctors to successfully treat the condition. Finally, interpretive control is a sense of control gained by reinterpreting negative events to find positive meaning and value in them.

Secondary Interpretive Control

Rothbaum et al. (1982) suggest that interpretive control may be the most important type of secondary control because it incorporates the other three types of secondary control, and that it may be used by individuals to manage stress. Further, Frankl (1963) suggests the importance of interpretive control from personal experiences in the concentration camps of World War II, by concluding that the "will to meaning", by definition a form of interpretive control, is the most basic human motivation. In short, previous work suggests that of Rothbaum et al.'s (1982) four types of secondary control, interpretive control may hold the most potential for improving the lives of older individuals.

Interpretive control as downgrading importance. Rothbaum et al. (1982)

describe the existence of one aspect of interpretive control as the readjustment of personal beliefs and expectations such that failure situations and threats to control may be avoided. This compensatory interpretive-control strategy specifically involves downgrading the importance of negative situations and events in order to "buffer the potential negative effects of failure on the motivational resources of the individual, [promoting] long-term potential for primary control" (Heckhausen & Schulz, 1998, p. 57). An example of downgrading importance is an older person with restrictive arthritis, downgrading the importance of going shopping by telling him- or herself, "I can easily get by with the groceries I've got". As suggested by Rothbaum et al. (1982), reinterpreting via downgrading the importance of going shopping, (when the alternatives are to suffer through the shopping or feel like a failure for staying home), could conceivably lead to greater perceived control that could, in turn, weaken the stress-well being relationship. Some researchers have measured downgrading by asking whether individuals try to downgrade importance when faced with obstacles, thus considering the *strategies* people use. However, downgrading can also be measurable as a *belief* by assessing the relative importance of life domains, compared to earlier points in time. Thus, the downgrading form of interpretive control has previously been considered as a strategy or a belief, or a mixture of both (for instance, Chipperfield, Perry, & Bailis, 2004; Hladkyj, Chipperfield, & Perry, 2000; Rothermund & Brandtstädter, 2003). For the purposes of the present study, downgrading importance was measured as beliefs.

Interpretive control as finding benefit. Rothbaum et al. (1982) originally defined interpretive control as a sense of control gained from finding meaning in uncontrollable negative events, in order to accept them. Since Rothbaum et al.'s (1982) work, researchers have at times conceptualized and measured interpretive control as finding benefit (for instance, Hladkyj et al., 2000). The finding-benefit aspect of interpretive control has previously been measured indirectly by the use of common folk expressions. For example, in a study of 131 adults aged 59 to 85 years, Freund and Baltes (2002) used common folk expressions or "proverbs" to measure the reinterpretation of negative situations and events to find their positive meaning and value. Similar to proverbs, the endorsement of commonly-used expressions and transformitive folk-psychological beliefs such as, "Negative experiences can often be a blessing in disguise" and, "There's a silver lining in every cloud" can be used to assess individual interpretive-control beliefs in the form of finding benefit (Freund & Baltes, 2002). Thus, for the purposes of this study, folk-wisdom expressions such as these were used to measure finding benefit.

Control and Health

The sections that follow will summarize the literature relevant to the relationship between control and health. First, previous research in the area of primary control and health will be reviewed, followed by a synopsis of past work done on secondary control and health.

Primary control and health. Perceived control is known to be important for health and well-being (for instance, Chipperfield, Campbell, & Perry, 2004; Schulz & Heckhausen, 1999; Thompson, Nanni & Levine, 1994; Fiske & Taylor, 1991; Affleck, Tennen, Croog & Levine, 1987; Baltes & Baltes, 1986; Langer & Rodin, 1976). Control perceptions have also been shown to predict the use of health services (Chipperfield & Greenslade, 1999) and survival (Bailis, Chipperfield, & Perry, 2003; Menec, Chipperfield, & Perry, 1999; Chipperfield, 1993). This linkage between control beliefs and health may become even more important in later life, as perceived control is thought to be relevant to successful aging (Baltes & Baltes, 1990; Rodin, 1986).

A number of studies have shown that perceived control is important for the well-being of both institutionalized and community-living older individuals. For example, in a field experiment done on 91 nursing home residents, Langer and Rodin (1976) found that participants in an experimental group who were given control over personal decisions and the care of a plant experienced significant improvements in alertness, active participation, and general sense of well-being, relative to the comparison group. Moreover, in a study involving 42 institutionalized individuals ranging in age from 67 to 96 years, Schulz (1976) found that those who were able to predict and control visitations by college students experienced greater levels of well-being relative to their counterparts with low predictability and control. In a more recent review article, Schulz and Heckhausen (1999) suggested that due to the centrality of primary control to human functioning, its relative decrease with increasing age should be given high research priority.

Research on community-dwelling older adults supports the importance of the relationship between perceived control and well-being. For instance, in a longitudinal study of 4,317 individuals ranging in age from 65 to 111 years, perceived control was found to positively predict survival. In that study, Chipperfield (1993) found that even with age, gender, income, education, and initial health status controlled, perceived control was positively related to survival 12 years later. Further, evidence in favour of a positive relationship between perceived control and functional health emerged in a longitudinal study of 1,406 community-dwelling older individuals (Menec, Chipperfield, & Perry, 1999). It is relevant to note here, that although previous research in the area of perceived control does not explicitly state that perceived control stems from *primary* control beliefs, most of the control measures, in fact, reflect primary control. Nonetheless, secondary control is also important.

Secondary interpretive control and health. Evidence exists in favour of links between secondary interpretive control and physical and psychological well-being. For example, Croog and Levine (1982) determined from a sample of 205 male cardiac patients, that those who found benefit from their heart attacks were generally less depressed and experienced increased life satisfaction eight years after the attack. In a sample of 59 women, Carver et al. (1993) found a negative relationship between acceptance of early-stage breast cancer and distress. In a study of 104 HIV-positive men, acceptance of the condition was found to relate to lower levels of depression (Thompson et al., 1994). Further, in a study by Affleck et al. (1987) of 287 male heart attack patients, those who perceived benefit from a first heart attack were less likely to experience a subsequent attack and exhibited less morbidity 8 years later.

In short, although in comparison to primary control, less empirical evidence seems to exist in favour of secondary interpretive control as an aide for coping with health problems, secondary control may nonetheless fulfill this role. Consider, for example, someone who is diagnosed with heart trouble. The way that one person deals with this news may be quite different from another. That is, upon learning of the diagnosis, one individual may become despondent, quit all of his or her recreational activities, and become depressed and reclusive at home, sitting and waiting for an 'inevitable' heart attack to occur. In contrast, another individual may reinterpret the diagnosis of heart trouble in a positive way, adopting the attitude that the experience has culminated in a greater appreciation for life, and attempting to lead life as usual. In the latter example, the person has used the finding benefit aspect of interpretive secondary control to subjectively reinterpret the health problem as having meaning and value, presumably readjusting his or her beliefs about the predictability and subsequently the controllability of the heart trouble and his or her life.

It is relevant to note here that studies that have examined the relationship between finding benefit and well-being have not necessarily conceptualized finding benefit as interpretive control per se (for example, Updegraff, Taylor, Kemeny, & Wyatt, 2002; Katz, Flasher, Cacciapaglia, & Nelson, 2001). Moreover, links between finding benefit and well being have not been found in all studies. Specifically, findings from one study of 94 multiple sclerosis (MS) patients suggest that although benefit-finding was associated with adaptive coping strategies like positive reappraisal and social support seeking, it was unrelated to depression and positively related to increased levels of anger and anxiety (Mohr, Dick, Russo, Pinn, Boudewyn, Likosky, & Goodkin, 1999). Nonetheless, most studies on benefit-finding conclude that it is beneficial for individual health and well being. For example, Chipperfield and Perry (2004) found that benefit-finding related to fewer and shorter-duration hospital stays in older women.

Stress

Stress has been defined in many ways. Selye (1960) conceptualized stress as a nonspecific somatic response to positive and negative stressors alike. Stress has also been measured as fleeting physiological changes such as increases in pulse, respiration rate, blood pressure, and sweaty palms in the body's preparation for 'fight or flight' (Cannon, 1932). In contrast to these physiological measures, stress has also been assessed in terms of the number of stressful life events experienced (Rapkin & Fischer, 1992). Some studies have focused on singular stressful life events such as widowhood (Harlow, Goldberg, & Comstock, 1991) or personal health crises (Ladwig, Lehmacher, Roth, Breithardt, Budde, Borggrefe, 1992), while others have examined multiple stressful life events (Glass, Kasl, & Berkman, 1997). Perceived stress is another often-used measure of stress (Cohen, Kamarck, & Mermelstein, 1983). Just as past research suggests that perceived health accurately represents actual health status (Menec, Chipperfield, & Perry, 1999) it is assumed that perceived stress does reflect objective stress to some extent. However, perceived stress is also used in the present study to capture the subjective phenomenological nature of stress.

Stress and well-being. To date researchers have focused their efforts on the negative relationship between stress and well-being (for instance, Lazarus & Folkman, 1984) in order to isolate ways of decreasing the deleterious effects of stress, thereby promoting relatively greater health and well-being. Because the stress literature to date has become voluminous, a detailed account is beyond the scope of this review. Interested readers may refer to Hobfoll, Schwarzer, and Chon (1998) for a more complete synopsis.

Early stress research focused on the fleeting physiological changes such as increases in pulse, respiration rate, blood pressure, and sweaty palms that individuals experience in preparation for 'fight or flight' when faced with unexpected, important, and negative life events (Cannon, 1932). This research largely ignored the psychological factors associated with stress, perhaps because much of the early stress research was conducted with animals (Taylor, 1990). Since then, human research (which for ethical reasons has been relatively constrained in its ability to manipulate stressors), has generally been consistent with earlier findings from animal studies. In some cases, prolonged high levels of stress have been found to relate to deleterious effects on the body (Evans, Hodge, & Pless, 1994). These findings validate Levi's (1974) suggestion that if the stress response lasts long enough, a situation conceivably precipitated by the rigors of modern-day living, it may lead to adverse physical health conditions.

Studies that have examined the relationship between stress and *physical health* include a study of 88 individuals who completed the Schedule of Recent Experience (Amundson, Hart, & Holmes, 1981). To the extent that life changes may be construed as stressful, this study found a strong temporal association between stress and reported changes in physical health status (Rahe & Holmes, 1989). Further, a study by Tavazzi, Zotti, and Mazzuero (1987) suggests that psychological stress may induce heart failure in humans, and in a report of an association of sustained stress and inhibited breathing pattern in humans, Anderson and Chesney (2002) suggest that chronic stress may contribute to the development of hypertension. In fact, a recent review of the literature by Esch, et al., (2002) underscores the significant role of stress in the susceptibility, progress, and outcome of cardiovascular disease.

Numerous studies have also examined the negative relationship between stress and *psychological health*. For instance, one prospective study of 1,962 noninstitutionalized older people reported a dose-response relationship between stress and an increase in depressive symptoms (Glass et al., 1997). Another longitudinal study of 260 older individuals found that of eight types of stressful life events examined, widowhood was associated with depressive symptoms three years later, even after controlling for select demographic, social support, and physical health status variables (Chou & Chi, 2000). In total, these findings suggest that a decrease in the amount of stress experienced may precipitate greater health and well-being in older individuals.

The Moderating Effects of Control Beliefs

Although some research has focused on secondary control and its sources as moderators of well-being (for instance, Rothermund & Brandstädter, 2003; Bailis & Chipperfield, 2002), the vast majority of existing studies have focused on primary control. Further, not all past work supports the notion that control beliefs are moderators of the relationship between stress and well-being. For example, in an empirical study of 159 college students, personal control beliefs were *not* found to moderate the relationship between stress and psychological and physical health (Anderson & Arnoult, 1989). Similarly, in a study of 675 Canadian nurses, primary control was *not* found to moderate the effect of job stress on job satisfaction (McLaney & Hurrell, 1988).

In contrast, a body of research exists that does provide support for the moderating effects of perceived control on the relationship between stress and well-being. For example, in Roberts, Dunkle, and Haug's (1994) study of a sample of very-old women and men ages 85 and over, perceived control in the form of mastery was found to attenuate the negative relationship between stress and mental health. Moreover, a review article on locus of control and stress suggests that perceiving influence moderates the relationship between stress and depressive characteristics (Lefcourt, 1976). In addition, an empirical study of 154 school children found that primary control in the forms of perceived competence and contingency moderated the relationship between stress and illness (Weigel, Wertlieb, & Feldstein, 1989). Further, in a sample of 377 nurses, perceived control was found to moderate the relationship between occupational stress and long-term stress (Kivimäki & Lindström, 1995), and in a study of 316 older adults who reported arthritis as their most severe health problem, Chipperfield & Greenslade (1999) found that perceived control buffered the relationship between arthritis-related restriction and health service use. In addition, although it is arguable as to whether low collective self esteem may be equated with stress, Bailis and Chipperfield (2002) found in a sample of 1,267 individuals ages 69 and older, that perceived control moderated the relationships between collective self esteem and two measures of health status.

In sum, the empirical evidence in favour of perceived control as a moderator of the relationship between stress and well-being is extensive. These studies that used measures in keeping with the idea of primary control generally support the main premise of this thesis, that control beliefs could conceivably buffer the relationship between stress and well-being. This thinking is echoed in Helgeson's (1992) observation that: "When feelings of control are manipulated in response to an aversive event, those who have control are less affected by the stressor than those who do not" (p.656). It is important to determine whether this holds true for a sample of largely old-old individuals.

Despite the mixed reviews on the existence of the moderator effect, stress has been found to predict poor health and well-being (for instance, Jang, Mortimer, Haley, Chisholm & Graves, 2002; Rahe, Meyer, Smith, Kjaer & Holmes, 1964), and control beliefs could conceivably buffer this relationship. Specifically, the negative relationship between stress and well-being should be weaker in individuals who feel that they have direct influence over their circumstances. Moreover, it is conceivable that the relationship between stress and well-being would be weaker in individuals who engage in "alternate interpretations of [negative] events" (Hobfoll et al., 1998, p.203), such as downgrading their importance or finding benefit from them (Rothbaum et al., 1982). In sum, downgrading importance, finding benefit, and perceiving influence over various aspects of life could conceivably be three ways to weaken the negative relationship between stress and health in older people (Roberts et al., 1994). Although the chain of events responsible for the buffering effects of primary- and secondary- interpretive control on the stress-health relationship is not directly assessed in this thesis, the learned-helplessness work is relevant here because if an individual can find ways to moderate the effects of stress, he or she may not succumb to reactive depression and instead may experience greater health and well-being (Seligman & Maier, 1967;

Overmier & Seligman, 1967; Abramson, et al., 1980).

Any analysis of the buffers of the stress-health relationship would be incomplete without considering confounding variables. Certain demographic factors have been shown to relate to stress and to control beliefs. In a study of 39 males and 37 females that involved intermittently immersing subjects' hands in ice water, men were found to have greater tolerance for the noxious stressor than women (Zimmer, Basler, Vedder, & Lautenbacher, 2003). Also, in a sample of university students, church/civic group members, and community-living adults, age, gender, and ethnicity were found to influence individual reactions to the terrorist attack of September 11, 2001 (Walker & Chestnut, 2003). Moreover, Pearlin and Schooler (1978) found positive relationships between age and downgrading importance in the forms of devaluation of money and the substitution of rewards. In light of this previous evidence suggesting that background variables predict stress and control beliefs, an analysis of buffers of the stress-health relationship should consider demographic and background variables such as age, gender, income, marital status, prior illness restriction and life satisfaction as control variables.

The Present Study: Buffers of the Relationship between Stress and Well-Being

Drawing on previous research, this study examines the buffering effects of control beliefs on the negative relationship between stress and well-being. In a secondary analysis of interview data from a sample of 229 community-living individuals ages 72 through 99, a five-year longitudinal design was employed, with control beliefs and stress being measured in 1996 and well-being assessed five years later.

Stress was measured as perceived stress in the present study, and the "control belief" measures included primary control in the form of perceived influence over various life domains and two different aspects of interpretive secondary control (namely, downgrading importance and finding benefit). In particular, the downgrading measure asked individuals to rate the relative importance of past and present beliefs about the importance of various life domains, while the finding-benefit measure examined individual beliefs about finding benefit from negative experiences.

The goal of the present study was to consider the effects of the stress-control belief interactions on the main dependent measures physical and psychological well-being. Hypothesis 1 was that the negative relationship between perceived stress and well-being would be moderated or buffered by two types of interpretive secondary control beliefs. That is, as downgrading and finding benefit increased, the negative relationships between perceived stress and well-being were expected to weaken. Similarly, Hypothesis 2 expected that the negative relationship between perceived stress and well-being would be buffered by primary control beliefs in the form of perceived influence. Based on empirical evidence and conceptual reasoning suggesting that demographic factors may influence well being, age, gender, income, and marital status assessed in 1996 were included in all analyses. Moreover, since prior self-rated illness restriction and life satisfaction were expected to predict subsequent physical and psychological well-being, these Time one (T1) background variables were also controlled. Preliminary cross-sectional analyses involved testing the relationships between the control variables and the psychosocial variables, stress, downgrading, finding benefit, and primary control. It was expected that these cross-sectional analyses would shed light on the importance of stress, downgrading, finding benefit, and primary control as intervening variables in the longitudinal analyses that followed.

Method

This study used a subset of participants from the Aging in Manitoba (AIM) project. A description of the subsample will follow a brief outline of the AIM study, which has been described in greater detail by Chipperfield, Havens, and Doig (1997).

The Aging in Manitoba (AIM) Study

Since its inception in 1971, AIM has been directed at investigating the factors that affect the quality of life of older people. Three independent, cross-sectional samples of community-living seniors ages 60 and older were taken in 1971, 1976, and 1983 from an electronic registry of all Manitobans enrolled in the provincial health insurance program. In total, a sample of approximately 9000 participants from a population of older individuals has been selected to date. Longitudinal data were also collected during the 1971, 1976, 1983, 1996 and 2001 waves, allowing for the use of a longitudinal design to study the oldest old, (80 years of age and older), over time. In addition, AIM data has been linked to national and provincial mortality statistics, enabling investigations of psychosocial factors as they relate to survival. Previous work has suggested achieving randomness as the most serious challenge for longitudinal studies in general (Chipperfield, et al., 1997). AIM appears to have overcome this challenge by constructing each initial sample using an age and gender stratified area-probability sampling technique, generating a list of potential study participants, and employing a 'substitution' procedure to minimize loss of respondents due to death, serious illness, or migration (Chipperfield, et al., 1997). Participants in the sample were contacted and in-home interviews conducted in the participant's preferred language, covering topics including biographical information, perceptions of control, and physical and psychological well-being, among others.

The Control Beliefs-Stress Study

This study used a subset of participants who had previously taken part in AIM 1996 approximately three months earlier. That is, individuals were selected from among those who participated in the subsequently smaller Successful Aging Study (SAS) that assessed primary and secondary control beliefs. Ethics approval for SAS 1996 was granted by the Health Information Privacy Committee, Manitoba Health and the Education/Nursing Research Ethics Board (see Appendix A, Parts A and B). Since all identifiers were removed from the data prior to the present study, ethics approval for this secondary analysis of data was not required (see Appendix A, Part C). In the paragraphs that follow, the subject selection procedure for SAS 1996 is outlined, followed by a brief description of the variables.

In addition to death, serious illness, and migration, individuals who were ineligible to participate in the SAS included people who were located in the more remote regions of Manitoba, those who were subsequently institutionalized, and those with cognitive impairments or language barriers. Trained interviewers conducted in-home interviews with the participants from August through

November 1996. The interviews were approximately one to one and a quarter hours long and covered topics including individual perceptions of control, stress, and health, among other things.

The present study focused on items from the SAS and AIM studies that were used to assess two types of Rothbaum et al.'s (1982) interpretive secondary control, primary control, perceived stress, and psychological and physical well-being. The sample size for the subsequent analyses was further reduced after excluding participants with missing values on the key psychosocial variables stress and control and the measures of well-being that were examined five years later. The remaining sample of 229 individuals was used in generating the descriptive data reported for each variable. However, it is important to note that since not all participants had valid responses for each of the dependent measures, the sample sizes for the main analyses differed according to the dependent measure under consideration.

Variables

Four main types of variables were included in the present study: (a) the predictor, perceived stress (AIM 1996) measured at Time one (1996); (b) the potential psychosocial moderators, primary control beliefs (perceived influence) and secondary interpretive control beliefs (downgrading importance and finding benefit) measured at Time one; (c) the demographic and background controls measured at Time one; and (d) the dependent variable well-being, measured at Time two five years later (2001). The demographic and background controls included age, gender, income, and marital status (i.e., demographic variables) and prior illness restriction and life satisfaction (i.e., background variables). The three dependent variables included psychological well-being in the forms of depression and happiness, and the physical well-being measure, self-reported illness restriction. The predictor, moderators, and dependent measures are described in greater detail in the section that follows.

Potential Moderators

Downgrading. Interpretive secondary control in the form of downgrading importance of certain life domains was measured in SAS 1996 (Hladkyj et al., 2000) by asking participants to rate the perceived importance of 11 life domains now, relative to when they were younger (0 = less important, 1 = about the same, and 2 = more important). Sample items included, "Compared to when you were younger, how important is good health?" and "Compared to when you were younger, how important is doing a good job of what you do?" (see Appendix B, Part A). Items were recoded so that 1 = less important, 2 = about the same, and 3 = more important, and all items were reverse coded such that high scores indicated downgrading. The 11 downgrading items were subjected to a principal components factor analysis which showed that all items loaded on a single factor (see Appendix B, Part B). An examination of the inter-item correlations revealed that no items were negatively correlated and that all were of an acceptable magnitude (see Appendix B, Part C). Thus, the 11 items were summed to create a measure of downgrading. The alpha reliability coefficient was α=.73. The frequency distribution of the downgrading scale appears in Appendix B, Part D.

Finding benefit. Interpretive secondary control in the form of finding benefit was measured by asking the respondents in 1996 the extent to which they agreed or disagreed (1=disagree strongly to 6=agree strongly) with five common colloquial expressions such as, "Negative experiences can often be a blessing in disguise," and "There's a silver lining in every cloud" (Hladkyj et al., 2000). The five finding-benefit items (see Appendix C, Part A) were subjected to a principal components factor analysis which showed that all items loaded on a single factor (see Appendix C, Part B). An examination of the inter-item correlations revealed that no items were negatively correlated and that all were of an acceptable magnitude (see Appendix C, Part C), meaning that they were all measuring benefit-finding. Thus, the five items were summed to create an overall measure of finding benefit (α=.75). The frequency distribution of the finding benefit scale appears in Appendix C, Part D.

Primary control. Primary control in the form of perceived influence, previously defined as the proactive attempts of individuals to influence or alter their environments in ways that are aligned with their wishes, was measured by using participants' 1996 responses to ratings of the extent to which they felt they had influence over 11 domains of daily life (1=almost no influence to 10=total influence). The original items came from the updated SAS 1996 technical report (Chipperfield, Perry, Hladkyj, & Volk, 2003). Sample questions included, "How much influence [do] you feel you have over your physical health?" and ""How much influence [do] you feel you have over the usual tasks that need to be done?" (see Appendix D, Part A). A principal components factor analysis showed that all 11 items loaded onto a single factor (see Appendix D, Part B). An examination of the inter-item correlations revealed that no items were negatively correlated and that all were of an acceptable magnitude for measuring primary control (see Appendix D, Part C). Thus, the 11 items were summed to create an overall measure of primary control (α=.85). Appendix D, Part D shows the frequency distribution of the newly-constructed primary control scale.

Main Predictor

Perceived stress. Stress was measured by asking participants in 1996 to rate on a scale of 1 to 4 the extent to which they had perceived stress in the last month (1=never to 4=always). With regard to stress only being measured in the last month, Chipperfield, Perry, and Weiner (2003) and Suh, Diener, and Fujita (1996) suggest that recent events matter. The four perceived-stress items (see Appendix E, Part A) originated from the larger 14-item Perceived Stress Scale, a scale used to measure "the degree to which situations in one's life are appraised as stressful" (Cohen et al., 1983, p. 385). An examination of the items suggested reverse coding for items 2 and 3 (see Appendix E, Part A). A principal components factor analysis revealed that item 4 should be eliminated (see Appendix E, Part B), and so the factor analysis was repeated without item 4 (see Appendix E, Part C). An examination of the inter-item correlations revealed that in the three remaining items, item 3 correlated with items 1 and 2 (r =.37 and r =.22, respectively) but item 2 did not correlate with item 1 (r =.06, see Appendix E, Part D). Thus, item 2 was removed, leaving items 1 and 3 to be summed into the present perceived stress measure. The two remaining perceived stress items read, "In the last month, how often have you been upset because of something that happened unexpectedly?" and "In the last month, how often have you felt that things were not going your way?" (r =.37**). The frequency distribution of the perceived stress measure is shown in Appendix E, Part E.

Demographic Predictors

Age. A continuous measure of self-reported age was used in the present study. Mean age of the SAS 1996 study participants was 78.85 years (Appendix F, Part A1). Interestingly, 38.4% of the study participants were ages 80 and older (Appendix F, Part A2).

Gender. This study included 147 women and 82 men from the 1996 survey, with the majority (64.2%) being female (Appendix F, Part B). The gender variable was dummy coded to incorporate the variable into the regression analyses (0=men, 1=women).

