

Regret in Later Life: Exploring Relationships Between Regret,
Perceived Control and Health in Older Individuals

By

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Thesis Submitted to the Faculty of Graduate Studies in
Partial Fulfillment of the Requirements for the Degree of

Master of Arts

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To regret deeply is to live afresh -Thoreau

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Abstract

The present study extended research on regret in later life by examining how frequently older individuals experience regret, what events cause regret, and whether regret affects health and life satisfaction. The study also bridged the regret and perceived control literatures by exploring how secondary control beliefs relate to regret, health and life satisfaction. Analyses were performed on data collected as part of the Successful Aging Study 2003. The sample consisted of 228 community-living individuals (79-98 years old) who reported on their experience of regret (e.g., content and frequency), secondary control beliefs (interpretive and illusory), health, and life satisfaction. A content analysis of regrets revealed that participants most commonly reported feeling regret due to things they had not done, the death of a loved one, and their own or others' health. Regression analyses indicated that experiencing regret less frequently was associated with better life satisfaction and the presence of fewer health problems. As predicted, having stronger secondary interpretive control beliefs was associated with better life satisfaction, and better health outcomes. Moreover, evidence for an emotion-modifying role of secondary interpretive control was shown through its negative correlation with regret; and mediational analyses showed that interpretive control indirectly influenced life satisfaction through its effects on regret. However, this mediation effect was weak and was not replicated for the health outcomes. Finally, having stronger secondary illusory control beliefs was associated with better life satisfaction; however, these beliefs were unrelated to health or to frequency of feeling regret. Results add to the broader literature on emotions, control beliefs, and health and life satisfaction among older individuals.

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Youth is a blunder, manhood a struggle, old age a regret

-Benjamin Disraeli

Old age is often portrayed as a time of regret and despair. Why this is so has no doubt to do with the many losses (e.g., physical, social) associated with later life. But how true is the conclusion that old age is “a regret”? How often do older individuals experience regret and what do they regret? Do some people experience this emotion more often than others, and if so, why? What is particularly compelling about studying the experience of regret in older individuals is that learning about people’s regrets can ultimately reveal a little about their life story and about what they value. Indeed, knowing the regrets of an older cohort can serve as a lesson for younger generations. In addition, studying regrets in older individuals may be important in understanding how people deal with personal loss in general, and how emotional experiences can effect well-being, whether physical or psychological.

The purpose of the present study was to extend the small body of research on regret in older individuals by examining how frequently individuals experience regret, what they regret, and how regret relates to health and life satisfaction. In addition to these objectives, the present study also focused on a process that theoretically could be involved in modifying emotions such as regret: the process of secondary control. The secondary control process, characterized by Rothbaum, Weisz, and Snyder (1982) as involving attempts to gain control by accommodating to the environment and accepting

circumstances, has been found in past research to be important for older individuals in terms of their physical health and well-being. The present study allowed an examination of how secondary control relates to the emotion of regret in older individuals.

The following review of literature will focus on the definition of regret, the causes of regret, and the connections between regret, health and control processes. Particular attention will be given to studies which have involved older participants. This literature review will be followed by a more detailed summary of the present study objectives.

Regret

Few individuals will go through life without experiencing regret. This single emotion is surprisingly ubiquitous. Its poignancy appears in songs and novels; and it is an aspect of everyday decision-making (“I wish I had bought the sweater when it was on sale”) and important life decisions and events (“I regret not following my doctor’s advice”). In a study of the most commonly mentioned emotions in conversations, regret, together with guilt and being sorry, were the next most frequently named emotions after love (Shimanoff, 1984).

According to Webster’s Third New International Dictionary of the English Language, the word regret is of Scandinavian origin, stemming from *grata*, to weep. A complex emotion, it is typically associated with personal losses or mistakes. In her theoretical and conceptual consideration of regret, Landman (1987) formulated the following broad definition of regret:

“Regret is a more or less painful cognitive/affective state of feeling sorry for losses, transgressions, shortcomings, or mistakes. The regretted matters may have

been sins of commission as well as sins of omission; they may range from the entirely voluntary to the accidental; they may have been actually executed deeds or entirely mental ones; they may have been committed by oneself or by another person or group; they may be moral or legal transgressions or morally and legally neutral; and the regretted matters may have occurred in the past, the present, or the future.” (p. 153)

Regret can be characterized as a self-focused *negative emotion* sharing similarities with guilt, shame (Mandel, 2003; Landman, 1987), and remorse (Landman, 1987). Regret can also be considered a *cognitive phenomenon* related to counterfactual thinking, a process whereby individuals focus on how events may have been different or counter to ‘fact’. Indeed, Kahneman and Tversky (1982b) used the term “counterfactual emotion” to describe emotions such as regret, frustration, indignation, grief, and envy that appear to depend on “a comparison of reality with what might or should have been” (p. 206).