Income. A measure of total monthly income in Canadian dollars was obtained by summing the SAS 1996 participant self-reports of monthly income from various sources. Potential income included private pensions, wages, rent, and dividend interest. Potential income from pensions and allowances included Old Age Security, War Veterans' Pensions, and Unemployment Insurance; and potential income from other sources included money from children, service groups, and private agencies. Mean monthly income of the participants was $1527.59. High and low outliers were coded back into the distribution with rank orders retained (see Appendix F, Part C). In order to avoid excluding 47 individuals who were missing income data, a regression-based substitution procedure was employed (Tabachnik & Fidell, 2001, p. 63). Specifically, cases with complete data were first used to generate the regression equation (i.e., the intercept and regression coefficients). Next, since stepwise regression analyses showed that income was predicted by education and gender, the individual predictor data for these variables was entered into the regression equation, enabling the prediction of missing values for income, which were then substituted for missing incomes for the 47 people.

Marital status. This study included 117 married and 112 unmarried individuals, with the majority (51.1%) being married (see Appendix F, Part D). SAS 1996 participants were asked, "What is your marital status?" (1=single, 2=married, 3=widowed, 4=divorced/separated). Responses from the single, widowed, and divorced/separated categories were summed to yield the number of participants who were unmarried. The remainder comprised the group of married individuals. The marital status variable was dummy coded to incorporate the variable into the regression analyses (0=unmarried, 1=married).

Background Variables

Prior illness restriction. The construction of the 1996 illness restriction control variable was based upon that of its parallel dependent measure, the 2001 illness restriction variable, subsequently described. The nine items from the 1996 questionnaire (see Appendix G, Part A) corresponding to the nine illness restriction items used in the construction of the 2001 illness restriction measure, were treated identically to their 2001 equivalents (see Appendix G, Parts B and C). The 9 items from the 1996 questionnaire were then summed to form the illness restriction background variable. The frequency distibution for the 1996 illness restriction background variable is shown in Appendix G, Part D (M=11.2, α=.54).

Prior life satisfaction. The prior life satisfaction background variable was indicated by Neugarten, Havinghurst, and Tobin's (1961) Life Satisfaction Index A, a 20-item forced-choice (agree, disagree) inventory of statements related to life satisfaction (see Appendix H, Part A) that has previously been used (for instance, Chipperfield & Havens, 2001). The control variable used in this study (see Appendix H, Part B) was previously created by assigning participants a score of 1 for each affirmative response, and summing the 1's to yield a total life satisfaction score (Hladkyj et al., 2000). Sample items include, "As I look back on my life, I am fairly well satisfied" and "I would not change my past, even if I could (M=13.55, α=.74).

Dependent Measures

Depression. This measure of psychological health from the 2001 questionnaire comprises the shortened, 10-item version of the Center for Epidemiologic Studies Depression Scale (CESD-10). The CESD-10 has been shown to be a reliable and valid indicator of depressed mood in older individuals (Andresen, Carter, Malmgren & Patrick, 1994). Using a 4-point Likert scale, the participants were asked to rate how often they felt certain ways during the past week (0=Rarely or none of the time, 1=Some of the time, 2=Moderate amount of time, 3=Most or all of the time). Sample items include, "I felt depressed" and, "I felt that everything I did was an effort" (see Appendix I, Part A). Item responses were recoded to eliminate zeros (1=Rarely or none of the time, 2=Some of the time, 3=Moderate amount of time, and 4=Most or all of the time) and items 5 and 8 were reverse coded. The 10 depression items were subjected to a principal components factor analysis which showed that all items loaded on a single factor (see Appendix I, Part B). An examination of the inter-item correlations revealed that no items were negatively correlated in the first decimal place, and therefore all were of an acceptable magnitude to form a scale (see Appendix I, Part C). Thus, the 10 items were summed to create an overall measure of depression (α=.77). The frequency distribution of the depression measure appears in Appendix I, Part D.

2001 Illness restriction. The perceived illness restriction scale, conceivably a proxy for physical well-being, was constructed from the list of chronic conditions included in the 2001 questionnaire and shown in Appendix J, Part A. The original 23 items were screened for variability and face validity, to determine which items would be retained for use in the current illness restriction scale. That is, frequency distributions were run on the original 23 chronic conditions to determine whether each item had sufficient variability for inclusion in a measure (see Appendix J, Part B). These analyses indicated that seven items should be excluded because of valid percents of >90 or ≤ 10. The seven items for exclusion were: stroke, anaemia, palsy, Alzheimer's disease, kidney problems, diabetes, and skin problems. Face validity examinations of the remaining 16 items led to the following seven being excluded for the reasons indicated: prior heart attack, because it was redundant with heart and circulation problems; ear and foot trouble, because they were not specific to older people; dental problems, missing teeth, and amputations which are not illnesses per se; nerve trouble which is not a physical illness (Appendix J, Part A). The remaining 9 items were subjected to a principal components factor analysis which showed that all of them loaded on a single factor (see Appendix J, Part C). An examination of the inter-item correlations revealed that virtually no items were negatively correlated (see Appendix J, Part D).

For each of the 9 chronic conditions remaining for inclusion in the new illness restriction measure, the degree of restrictiveness of each health condition was determined using similar data from the subsequent 2003 study (see Appendix J, Part E). In particular, in SAS 2003, participants reporting health problems were asked how often during the past year their health conditions had restricted their activities. Based upon the means of these responses, the 9 illnesses selected for inclusion in the new illness restriction measure were ranked from least to most restrictive, and then weighted, to accentuate the interval-level nature of the new illness restriction scale. The weighting scheme and corresponding illness restrictiveness rating are shown in Appendix J, Part E (1=least restrictive, 9=most restrictive). The 9 items were then summed to form the 2001 perceived illness restriction variable. The frequency distibution for the illness restriction measure is shown in Appendix J, Part F (M=13.5, α=.50).

Happiness. General well-being in the form of happiness was measured in the 2001 questionnaire using the second half of Stones, Kozma, Hirdes, & Gold's (1996) two-part Short Happiness and Affect Research Protocol (SHARP), the reliable and valid short form of Kozma and Stones' (1980) Memorial University of Newfoundland Scale of Happiness (MUNSH). The six forced-choice items in the "general happiness" section of the SHARP are preceeded by the lead-in statement, "The next section has to do with more general life experiences. Please answer yes or no." Sample items include, "I am just as happy as when I was younger" and, "As I look back on my life, I am fairly well satisfied" (see Appendix K, Part A). For the purposes of the present study, items 4, 5, and 6 were reverse-coded so that high scores indicated greater happiness. A principal components factor analysis showed that all 6 items loaded onto a single factor (see Appendix K, Part B). An examination of the inter-item correlations revealed that virtually no items were negatively correlated and that all were of an acceptable magnitude (see Appendix K, Part C). Thus, the 6 items were summed to create an overall measure of happiness (α=.60). The frequency distribution of the happiness measure appears in Appendix K, Part D.

Analytic Approach

An incremental model-building strategy using SPSS 7.5 statistical software estimated the buffering influences of control beliefs, primary and secondary interpretive control, on the relationships between stress and measures of physical and psychological well-being (see Figure 1). The incremental model-building strategy initially involved zero-order correlations to determine associations between the independent and dependent variables. Next, cross-sectional regression analyses were used to determine how much variance in the intervening psychosocial variables was attributable to the demographic and background control variables in 1996. Following that, variables from the preliminary regression models were selected for inclusion in the design of a larger basic regression model which tested the longitudinal main effects of the 1996 demographic, background and psychosocial variables on the 2001 dependent variables depression, illness restriction, and happiness. Lastly, three expanded models, each of which additionally included one of the three stress-control belief interaction terms, were tested.

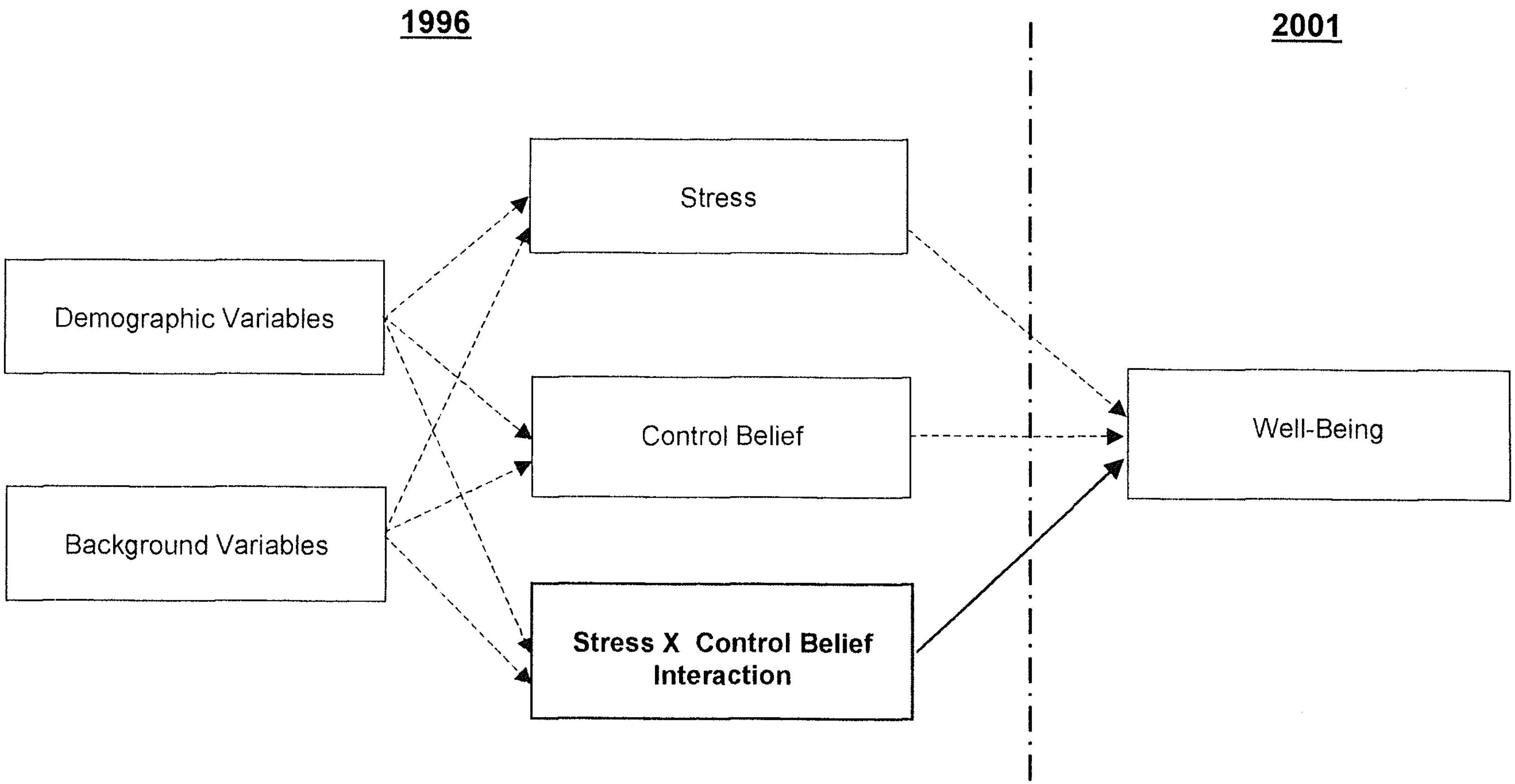


Figure 1. The moderator effect of control beliefs on the relationship between stress and well-being.

Preliminary analyses. Preliminary analyses were cross-sectional in nature and involved using correlations and multiple regression to test relationships between the independent and dependent variables. Specifically, the relationships between the demographic variables (age, gender, income, and marital status), the background variables (perceived illness restriction and life satisfaction) and the psychosocial variables (stress, downgrading, finding benefit, and primary control) in 1996 were assessed. These analyses were used to construct a basic model, that was subsequently expanded to estimate the moderator hypotheses. The preliminary regression analyses were repeated 16 times (four times for each of the four psychosocial variables) to determine the combination that accounted for the most overall variance in the psychosocial variables.

Hypotheses 1 and 2: The moderator hypotheses. Testing the expectations that high secondary interpretive and high primary control beliefs would buffer the relationship between stress in 1996 and well-being in 2001 was done in two stages. The first stage involved designing a basic model to test the main effects of the 1996 demographic and background variables and the psychosocial variables on the 2001 dependent variables, happiness, depression, and illness restriction. These analyses were initially repeated 18 times (six times for each of the three dependent measures) to determine which combination accounted for the most variance overall in the 2001 dependent variables. It was thought that incorporating the basic model (that accounted for the most overall variance in the Stage 1 analyses) into Stage 2 would ultimately provide good estimates of the moderator hypotheses.

Stage 2 of testing the moderator hypotheses involved designing three expanded models that each included the basic model described earlier along with one of the three stress-control belief interaction terms. The expanded models were repeated nine times, (once for each of the three expanded models on each of the three dependent variables). If the 1996 stress-control belief interactions from the expanded model accounted for a significant amount of the variance in the dependent variables above and beyond that of the basic model, it suggests that the interaction effects are robust. Moreover, if the essential criteria for moderator effects (i.e., the potential moderator not being correlated with either the predictor or the dependent measure) were met (Baron & Kenny, 1986), the moderator hypotheses would be considered supported.

Results

Before describing the findings for the main analyses that examine control beliefs as moderators of the relationships between stress and well-being, two preliminary analyses are reported. In particular, preliminary correlations between the independent and dependent variables are summarized, followed by a cross-sectional analysis that examines the demographic and background variables as predictors of the psychosocial variables (control beliefs and perceived stress).

Correlations Between the Variables

Table 1 shows the correlations between all variables in this study. Many of the correlations were significant and in the expected direction. For example, marital status and income were strongly associated with gender, women being more likely than men to be married and have lower incomes. Of note, the measures of prior illness restriction and life satisfaction (as measured in 1996) were correlated in the expected direction with the psychosocial measures (also obtained in 1996). As anticipated, higher illness restriction was associated with more stress (r=.313**) and lower perceptions of primary control (r=-.263), and higher life satisfaction was associated with less stress (r=-.504**) and higher perceptions of primary control (r=.340**). On the other hand, illness restriction and life satisfaction were generally unrelated to both measures of secondary control (downgrading and finding benefit). Moreover, the measures of secondary control were unrelated to the three measures of well-being (depression, 2001 illness restriction, and happiness) as assessed five years later.

Table 1

Zero-Order Correlations (r) between the Independent Variables from 1996 and the Dependent Measures from 2001

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	--												
2. Gender	.047	--											
3. Income	-.029	-.394**	--										
4. Marital status	-.365**	-.476**	.174**	--									
5. 1996 illness restriction	.041	.135	-.072	-.118	--								
6. Life satisfaction	-.135*	.020	.122	.097	-.297**	--							
7. Stress	-.021	.011	-.023	.070	.313**	-.504**	--						
8. Downgrading	.130	.153*	-.035	-.132	-.010	-.092	.062	--					
9. Finding benefit	.025	.083	-.079	-.027	-.051	.252**	-.237**	-.060	--				
10. Primary control	-.056	.091	-.009	-.059	-.263	.340**	-.372**	-.020	.244**	--			
11. Depression	.089	.121	-.203**	-.134	.296**	-.470**	.284**	-.026	-.103	-.199**	--		
12. 2001 illness restriction	.133*	.135*	-.045	-.171**	.581**	-.199**	.144*	-.042	.047	-.187**	.273**	--	
13. Happiness	-.105	.020	.082	.041	-.249**	.347**	-.225**	.130	.043	.212**	-.563**	-.314**	--

Note. Factors 1 through 4 are demographic variables from 1996, 5 and 6 are background variables from 1996, 7 is the predictor from 1996, 8 through 10 are the potential moderators from 1996, 11 through 13 are the dependent measures from 2001.

*$p \leq .05$; ** $p \leq .01$.

Interestingly, both stress and primary control continued to relate significantly to well-being as assessed five years later, although the relationships were weaker.

Cross-Sectional Analyses: Demographic and Background Variables on the Psychosocial Variables in 1996

In order to determine which demographic and background factors had the greatest effect on each of the psychosocial variables, multiple regression analyses were used on each of the four psychosocial variables (stress, downgrading, finding benefit, and primary control). These analyses were cross-sectional in nature, assessing participants who had responded to the psychosocial measures of stress, downgrading, finding benefit, and primary control. A summary of the effects of the demographic variables (age, gender, income, and marital status) and the background variables (illness restriction and life satisfaction) on the psychosocial variables is shown in Table 2. The adjusted R^2 (R^2_{adj}) shown at the bottom of the table indicates the variance accounted for by each of the analyses.

With regard to the demographic factors, Table 2 revealed that age marginally affected three of the four psychosocial variables, stress (β=-.089$^+$, p=.08), downgrading (β=.117$^+$, p=.06), and primary control (β=-.112$^+$, p=.06). Income affected only finding benefit (β=-.126*) and marital status affected only stress (β=.099$^+$, p=.08).

With regard to the 1996 background variables of illness restriction and life satisfaction, illness restriction related positively to stress (β=.194***) and

Table 2

Standardized Regression Coefficients, Standard Errors, and R^2s for the Effects of the Demographic and Background Variables on the Psychosocial Variables in 1996

	Psychosocial Variables			
Demographic and Background Variables	Stress	Downgrading	Finding benefit	Primary control
Age	-.089$^+$ (.011)	.117$^+$ (.039)	.022 (.039)	-.112$^+$ (.137)
Gender	.076 (.149)	.096 (.505)	.041 (.514)	.052 (1.785)
Income	.051 (.000)	.016 (.000)	-.126* (.000)	.049 (.001)
Marital status	.099$^+$ (.144)	-.067 (.489)	.006 (.499)	-.076 (1.730)
Illness restriction	.194*** (.007)	-.031 (.023)	.011 (.024)	-.207*** (.083)
Life satisfaction	-.425*** (.017)	-.099$^+$ (.058)	.306*** (.059)	.269*** (.206)
Adjusted R^2	.250	.031	.089	.146
N	349	318	324	301

Note. Standard errors are in parentheses. $^+p \leq .10$; $^*p \leq .05$; $^{***}p \leq .001$.

negatively to primary control (β=-.207***) and life satisfaction related negatively to stress (β=-.425***) and downgrading (β=-.099⁺) and positively to finding benefit (β=.306***) and primary control (β=.269***). The magnitudes of the 1996 background variables' effect parameters suggest that relative to other predictors, life satisfaction had the largest effects on stress (β=-.425***), finding benefit (β=.306***) and primary control (β=.269***). Taken together, the magnitudes of the life satisfaction and 1996 illness restriction betas suggested that the inclusion of these variables in the main regression analyses would indeed make for very conservative estimates of the moderator hypotheses. Out of the four separate analyses of the psychosocial variables, the demographic and background variables explained the greatest amount of variance in stress (R^2_{adj}=25.0%), followed by primary control (R^2_{adj}=14.6%), finding benefit (R^2_{adj}=8.9%), and downgrading (R^2_{adj}=3.1%).

Longitudinal Analyses: Single-Step Analyses of the Moderator Hypotheses

Table 3 shows the effects of the 1996 demographic variables (age, gender, income, and marital status), the 1996 background variables (illness restriction and life satisfaction) and the psychosocial variables (stress, finding benefit, downgrading, and primary control) on the 2001 dependent measures (depression, illness restriction, and happiness). Including the demographic and background variables to control for prior difference in well-being provided a conservative test of the role of psychosocial variables on the 2001 well-being variables.

Table 3

Standardized Regression Coefficients, Standard Errors, and R^2s for the Effects of the Demographic, Background, Psychosocial Variables on Depression, Illness Restriction, and Happiness

Independent Variables from 1996	Dependent Variables from 2001		
	Depression	Illness restriction	Happiness
Age	-.003 (.059)	.034 (.100)	-.064 (.018)
Gender	.010 (.762)	-.006 (1.286)	.062 (.236)
Income	-.139* (.000)	.055 (.001)	.087 (.000)
Marital status	-.098 (.737)	-.099 (1.244)	.047 (.228)
Illness restriction	.121⁺ (.036)	.566*** (.061)	-.119⁺ (.011)
Life satisfaction	-.350*** (.100)	-.084 (.169)	.252** (.031)
Stress	.103 (.287)	-.038 (.485)	-.087 (.089)
Downgrading	-.082 (.086)	-.079 (.145)	.174* (.027)
Finding benefit	-.002 (.085)	.092 (.143)	-.041 (.026)
Primary control	-.035 (.026)	-.025 (.044)	.101 (.008)
Adjusted R^2	.238	.341	.155
N	226	244	218

Note. Standard errors are in parentheses. $^{+}p \leq .10$; $^{*}p \leq .05$; $^{**}p \leq .01$; $^{***}p \leq .001$.

The analyses shown in Table 3 will subsequently be referred to as the "basic" analyses because they include all of the independent variables other than the stress-control belief interaction variables. The adjusted R^2 (R^2_{adj}), a statistic indicating the variance accounted for by each of the basic analyses, is given at the bottom of Table 3. In considering the relationships between the demographic variables and the three dependent variables, income negatively affects depression (β=-.139*), suggesting that people with higher incomes experience less stress. In contrast, age, gender, and marital status do not affect any of the dependent measures.

With regard to the 1996 background variables relating to the 2001 dependent measures, 1996 illness restriction marginally affects depression (β=.121$^+$) and happiness (β=-.119$^+$, p=.10), and strongly affects 2001 illness restriction (β=.566***), which is understandable because these two variables are identical except for being measured five years apart. In contrast, life satisfaction strongly affects depression (β=-.350***) and happiness (β=.252**), but does not affect 2001 illness restriction.

In consideration of the relationships between the psychosocial variables and the dependent measures, only downgrading positively affects happiness (β=.174*). Out of the three basic analyses shown in Table 3, the demographic, 1996 background, and psychosocial variables combined explained the greatest amount of variance in 2001 illness restriction (R^2_{adj}=34.1%), followed by depression (R^2_{adj}=23.8%) and happiness (R^2_{adj}=15.5%).

Moderating Effects and Collinearity

Prior to describing the findings relevant to the moderating effects of the control beliefs on the relationship between stress and well-being, a brief review of the criteria for moderator effects is provided. In addition, because as described later, collinearity was evident in the subsequent analyses, a review of collinearity is provided.

Criteria for moderator effects. Moderating variables can be continuous (e.g., control beliefs) or discrete (e.g., gender), and they influence the strength and/or direction of the relationship between an independent and a dependent variable (Baron and Kenny, 1986). If the independent variables in a study are not correlated, and the interaction between the predictor and the moderator on the dependent variable is significant, the moderator hypothesis is considered supported (Baron and Kenny, 1986). The main effects may also be significant, but according to Baron and Kenny (1986), these "are not directly relevant conceptually to testing the moderator hypothesis" (p. 1174). The authors qualify this by stating that in order to have a clearly interpretable interaction, the moderator should not be correlated with either the predictor or the dependent variables. Although other researchers have used the terms "interaction" and "moderator effect" synonymously (Jaccard, Turrisi, & Wan, 1990), Baron and Kenny's (1986) more stringent criteria for moderator effects will be used here. For the purposes of this study, significant correlations will be used to determine associations.

The problem of collinearity. Collinearity occurs in multiple regression analyses in which independent variables are strongly correlated (e.g., 0.8 to 0.9; Fox, 1991, p.12). According to Maruyama (1998), collinearity gives rise to beta weights that cannot be trusted, and is easily diagnosed by examining regression results for various symptoms, including inappropriate signs or radical changes in beta weights resulting from the inclusion of single variables (also known as "bouncing betas"), large beta coefficients, and variance inflation factors (VIF) greater than 6 or 7. Although all VIFs were obtained for all variables in all three analyses, only those greater than 6 are reported for ease of presentation. Maruyama (1998) suggests that if collinearity is present in regression analyses, it creates problems for the interpretation of the effect parameters. Because collinearity was detected in the present analyses, the beta coefficients of the interaction variables may not be reasonable in magnitude. To further consider this, it was important to examine the changes in R squared for the basic models and the expanded models.

Longitudinal Analyses: Examining the Moderating Effects of Control Beliefs

The final set of regression analyses test the moderating effects of control beliefs on the relationship between stress and well-being (see Table 4). This involved testing the "expanded model" that included each of the variables from the previously described "basic analyses", in addition to the interaction term between stress and one of the control beliefs. Thus, the "expanded" analyses presented in Table 4 differed from the "basic" analyses presented in Table 3 in

Table 4

Standardized Regression Coefficients, Standard Errors, and R^2s for the Basic Models and the Stress-Control Interactions on the Dependent Measures in 2001

Independent Variables from 1996	Dependent Variables from 2001					
	Depression	Depression VIF	Illness restriction	Illness restriction VIF	Happiness	Happiness VIF
Age	-.018 (.059)		.040 (.098)		.044 (.017)	
Gender	.007 (.758)		.021 (1.281)		.076 (.208)	
Income	-.154* (.000)		.067 (.001)		.128* (.000)	
Marital status	-.091 (.734)		-.041 (1.288)		.216** (.211)	
Illness restriction	.112^{+} (.036)		.601*** (.062)		-.053 (.010)	
Life satisfaction	-.365*** (.100)		-.077 (.166)		.216** (.027)	

Table 4 (continued)

Independent Variables from 1996	Dependent Variables from 2001					
	Depression	Depression VIF	Illness restriction	Illness restriction VIF	Happiness	Happiness VIF
Stress (S)	.688^{+} (1.367)	33.885	.830* (2.393)	37.209	2.527*** (.399)	37.437
Downgrading (D)	.255 (.284)	11.847	-.050 (.145)		.228*** (.024)	
Finding benefit (FB)	.003 (.084)		.551** (.434)	11.142	.063 (.024)	
Primary control (PC)	-.032 (.026)		-.043 (.044)		1.441*** (.021)	10.876
S x D	-.688^{+} (.071)	44.819	--		--	
S x FB	--		-.928** (.099)	40.863	--	
S x PC	--		--		-2.465*** (.005)	32.046
Adjusted R^2	.245		.360		.347	
N	226		244		218	

Note. Standard errors are in parentheses. VIF = Variance Inflation Factor. $^{+}p\leq.10$; $^{*}p\leq.05$; $^{**}p\leq.01$; $^{***}p\leq.001$.

that they each included one stress-control belief interaction term. Three regressions were conducted on each of the three dependent measures, depression, illness restriction, and happiness, each time including only one of the three possible interaction terms (i.e., stress-downgrading, stress-finding benefit, and stress-primary control, respectively). In order to retain an *N*-size above 20 cases per independent variable and adequate statistical power, the three interaction terms were included in separate analyses for each of the dependent measures (Lockhart, 1998). However in Table 4, values are reported only for the one interaction coefficient that was most relevant for each dependent variable, and the interaction reported had to be statistically significant.