Much research has focused on two types of events that are thought to influence counterfactual thinking and ultimately lead to regret— actions and inactions (also called commissions and omissions, respectively). A consistent trend, termed the “action effect,” is that people report that they would feel more regret over actions than inactions (e.g., Landman, 1988). A classic example is respondents indicating that a man who learned he would have gained \$1200 in the stock market had he not switched companies (action) would feel *more* regret than a man who learned he would have gained \$1200 had he not stayed with the same company (inaction) (Kahneman & Tversky, 1982a). Both hypothetical negative events are the same (i.e. not gaining the money), but the pathways

to the events differ by whether they involved inactions or actions.

There has been much debate surrounding this “action effect,” however. For example, in contrast to scenario-based studies, studies which focus on people’s actual major life regrets appear to reveal an opposite trend. That is, when asked to list their life regrets, individuals tend to report more regrettable inactions than actions (Gilovich & Medvec, 1995). Furthermore, when asked about what they regret *more*— things they did not do but wish they had (inaction) or things they had done but wished they had not (action), individuals report feeling more regret over the former (Gilovich & Medvec, 1995).

Several investigators have attempted to account for this apparent discrepancy in findings related to the “action effect.” For instance, Gilovich and Medvec (1994) proposed that the discrepancy may have to do with duration or time such that in the *short-term* people tend to regret actions the most; however, in the *long-term*, people tend to regret inactions more than actions. Zeelenberg, van den Bos, van Dijk, & Pieters (2002) argued that it is the normality of a behaviour and not whether one acts or fails to act that influences counterfactual thinking and regret. In one study, an “inaction effect” was found when information about prior outcomes was included into scenarios that made failing to act seem more abnormal than acting (Zeelenberg et al., 2002). That is, they found that participants reported greater regret for inactions than actions. In his discussion of counterfactual thinking, Roese (1997) also questioned the reliability of the “action effect,” citing methodological problems with past research. Thus, the importance of an action-inaction dichotomy in terms of effects on counterfactual thinking and regret may have been overplayed in past research.

Implied in the many studies on regrettable actions vs. inactions is the notion that a defining feature of a regrettable event is its association with decision-making (to act or not) and a sense of personal responsibility. Related to this, Zeelenberg and colleagues have studied the relation between counterfactual thinking and regret and disappointment in the context of decision-making (e.g., Zeelenberg et al., 1998). Their study findings point to the notion that regret can be explained by *what type* of counterfactual event is generated. In particular, disappointment, is primarily associated with counterfactuals focused on the situation (i.e., aspects that are not under one's control). Regret, on the other hand, is associated with the generation of counterfactuals that are focused on behaviours or decisions that are under a person's control (e.g., *If only I had gone to college when I had the chance*). Following from this, they have concluded that regret is strongly related to a sense of personal responsibility over the situation. Although there has been some disagreement over this issue (e.g., see Ordonez & Connolly, 2000; Zeelenberg, van Dijk, & Manstead, 2000), research appears to show that regret does typically involve a sense of personal responsibility over a decision or outcome (e.g., Gilovich & Medvec, 1995).

Interestingly, however, when discussing the theoretical distinction between regret and guilt, Landman (1987) concluded that regret is the more overarching of the two emotions because people can feel regret for events that they had no control over, whereas guilt is typically experienced after a transgression for which an individual feels responsible. As stated by Zeelenberg et al. (2000), cases in which individuals experience regret without having a sense of responsibility may be "exceptions rather than the rule"(p. 152);

however, it does appear that a sense of responsibility need not be a *necessary* condition for regret.

What Individuals Regret

What events do individuals regret? To answer this, many researchers have classified people's regrets on the basis of the life domain to which they relate. For example, in a study on life regrets and current goals, 155 community college students (ages 18-59 years) were asked to list goals they wished they had pursued but never had (Lecci, Okun, & Karoly, 1994). Blind raters classified the content of regrets into the following 12 categories: educational-academic, occupational, family, intimate relationships, friendship, spiritual-religious, health-self-care (e.g., regret not staying in shape), self-trait (e.g., wish had been more assertive), financial, temporal (e.g., regret wasting time), leisure, and other. A "dual" category was also added to represent responses that combined one or more categories.

Results showed that subjects listed an average of 1.9 regrets and that older individuals reported fewer regrets than younger individuals. Eleven individuals (7.1%) reported having no regrets. The most commonly cited type of regret was educational-academic, representing 30.8 % of all regrets. Moreover, this type of regret was the most commonly cited, regardless of age or gender. Occupational followed by leisure were the next most commonly cited regrets. An exception to this trend occurred for the 18- to 21-year-olds who had more leisure than occupational regrets. The fourth most frequently cited type of regret was intimate relationships. Males more frequently cited this type of regret than females; likewise the oldest adults of the sample (aged 35-58 yrs) identified more of these

types of regrets compared to the younger adults. When only the most important regret for each individual was considered, similar results to those above were found.