Depression Analysis: Background and Psychosocial Variables

Beginning with the analysis of depression, a comparison of the Tables 3 and 4 effect parameters associated with the background and psychosocial variables reveals that the relationships were generally in the expected directions. Specifically, income and life satisfaction negatively affected depression, whereas illness restriction and stress positively affected depression. However, consideration of Tables 3 and 4 also revealed signs of collinearity (Maruyama, 1998). Specifically, the change in the magnitude of the stress beta (.103 in Table 3 and .688^{+} in Table 4), and its increased standard error (.287 in Table 3 and 1.367 in Table 4) when the stress-downgrading interaction term was added, makes these effect parameters questionable. The large variance inflation factors (VIF) that resulted from including the stress-downgrading interaction term and its component parts (stress and downgrading) further indicated the presence of the collinearity.

The stress-downgrading interaction. To determine whether the stress-downgrading interaction (Table 4) accounted for a significant amount of variance in depression above and beyond that shown in the basic analysis (Table 3), the ΔR^2_{adj} between the basic and expanded depression analyses in Tables 3 and 4 were considered. As shown in Table 5, the depression R^2_{adj} increased from 23.8% in the basic depression analysis (Table 3) to 24.5% in the expanded depression analysis (Table 4). According to the *F*-ratio calculations described at the bottom of Table 5, this 0.7% increase in the variance accounted for by the stress-downgrading interaction was significant at the $p \leq .05$ level. This means that the interaction of stress and downgrading accounts for a significant amount of the variance in the 2001 depression measure above and beyond that of the independent variables shown in Table 3. However, it did not shed any light on the nature of the interaction. With regard to the moderator hypothesis, since downgrading did not correlate with stress or depression (see Table 1), the downgrading-stress interaction met Baron and Kenny's (1986) essential criteria for moderating effects. As such, the downgrading-stress interaction was considered to support the moderator hypothesis.

Interpretation of the moderator effect of downgrading. Keeping in mind the limitations imposed by the presence of collinearity, an attempt was made to

Table 5

Comparison of the Variance Accounted For in the 2001 Dependent Measures by the Basic Models and the Expanded Models

	R^2		
	Depression	2001 illness restriction	Happiness
Basic Model (BM)	.238	.341	.155
BM + (S x D)	.245	--	--
BM + (S x FB)	--	.360	--
BM + (S x PC)	--	--	.347
$\Delta R^2_{\text{BM-BM + I}}$	.007*	.019***	.192***

Note. S = Stress, PC = Primary Control, FB = Finding Benefit, D = Downgrading, I = Interaction Term. The F-ratio formula used to determine significance of ΔR^2 is:

$$F = \frac{(R^2_2 - R^2_1) / (k_2 - k_1)}{(1 - R^2_2) / (N - k_2 - 1)},$$

where R_2 is the multiple R for the expanded equation, R_1 is the multiple R for the original equation, k_2 is the number of predictors in the expanded equation, k_1 is the number of predictors in the original equation, and N is the total sample size. The resulting F is distributed with $k_2 - k_1$ and $N - k_2 - 1$ degrees of freedom.

" -- " = $R^2 \leq$ Basic Model. $^*p \leq .05$; $^{***}p \leq .001$.

examine the nature of the joint effects of secondary control (downgrading) and stress on depression. This was done by solving the regression equation using the unstandardized betas from the expanded depression analysis in Table 4. Specifically, the continuous variables were represented in the regression equation by the products of their unstandardized betas and the respective means of the variables age, income, illness restriction, life satisfaction, stress, downgrading, finding benefit, and primary control. The dichotomous variables gender and marital status were represented in the regression equation by the products of their unstandardized betas (taken from the depression analysis shown in Table 4) and the coefficients representing the most commonly-occurring individuals in the sample (i.e., female and married). All products were then added to the unstandardized beta of the constant, yielding a coefficient that could be graphed as shown in Figure 2. The regression equation was solved in this manner such that four different points were calculated: high stress (S)-high downgrading (D), high S-low D, low S-high D, and low S-low D. Specifically, the high and low values of S and D were calculated at one standard deviation (SD) above and one standard deviation below the mean (Tabachnik & Fidell, 2001, p.152). The four calculated points were then plotted on the graph, and lines were extrapolated through them to represent the effect of the interaction between stress and downgrading on depression (see Figure 2).

In sum, Figure 2 suggests that during times of high stress, downgrading buffers the positive relationship between stress and depression. Moreover the

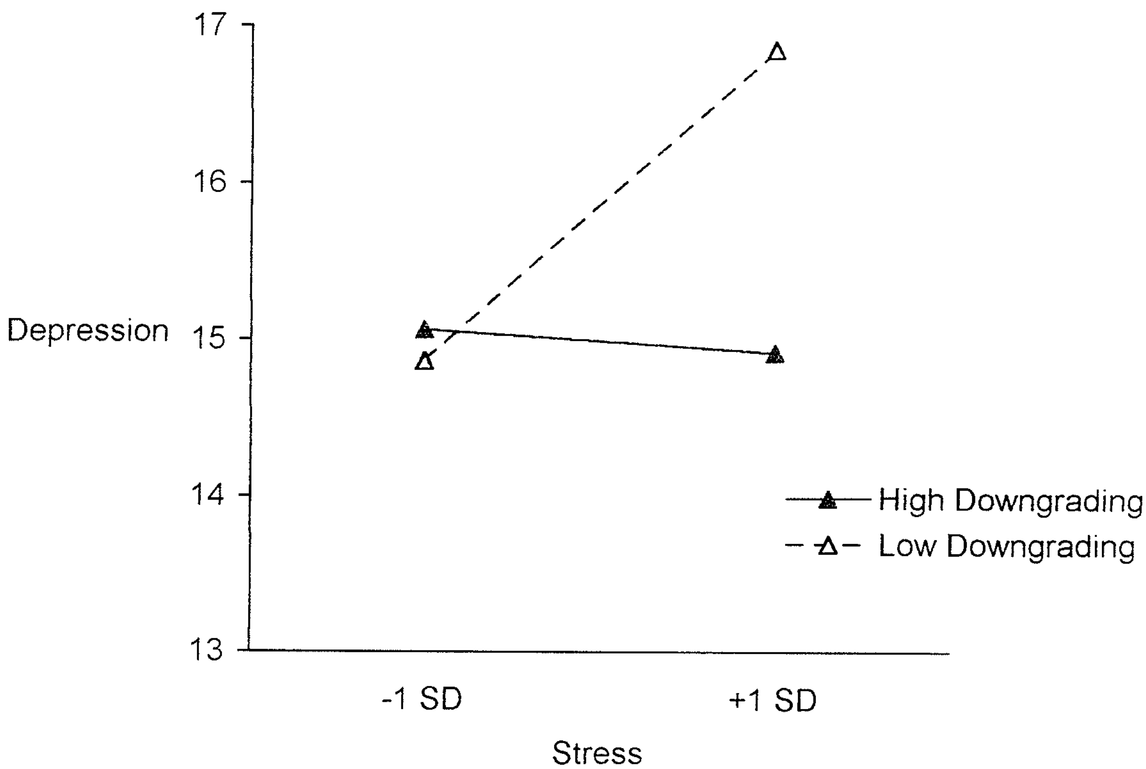


Figure 2. Downgrading buffering the relationship between stress in 1996 and depression in 2001. Covariates included: Age, gender, income, marital status, T1 illness restriction, T1 life satisfaction, stress, finding benefit, downgrading, and primary control.

interaction pattern suggests that in individuals high in downgrading, stress does not relate to depression five years later. Again, it is important to point out that, due to the statistical problem of collinearity, it is possible that the pattern of effects shown in Figure 2 is not a completely accurate depiction of the moderating effect of downgrading on the stress-depression relationship. What can be said with certainty, however, is that downgrading and stress do indeed interact in some way to predict depression, and Figure 2 reflects one possible pattern of findings.

Illness Restriction Analysis: Background and Psychosocial Variables

As shown in the illness restriction analysis in Table 4, the only background variable that affected illness restriction in 2001 was illness restriction in 1996 (β=.601***). Further, although higher levels of the psychosocial variables stress and finding benefit were found to positively predict 2001 illness restriction (β=.830* and β= .551**, respectively) these effect parameters were not likely reliable (Maruyama, 1998). Specifically, the changes in magnitude and direction of the stress and finding benefit betas in response to the addition of the stress-finding benefit interaction term rendered the effect parameters in the 2001 illness restriction analysis unbelievable (compare with the illness restriction analyses in Table 3). Moreover, the large variance inflation factors (VIF) that resulted from including the stress-finding benefit interaction term and its component parts (stress and finding benefit) were further evidence of the presence of the collinearity in Table 4 that rendered the betas in the analysis of 2001 illness restriction unreliable (Maruyama, 1998).

The stress-finding benefit interaction. To determine whether the stress-finding benefit interaction accounted for a significant amount of variance in 2001 illness restriction above and beyond the corresponding basic analysis shown in Table 3, the change in adjusted R^2 between the basic and expanded 2001 illness restriction analyses shown in Tables 3 and 4 were examined. As Tables 3 and 4 suggest, the 2001 illness restriction R^2_{adj} increased from 34.1% in the basic analysis (Table 3) to 36.0% in the expanded analysis (Table 4). According to the F-ratio calculations described at the bottom of Table 5, this 1.9% increase in the variance accounted for by the stress-finding benefit interaction was significant at the $p \leq .001$ level. This meant that the combination of stress and finding benefit accounted for a significant amount of the variance in the 2001 illness restriction dependent measure above and beyond that of the independent variables in the illness restriction analysis shown in Table 3.

Nature of the interaction effect. In order to determine the nature of the stress-finding benefit interaction on illness restriction in 2001, the interaction pattern was graphed using the same procedure outlined for the stress-downgrading interaction. Specifically, the high and low values of stress and finding benefit were calculated at one standard deviation above and one standard deviation below the mean (Tabachnik & Fidell, 2001, p.152). Figure 3 suggests that during times of low stress, secondary control in the form of finding

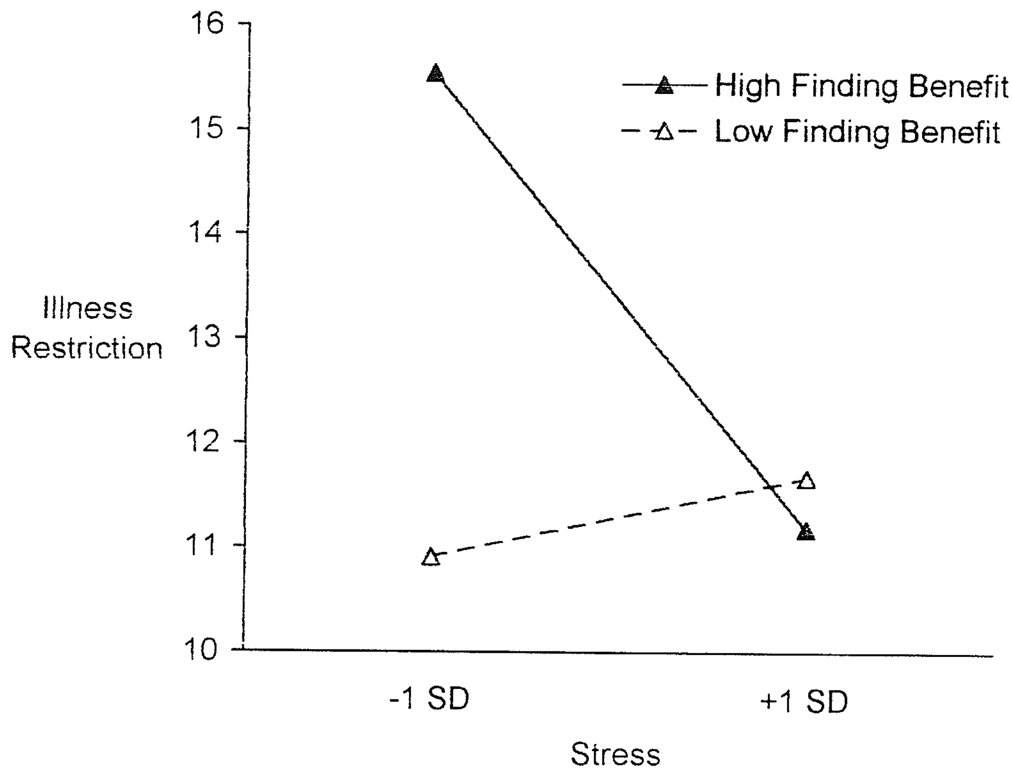


Figure 3. Finding benefit interacting with stress in 1996 on illness restriction in 2001. Covariates included: Age, gender, income, marital status, T1 illness restriction, life satisfaction, stress, finding benefit, downgrading, and primary control.

benefit relates to greater illness restriction. In light of previous work, this finding is contrary to the expectation that secondary control positively influences well-being (for instance, Affleck et al., 1987). However, most previous work that considered the relationship between secondary control and well-being did not take into account the effects of stress. Once again, the collinearity problems imply that the form of the interaction in Figure 3 may not accurately reflect the true manner in which secondary control and stress interact to predict illness restriction.

Happiness Analysis: Background and Psychosocial Variables

As shown in Table 4, happiness was predicted by several background variables. Specifically, happiness was positively predicted by income and marital status (β=.128* and β=.216**, respectively). Further, life satisfaction in 1996 positively predicted happiness (β=.216**). Although higher levels of the psychosocial variables stress, downgrading, and primary control were found to positively predict happiness (β=2.527***, β=.228***, and β= 1.441*** respectively), these effect parameters are not likely reliable (Maruyama, 1998). That is, comparisons of the results in Table 4 suggest that the effect parameters in the happiness analysis are suspect. This is specifically implied by the changes in magnitude and direction of the stress and primary control betas in response to the addition of the stress-primary control interaction term (compare the happiness analyses in Tables 3 and 4). The large variance inflation factors (VIF) that resulted from including the stress-primary control interaction term and its component parts (stress and primary control) in the expanded happiness analysis were additional evidence of the presence of collinearity.

The stress-primary control interaction. To determine whether the stress-primary control interaction accounted for a significant amount of variance in happiness above and beyond that of the basic analysis shown in Table 3, the change in adjusted R^2 between the basic and expanded happiness analyses in Tables 3 and 4 was examined. As shown in Table 5, the happiness adjusted R^2 increased from 15.5% in the basic analysis (Table 3) to 34.7% in the expanded analysis (Table 4). According to the *F*-ratio calculations outlined at the bottom of Table 5, this 19.2% increase in the variance accounted for by the stress-primary control interaction variable was significant at the $p \leq .001$ level. This meant that the combination of stress and primary control accounted for a significant amount of the variance in the happiness measure above and beyond that of the independent variables in the basic happiness analysis.

Nature of the interaction effect. In order to determine the nature of the stress-primary control interaction on happiness the interaction was graphed. Figure 4 was graphed using the same procedure outlined earlier, in which high and low values were calculated and plotted for stress and primary control at one standard deviation above and one standard deviation below the mean (Tabachnik & Fidell, 2001, p.152). Once again it is necessary to point out that due to the collinearity problems stemming from including the interaction term and

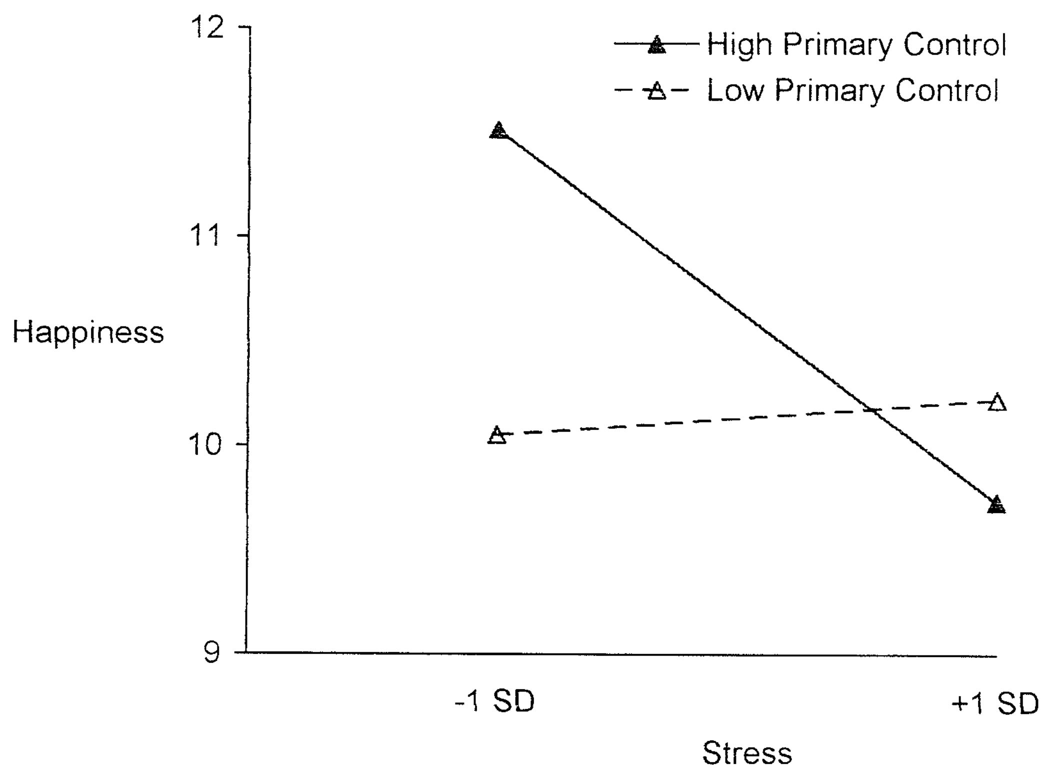


Figure 4. Primary control interacting with stress in 1996 on happiness in 2001. Covariates included: Age, gender, income, marital status, T1 illness restriction, life satisfaction, stress, finding benefit, downgrading, and primary control.

its component parts in the same regression model, Figure 4 may not accurately represent the interaction effect of primary control and stress on happiness.

Nonetheless, with further regard to all three analyses of the dependent measures, using the R squared change statistic it was possible to determine the change in the amount of variance accounted for between the comparable depression, illness restriction, and happiness analyses shown in Tables 3 and 4. The levels of significance in each change in R^2 between each pair of comparable analyses in Tables 3 and 4 confirmed what the previously unbelievable collinearity-laden interaction-term betas suggested, that each of the three stress-control belief interactions accounted for significant increases in the variances in separate dependent measures above and beyond that accounted for by the other independent variables. Specifically, downgrading moderated the positive relationship between stress in 1996 and depression in 2001 (see Table 5, $\Delta R^2_{\text{BM-BM+I}}$ =.7%*), finding benefit interacted with stress in 1996 to negatively predict illness restriction in 2001 (Table 5, $\Delta R^2_{\text{BM-BM+I}}$ = 1.9%***), and primary control interacted with stress in 1996 to negatively predict happiness in 2001 (Table 5, $\Delta R^2_{\text{BM-BM+I}}$ = 19.2%***).

Discussion

The findings from this study suggest that an examination of psychosocial variables such as primary- and secondary-control beliefs can help shed light on the stress-well-being relationship. Even with Time one demographic and background variables controlled, each of the three types of control beliefs examined interacted with stress to predict measures of well-being five years later. Interestingly, the presence of the control belief-stress interactions differs depending upon the type of control belief involved (i.e., primary or secondary control) and the measure of health or well-being considered (i.e., depression, illness restriction, or happiness). A discussion of the analyses ensues, followed by a more detailed look at the relationships between the background variables and the psychosocial variables (cross-sectional analyses), and the 1996 psychosocial variables on the 2001 dependent measures.

Cross-Sectional Analyses: Demographic Factors and Psychosocial Variables in 1996

Analyses of the potential relationships between the demographics and the psychosocial variables yielded a significant finding: those with higher incomes reported lower levels of secondary control in the form of finding benefit. This finding makes conceptual sense if being better off financially brings with it associated problems, such as being in a higher tax bracket and having to pay income tax. Such a situation could conceivably dampen one's likelihood of finding benefit, and fits with the common folk expression that, "Money is the root of all evil". With further regard to the relationships between demographic variables and control beliefs, with increasing age individuals experienced less stress, lower primary control, and higher secondary control in the form of downgrading importance. These findings are consistent with the work of Heckhausen and Schulz (1998) which suggests that as age increases, primary control decreases and secondary control increases.

Cross-Sectional Analyses: Background Factors and Psychosocial Variables in 1996

The relationships between the background variables (prior illness restriction and life satisfaction) on the psychosocial variables were not surprising. For example, the strong relationship between illness restriction and stress at Time one suggests that individuals experiencing illness restriction perceive more stress, perhaps as a direct result of those restrictions. In addition, the finding that Time one illness restriction relates negatively to primary control is understandable in that if one feels restricted by illness, one may not feel able to take direct action. This is consistent with past research on primary control and well-being, (for instance, Chipperfield & Greenslade, 1999; Menec, Chipperfield, & Perry, 1999). Moreover, with regard to prior life satisfaction relating to the psychosocial variables, the fact that individuals who report greater life satisfaction also experienced lower levels of stress and higher levels of primary and secondary control was to be expected. To the extent that life satisfaction can be considered a measure of well-being, these findings are consistent with the large body of literature on perceived control positively predicting well-being (for instance, Schulz & Heckhausen, 1999; Chipperfield et al., 2004; Thompson et al., 1994; Fiske & Taylor, 1991; Affleck et al., 1987; Croog & Levine, 1987; Baltes & Baltes, 1986; Langer & Rodin, 1976; Menec et al., 1999; Chipperfield, 1993; Carver et al., 1993). The predominantly highly significant effect parameters of Time one illness restriction and life satisfaction on the psychosocial variables suggested that their inclusion in the subsequent longitudinal analyses indeed provided a highly-conservative restriction on the research hypotheses.

Longitudinal Analyses: Psychosocial Variables in 1996 and Well-Being in 2001

Before discussing the results relevant to the moderating effects of control beliefs on the relationship between stress and subsequent well-being, the individual effects of control beliefs are summarized. The only relationship found in which one of the control beliefs significantly predicted a measure of well-being was that of downgrading positively predicting happiness. This relationship makes sense to the extent that downgrading (or reinterpreting the importance of a negative event) makes people more relaxed and consequently less worried about troublesome situations or events, thereby increasing their likelihood of experiencing happiness. Further, although not significant, downgrading was associated with less depression and less illness restriction in 2001. These findings were consistent with past research on interpretive secondary control positively predicting well-being (for instance, Chipperfield & Perry, 2004;

Thompson et al., 1994; Carver et al., 1993; Affleck et al., 1987; Croog & Levine, 1982).

Secondary Control as a Buffer of Stress and Well-Being

The main hypotheses in this thesis were supported in that secondary interpretive control in the form of downgrading importance was found to buffer the deleterious effects of stress on depression. Furthermore, the interaction between stress and downgrading qualified as a true moderator effect in that it met Baron and Kenny's (1986) two essential criteria for moderators: (a) the interaction between stress (the predictor) and downgrading (the moderator) on depression (the dependent variable) was significant (see Table 4), and (b) the interaction was clearly interpretable because downgrading (the moderator) did not correlate with either the predictor, stress, or the dependent measure, depression (see Table 1).

Although the statistical complications outlined in the Results section necessitated interpreting the interaction findings with caution, to the extent that Figure 2 depicts the combined effects of stress and downgrading on depression, the results suggest that, in individuals experiencing high levels of stress, those who use downgrading are less depressed than their counterparts who do not use this form of secondary control. This specifically suggests that downgrading guards against the depression associated with high levels of stress. Moreover, the interaction pattern suggests that the positive relationship between stress and depression did not exist among individuals who downgraded the importance of various domains relevant to later life such as health.

To the extent that downgrading can be considered a form of compensatory secondary control, these findings are consistent with previous work suggesting that compensatory secondary control buffers the consequences of inevitable negative events that occur over the lifespan (Heckhausen & Schulz, 1998; Rothermund & Brandstadter, 2003). In short, as hypothesized, the present findings suggest that secondary control may benefit individuals most during times of high stress.

With further regard to secondary control interacting with stress to affect well being, Figure 3 suggests that finding benefit, another type of secondary interpretive control, interacted with stress to predict subjective illness restriction five years later. It is important to note here that the interaction between finding benefit and stress did not qualify as a true moderator effect, because as shown in Table 1, finding benefit (the potential moderator) correlated significantly with the predictor stress (Baron & Kenny, 1986). Thus, the interaction findings must be interpreted with caution. Nonetheless, to the extent that Figure 3 depicts the combined effects of stress and finding benefit on illness restriction, the results suggest that high secondary control may not always promote well-being, particularly during times of low stress. Although not expected, this finding is consistent with literature suggesting that the use of secondary control may not always be beneficial (Heckhausen & Schulz, 1998) or may not be beneficial for all individuals (Chipperfield & Perry, 2004). Given that individuals engage in secondary control over the adult lifespan (Heckhausen & Schulz, 1998, p.54), the notion that secondary control may not be beneficial during times of low stress is important to consider.

Primary Control-Stress Interaction on Happiness

Although primary control (i.e., perceived influence) interacted with stress to predict happiness five years later, it is important to note that the interaction did not qualify as a true moderator effect because primary control (the potential moderator) correlated with the predictor stress and the dependent measure happiness (Baron & Kenny, 1986). In addition, the pattern is inconsistent with that of a buffer effect. Nonetheless, for individuals experiencing low levels of stress, the findings are consistent with past research on primary control positively predicting well-being (for instance, Chipperfield et al., 2004; Schulz & Heckhausen, 1999; Affleck et al., 1987). Under these conditions, primary control beliefs corresponded to more happiness. Stated differently, under conditions of high stress, primary control made very little difference to happiness.

What differentiated the present study from many previous studies on the moderating effects of control beliefs on stress and well-being was that this study sample comprised almost 40% of individuals ages 80 years and up. Since previous work suggests that old-old individuals may face age-related challenges differently from their young-old peers (Heckhausen & Schulz, 1998; Menec & Chipperfield, 1997) the large number of old-old participants in the present study sample may have accounted for primary control not making much difference to happiness during times of high stress.

Although the statistical complications outlined indicated that the interaction findings should be interpreted with caution, to the extent that Figure 4 illustrates an approximate account of how the combined effects of stress and primary control relate to happiness, these results suggest that high primary control promotes psychological well-being, but only during times of low stress. In short, under conditions of low stress, this finding is consistent with previous work on the positive relationship between primary control and psychological well being (for instance, Chipperfield et al., 2004; Schulz & Heckhausen, 1999; Fiske & Taylor, 1991; Schulz, 1976).

In sum, the results from Figures 3 and 4 suggest that when stress levels are low, well-being is more positively influenced by primary control and more negatively influenced by secondary control. The evidence also suggests that when stress levels are high, secondary control has stronger consequences for individual well-being (see Figure 2). If optimal levels of primary and secondary control differ depending on variables like age and gender as previous research suggests (Heckhausen & Schulz, 1998; Chipperfield et al., 1999; Chipperfield & Perry, 2004), it is conceivable that optimal levels of control may also differ depending on stress level. If this is indeed the case, these findings may hold implications for improving stress-related well-being in older individuals.

Limitations and Strengths

Similar to other studies, this study inherently possessed several limitations and several strengths. First, as with any secondary analysis of data, measurement limitations exist. For example, the perceived stress measure in the present study was made up of only two correlated items. This was not enough to secure an acceptable alpha reliability or to capture the multi-dimensional nature of perceived stress that would become more evident with a multi-item perceived-stress scale (e.g., Cohen, et al., 1983). Nonetheless, the two items used were the only perceived stress items available in the datasets. A second issue in the present study was that since happiness and depression were somewhat highly correlated (see Table 1) they could be redundant measures. However, just because one is unhappy, does not necessarily mean one is depressed. Thus, including both measures in the analyses is justifiable. A third limitation was the loss of subjects over time due to mortality. Specifically, when the Time 2 dependent variables were measured, what remained was a sample of the hardiest survivors. This means that the present findings are only generalizeable to this particular population.

A noteworthy strength of this study was its longitudinal design, specifically, analyses of the relationships between the independent variables measured in 1996, and the dependent variables measured five years later. On that note, although many other confounding variables may have worked to indirectly account for well-being through stress or control, by statistically adjusting for several commonly-considered background variables, their effects were at least eliminated. Moreover, by including the background variables as statistical controls, the analyses were very conservative in nature. For instance, in the three separate longitudinal models shown (Table 3), prior life satisfaction and illness restriction accounted for a considerable amount of the variance on the dependent measures, not leaving much to be distributed amongst the remaining independent variables. However, despite the inclusion of these powerful statistical controls, the expected interactions emerged between primary- and secondary control beliefs and stress on three separate indicators of well-being in the representative sample under consideration. This allows for more confidence in concluding that the psychosocial variables play a role in the subsequent health and well-being of older individuals.

Conclusion

The findings from this study suggest that depending on the circumstances, primary and secondary control may differ in their implications for the well-being of older people. That is, under conditions of low stress, primary control appears to have positive consequences for psychological well-being in the form of happiness and secondary control has negative consequences for physical well-being in the form of illness restriction. Conversely, the results from this study suggest that when stress levels are high, secondary control has positive consequences for physical well-being in that it may suppress depression.

To the extent that primary control can be considered a problem-focused way of managing stress and secondary control an emotion-focused way, these findings are consistent with the work of Folkman and Lazarus (1980) which suggests that primary control most often has positive effects in situations where individuals feel that they can positively influence events (presumably in times of low stress), whereas secondary control has positive effects when people feel that the stress they are under is something they must endure. Moreover, in light of Chipperfield and Perry's (2004) finding that optimal levels of primary and secondary control differ by gender, and Heckhausen and Schulz's (1998) suggestion that optimal levels of primary and secondary control levels differ by age, it is conceivable that optimal levels of primary and secondary control could differ depending on level of stress. That is, since previous work suggests that optimal levels of primary and secondary control are affected by variables like gender and age (Chipperfield & Perry, 2004; Heckhausen & Schulz, 1998) it follows that optimal control levels may similarly be influenced by perceived stress.

To the extent that the figures accurately depict the existing relationships between control beliefs, stress, and well being, this research may hold implications for the design of interventions aimed at incorporating secondary interpretive control to help older individuals manage stress. Findings from this study highlight the downgrading importance aspect of interpretive control as being particularly important for older people, at least with regard to depression.

This is consistent with previous work suggesting that interpretive secondary control holds high potential for improving the lives of older individuals (Rothermund & Brandstädter, 2003; Rothbaum, et al., 1982; Frankl, 1963).

References

Abramson, L. Y., Garber, J. & Seligman, M. E. P. (1980). Learned helplessness in humans: An attributional analysis. In J. Garber & M. Seligman (Eds.), *Human helplessness: Theory and applications* (pp. 3-34). Toronto: Academic Press.

Affleck, G., Tennen, H., Croog, S., & Levine, S. (1987). Causal attribution, perceived control, and recovery from a heart attack. *Journal of Social and Clinical Psychology, 5*(3), 339-355.

Amundson, M. E., Hart, C. A., & Holmes, T. H. (1981). Manual for the Schedule of Recent Experience (SRE). In T. H. Holmes & E. M. David (Eds.), *Life change, life events, and illness* (pp. 125-148). New York: Praeger.

Anderson, C. A., & Arnoult, L. H. (1989). An examination of perceived control, humor, irrational beliefs, and positive stress as moderators of the relation between negative stress and health. *Basic and Applied Social Psychology, 10*(2), 101-117.

Anderson, D. E. & Chesney, M. A. (2002). Gender-specific association of perceived stress and inhibited breathing pattern. *International Journal of Behavioural Medicine, 9*(3), 216-227.

Andresen, E. M., Carter, W. B., Malmgren, J. A., & Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American Journal of Preventive Medicine, 10*(2), 77-84.

Bailis, D. S., & Chipperfield, J. G. (2002). Compensating for losses in perceived personal control over health: A role for collective self-esteem in healthy aging. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 57B*(6), P531-P539.

Bailis, D. S., Chipperfield, J. G., & Perry, R. P. (2004). *Optimistic social comparisons of older adults low in primary control: A prospective analysis of hospitalization and mortality.* Unpublished manuscript.

Baltes, M. M., & Baltes, P. B. (1986). *The psychology of control and aging.* Hillsdale, NJ: Erlbaum.

Baltes, M. M., & Baltes, P. B. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1-34). Cambridge, England: Cambridge University Press.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology, 56,* 246-256.

Cannon, W. B. (1932). *The wisdom of the body.* New York: Norton.

Carter, W., & Patrick, D. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American Journal of*

Preventative Medicine, 10(2), 77-82.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., Moffat, F. L. Jr. & Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology, 65*(2), 375-390.

Chipperfield, J. G. (1993). Perceived barriers in coping with health problems: A twelve- year longitudinal study of survival among elderly individuals. *Journal of Aging and Health, 5*(1), 123-139.

Chipperfield, J. G., Campbell, D. W., & Perry, R. P. (2004). Stability in perceived control: Implications for health among very old community-dwelling adults. *Journal of Aging and Health, 16*(1), 116-147.

Chipperfield, J. G., & Greenslade, L. (1999). Perceived control as a buffer in the use of health care services. *Journal of Gerontology: Psychological Sciences, 54B*(2), P1-P9.

Chipperfield J. G., & Havens, B. (2001). Gender differences in the relationship between marital status transitions and life satisfaction in later life. *Journal of Gerontology: Psychological Sciences, 56B*(3), P1-P11.

Chipperfield, J. G., Havens, B., & Doig, W. (1997). Method and description of the Aging in Manitoba project: A 20-year longitudinal study. *Canadian Journal on Aging, 16,* 606-625.

Chipperfield, J. G., & Perry, R. P. (2004). *Primary- and secondary-control* *enhancing strategies in later life: Gender differences in strategy use as predictors of hospital outcomes.* Unpublished manuscript.

Chipperfield, J. G., Perry, R. P., & Bailis, D. S. (2004). *Contextualizing Primary- and Secondary-Control Strategies in Later Life.* Unpublished manuscript.

Chipperfield, J. G., Perry, R. P., Hladkyj, S., & Volk, J. (2003). *The Successful Aging Study (1996): Description and methods.* Technical Report, Report Number HLHPRI103, Health, Leisure & Human Performance Research Institute, University of Manitoba, Winnipeg, Manitoba.

Chipperfield, J. G., Perry, R. P., & Weiner, B. (2003). Discrete emotions in later life. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 58B*(1), P23-P34.

Chou, K. L. & Chi, I. (2000). Stressful events and depressive symptoms among old women and men: A longitudinal study. *International Journal of Aging and Human Development, 51*(4), 275-293.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24,* 385-396.

Croog, S. H. & Levine, S. (1982). *Life after a heart attack: Social and psychological factors eight years later.* New York: Human Sciences Press.

Decharms, R., Carpenter, V., & Kuperman, A. (1965). The "origin-pawn" variable in person perception. *Sociometry, 28*(3), 241-258.

Esch, T., Stefano, G. B., Fricchione, G. L., & Benson, H. (2002). Stress in cardiovascular diseases. *Medical Science Monitor, 8*(5), RA93-RA101.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition (2nd ed.).* New York: McGraw-Hill.

Folkman,S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*, 219-239.

Fox, J. (1991). *Regression diagnostics.* Thousand Oaks, CA: Sage.

Frankl, V. E. (1963). *Man's search for meaning: An introduction to logotherapy.* Boston: Beacon.

Freund, A. M., & Baltes, P. B. (2002). The adaptiveness of selection, optimization, and compensation as strategies of life management: Evidence from a preference study on proverbs. *Journal of Gerontology: Psychological Sciences, 57B*(5), P426-P434.

Glass, T. A., Kasl, S. V., & Berkman, L. F. (1997). Stressful life events and depressive symptoms among the elderly. *Journal of Aging and Health, 9(1),* 70-89.

Glass, D. C., & Singer, J. E. (1972). *Urban stress: Experiments on noise and social stressors.* New York: Academic Press.

Harlow, S. D., Goldberg, E. L., & Comstock, G. W. (1991). A longitudinal study of risk factors for depressive symptomatology in elderly widowed and married women. *American Journal of Epidemiology, 134*, 526-538.

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review, 102*(2), 284-304.

Heckhausen, J., & Schulz, R. (1998). Developmental regulation in adulthood:

Selection and compensation via primary and secondary control. In J. Heckhausen & C. S. Dweck (Eds.), *Motivation and self-regulation across the life span* (pp. 50-77). New York, NY: Cambridge University Press.

Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.

Helgeson, V. S. (1992). Moderators of the relation between perceived control and adjustment to chronic illness. *Journal of Personality and Social Psychology, 63*, 656-666.

Hladkyj, S., Chipperfield, J. G., & Perry, R. P. (2000). *Successful Aging Study. Perceived control and health among older individuals: Variable creation and description.* Technical Report, Report Number HLHPRI087, Health, Leisure & Human Performance Research Institute, University of Manitoba, Winnipeg, Manitoba.

Hobfoll, S. E., Schwarzer, R., & Chon, K. K. (1998). Disentangling the stress labyrinth: Interpreting the meaning of the term stress as it is studied in health context. *Anxiety, Stress, and Coping: An International Journal, 11*(3), 181-212.

Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research, 11,* 213-218.

Holt, C. L., Clark, E. M., Kreuter, M. W., & Rubio, D. M. (2003). Spiritual health locus of control and breast cancer beliefs among urban African American women. *Health Psychology, 22*(3), 294-299.

Jaccard, J., Turrisi, R., & Wan, C. K. (1990). *Interaction effects in multiple* *regression.* Newbury Park: Sage Publications.

Jang, M., Mortimer, J. A., Haley, W. E., Chisholm, T. E. H., & Graves, A. B. (2002). Nonauditory determinants of self-perceived hearing problems among older adults: The role of stressful life conditions, neuroticism, and social resources. *Journals of Gerontology: Series A: Biological Sciences and Medical Sciences, 57A*(7), M466-M469.

Katz, R. C., Flasher, L., Cacciapaglia, H., & Nelson, S. (2001). The psychosocial impact of cancer and lupus: A cross validation study that extends the generality of "benefit-finding" in patients with chronic disease. *Journal of Behavioral Medicine, 24*(6), 561-571.

Kivimäki, M., & Lindström, K. (1995). Effects of private self-consciousness and control on the occupational stress-strain relationship. *Stress Medicine, 11,* 7-16.

Kozma, A., & Stones, M. J. (1980). The measurement of happiness: Development of the Memorial University of Newfoundland Scale of Happiness (MUNSH). *Journal of Gerontology, 35*(6), 906-912.

Ladwig, K. H., Lehmacher, W., Roth, R., Breithardt, G., Budde, T., & Borggrefe, M. (1992). Factors which provoke post-infarction depression: Results from the post-infarction late potential study (PILP). *Journal of Psychosomatic Research, 36,* 723-729.

Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting.

Journal of Personality and Social Psychology, 34, 191-198.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lefcourt, H. M. (1976). Locus of control and the response to aversive events. *Ontario Psychologist, 8*(5), 41-49.

Levi, L. (1974). Psychosocial stress and disease: A conceptual model. In E. K. Eric Gunderson & R. H. Rahe (Eds.), *Life stress and illness* (pp. 8-33). Springfield, Il: Charles C. Thomas.

Lockhart, R. S. (1998). *Introduction to statistics and data analysis for the behavioral sciences.* New York: W. H. Freeman and Company.

Maruyama, G. M. (1998). *Basics of structural equation modeling.* Thousand Oaks, CA: Sage Publications.

McLaney, M. A., & Hurrell, J. J. (1988). Control, stress, and job satisfaction in Canadian nurses. *Work and Stress, 2*(3), 217-224.

Menec, V. H., & Chipperfield, J. G. (1997). The interactive effect of perceived control and functional status on health and mortality among young-old and old-old adults. *Journal of Gerontology: Psychological Sciences, 52B*(3), P118-P126.

Menec, V. H., Chipperfield, J. G., & Perry, R. P. (1999). Self-perceptions of health: A prospective analysis of mortality, control, and health. *Journal of Gerontology: Psychological Sciences, 54B*(2), P85-P93.

Mohr, D. C., Dick, L. P., Russo, D., Pinn, J., Boudewyn, A. C., Likosky, W., &

Goodkin, D. E. (1999). The psychosocial impact of multiple sclerosis: Exploring the patient's perspective. *Health Psychology, 18*(4), 376-382.

Neugarten, B. L., Havinghurst, R. J., & Tobin, S. S. (1961). The measurement of life satisfaction. *Journal of Gerontology, 16*(2), 134-143.

Overmier, J. B., & Seligman, M. E. (1967). Effects of inescapable shock upon subsequent escape and avoidance responding. *Journal of Comparative and Physiological Psychology, 63*(1), 28-33.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2-21.

Rahe, R. H., & Holmes, T. H. (1989). Life crisis and disease onset: Qualitative and quantitative definition of the life crisis and its association with health change. In T. H. Holmes & E. M. David (Eds.), *Life change, life events, and illness* (pp. 193-201). New York: Praeger.

Rahe, R. H., Meyer, M., Smith, M., Kjaer, G., & Holmes, T. H. (1964). Social stress and illness onset. In T. H. Holmes & E. M. David (Eds.), *Life change, life events, and illness* (pp. 179-192). New York: Praeger.

Rapkin, B. D., & Fischer, K. (1992). Framing the construct of life satisfaction in terms of older adults' personal goals. *Psychology and Aging, 7*(1), 138-149.

Roberts, B. L., Dunkle, R., and Haug, M. (1994). Physical, psychological, and social resources as moderators of the relationship of stress to mental health of the very old. *Journal of Gerontology: Psychological Sciences,* *49*(1), S35-S43.

Rodin, J. (1986). Personal control through the life course. In R. Abeles (Ed.), *Implications of the life span perspective for social psychology* (pp. 103-120). Hillsdale, NJ: Erlbaum.

Rothbaum, F., Weisz, J. & Snyder, S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology, 42*, 5-37.

Rothermund, K., & Brandtstädter, J. (2003). Coping with deficits and losses in later life: From compensatory action to accomodation. *Psychology and Aging, 18*(4), 896-905.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of *reinforcement. Psychological Monographs, 80.*

Schulz, R. (1976). Effects of control and predictability on the physical and psychological well-being of the institutionalized aged. *Journal of Personality and Social Psychology, 33*(5), 563-573.

Schulz, R., & Heckhausen, J. (1999). Aging, culture and control: Setting a new research agenda. *Journal of Gerontology: Psychological Sciences, 54B*(3), P139-P145.

Seligman, M. E., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology, 74*(1), 1-9.

Selye, H. (1960). The concept of stress in experimental physiology. In Tanner, J. M. (Ed.), *Stress and Psychiatric Disorder.* Oxford: Blackwell.

Shephard, R. J. (1969). *Endurance fitness*. Toronto, ON: University of Toronto Press.

Stones, M. J., Kozma, A., Hirdes, J., & Gold, D. (1996). Short Happiness and Affect Research Protocol (SHARP). *Social Indicators Research, 37*(1), 75-91.

Suh, E., Diener, E. & Fujita, F. (1996). Events and subjective well-being: Only recent events matter. *Journal of Personality and Social Psychology, 70*(5), 1091-1102.

Tabachnik, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.

Tavazzi, L., Zotti, A. M. & Mazzuero, G. (1987). Acute pulmonary edema provoked by psychologic stress: Report of two cases. *Cardiology, 74*(3), 229-235.

Taylor, S. E. (1990). Health psychology: The science and the field. *American Psychologist, 45*(1), 40-50.

Thompson, S. C., Nanni, C., & Levine, A. (1994). Primary versus secondary and central versus consequence-related control in HIV-positive men. *Journal of Personality and Social Psychology, 67*(3), 540-547.

Thompson, S. C., Sobolew-Shubin, A., Galbraith, M. E., Schwankovsky, L., & Cruzen, D. (1993). Maintaining perceptions of control: Finding perceived control in low-control circumstances. *Journal of Personality and Social Psychology, 64,* 293-304.

Updegraff, J. A., Taylor, S. E., Kemeny, M. E., & Wyatt, G. E. (2002). Positive and negative effects of HIV infection in women with low socioeconomic resources. *Personality and Social Psychology Bulletin, 28*(3), 382-394.

Walker, K. L., & Chestnut, D. (2003). The role of ethnocultural variables in response to terrorism. *Cultural Diversity and Ethnic Minority Psychology, 9*(3), 251-262.

Weigel, C., Wertlieb, D., & Feldstein, M. (1989). Perceptions of control, competence, and contingency as influences on the stress-behavior symptom relation in school-age children. *Journal of Personality and Social Psychology, 56*(3), 456-464.

Weiner, B. (1983). Some methodological pitfalls in attributional research. *Journal of Educational Psychology, 75*(4), 530-543.

Weiner, B. (1985a). An attributional theory of achievement motivation and emotion. *Psychological Review, 92,* 548-573.

Zimmer, C., Basler, H. D., Vedder, H., & Lautenbacher, S. (2003). Sex differences in cortisol response to noxious stress. *Clinical Journal of Pain, 19*(4), 233-239.

Appendices

Appendix A: Ethics Approval

A. Health Information Privacy Committee

Manitoba

Health

Health Information
Systems Branch

P.O. Box 925
599 Empress Street
Winnipeg MB R3C 2T6

March 14, 1996

Dr. Judith G. Chipperfield
Associate Professor
University of Manitoba
Faculty of Physical Education
and Recreation Studies
Max Bell Centre
Winnipeg MB R3T 2N2

Dear Dr. Chipperfield:

RE: Aging in Manitoba: Studying Adaptive Strategies

The Access and Confidentiality Committee considered your letter of January 7, 1996 to Dr. M. Dutta requesting access to Manitoba Health's hospital, medical, personal care home and home care services files from January 1993 and Pharmacare records from July 1994.

The Committee agreed to recommend to Manitoba Health that the request be granted subject to the receipt of (a) a consent form for release of Manitoba Health records and (b) Appendix B2, inserting the specific time periods data are requested for in lieu of the expression "as long as you continue to live in Manitoba". It also suggested that the word "urged" be replaced by "invited" in the last paragraph of Appendix B-2. I am pleased to advise that we have accepted the recommendation. Please forward these documents to Dr. Dutta.

Yours truly,

G. Alexander,
Executive Director,
Health Information Services.

GA/bsg

c.c. Dr. Robert D. Walker, College of Physicians and Surgeons of Manitoba

Appendix A: Ethics Approval

B. Education/Nursing Research Ethics Board

FACULTY OF PHYSICAL EDUCATION AND RECREATION STUDIES

COMMITTEE ON RESEARCH INVOLVING HUMAN SUBJECTS

TITLE OF PROPOSAL:

Successful Aging Survey - 1996

PRINCIPAL INVESTIGATOR:

Dr. J. Chipperfield

SPONSORING AGENCY:

The Committee on Research Involving Human Subjects (Faculty of Physical Education and Recreation Studies) has evaluated the above proposal according to the criteria of the University of Manitoba Committee on Research Involving Human Subjects and finds it to be:

X ____ acceptable

____ not acceptable

under the approval category: X Approved; ____ Renewal Approved; ____ Approved in Principle; ____ Tabled; ____ Withdrawn; ____ Denied

June 25, 1996

D. W. Hrycaiko

Dr. D. W. Hrycaiko, Chair

Notes:

Appendix A: Ethics Approval

C. Message Stating that Ethics Approval is Not Required

Audrey Swift

From: "Margaret Bowman" <Margaret_bowman@umanitoba.ca>
To: "Audrey Swift" <audrey_swift@hotmail.com>
Sent: Tuesday, January 20, 2004 4:23 PM
Subject: Re: Master's Thesis - Ethics Approval

Hi Audrey,
Yes, the Tri-Council Guidelines suggest that if the identifiers have been removed from the data then ethics approval is not necessary. The Chair of ENREB, Dr. Stan Straw, suggests that you may wish to get a statement from the original researcher(s) stating that you have permission to access the data and that the data-set given to you cannot identify the original participants.Margaret (Maggie) Bowman
Coordinator, Human Ethics
Research Services & Programs
The University of Manitoba
244 Engineering Building
Winnipeg, Manitoba, R3T 5V6
(204) 474-7122, fax (204) 261-0325

"Get to Know Research . . . at your University"

Appendix B

A. Downgrading Items (Secondary Control): SAS 1996)

"Compared to when you were younger, [say around 40], how important is... "

(0=Less important, 1=About the same, 2=More important)

1. ... socializing with others?
2. ... good health?
3. ... religion/spirituality?
4. ... being in touch with nature?
5. ... your family?
6. ... friendship?
7. ... belonging to groups?
8. ... planning for the future?
9. ... being knowledgeable?
10. ... being efficient at what you do (i.e., getting things done quickly)?
11. ... doing a good job of what you do?