Jeffries and Konnert (2002) examined regret and psychological well-being among women who were either voluntarily or involuntarily childless or who had children. The sample included 72 women over the age of 45 who were recruited through newspaper articles and advertisements posted at university campus and community sites. The average age for the younger group was 47.9 years (range = 45-54 years) and for the older group was 63.8 years (range = 55-83). Using Lecci et al.'s (1994) method, regrets were measured by asking participants whether they had any goals that they wished they had achieved but never did.

Content analysis of the 327 reported regrets indicated 11 categories as follows: academic, occupational, artistic pursuits, intimate relationships, family, children, leisure, travel, health-self-care, financial, and self-trait. All participants reported at least one regret. As with the Lecci et al. (1994) study, regrets classified in the domain of academics were mentioned the most (17.13 %), followed by occupation (13.46 %). The next most common category was artistic pursuits (13.15 %). Moreover, also similar to Lecci et al. (1994), older individuals reported fewer regrets than younger individuals.

Wrosch and Heckhausen (2002) also classified regrets based on life domains in their investigation of regret in older and younger adults. The study sample consisted of 122 residents of Berlin (age range = 20-87 years, $M = 49.48$ years) who were recruited from a newspaper advertisement and from previous unrelated studies. Participants were asked to report the activity they regretted most not having pursued during their lives (i.e., a long-

term regrettable inaction) or in the past couple of weeks (short-term). Regrets were categorized into 8 different domains as follows: work-education, family-partnership, self-development (e.g., regret I did not continue learning Russian), leisure, friendship, social engagement (e.g., regret I did not give enough money to a homeless person), health, and finances.

Consistent with other studies, the most commonly cited regrets were those related to work-education. This trend held even when focusing only on short-term regrets. The next most frequently cited types of regrets were family-partnership and self-development. No significant effects were found when predicting the probability of reporting these three regret categories by gender or educational level. Likewise, and perhaps of greatest relevance to the present study, the probability of reporting a certain category of regret did not differ by age.

Taken together, these studies indicate a pattern in which individuals most commonly report having regrets related to education. Moreover, this finding was consistent across different age groups and for both males and females. Life review studies in which participants are asked what they would do differently if it were possible to relive their past life have obtained similar findings (e.g., DeGenova, 1992; Kinnier & Metha, 1989). Interestingly, the above studies also seem to suggest that older adults have fewer regrets compared to younger adults.

It should be noted, however, that each of the above studies focused on individuals' regrettable *inactions*. That is, individuals were asked to focus on what they wished they had done but did not do, or what they would do differently if they had the chance to relive

their past. But what about regrettable actions? There have been few studies asking about regrettable actions and so it is difficult to say what types of actions people typically regret. In one study that did pertain to regrettable actions, Hattiangadi, Medvec, and Gilovich (1995) examined the responses of Terman's geniuses to the question, "Now, looking back over your whole life, what choices would you make differently if you had the opportunity to live it again?" (p. 178). The question was included in the 1986 follow-up study of geniuses (all had IQs above 140) recruited by Lewis Terman in 1921. The follow-up sample consisted of 720 survivors (388 females, M age = 74 years). The focus of Hattiangadi et al.'s study was on the action/inaction dichotomy of participants' responses. Although a large number of regrets (34%) were indeterminate, that is, responses could not clearly be grouped in either category, they found that more individuals cited regrettable inactions (54%) compared to actions (12%).

Consistent with previous research focusing on more heterogeneous samples, by far the most commonly cited regrettable inactions of Terman's geniuses were related to education. The next most frequently cited inactions were not being more disciplined and not being more assertive. Turning to the regrettable actions, those most commonly cited were related to timing of marriage (e.g., should not have married so early) and health (e.g., should not have smoked).

Although the above study considered actions as well as inactions, what is remarkable about this study and the bulk of research on regret is that few studies involve simply asking participants directly about their feelings of regret. That is, few have asked "what do you regret or what caused you to feel regret?" Indeed Gilovich and Medvec (1995)

themselves have been critical of this issue, pointing out that, “Although asking people what they would do differently if they had a chance is likely to tap into some regrets, it need not. A person can look back and seize on something that should have been done differently without feeling any sense of regret or remorse....In addition, asking people what they would *do* differently if they had the chance may have predisposed them of thinking of inactions” (p. 383; italics in original).