Appendix B: Downgrading

B. Factor Analysis

Communalities

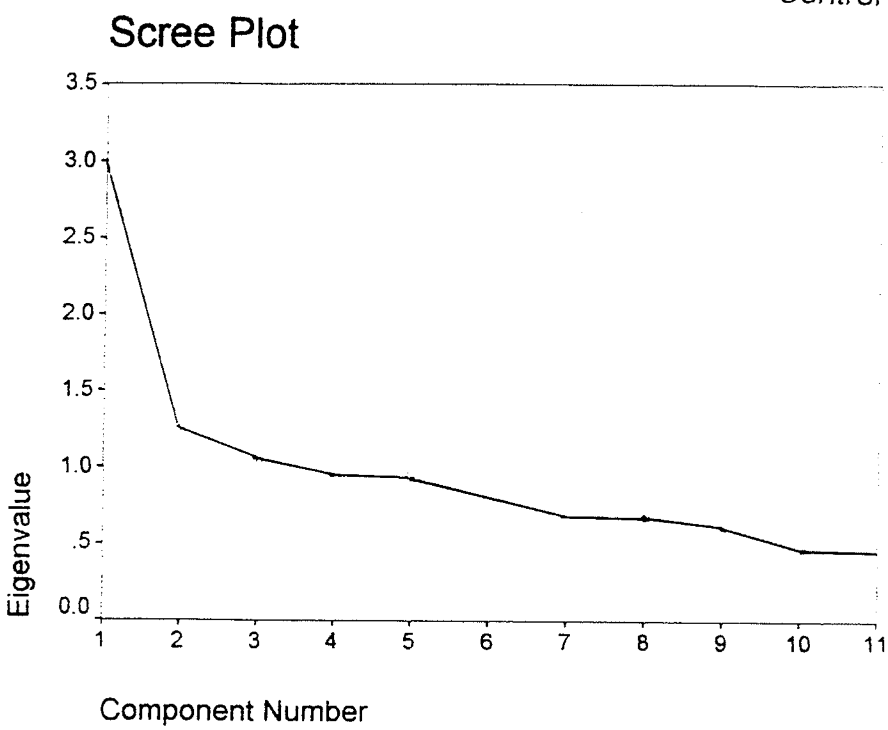
	Initial	Extraction
DWNGRD1A	1.000	.243
DWNGRD2A	1.000	.197
DWNGRD3A	1.000	.157
DWNGRD4A	1.000	.231
DWNGRD5A	1.000	.293
DWNGRD6A	1.000	.344
DWNGRD7A	1.000	.319
DWNGRD8A	1.000	.271
DWNGRD9A	1.000	.343
DWNGR10A	1.000	.311
DWNGR11A	1.000	.309

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.020	27.459	27.459	3.020	27.459	27.459
2	1.259	11.446	38.904			
3	1.069	9.715	48.619			
4	.959	8.714	57.333			
5	.942	8.565	65.898			
6	.813	7.386	73.285			
7	.690	6.268	79.553			
8	.684	6.222	85.775			
9	.623	5.668	91.443			
10	.481	4.373	95.816			
11	.460	4.184	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component 1
DWNGRD6A	.587
DWNGRD9A	.586
DWNGRD7A	.565
DWNGR10A	.558
DWNGR11A	.556
DWNGRD5A	.542
DWNGRD8A	.521
DWNGRD1A	.493
DWNGRD4A	.480
DWNGRD2A	.444
DWNGRD3A	.396

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix B: Downgrading

C. Reliability

```
****** Method 2 (covariance matrix) will be used for this analysis ****
R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A

  1.    DWNGRD1A    dwngrd recoded to eliminate 0's, code 8'
  2.    DWNGRD2A
  3.    DWNGRD3A
  4.    DWNGRD4A
  5.    DWNGRD5A
  6.    DWNGRD6A
  7.    DWNGRD7A
  8.    DWNGRD8A
  9.    DWNGRD9A
 10.    DWNGR10A
 11.    DWNGR11A
```

		Mean	Std Dev	Cases
1.	DWNGRD1A	1.9447	.7049	217.0
2.	DWNGRD2A	1.3318	.4912	217.0
3.	DWNGRD3A	1.8203	.6236	217.0
4.	DWNGRD4A	1.7788	.5417	217.0
5.	DWNGRD5A	1.3410	.5035	217.0
6.	DWNGRD6A	1.4793	.5364	217.0
7.	DWNGRD7A	2.0000	.7515	217.0
8.	DWNGRD8A	2.1106	.7557	217.0
9.	DWNGRD9A	1.5991	.5858	217.0
10.	DWNGR10A	1.9770	.6766	217.0
11.	DWNGR11A	1.7235	.5986	217.0

Correlation Matrix

	DWNGRD1A	DWNGRD2A	DWNGRD3A	DWNGRD4A	DWNGRD5A
DWNGRD1A	1.0000				
DWNGRD2A	.1335	1.0000			
DWNGRD3A	.1142	.1956	1.0000		
DWNGRD4A	.1739	.0683	.2381	1.0000	
DWNGRD5A	.1316	.1768	.1666	.2269	1.0000
DWNGRD6A	.3153	.1844	.1480	.2550	.4377
DWNGRD7A	.3408	.1505	.1087	.2274	.1590
DWNGRD8A	.2201	.1876	.0522	.1844	.2168
DWNGRD9A	.1479	.2553	.1947	.1423	.2459
DWNGR10A	.2109	.1485	.1986	.1629	.0775
DWNGR11A	.0952	.1875	.1391	.1532	.2221

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   A L P H A

Correlation Matrix

	DWNGRD6A	DWNGRD7A	DWNGRD8A	DWNGRD9A	DWNGR10A
DWNGRD6A	1.0000				
DWNGRD7A	.2986	1.0000			
DWNGRD8A	.1199	.3098	1.0000		
DWNGRD9A	.2460	.1472	.2680	1.0000	
DWNGR10A	.0816	.2185	.2404	.3036	1.0000
DWNGR11A	.1695	.1955	.2214	.3161	.4642

	DWNGR11A
DWNGR11A	1.0000

N of Cases = 217.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	19.1060	12.6230	3.5529	11

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
DWNGRD1A	17.1613	10.4692	.3632	.2019	.7121
DWNGRD2A	17.7742	11.3423	.3142	.1256	.7177
DWNGRD3A	17.2857	11.0847	.2768	.1279	.7234
DWNGRD4A	17.3272	11.0823	.3458	.1544	.7137
DWNGRD5A	17.7650	11.1065	.3763	.2597	.7106
DWNGRD6A	17.6267	10.8554	.4186	.3182	.7048
DWNGRD7A	17.1060	10.0582	.4196	.2333	.7032
DWNGRD8A	16.9954	10.1805	.3881	.2068	.7088
DWNGRD9A	17.5069	10.6493	.4265	.2283	

```
.7028
DWNGR10A       17.1290        10.3814        .4091        .2994
.7045
DWNGR11A       17.3825        10.6540        .4121        .2849
.7045


  R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)


Reliability Coefficients     11 items

Alpha =    .7290           Standardized item alpha =    .7332
```

Appendix B: Downgrading

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
DWNGRIMP	217	12	19.1060	19.0000	22.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
DWNGRIMP	3.5529	12.6230	-.129	.165

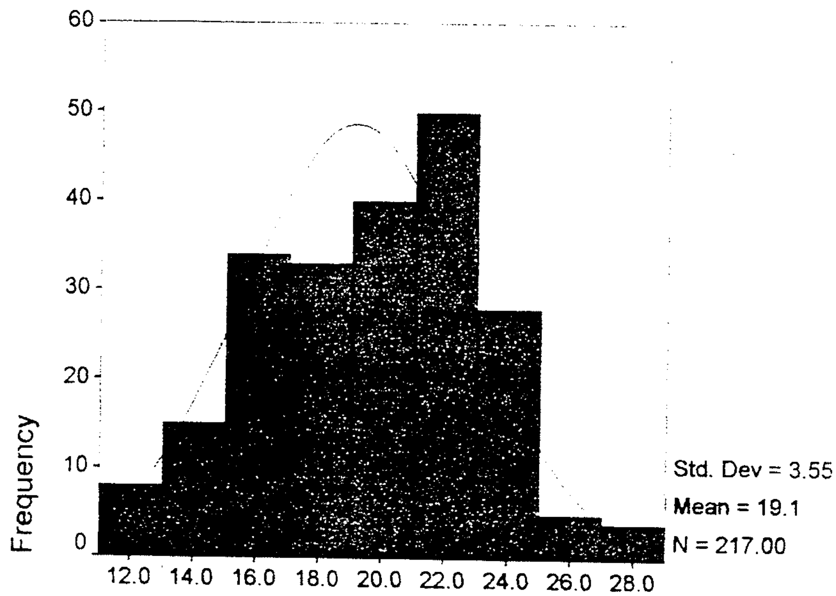
Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
DWNGRIMP	-.498	.329	17.00	11.00	28.00

DWNGRIMP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11.00	2	.9	.9	.9
	12.00	6	2.6	2.8	3.7
	13.00	8	3.5	3.7	7.4
	14.00	7	3.1	3.2	10.6
	15.00	14	6.1	6.5	17.1
	16.00	20	8.7	9.2	26.3
	17.00	18	7.9	8.3	34.6
	18.00	15	6.6	6.9	41.5
	19.00	20	8.7	9.2	50.7
	20.00	20	8.7	9.2	59.9
	21.00	23	10.0	10.6	70.5
	22.00	27	11.8	12.4	82.9
	23.00	22	9.6	10.1	93.1
	24.00	6	2.6	2.8	95.9
	25.00	3	1.3	1.4	97.2
	26.00	2	.9	.9	98.2
	27.00	2	.9	.9	99.1
	28.00	2	.9	.9	100.0
	Total	217	94.8	100.0	
Missing	System Missing	12	5.2		
	Total	12	5.2		
Total		229	100.0		

Histogram



Appendix C

A. Finding Benefit Items (Secondary Control): SAS 1996

"How strongly would you agree or disagree with these common sayings?"

(1=Disagree strongly, 6=Agree strongly)

1. Negative experiences can often be "a blessing in disguise". (There are sometimes benefits that come from negative experiences).
2. I often tell myself I should "count my blessings". (It is better to focus on the good things than the bad things).
3. "There's a silver lining in every cloud". (Things that look bad always have a positive side to them).
4. "Patience is a virtue". (It is important to be patient when striving for your goals).
5. "Things will all work out in the end". (It will be okay no matter what happens).

Appendix C: Finding Benefit

B. Factor Analysis

Communalities

	Initial	Extraction
BLESDIS	1.000	.242
COUNTBLE	1.000	.628
SILVRLIN	1.000	.614
PATIENCE	1.000	.500
WORKEND	1.000	.574

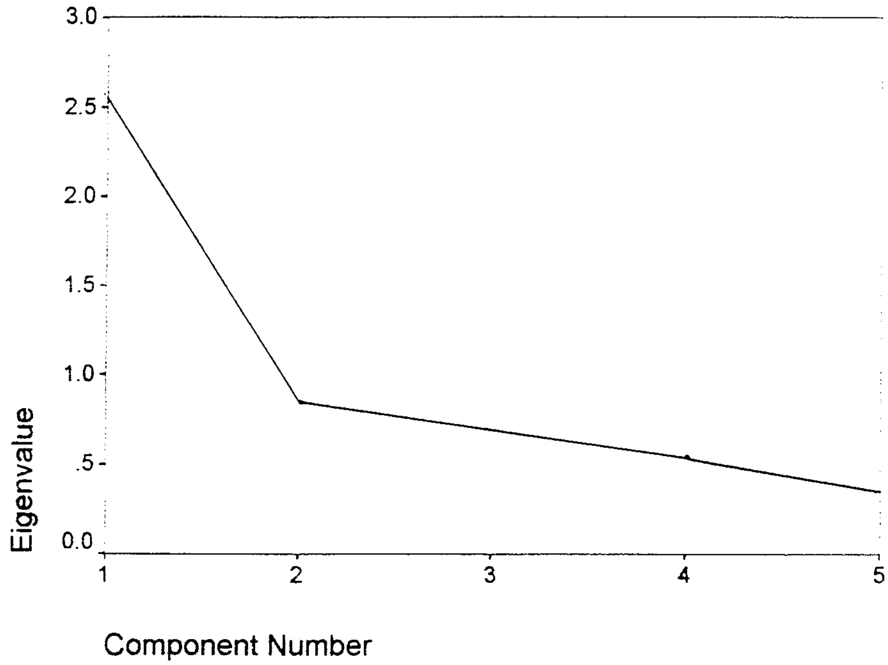
Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.558	51.161	51.161	2.558	51.161	51.161
2	.856	17.114	68.274			
3	.699	13.980	82.254			
4	.540	10.801	93.055			
5	.347	6.945	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix[a]

	Component 1
COUNTBLE	.792
SILVRLIN	.784
WORKEND	.758
PATIENCE	.707
BLESDIS	.492

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix C: Finding Benefit

C. Reliability

		Mean	Std Dev	Cases
1.	BLESDIS	4.5502	1.2647	229.0
2.	COUNTBLE	5.4498	.8183	229.0
3.	SILVRLIN	4.8908	1.2675	229.0
4.	PATIENCE	5.4716	.7582	229.0
5.	WORKEND	4.8996	1.2508	229.0

Correlation Matrix

	BLESDIS	COUNTBLE	SILVRLIN	PATIENCE	WORKEND
BLESDIS	1.0000				
COUNTBLE	.2302	1.0000			
SILVRLIN	.2593	.5550	1.0000		
PATIENCE	.2862	.5049	.3277	1.0000	
WORKEND	.2347	.4343	.5574	.4017	1.0000

N of Cases = 229.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	25.2620	14.4398	3.8000	5

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
BLESDIS	20.7118	10.2411	.3211	.1154	.7585
COUNTBLE	19.8122	10.6269	.5992	.4284	.6627
SILVRLIN	20.3712	8.4537	.5942	.4400	.6390
PATIENCE	19.7904	11.2980	.5036	.3193	.6913
WORKEND	20.3624	8.7145	.5634	.3699	.6524

Reliability Coefficients 5 items

Alpha = .7293 Standardized item alpha = .7533

Appendix C: Finding Benefit

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
FINDBNFT	229	0	25.2620	25.0000	25.00

Statistics

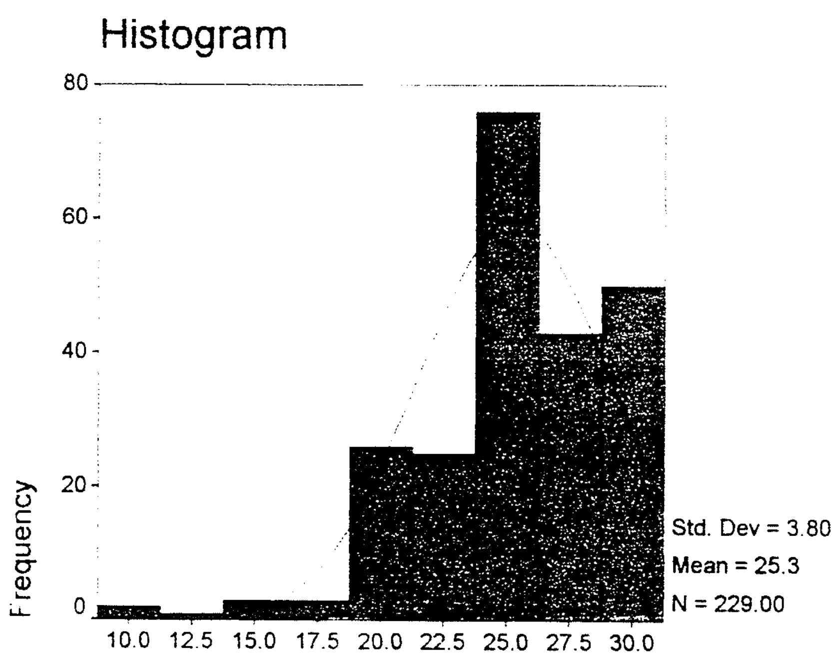
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
FINDBNFT	3.8000	14.4398	-1.166	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
FINDBNFT	2.185	.320	21.00	9.00	30.00

FINDBNFT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9.00	1	.4	.4	.4
	10.00	1	.4	.4	.9
	13.00	1	.4	.4	1.3
	14.00	1	.4	.4	1.7
	15.00	2	.9	.9	2.6
	17.00	2	.9	.9	3.5
	18.00	1	.4	.4	3.9
	19.00	9	3.9	3.9	7.9
	20.00	8	3.5	3.5	11.4
	21.00	9	3.9	3.9	15.3
	22.00	5	2.2	2.2	17.5
	23.00	20	8.7	8.7	26.2
	24.00	16	7.0	7.0	33.2
	25.00	40	17.5	17.5	50.7
	26.00	20	8.7	8.7	59.4
	27.00	22	9.6	9.6	69.0
	28.00	21	9.2	9.2	78.2
	29.00	19	8.3	8.3	86.5
	30.00	31	13.5	13.5	100.0
	Total	229	100.0	100.0	
Total		229	100.0		



Appendix D

A. Perceived Influence Items (Primary Control): SAS 1996

"How do you feel when you can't influence... "

(1=Almost totally out of control, 10=Totally under control)

1. ... your physical health?
2. ... where you live or will be living?
3. ... who you spend your time with?
4. ... the things you can do for fun and enjoyment?
5. ... developing new friendships?
6. ... your physical fitness?
7. ... your physical comfort (e.g., pain)?
8. ... your emotional or mental well being?
9. ... the basic things you must do just to look after yourself (e.g., bathing, eating, etc.)?
10. ... the usual tasks that need to be done (e.g., housework, shopping, yardwork, laundry)?
11. ... your life in general?

Appendix D: Primary Control

B. Factor Analysis

Communalities

	Initial	Extraction
PCHTH	1.000	.384
PCRESID	1.000	.378
PCSOCIZ	1.000	.410
PCLESUR	1.000	.476
PCNEWFR	1.000	.329
PCFITNES	1.000	.361
PCPHYS	1.000	.473
PCEMOT	1.000	.476
PCADL	1.000	.400
PCIADL	1.000	.351
PCLIFE	1.000	.508

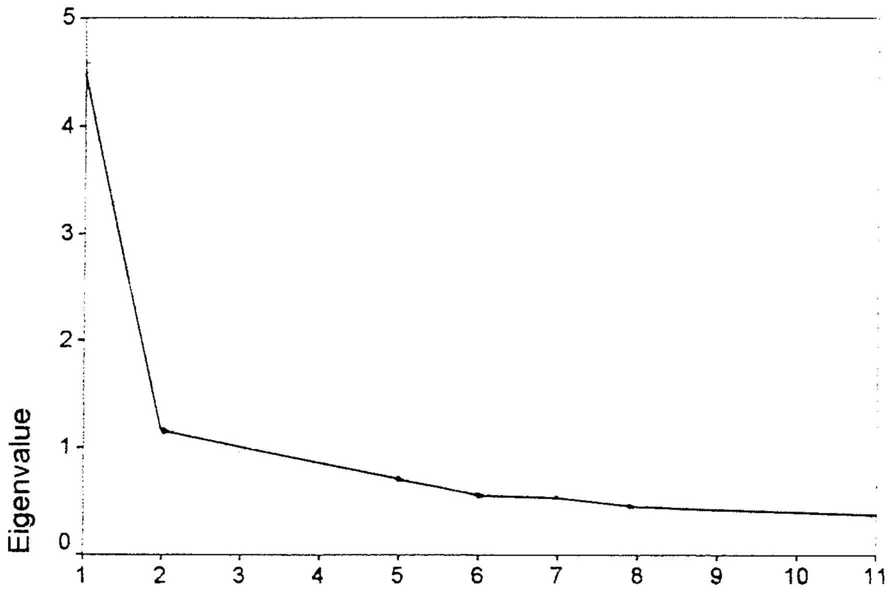
Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.544	41.313	41.313	4.544	41.313	41.313
2	1.162	10.561	51.874			
3	1.000	9.087	60.960			
4	.867	7.878	68.838			
5	.709	6 445	75.283			
6	.556	5.055	80.338			
7	.533	4.849	85.187			
8	.447	4.065	89.252			
9	.424	3.855	93.107			
10	.397	3.609	96.716			
11	.361	3.284	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix[a]

	Component
	1
PCLIFE	.713
PCEMOT	.690
PCLESUR	.690
PCPHYS	.687
PCSOCIZ	.640
PCADL	.633
PCHTH	.619
PCRESID	.615
PCFITNES	.601
PCIADL	.592
PCNEWFR	.573

Extraction Method: Principal Component Analysis

a. 1 components extracted.

Appendix D: Primary Control

C. Reliability

		Mean	Std Dev	Cases
1.	PCHTH	7.7094	1.8399	203.0
2.	PCRESID	8.8522	1.6554	203.0
3.	PCSOCIZ	9.7340	1.7056	203.0
4.	PCLESUR	8.3399	1.7932	203.0
5.	PCNEWFR	7.8424	2.1375	203.0
6.	PCFITNES	7.9310	1.8656	203.0
7.	PCPHYS	8.2167	1.6597	203.0
8.	PCEMOT	8.1872	1.7532	203.0
9.	PCADL	9.1970	1.3682	203.0
10.	PCIADL	9.7882	1.6797	203.0
11.	PCLIFE	8.7241	1.4599	203.0

Correlation Matrix

	PCHTH	PCRESID	PCSOCIZ	PCLESUR	PCNEWFR
PCHTH	1.0000				
PCRESID	.2670	1.0000			
PCSOCIZ	.2797	.3489	1.0000		
PCLESUR	.3107	.2622	.5088	1.0000	
PCNEWFR	.3067	.1641	.4800	.4919	1.0000
PCFITNES	.4470	.3237	.2074	.3385	.2071
PCPHYS	.4163	.3396	.2758	.3444	.2720
PCEMOT	.4206	.3644	.3545	.4127	.3263
PCADL	.2372	.3692	.4172	.2369	.2020
PCIADL	.2747	.2308	.3777	.2377	.1920
PCLIFE	.3202	.3784	.3999	.4747	.3366

Correlation Matrix

	PCFITNES	PCPHYS	PCEMOT	PCADL	PCIADL
PCFITNES	1.0000				
PCPHYS	.4173	1.0000			
PCEMOT	.3324	.4794	1.0000		
PCADL	.2805	.4367	.3457	1.0000	
PCIADL	.2686	.4108	.2590	.6128	1.0000
PCLIFE	.3420	.4702	.5309	.3148	.2849

	PCLIFE
PCLIFE	1.0000

N of Cases = 203.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	92.5222	143.8052	11.9919	11

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PCHTH	84.8128	119.6381	.5163	.3309	.8365
PCRESID	83.6700	123.9846	.4633	.2782	.8404
PCSOCIZ	83.7882	119.4549	.5751	.4494	.8317
PCLESUR	84.1823	118.1102	.5767	.4314	.8314
PCNEWFR	84.6798	117.7039	.4642	.3399	.8432
PCFITNES	84.5911	120.2825	.4898	.3167	.8389
PCPHYS	84.3054	119.1736	.6037	.4292	.8296
PCEMOT	84.3350	117.8773	.6003	.4197	.8295
PCADL	83.3251	125.6264	.5317	.4781	.8362
PCIADL	83.7340	123.3150	.4736	.4268	.8396
PCLIFE	83.7980	122.0333	.6089	.4265	.8305

Reliability Coefficients 11 items

Alpha = .8479 Standardized item alpha = .8525

Appendix D: Primary Control

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
PRIMSCA2	203	26	92.6010	93.0000	92.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
PRIMSCA2	11.6531	135.7954	-.874	.171

Statistics

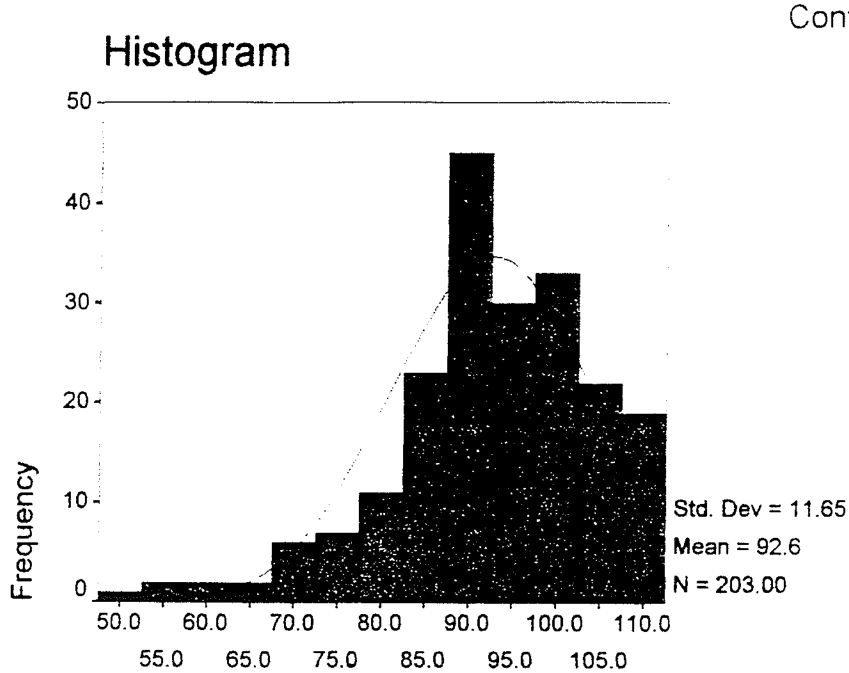
	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
PRIMSCA2	1.120	.340	60.00	50.00	110.00

PRIMSCA2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50.00	1	.4	.5	.5
	54.00	1	.4	.5	1.0
	57.00	1	.4	.5	1.5
	59.00	1	.4	.5	2.0
	62.00	1	.4	.5	2.5
	63.00	1	.4	.5	3.0
	66.00	1	.4	.5	3.4

PRIMSCA2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	68.00	1	.4	.5	3.9
	71.00	2	.9	1.0	4.9
	72.00	3	1.3	1.5	6.4
	73.00	1	.4	.5	6.9
	74.00	2	.9	1.0	7.9
	76.00	2	.9	1.0	8.9
	77.00	2	.9	1.0	9.9
	79.00	3	1.3	1.5	11.3
	80.00	5	2.2	2.5	13.8
	81.00	1	.4	.5	14.3
	82.00	2	.9	1.0	15.3
	83.00	6	2.6	3.0	18.2
	84.00	5	2.2	2.5	20.7
	86.00	5	2.2	2.5	23.2
	87.00	7	3.1	3.4	26.6
	88.00	8	3.5	3.9	30.5
	89.00	9	3.9	4.4	35.0
	90.00	10	4.4	4.9	39.9
	91.00	7	3.1	3.4	43.3
	92.00	11	4.8	5.4	48.8
	93.00	5	2.2	2.5	51.2
	94.00	5	2.2	2.5	53.7
	95.00	9	3.9	4.4	58.1
	96.00	7	3.1	3.4	61.6
	97.00	4	1.7	2.0	63.5
	98.00	4	1.7	2.0	65.5
	99.00	8	3.5	3.9	69.5
	100.00	5	2.2	2.5	71.9
	101.00	8	3.5	3.9	75.9
	102.00	8	3.5	3.9	79.8
	103.00	4	1.7	2.0	81.8
	104.00	6	2.6	3.0	84.7
	105.00	4	1.7	2.0	86.7
	106.00	4	1.7	2.0	88.7
	107.00	4	1.7	2.0	90.6
	108.00	5	2.2	2.5	93.1
	109.00	5	2.2	2.5	95.6
	110.00	9	3.9	4.4	100.0
	Total	203	88.6	100.0	
Missing	System Missing	26	11.4		
	Total	26	11.4		
Total		229	100.0		


Histogram
50
40
30
20
10
0
Frequency
50.0
60.0
70.0
80.0
90.0
100.0
110.0
55.0
65.0
75.0
85.0
95.0
105.0
Std. Dev = 11.65
Mean = 92.6
N = 203.00

Appendix E

A. Perceived Stress Items: AIM 1996

"Now think about the *last month only*, and refer to this scale. In the last month, how often have you..."

(1=Never, 4=Always)

1. ... been upset because of something that happened unexpectedly?
2. ... felt that you were effectively coping with important changes that were occurring in your life?
3. ... felt that things were going your way?
4. ... found yourself thinking about things that you have to accomplish?

Appendix E: Perceived Stress

B. 4-Item Factor Analysis

Communalities

	Initial	Extraction
PS1	1.000	.481
PS2_R	1.000	.263
PS3_R	1.000	.688
PS4	1.000	3.508E-02

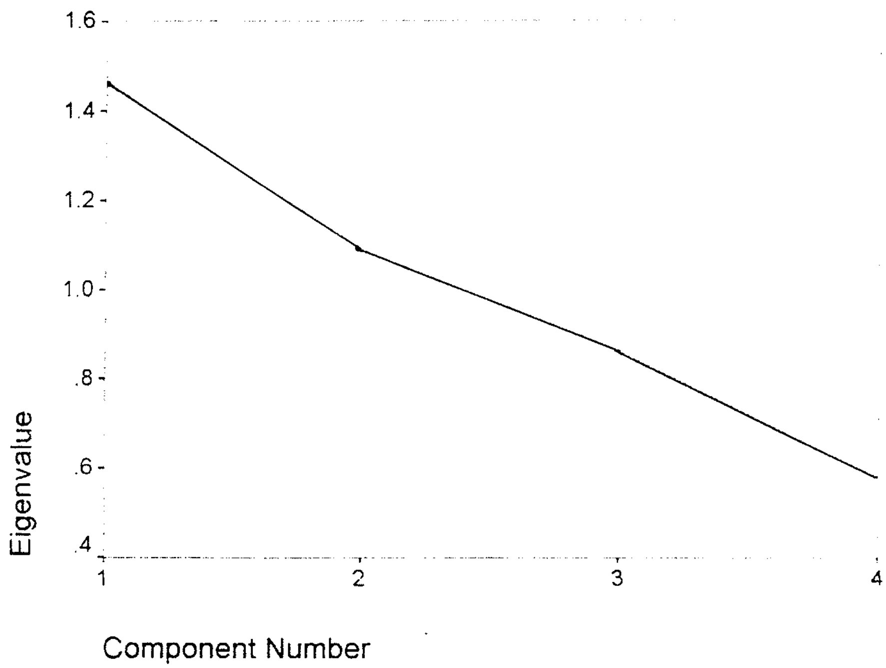
Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.467	36.686	36.686	1.467	36.686	36.686
2	1.091	27.281	63.967			
3	.864	21.609	85.575			
4	.577	14.425	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot



Component Matrix[a]

	Component
	1
PS3_R	.829
PS1	.694
PS2_R	.513
PS4	-.187

Extraction Method: Principal Component Analysis.

a 1 components extracted

Appendix E: Perceived Stress

C. 3-Item Factor Analysis

Communalities

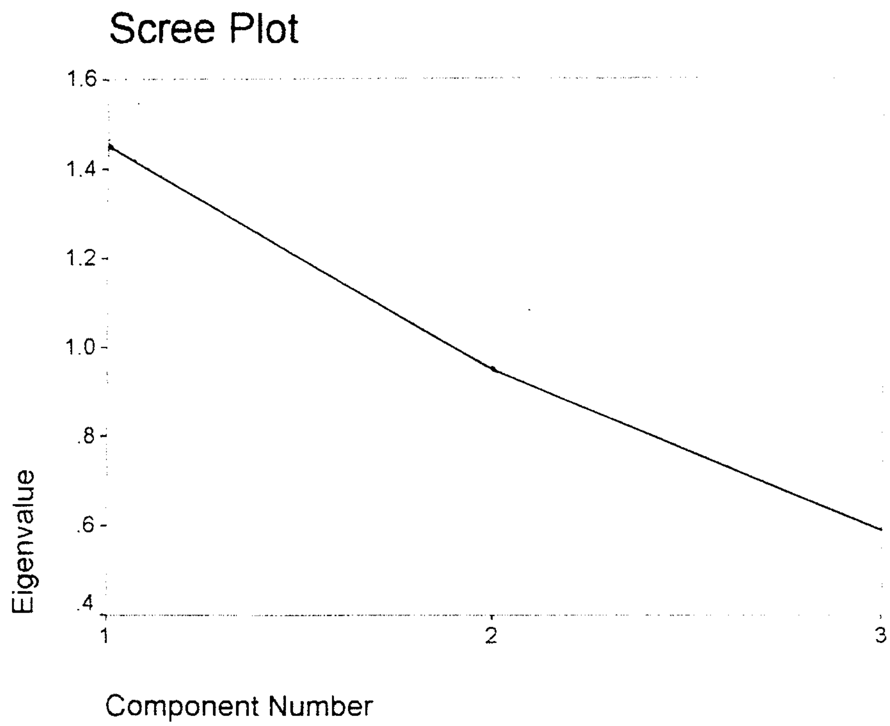
	Initial	Extraction
PS1	1.000	.534
PS2_R	1.000	.237
PS3_R	1.000	.685

Extraction Method: Principal Component Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.457	48.558	48.558	1.457	48.558	48.558
2	.952	31.730	80.288			
3	.591	19.712	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component
	1
PS3_R	.828
PS1	.731
PS2_R	.487

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix E: Perceived Stress

D. Reliability

```
****** Method 2 (covariance matrix) will be used for this analysis ****


R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

 1.     PS1          UNEXPECTD EVENT UPSET YOU LAST MTH?
 2.     PS2_R        ps2 reverse coded
 3.     PS3_R        ps3 reverse coded

                          Mean        Std Dev       Cases

 1.     PS1             1.7336         .7094        229.0
 2.     PS2_R           2.1441         .9873        229.0
 3.     PS3_R           2.1878         .8243        229.0

                  Correlation Matrix

                 PS1          PS2_R        PS3_R

PS1            1.0000
PS2_R           .0550        1.0000
PS3_R           .3709         .2199       1.0000


      N of Cases =        229.0

                                                     N of
Statistics for       Mean    Variance    Std Dev  Variables
      Scale        6.0655     3.0264     1.7397          3


Item-total Statistics

                 Scale          Scale        Corrected
                 Mean         Variance        Item-          Squared
Alpha
               if Item        if Item         Total          Multiple
Item
               Deleted        Deleted      Correlation     Correlation
Deleted

PS1             4.3319         2.0122         .2538           .1383
.3559
```

PS2_R	3.9214	1.6166	.1733	.0492	.5367
PS3_R	3.8777	1.5552	.3851	.1775	.0992

Reliability Coefficients   3 items

Alpha =   .4306   Standardized item alpha =   .4515

Appendix E: Perceived Stress

E. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
PSSCAL	229	0	3.9214	4.0000	4.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
PSSCAL	1.2715	1.6166	.497	.161

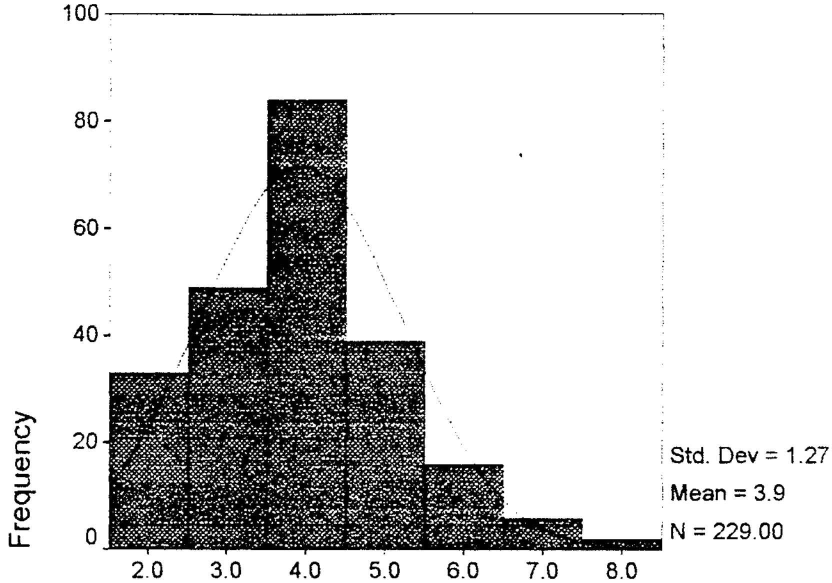
Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
PSSCAL	.284	.320	6.00	2.00	8.00

PSSCAL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	33	14.4	14.4	14.4
	3.00	49	21.4	21.4	35.8
	4.00	84	36.7	36.7	72.5
	5.00	39	17.0	17.0	89.5
	6.00	16	7.0	7.0	96.5
	7.00	6	2.6	2.6	99.1
	8.00	2	.9	.9	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

Histogram



AIM 1996 sum of ps1 & ps3_r (r=.37**)

Appendix F: Demographic Frequencies

A1. Continuous Age

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
AGE96	229	0	78.85	78.00	74

Statistics

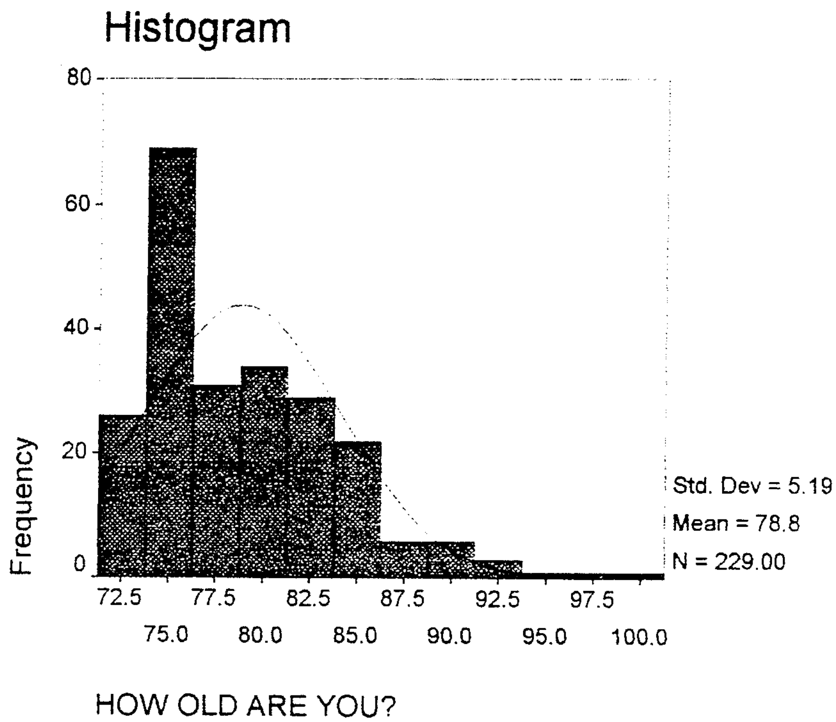
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
AGE96	5.19	26.94	1.084	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
AGE96	1.214	.320	27	72	99

AGE96

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	72	2	.9	.9	.9
	73	24	10.5	10.5	11.4
	74	31	13.5	13.5	24.9
	75	25	10.9	10.9	35.8
	76	13	5.7	5.7	41.5
	77	17	7.4	7.4	48.9
	78	14	6.1	6.1	55.0
	79	15	6.6	6.6	61.6
	80	7	3.1	3.1	64.6
	81	12	5.2	5.2	69.9
	82	15	6.6	6.6	76.4
	83	14	6.1	6.1	82.5
	84	16	7.0	7.0	89.5
	85	1	.4	.4	90.0
	86	5	2.2	2.2	92.1
	87	3	1.3	1.3	93.4
	88	3	1.3	1.3	94.8
	89	2	.9	.9	95.6
	90	2	.9	.9	96.5
	91	2	.9	.9	97.4
	92	2	.9	.9	98.3
	93	1	.4	.4	98.7
	95	1	.4	.4	99.1
	98	1	.4	.4	99.6
	99	1	.4	.4	100.0
	Total	229	100.0	100.0	
Total		229	100.0		



A2. Dichotomous Age

AGE2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	141	61.6	61.6	61.6
	2.00	88	38.4	38.4	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

Appendix F: Demographic Frequencies

B. Gender

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
SEX2	229	0	.6419	1.0000	1.00

Statistics

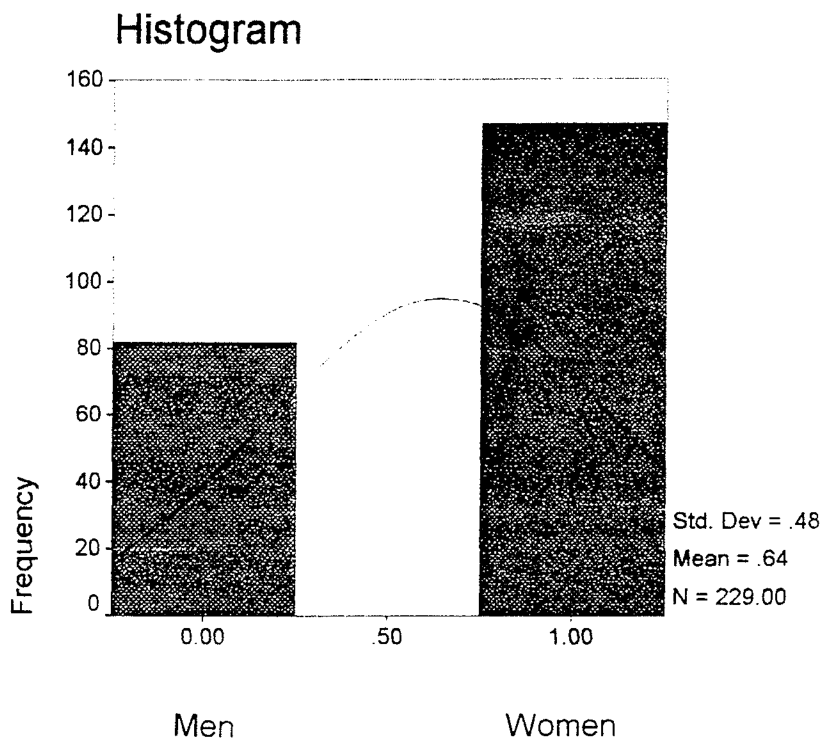
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
SEX2	.4805	.2309	-.596	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
SEX2	-1.659	.320	1.00	.00	1.00

SEX2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	82	35.8	35.8	35.8
	1.00	147	64.2	64.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		


Histogram
160
140
120
100
80
60
40
20
0
Frequency
0.00
.50
1.00
Std. Dev = .48
Mean = .64
N = 229.00
Men
Women

Appendix F: Demographic Frequencies

C. Income

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
TOTCAS2	229	0	1527.594	1200.580	250.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
TOTCAS2	1047.026	1096264	1.326	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
TOTCAS2	1.461	.320	4500.00	250.00	4750.00

TOTCAS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	250.00	13	5.7	5.7	5.7
	384.00	1	4	.4	6.1

TOTCAS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	385.00	1	.4	.4	6.6
	394.00	1	.4	.4	7.0
	395.00	5	2.2	2.2	9.2
	397.00	1	.4	.4	9.6
	400.00	1	.4	.4	10.0
	430.00	1	.4	.4	10.5
	440.00	1	.4	.4	10.9
	455.00	1	.4	.4	11.4
	470.00	1	.4	.4	11.8
	480.00	1	.4	.4	12.2
	495.00	1	.4	.4	12.7
	500.00	2	.9	.9	13.5
	524.33	1	.4	.4	14.0
	550.00	1	.4	.4	14.4
	583.00	1	.4	.4	14.8
	600.00	3	1.3	1.3	16.2
	623.00	1	.4	.4	16.6
	625.00	1	.4	.4	17.0
	656.00	1	.4	.4	17.5
	659.58	1	.4	.4	17.9
	660.00	1	.4	.4	18.3
	667.00	1	.4	.4	18.8
	700.00	3	1.3	1.3	20.1
	704.00	1	.4	.4	20.5
	717.00	1	.4	.4	21.0
	725.00	1	.4	.4	21.4
	790.00	1	.4	.4	21.8
	800.00	5	2.2	2.2	24.0
	801.00	1	.4	.4	24.5
	831.00	1	.4	.4	24.9
	850.00	2	.9	.9	25.8
	859.00	2	.9	.9	26.6
	875.00	1	.4	.4	27.1
	888.00	1	.4	.4	27.5
	895.00	1	.4	.4	27.9
	900.00	4	1.7	1.7	29.7
	923.00	1	.4	.4	30.1
	930.08	2	.9	.9	31.0
	931.00	1	4	.4	31.4
	950.00	1	.4	.4	31.9
	980.00	1	.4	.4	32.3
	985.00	1	.4	.4	32.8
	1000.00	5	2.2	2.2	34.9

TOTCAS2

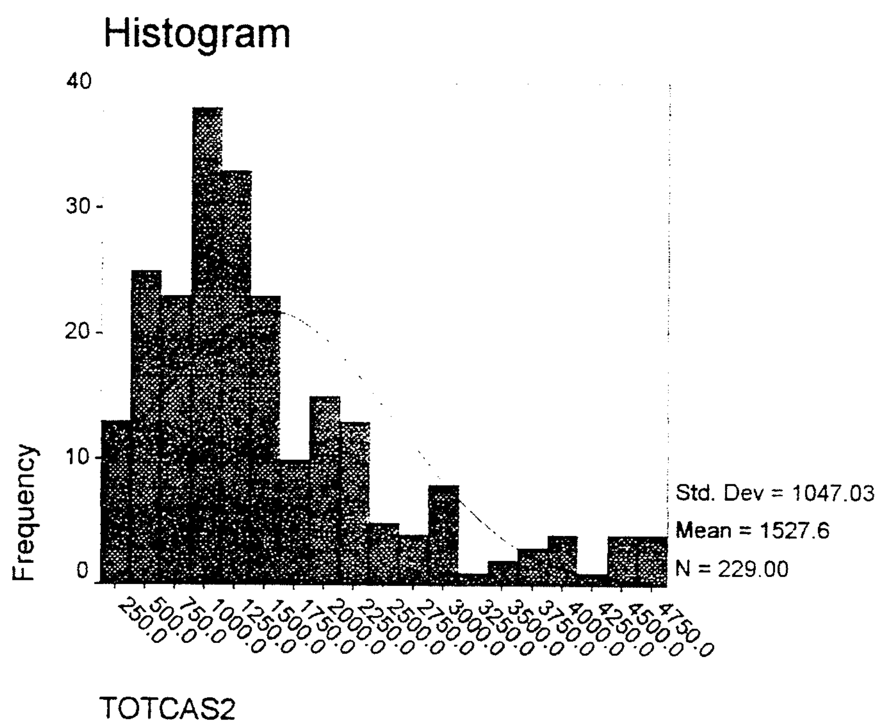
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1001.00	1	.4	.4	35.4
	1024.00	1	.4	.4	35.8
	1036.00	1	.4	.4	36.2
	1037.00	1	.4	.4	36.7
	1050.00	1	.4	.4	37.1
	1065.33	5	2.2	2.2	39.3
	1083.00	1	.4	.4	39.7
	1097.00	2	.9	.9	40.6
	1100.00	3	1.3	1.3	41.9
	1105.00	1	.4	.4	42.4
	1122.00	1	.4	.4	42.8
	1123.00	1	.4	.4	43.2
	1127.00	1	.4	.4	43.7
	1131.00	1	.4	.4	44.1
	1154.00	1	.4	.4	44.5
	1162.00	1	.4	.4	45.0
	1180.00	1	.4	.4	45.4
	1184.00	1	.4	.4	45.9
	1200.00	6	2.6	2.6	48.5
	1200.58	4	1.7	1.7	50.2
	1203.00	1	.4	.4	50.7
	1235.00	2	.9	.9	51.5
	1256.00	1	.4	.4	52.0
	1262.00	2	.9	.9	52.8
	1276.00	1	.4	.4	53.3
	1283.00	1	.4	.4	53.7
	1297.00	1	.4	.4	54.1
	1298.00	1	.4	.4	54.6
	1335.83	2	.9	.9	55.5
	1350.00	1	.4	.4	55.9
	1358.00	1	.4	.4	56.3
	1362.00	1	.4	.4	56.8
	1370.00	1	.4	.4	57.2
	1371.00	1	.4	.4	57.6
	1398.00	1	.4	.4	58.1
	1400.00	1	.4	.4	58.5
	1410.00	1	.4	.4	59.0
	1422.00	1	.4	.4	59.4
	1457.00	1	.4	.4	59.8
	1471.08	1	.4	.4	60.3
	1487.00	1	.4	.4	60.7
	1488.00	1	.4	.4	61.1
	1491.00	1	.4	.4	61.6

TOTCAS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1494.00	1	.4	.4	62.0
	1500.00	2	.9	.9	62.9
	1515.00	1	.4	.4	63.3
	1529.00	1	.4	.4	63.8
	1550.00	1	.4	.4	64.2
	1571.00	1	.4	.4	64.6
	1595.00	1	.4	.4	65.1
	1600.00	2	.9	.9	65.9
	1606.33	2	.9	.9	66.8
	1612.00	1	.4	.4	67.2
	1615.00	1	.4	.4	67.7
	1666.00	1	.4	.4	68.1
	1680.00	1	.4	.4	68.6
	1700.00	1	.4	.4	69.0
	1745.00	1	.4	.4	69.4
	1800.00	1	.4	.4	69.9
	1838.81	2	.9	.9	70.7
	1840.00	1	.4	.4	71.2
	1867.00	1	.4	.4	71.6
	1871.00	1	.4	.4	72.1
	1876.83	1	.4	.4	72.5
	1900.00	2	.9	.9	73.4
	1974.06	3	1.3	1.3	74.7
	2000.00	3	1.3	1.3	76.0
	2050.00	2	.9	.9	76.9
	2100.00	1	.4	.4	77.3
	2109.31	3	1.3	1.3	78.6
	2145.00	1	.4	.4	79.0
	2147.33	1	.4	.4	79.5
	2159.00	1	.4	.4	79.9
	2180.00	1	.4	.4	80.3
	2200.00	1	.4	.4	80.8
	2218.00	1	.4	.4	81.2
	2244.56	3	1.3	1.3	82.5
	2246.00	1	.4	.4	83.0
	2300.00	3	1.3	1.3	84.3
	2500.00	3	1.3	1.3	85.6
	2525.00	1	.4	.4	86.0
	2565.00	1	4	.4	86.5
	2629.00	1	.4	.4	86.9
	2650.31	1	.4	.4	87.3
	2800.00	1	.4	.4	87.8
	2850.00	1	.4	.4	88.2

TOTCAS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2903.00	1	.4	.4	88.6
	2912.00	1	.4	.4	89.1
	3000.00	4	1.7	1.7	90.8
	3100.00	2	.9	.9	91.7
	3130.00	1	.4	.4	92.1
	3461.81	1	.4	.4	92.6
	3500.00	1	.4	.4	93.0
	3700.00	1	.4	.4	93.4
	3800.00	1	.4	.4	93.9
	3873.00	1	.4	.4	94.3
	3999.00	1	.4	.4	94.8
	4000.00	2	.9	.9	95.6
	4072.00	1	.4	.4	96.1
	4200.00	1	.4	.4	96.5
	4438.00	1	.4	.4	96.9
	4500.00	2	.9	.9	97.8
	4583.00	1	.4	.4	98.3
	4750.00	4	1.7	1.7	100.0
	Total	229	100.0	100.0	
Total		229	100.0		



Appendix F: Demographic Frequencies

D. Marital Status

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
MARITAL	229	0	.51	1.00	1

Statistics

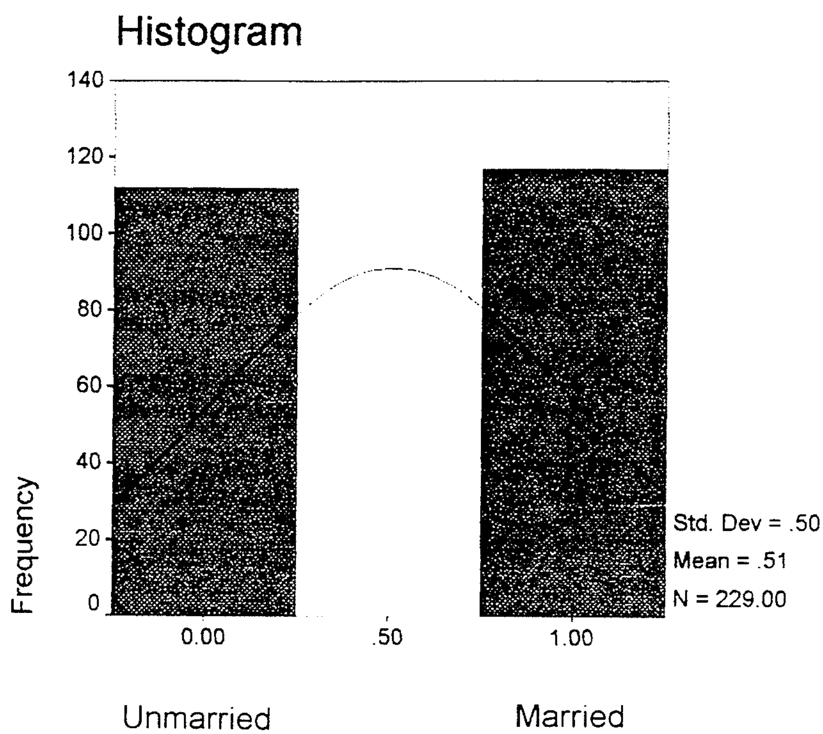
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
MARITAL	.50	.25	-.044	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
MARITAL	-2.016	.320	1	0	1

MARITAL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	112	48.9	48.9	48.9
	1	117	51.1	51.1	100.0
	Total	229	100.0	100.0	
Total		229	100.0		



Appendix G

A. Prior Illness Restriction Items: AIM 1996

"[I'll read a list of common health problems], and you tell me if you have had any of them within the last year or if you otherwise still have after effects from having had them earlier."

(1=Yes, 0=No)

1. Heart and circulation problems (hardening of the arteries, heart troubles).
2. High blood pressure (hypertension).
3. Arthritis or rheumatism (joints, back, or orthopaedic).
4. Eye trouble not relieved by glasses (cataracts, glaucoma).
5. Chest problems (asthma, emphysema, T.B., breathing problems).
6. Stomach trouble (including upper & lower gastro-intestinal problems).
7. Incontinence, that is, trouble controlling your bladder.
8. Trouble controlling your bowels.
9. Cancer, any variety (may have been mentioned above).

Appendix G: Prior Illness Restriction

B. Factor Analysis

Communalities

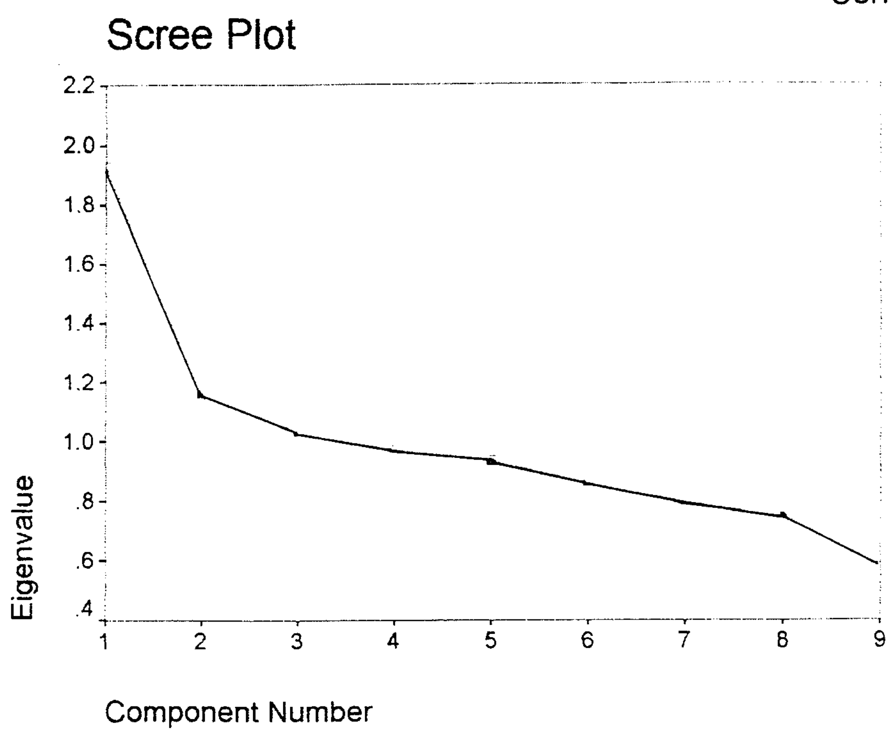
	Initial	Extraction
CHEST	1.000	.232
INCNBWL	1.000	.323
ARTHST	1.000	.255
INCNBLD	1.000	.214
STOMACH	1.000	.206
EYE	1.000	.190
CVASTS	1.000	.273
CANCER	1.000	.125
HYPERT	1.000	.110

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.929	21.431	21.431	1.929	21.431	21.431
2	1.160	12.890	34.321			
3	1.029	11.435	45.755			
4	.970	10.783	56.538			
5	.936	10.403	66.941			
6	.860	9.553	76.494			
7	.796	8.845	85.339			
8	.743	8.253	93.592			
9	.577	6.408	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component
	1
INCNBWL	.568
CVASTS	.523
ARTHST	.505
CHEST	.482
INCNBLD	.463
STOMACH	.454
EYE	.436
CANCER	.354
HYPERT	.332

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix G: Prior Illness Restriction

C. Reliability

```
****** Method 2 (covariance matrix) will be used for this analysis ****

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

1.     CHEST       CHEST PROBLEMS LST YR?
2.     INCNBWL     TROUBLE CONTROLLING YOUR BOWELS?
3.     ARTHST      ARTHRITIS LST YR?
4.     INCNBLD     INCONTINENCE?
5.     STOMACH     STOMACH PROBLEMS LST YR?
6.     EYE         EYE PROBLEMS LST YR?
7.     CVASTS      HEART PROBLEMS LST YR?
8.     CANCER      CANCER LST YR?
9.     HYPERT      HYPERTENSION LST YR?
```

		Mean	Std Dev	Cases
1.	CHEST	.1674	.3742	227.0
2.	INCNBWL	.0749	.2638	227.0
3.	ARTHST	.6432	.4801	227.0
4.	INCNBLD	.1454	.3533	227.0
5.	STOMACH	.1630	.3702	227.0
6.	EYE	.4009	.4912	227.0
7.	CVASTS	.3040	.4610	227.0
8.	CANCER	.0617	.2411	227.0
9.	HYPERT	.3260	.4698	227.0

Correlation Matrix

	CHEST	INCNBWL	ARTHST	INCNBLD	STOMACH
CHEST	1.0000				
INCNBWL	.1414	1.0000			
ARTHST	.1616	.2119	1.0000		
INCNBLD	.1833	.2150	.1507	1.0000	
STOMACH	.1535	.1916	.1295	.0210	1.0000
EYE	.0425	.1088	.1214	.1217	.0771
CVASTS	.1654	.2122	.0124	.0807	.1233
CANCER	.0322	.0662	.1527	.1021	.1348
HYPERT	.0658	-.0193	.1257	.0065	.0493

	EYE	CVASTS	CANCER	HYPERT
EYE	1.0000			
CVASTS	.2021	1.0000		
CANCER	.0892	.0695	1.0000	
HYPERT	.1215	.2147	.0561	1.0000

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

N of Cases = 227.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	2.2863	2.6743	1.6353	9

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
CHEST	2.1189	2.2557	.2479	.0913	.4870
INCNBWL	2.2115	2.3622	.2991	.1477	.4825
ARTHST	1.6432	2.0801	.2626	.1173	.4814
INCNBLD	2.1410	2.3163	.2168	.0938	.4967
STOMACH	2.1233	2.2945	.2165	.0794	.4966
EYE	1.8855	2.0930	.2393	.0728	.4913
CVASTS	1.9824	2.0793	.2877	.1438	.4712
CANCER	2.2247	2.4758	.1849	.0490	.5075
HYPERT	1.9604	2.1975	.1838	.0766	.5116

Reliability Coefficients 9 items

Alpha = .5215 Standardized item alpha = .5359

Appendix G: Prior Illness Restriction

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
ILLREST2	227	2	11.2291	11.0000	.00

Statistics

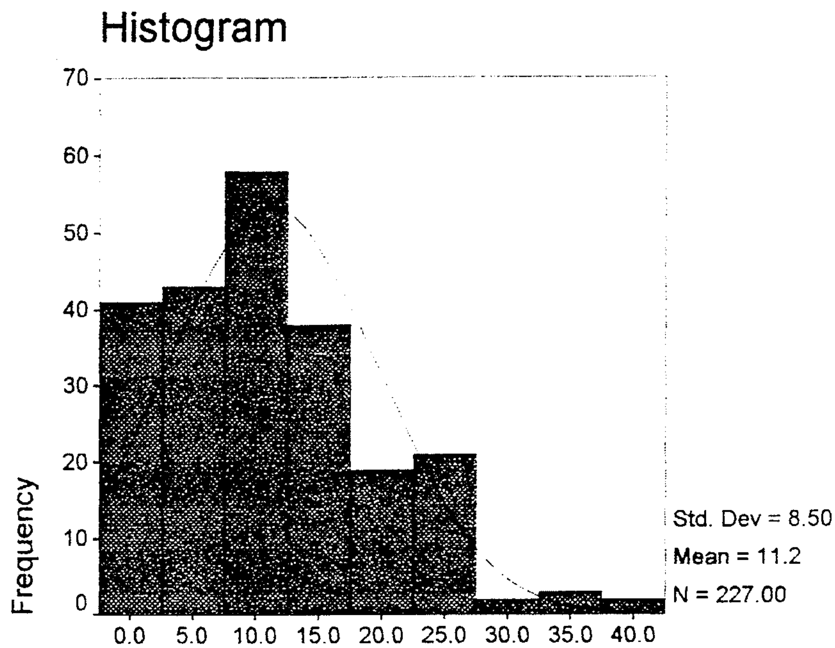
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
ILLREST2	8.5009	72.2659	.734	.162

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
ILLREST2	.534	.322	40.00	.00	40.00

ILLREST2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	36	15.7	15.9	15.9
	1.00	5	2.2	2.2	18.1
	3.00	4	1.7	1.8	19.8
	4.00	9	3.9	4.0	23.8
	5.00	6	2.6	2.6	26.4
	6.00	1	.4	.4	26.9
	7.00	23	10.0	10.1	37.0
	8.00	12	5.2	5.3	42.3
	9.00	2	.9	.9	43.2
	10.00	5	2.2	2.2	45.4
	11.00	23	10.0	10.1	55.5
	12.00	16	7.0	7.0	62.6
	13.00	13	5.7	5.7	68.3
	14.00	7	3.1	3.1	71.4
	15.00	4	1.7	1.8	73.1
	16.00	7	3.1	3.1	76.2
	17.00	7	3.1	3.1	79.3
	18.00	5	2.2	2.2	81.5
	19.00	4	1.7	1.8	83.3
	20.00	5	2.2	2.2	85.5
	21.00	3	1.3	1.3	86.8
	22.00	2	.9	.9	87.7
	23.00	7	3.1	3.1	90.7
	24.00	4	1.7	1.8	92.5
	25.00	4	1.7	1.8	94.3
	26.00	4	1.7	1.8	96.0
	27.00	2	.9	.9	96.9
	29.00	2	.9	.9	97.8
	34.00	1	.4	.4	98.2
	35.00	1	.4	.4	98.7
	37.00	1	.4	.4	99.1
	40.00	2	.9	.9	100.0
	Total	227	99.1	100.0	
Missing	System Missing	2	.9		
	Total	2	.9		
Total		229	100.0		


Histogram
70
60
50
40
30
20
10
0
Frequency
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0
Std. Dev = 8.50
Mean = 11.2
N = 227.00

Appendix H

A. Prior Life Satisfaction Items (Agree, Disagree): AIM 1996

1. As I grow older, things seem better than I thought they would be.
2. I have gotten more of the breaks in life than most of the people I know.
3. This is the dreariest time of my life.
4. I am just as happy as when I was younger.
5. My life could be happier than it is now.
6. These are the best years of my life.
7. Most of the things I do are boring and monotonous.
8. I expect some interesting and pleasant things to happen to me in the future.
9. The things I do are as interesting to me as they ever were.
10. I feel old and somewhat tired.
11. I feel my age but it does not bother me.
12. As I look back on my life, I am fairly well satisfied.
13. I would not change my past even if I could.
14. Compared to other people my age, I've made a lot of foolish decisions in my life.
15. Compared to other people my age, I make a good appearance.
16. I have made plans for things I'll be doing in the future.
17. When I think back over my life, I didn't get most of the important things I wanted.

18. Compared to other people, I get down in the dumps too often.

19. I've gotten pretty much what I expected out of life.

20. In spite of what people say, the lot of the average person is getting worse, not better.

Appendix H: Prior Life Satisfaction

B. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
LSIATOT1	229	0	13.5502	14.0000	16.00

Statistics

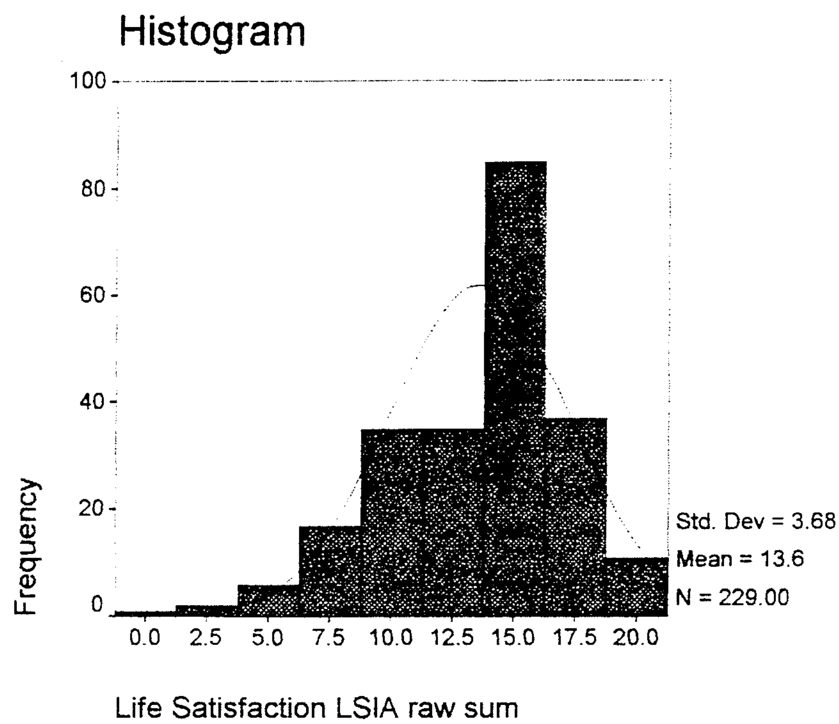
	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
LSIATOT1	3.6782	13.5293	-.774	.161

Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
LSIATOT1	.311	.320	19.00	1.00	20.00

LSIATOT1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	.4	.4	.4
	2.00	1	.4	.4	.9
	3.00	1	.4	.4	1.3
	4.00	2	.9	.9	2.2
	6.00	4	1.7	1.7	3.9
	7.00	8	3.5	3.5	7.4
	8.00	9	3.9	3.9	11.4
	9.00	9	3.9	3.9	15.3
	10.00	9	3.9	3.9	19.2
	11.00	17	7.4	7.4	26.6
	12.00	21	9.2	9.2	35.8
	13.00	14	6.1	6.1	41.9
	14.00	20	8.7	8.7	50.7
	15.00	29	12.7	12.7	63.3
	16.00	36	15.7	15.7	79.0
	17.00	24	10.5	10.5	89.5
	18.00	13	5.7	5.7	95.2
	19.00	8	3.5	3.5	98.7
	20.00	3	1.3	1.3	100.0
	Total	229	100.0	100.0	
Total		229	100.0		


Histogram
100
80
60
40
20
0
Frequency
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Std. Dev = 3.68
Mean = 13.6
N = 229.00
Life Satisfaction LSIA raw sum

Appendix I

A. Depression Items[a]: AIM 2001

"Please [indicate] how often you felt this way *during the past week*[b]"

(0=Rarely, 3=Most of the time)

1. I was bothered by things that don't usually bother me.
2. I had trouble keeping my mind on what I was doing.
3. I felt depressed.
4. I felt that everything I did was an effort.
5. I felt hopeful about the future.
6. I felt fearful.
7. My sleep was restless.
8. I was happy.
9. I felt lonely.
10. I could not get going.

[a]A short version of the CES-D, (Carter & Patrick, 1994). [b]Chipperfield, Perry & Weiner (2003) and Suh, Diener, & Fujita (1996) suggest that recent events matter.

Appendix I: Depression

B. Factor Analysis

Communalities

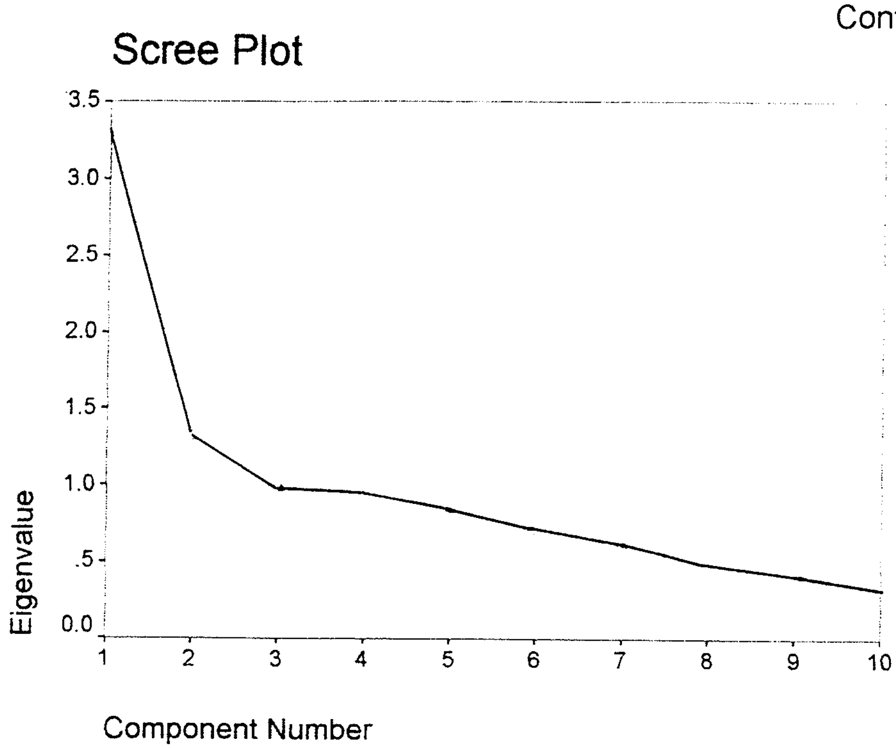
	Initial	Extraction
CESD1_A	1.000	.374
CESD2_A	1.000	.314
CESD3_A	1.000	.522
CESD4_A	1.000	.432
CESD5_RA	1.000	.260
CESD6_A	1.000	.234
CESD7_A	1.000	.162
CESD8_RA	1.000	.438
CESD9_A	1.000	.209
CESD10_A	1.000	.385

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.330	33.298	33.298	3.330	33.298	33.298
2	1.329	13.293	46.590			
3	.975	9.748	56.339			
4	.951	9.515	65.853			
5	.858	8.579	74.433			
6	.719	7.189	81.622			
7	.632	6.317	87.939			
8	.485	4.854	92.793			
9	.404	4.041	96.834			
10	.317	3.166	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component
	1
CESD3_A	.722
CESD8_RA	.662
CESD4_A	.657
CESD10_A	.621
CESD1_A	.612
CESD2_A	.560
CESD5_RA	.510
CESD6_A	.484
CESD9_A	.457
CESD7_A	.402

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix I: Depression

C. Reliability

****** Method 2 (covariance matrix) will be used for this analysis ****

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

1.	CESD1_A	cesd items
2.	CESD2_A	
3.	CESD3_A	
4.	CESD4_A	
5.	CESD5_RA	
6.	CESD6_A	
7.	CESD7_A	
8.	CESD8_RA	
9.	CESD9_A	
10.	CESD10_A	

		Mean	Std Dev	Cases
1.	CESD1_A	1.4623	.7437	212.0
2.	CESD2_A	1.4623	.7563	212.0
3.	CESD3_A	1.4387	.7610	212.0
4.	CESD4_A	1.7217	.9302	212.0
5.	CESD5_RA	2.0094	1.0841	212.0
6.	CESD6_A	1.1792	.5114	212.0
7.	CESD7_A	1.9387	1.0354	212.0
8.	CESD8_RA	1.6321	.8468	212.0
9.	CESD9_A	1.4481	.7982	212.0
10.	CESD10_A	1.7075	.8813	212.0

Correlation Matrix

	CESD1_A	CESD2_A	CESD3_A	CESD4_A	CESD5_RA
CESD1_A	1.0000				
CESD2_A	.3261	1.0000			
CESD3_A	.3183	.3047	1.0000		
CESD4_A	.4198	.2915	.3674	1.0000	
CESD5_RA	.1004	.2432	.2937	.1295	1.0000
CESD6_A	.2297	.3116	.3206	.2050	.2106
CESD7_A	.1970	.2179	.1666	.2085	.1187
CESD8_RA	.3090	.2520	.4649	.2845	.4426
CESD9_A	.2322	.1577	.4863	.1305	.2251
CESD10_A	.3157	.2109	.3123	.5882	.2609

CESD6_A	CESD7_A	CESD8_RA	CESD9_A	CESD10_A

CESD6_A	1.0000				
CESD7_A	.2088	1.0000			
CESD8_RA	.2296	.0552	1.0000		
CESD9_A	.1158	.1080	.3362	1.0000	
CESD10_A	.1800	.3075	.2933	-.0352	1.0000

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

N of Cases = 212.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
Scale	16.0000	22.9194	4.7874	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
CESD1_A	14.5377	19.3398	.4627	.2827	.7378
CESD2_A	14.5377	19.4441	.4353	.2288	.7410
CESD3_A	14.5613	18.5033	.5860	.4429	.7219
CESD4_A	14.2783	18.0786	.5026	.4410	.7302
CESD5_RA	13.9906	18.2369	.3788	.2681	.7528
CESD6_A	14.8208	20.8872	.3788	.1858	.7508
CESD7_A	14.0613	19.2142	.2901	.1581	.7657
CESD8_RA	14.3679	18.4422	.5170	.3729	.7290
CESD9_A	14.5519	19.9641	.3250	.3342	.7547
CESD10_A	14.2925	18.4544	.4871	.4677	.7329

Reliability Coefficients   10 items

Alpha = .7616   Standardized item alpha = .7734

Appendix I: Depression

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
DEPSCAL_	212	17	16.0000	15.0000	10.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
DEPSCAL_	4.7874	22.9194	1.100	.167

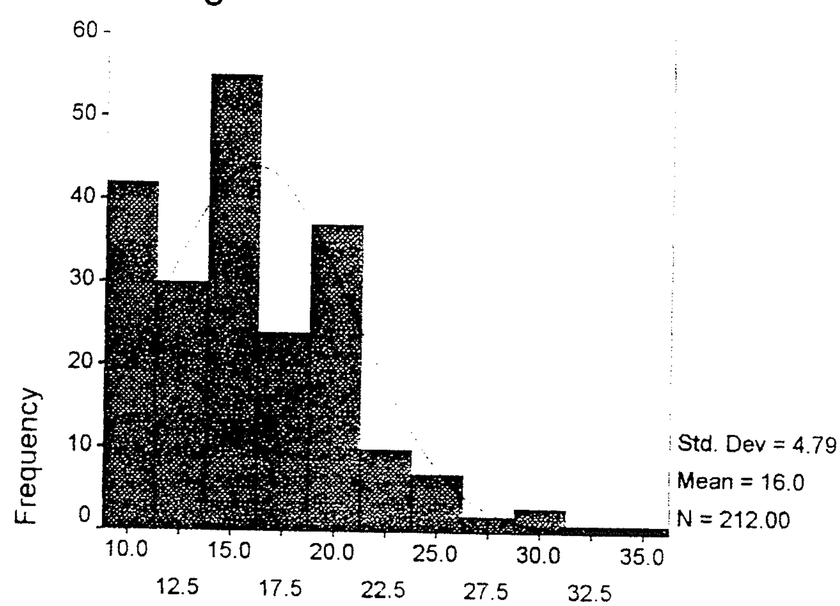
Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
DEPSCAL_	1.698	.333	25.00	10.00	35.00

DEPSCAL_

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	24	10.5	11.3	11.3
	11.00	18	7.9	8.5	19.8
	12.00	11	4.8	5.2	25.0
	13.00	19	8.3	9.0	34.0
	14.00	22	9.6	10.4	44.3
	15.00	15	6.6	7.1	51.4
	16.00	18	7.9	8.5	59.9
	17.00	18	7.9	8.5	68.4
	18.00	6	2.6	2.8	71.2
	19.00	17	7.4	8.0	79.2
	20.00	13	5.7	6.1	85.4
	21.00	7	3.1	3.3	88.7
	22.00	9	3.9	4.2	92.9
	23.00	1	.4	.5	93.4
	24.00	3	1.3	1.4	94.8
	25.00	2	.9	.9	95.8
	26.00	2	.9	.9	96.7
	27.00	2	.9	.9	97.6
	31.00	3	1.3	1.4	99.1
	33.00	1	.4	.5	99.5
	35.00	1	.4	.5	100.0
	Total	212	92.6	100.0	
Missing	System Missing	17	7.4		
	Total	17	7.4		
Total		229	100.0		

Histogram



Appendix J

A. Illness Restriction Items: AIM 2001

"[I'll read a list of common health problems], and you tell me if you have had any of them within the last year or if you otherwise still have after effects from having had them earlier."

(1=Yes, 0=No)

1. Heart and circulation problems (hardening of the arteries, heart troubles).
2. High blood pressure (hypertension).
3. Have had a heart attack.
4. Have had a stroke.
5. Anaemia or other blood diseases.
6. Arthritis or rheumatism (joints, back, or orthopaedic).
7. Palsy (Parkinson's Disease).
8. Alzheimer's Disease or other dementias.
9. Eye trouble not relieved by glasses (cataracts, glaucoma).
10. Ear trouble (hearing loss).
11. Dental problems (teeth need care, dentures don't fit).
12. Number of missing teeth *Specify* ________ .
13. Chest problems (asthma, emphysema, T.B., breathing problems).
14. Stomach trouble (including upper & lower gastro-intestinal problems).

15. Incontinence, that is, trouble controlling your bladder.

16. Trouble controlling your bowels.

17. Kidney trouble (including bladder troubles).

18. Diabetes.

19. Foot trouble.

20. Skin problems.

21. Nerve trouble (including all mental illness or emotional problems).

22. Cancer, any variety (may have been mentioned above).

23. Other (specify, including amputations, allergies, etc.) ____________ .

Appendix J: 2001 Illness Restriction

B. Original Item Frequencies

CVASTS_ HEART PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	134	58.5	58.5	58.5
	1 Yes	95	41.5	41.5	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

HYPERT_ HYPERTENSION LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	132	57.6	57.6	57.6
	1 Yes	97	42.4	42.4	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

HEART_ HEART ATTACK LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	199	86.9	86.9	86.9
	1 Yes	30	13.1	13.1	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

STROKE_ STROKE LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	206	90.0	90.0	90.0
	1 Yes	23	10.0	10.0	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

ANAEM_ ANAEMIA OR OTHER BLOOD DISEASES?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	213	93.0	93.0	93.0
	1 Yes	16	7.0	7.0	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

ARTHST_ ARTHRITIS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	70	30.6	30.6	30.6
	1 Yes	159	69.4	69.4	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

PALSY_ PALSY LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	224	97.8	97.8	97.8
	1 Yes	5	2.2	2.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

ALZDIS_ ALZHEIMER S DISEASE OR OTHER DEMENTIAS?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	218	95.2	95.2	95.2
	1 Yes	11	4.8	4.8	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

EYE_ EYE PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	121	52.8	52.8	52.8
	1 Yes	108	47.2	47.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

DENTAL_ DENTAL PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	192	83.8	83.8	83.8
	1 Yes	37	16.2	16.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

MISTTH_ NUMBER OF MISSING TEETH?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	10	4.4	4.4	4.4
	1	8	3.5	3.6	8.0
	2	9	3.9	4.0	12.0
	3	12	5.2	5.3	17.3
	4	10	4.4	4.4	21.8
	5	4	1.7	1.8	23.6
	6	12	5.2	5.3	28.9
	7	5	2.2	2.2	31.1
	8	9	3.9	4.0	35.1
	9	1	.4	.4	35.6
	10	4	1.7	1.8	37.3
	12	1	.4	.4	37.8
	13	1	.4	.4	38.2
	14	2	.9	.9	39.1
	16	7	3.1	3.1	42.2
	17	2	.9	.9	43.1
	18	2	.9	.9	44.0
	20	3	1.3	1.3	45.3
	21	2	.9	.9	46.2
	22	4	1.7	1.8	48.0
	23	1	.4	.4	48.4
	24	6	2.6	2.7	51.1
	25	6	2.6	2.7	53.8
	26	6	2.6	2.7	56.4
	27	1	.4	.4	56.9
	28	13	5.7	5.8	62.7
	29	2	.9	.9	63.6
	30	1	.4	.4	64.0
	31	2	.9	.9	64.9
	32	79	34.5	35.1	100.0
	Total	225	98.3	100.0	
Missing	96 U-Unknown/ Don't know	4	1.7		
	Total	4	1.7		
Total		229	100.0		

CHEST_ CHEST PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	184	80.3	80.3	80.3
	1 Yes	45	19.7	19.7	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

STOMACH_ STOMACH PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	193	84.3	84.3	84.3
	1 Yes	36	15.7	15.7	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

INCNBLD_ INCONTINENCE?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	176	76.9	76.9	76.9
	1 Yes	53	23.1	23.1	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

INCNBWL_ TROUBLE CONTROLLING YOUR BOWELS?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	202	88.2	88.2	88.2
	1 Yes	27	11.8	11.8	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

KIDNEY_ KIDNEY PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	217	94.8	94.8	94.8
	1 Yes	12	5.2	5.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

DIABTES_ DIABETES LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	207	90.4	90.4	90.4
	1 Yes	22	9.6	9.6	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

FOOT_ FOOT PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valic	0 No	173	75.5	75.5	75.5
	1 Yes	56	24.5	24.5	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

SKIN_ SKIN PROBLEMS ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	213	93.0	96.8	96.8
	1 Yes	7	3.1	3.2	100.0
	Total	220	96.1	100.0	
Missing	93 Telephone Interview	3	1.3		
	98 P-Proxy	6	2.6		
	Total	9	3.9		
Total		229	100.0		

NERVE_ NERVE PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	201	87.8	87.8	87.8
	1 Yes	28	12.2	12.2	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

CANCER_ CANCER LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	204	89.1	89.1	89.1
	1 Yes	25	10.9	10.9	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

EAR_ EAR PROBLEMS LST YR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	117	51.1	51.1	51 1
	1 Yes	112	48.9	48.9	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

AMPUTAT_ Other (incl. amputations, allergies, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	173	75.5	75.5	75.5
	1 Yes	56	24.5	24.5	100.0
	Total	229	100.0	100.0	
Total		229	100.0		

Appendix J: 2001 Illness restriction

C. *Factor Analysis*

Communalities

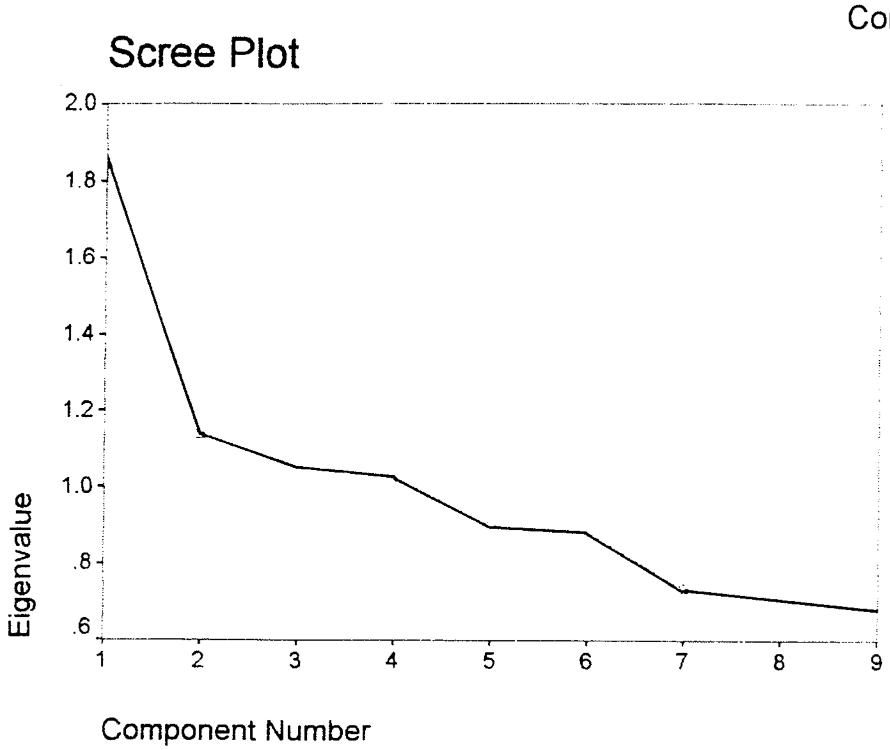
	Initial	Extraction
CVASTS_	1.000	.250
HYPERT_	1.000	.156
ARTHST_	1.000	.236
EYE_	1.000	7.221E-02
CHEST_	1.000	.183
STOMACH_	1.000	.290
INCNBLD_	1.000	.323
INCNBWL_	1.000	.331
CANCER_	1.000	3.051E-02

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.870	20.782	20.782	1.870	20.782	20.782
2	1.141	12.681	33.463			
3	1.054	11.707	45.170			
4	1.029	11.438	56.609			
5	.897	9.970	66.578			
6	.885	9.837	76.415			
7	.737	8.194	84.609			
8	.707	7.853	92.462			
9	.678	7.538	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component
	1
INCNBWL_	.575
INCNBLD_	.568
STOMACH_	.538
CVASTS_	.500
ARTHST_	.486
CHEST_	.428
HYPERT_	.394
EYE_	.269
CANCER_	.175

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix J: 2001 Illness Restriction

D. Reliability

****** Method 2 (covariance matrix) will be used for this analysis ****

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

1.	CVASTS_	HEART PROBLEMS LST YR?
2.	HYPERT_	HYPERTENSION LST YR?
3.	ARTHST_	ARTHRITIS LST YR?
4.	EYE_	EYE PROBLEMS LST YR?
5.	CHEST_	CHEST PROBLEMS LST YR?
6.	STOMACH_	STOMACH PROBLEMS LST YR?
7.	INCNBLD_	INCONTINENCE?
8.	INCNBWL_	TROUBLE CONTROLLING YOUR BOWELS?
9.	CANCER_	CANCER LST YR?

		Mean	Std Dev	Cases
1.	CVASTS_	.4148	.4938	229.0
2.	HYPERT_	.4236	.4952	229.0
3.	ARTHST_	.6943	.4617	229.0
4.	EYE_	.4716	.5003	229.0
5.	CHEST_	.1965	.3982	229.0
6.	STOMACH_	.1572	.3648	229.0
7.	INCNBLD_	.2314	.4227	229.0
8.	INCNBWL_	.1179	.3232	229.0
9.	CANCER_	.1092	.3125	229.0

Correlation Matrix

	CVASTS_	HYPERT_	ARTHST_	EYE_	CHEST_
CVASTS_	1.0000				
HYPERT_	.1930	1.0000			
ARTHST_	.0777	.0508	1.0000		
EYE_	.1633	.0045	.0572	1.0000	
CHEST_	.1858	.0209	.1611	.0391	1.0000
STOMACH_	.1720	.1154	.0782	.0726	.1185
INCNBLD_	.0843	.1163	.2068	.0623	.0934
INCNBWL_	.0769	.1251	.1838	.0615	.0918
CANCER_	.0747	.0683	.0803	-.0222	.0736

	STOMACH_	INCNBLD_	INCNBWL_	CANCER_
STOMACH_	1.0000			
INCNBLD_	.1612	1.0000		
INCNBWL_	.2141	.2810	1.0000	

CANCER_	.0796	.0071	-.0411	1.0000

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

N of Cases = 229.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
Scale	2.8166	2.8873	1.6992	9

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
CVASTS_	2.4017	2.2151	.2914	.1117	.4303
HYPERT_	2.3930	2.3624	.1837	.0633	.4754
ARTHST_	2.1223	2.3446	.2330	.0851	.4547
EYE_	2.3450	2.4463	.1219	.0351	.5006
CHEST_	2.6201	2.4647	.2111	.0682	.4629
STOMACH_	2.6594	2.4449	.2711	.0928	.4455
INCNBLD_	2.5852	2.3578	.2702	.1207	.4418
INCNBWL_	2.6987	2.5009	.2758	.1352	.4480
CANCER_	2.7074	2.6991	.0881	.0277	.4962

Reliability Coefficients 9 items

Alpha = .4919 Standardized item alpha = .4992

Appendix J: 2001 Illness Restriction

E. Table of SAS 2003 Means, Weighting Scheme, and Restrictiveness Rating

Illness restriction item	*Mean from SAS 2003*	*Weighting scheme*	*Restrictiveness rating*
Chest problems	2.15	chest_ * 9	Most restrictive
Incontinence of bowel	1.92	incnbwl_ * 8	
Arthritis	1.86	arthst_ * 7	
Incontinence of bladder	1.82	incnbld_ * 6	
Stomach trouble	1.81	stomach_ * 5	
Eye trouble	1.53	eye_ * 4	
Heart & circulation problems	1.48	cvasts_ * 3	
Cancer	1.07	cancer_ * 2	
High blood pressure	.62	hypert_ * 1	Least restrictive

Appendix J: 2001 Illness Restriction

F. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
ILLREST_	229	0	13.5197	11.0000	7.00[a]

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
ILLREST_	8.9983	80.9700	.697	.161

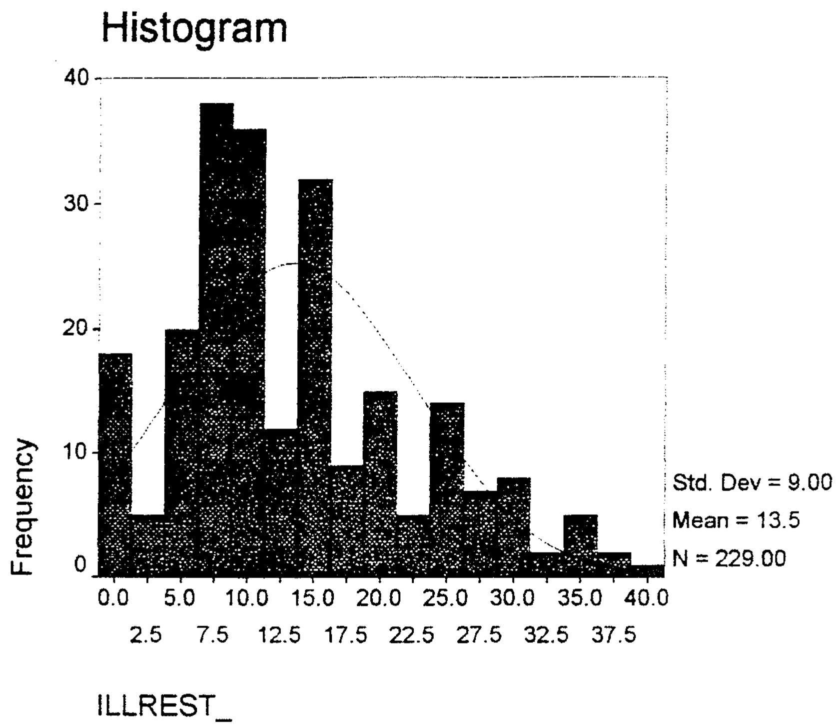
Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
ILLREST_	-.098	.320	40.00	.00	40.00

a. Multiple modes exist. The smallest value is shown

ILLREST_

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	14	6.1	6.1	6.1
	1.00	4	1.7	1.7	7.9
	3.00	5	2.2	2.2	10.0
	4.00	11	4.8	4.8	14.8
	5.00	7	3.1	3.1	17.9
	6.00	2	.9	.9	18.8
	7.00	20	8.7	8.7	27.5
	8.00	18	7.9	7.9	35.4
	9.00	6	2.6	2.6	38.0
	10.00	10	4.4	4.4	42.4
	11.00	20	8.7	8.7	51.1
	12.00	4	1.7	1.7	52.8
	13.00	8	3.5	3.5	56.3
	14.00	14	6.1	6.1	62.4
	15.00	10	4.4	4.4	66.8
	16.00	8	3.5	3.5	70.3
	17.00	7	3.1	3.1	73.4
	18.00	2	.9	.9	74.2
	19.00	2	.9	.9	75.1
	20.00	10	4.4	4.4	79.5
	21.00	3	1.3	1.3	80.8
	22.00	3	1.3	1.3	82.1
	23.00	2	.9	.9	83.0
	24.00	2	.9	.9	83.8
	25.00	4	1.7	1.7	85.6
	26.00	8	3.5	3.5	89.1
	27.00	4	1.7	1.7	90.8
	28.00	3	1.3	1.3	92.1
	29.00	5	2.2	2.2	94.3
	30.00	3	1.3	1.3	95.6
	32.00	2	.9	.9	96.5
	34.00	3	1.3	1.3	97.8
	35.00	2	.9	.9	98.7
	37.00	1	.4	.4	99.1
	38.00	1	.4	.4	99.6
	40.00	1	.4	.4	100.0
	Total	229	100.0	100.0	
Total		229	100.0		


Histogram
40
30
20
10
0
Frequency
Std. Dev = 9.00
Mean = 13.5
N = 229.00
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0
2.5 7.5 12.5 17.5 22.5 27.5 32.5 37.5
ILLREST_

Appendix K

A. Happiness Items[a]*: AIM 2001*

"Please answer *yes* or *no*".

(1=Yes, 2=No)

1. Things are getting worse as I get older.
2. Little things bother me more this year.
3. Life is hard for me most of the time.
4. I am satisfied with my life today.
5. I am just as happy as when I was younger.
6. As I look back on my life, I am fairly well satisfied.

[a]Second part of Stones et al.'s (1996) Short Happiness and Affect Research Protocol (SHARP).

Appendix K: Happiness

B. Factor Analysis

Communalities

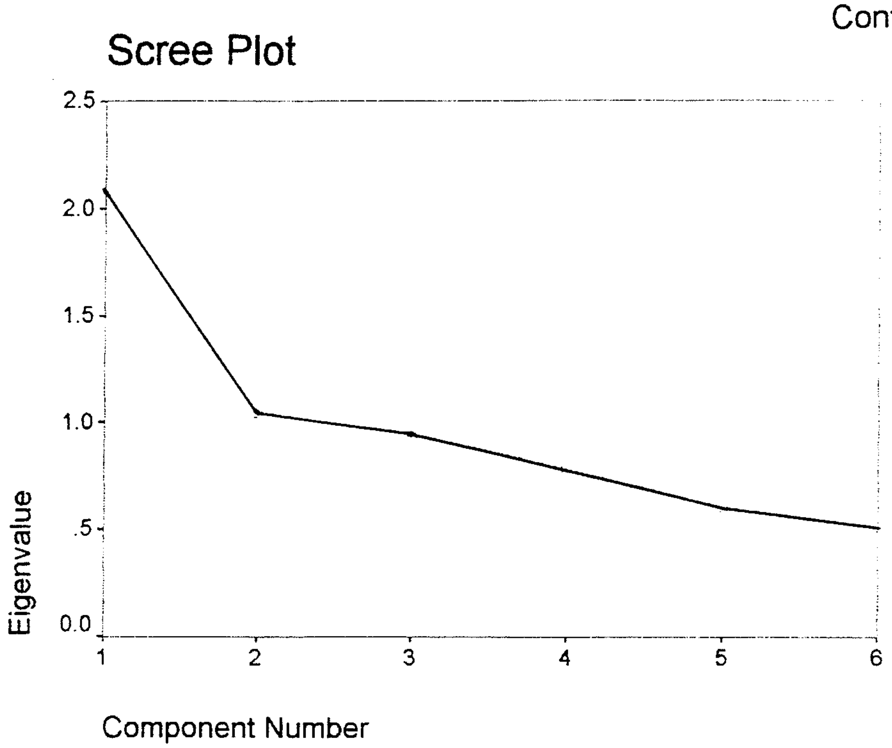
	Initial	Extraction
SHARP7_A	1.000	.438
SHARP8_A	1.000	.345
SHARP9_A	1.000	.460
SHRP10_R	1.000	.421
SHRP11_R	1.000	.361
SHRP12_R	1.000	6.013E-02

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.085	34.754	34.754	2.085	34.754	34.754
2	1.052	17.526	52.280			
3	.950	15.841	68.121			
4	.790	13.167	81.288			
5	.609	10.150	91.438			
6	.514	8.562	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component
	1
SHARP9_A	.678
SHARP7_A	.662
SHRP10_R	.649
SHRP11_R	.601
SHARP8_A	.588
SHRP12_R	.245

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Appendix K: Happiness

C. Reliability

****** Method 2 (covariance matrix) will be used for this analysis ****

R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (A L P H A)

1.	SHARP7_A	
2.	SHARP8_A	
3.	SHARP9_A	
4.	SHRP10_R	SHARP10_ reverse coded
5.	SHRP11_R	SHARP11_ reverse coded.
6.	SHRP12_R	sharp12 reverse coded.

		Mean	Std Dev	Cases
1.	SHARP7_A	1.5320	.5002	203.0
2.	SHARP8_A	1.6700	.4714	203.0
3.	SHARP9_A	1.8522	.3558	203.0
4.	SHRP10_R	1.9212	.2701	203.0
5.	SHRP11_R	1.4729	.5005	203.0
6.	SHRP12_R	1.9655	.1829	203.0

Correlation Matrix

	SHARP7_A	SHARP8_A	SHARP9_A	SHRP10_R	SHRP11_R
SHARP7_A	1.0000				
SHARP8_A	.3075	1.0000			
SHARP9_A	.2493	.3276	1.0000		
SHRP10_R	.1653	.1835	.3418	1.0000	
SHRP11_R	.3742	.1403	.1442	.2771	1.0000
SHRP12_R	.0392	-.0178	.1495	.1451	.1249

	SHRP12_R
SHRP12_R	1.0000

N of Cases = 203.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	10.4138	1.8972	1.3774	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted

SHARP7_A	8.8818	1.1741	.4363	.2218	.4987
SHARP8_A	8.7438	1.3103	.3380	.1703	.5501
SHARP9_A	8.5616	1.4355	.3931	.2175	.5279
SHRP10_R	8.4926	1.5779	.3630	.1785	.5505
SHRP11_R	8.9409	1.2440	.3607	.1949	.5412
SHRP12_R	8.4483	1.8030	.1237	.0469	.6105

Reliability Coefficients 6 items

Alpha = .5954 Standardized item alpha = .5951

Appendix K: Happiness

D. Frequencies

Statistics

	N		Mean	Median	Mode
	Valid	Missing			
	Statistic	Statistic	Statistic	Statistic	Statistic
HAPSCAL_	203	26	10.4138	10.0000	10.00

Statistics

	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Std. Error
HAPSCAL_	1.3774	1.8972	-.570	.171

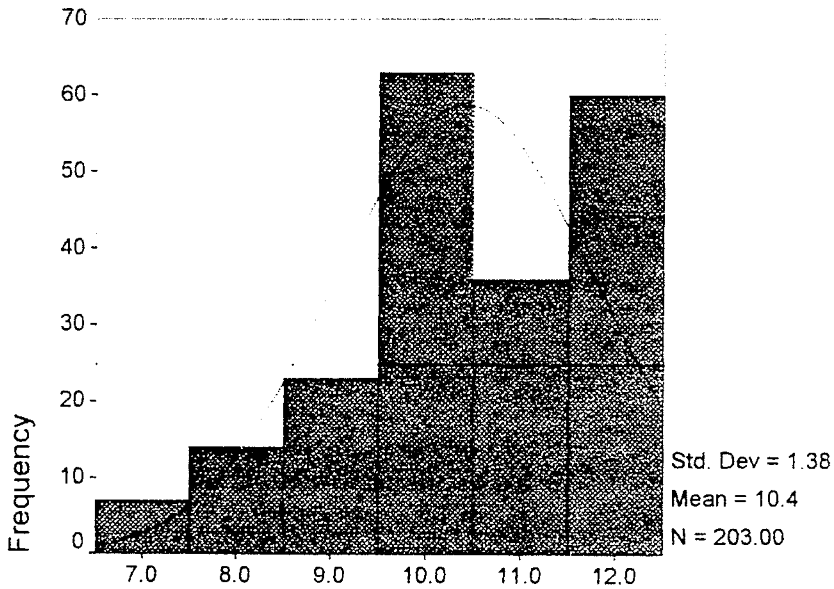
Statistics

	Kurtosis		Range	Minimum	Maximum
	Statistic	Std. Error	Statistic	Statistic	Statistic
HAPSCAL_	-.348	.340	5.00	7.00	12.00

HAPSCAL_

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7.00	7	3.1	3.4	3.4
	8.00	14	6.1	6.9	10.3
	9.00	23	10.0	11.3	21.7
	10.00	63	27.5	31.0	52.7
	11.00	36	15.7	17.7	70.4
	12.00	60	26.2	29.6	100.0
	Total	203	88.6	100.0	
Missing	System Missing	26	11.4		
	Total	26	11.4		
Total		229	100.0		

Histogram



SHARP 7-12 items from p.19 of AIM 2001.