To address this issue, Gilovich and Medvec (1995) designed a study using a free-response approach in which different groups of people (professors emeriti, residents in nursing homes, undergraduates, and clerical and custodial staff) were asked to identify their biggest regrets (and thus this more broad question did not focus on inactions or actions). The 77 respondents reported 213 regrets in total. The regrets were categorized as being due to actions, inactions, or situations (objectively) beyond a person’s control. Results indicated only 10 regrets related to circumstances beyond a person’s control. Of the remaining reported regrets, 63% were regrettable inactions. Consistent with other research, the most commonly cited regrets were inactions related to education. The second and third most commonly reported regrets were ‘failures to seize the moment’ (inactions) and ‘rushing in too soon’ (action).

Another study which used a broad measure of regret involved asking older individuals living in the community (n=25) or a nursing home (n=25), “When you think of your life in retrospect, do you have any regrets?” (Baum, 1999). Unfortunately, Baum was sparse with details on this study. Nonetheless, of interest is that when asked such a direct question on regret, 42% of the participants reported having no life regrets. Of those

reporting regrets, the two most common regret categories were personal illness and education/career limits. However, because no information was provided on the refusal rate, correlations between variables, or even on the procedure used to content-analyse regrets, the overall importance or validity of the study results is difficult to gauge.

In sum, based on the above studies, it appears that what individuals report regretting in their lives can be greatly influenced by whether participants are asked to focus on their regrettable actions or inactions. Thus, in order to go beyond an action/inaction distinction to understand the content of what people regret *in general*, it seems crucial to ask about regrets in a broad sense. Also, from these studies, it is clear that regrets appear in many different life domains. An important question becomes: What are the implications of experiencing this emotion?

Positive Implications of Regret: Functionality

By its definition, regret is an unpleasant feeling. However, like all emotions, it can be informative and even functional, in terms of how it may influence behaviours. Thus, there can be positive implications to regret. The functionality of regret can perhaps best be illustrated through its previously mentioned connection with counterfactual thinking. Researchers studying the phenomenon of counterfactual thinking have linked negative emotions such as regret to “upwards” counterfactual thinking (Markman, Gavanski, Sherman, & McMullen, 1993) which involves thinking about how events could have turned out *better* (e.g., “*If only* I had followed her advice...”). This contrasts with “downwards” counterfactual thinking whereby individuals think of *worse* scenarios than what actually occurred (e.g., “*At least* I did not break *both* of my arms when I fell...”). In

a discussion of the consequences of counterfactual thinking, Roese (1997) posited that there are two mechanisms by which counterfactual thinking may have psychological consequences. The first mechanism, *contrast effects*, results out of the contrast between actual outcomes and counterfactual alternatives. In particular, through this contrast effect, thinking about how events could have been *better* (i.e., upwards counterfactual thinking) is thought to result in negative affect.

The second mechanism through which counterfactual thinking may have psychological consequences has particular relevance for the functional argument of regret (Roese, 1997). This mechanism, called *causal inference effects*, stems from the antecedent-outcome linkage inherent particularly in upwards counterfactual thoughts. In particular, upwards counterfactual thinking can provide information for why events occurred; and the causal attributions elicited for events can, in turn, have emotional and behavioural consequences as guided by attribution theory (e.g., Weiner, 1985). More specifically, according to Weiner's Attribution theory (1985), the type of causal attribution made for an event (based on three dimensions of controllability, stability and internality) influences emotions and actions. For example, someone who perceives the reason s/he did not reach a goal as being due to lack of effort (a *controllable* causal attribution) may feel guilty (emotion) but also may try harder next time to achieve the goal (action). The key here is that if the perceived reason for the failure is attributed to controllable factors, the resulting guilt can serve to motivate individuals to change their behaviors in future similar endeavors. Guilt is typically contrasted with shame, an emotion that arises from making *uncontrollable* causal attributions, and can be considered debilitating rather than

motivating.

In sum, (upwards) counterfactual thinking can amplify negative emotions like regret through contrast and causal inference effects; however, counterfactual thinking can also be seen to be functional in that it can help individuals identify what could cause and what could potentially prevent particular negative events in the future (Roese, 1997; Mandel, 2003). In this way, at least in cases in which regret is felt in the context of goal attainment, the negative thinking surrounding regret may lead to positive responding (Stewart & Vandewater, 1999).

Negative Implications of Regret: Relationship with Health and Life Satisfaction

Although regret can be seen to be functional or motivating, experiencing this emotion may also have negative implications. In particular, a small body of research suggests that regret may be negatively associated with older individuals' physical and psychological well-being. Most studies have included two measures of well-being that are particularly significant for an older population: health and life satisfaction. These studies will be discussed following a general overview of the relation between emotions and health and life satisfaction.

There are several pathways by which positive and negative emotions may be linked to health. Emotions may affect health directly, for example, through physiological arousal, or indirectly through health behaviours and cognitions (Mayne, 2001). Emotional responses can also have an impact on social support and relationships which, in turn, can influence health (Tucker & Friedman, 1996).

Much research has indicated an association between emotions and health and life

satisfaction. For example, discrete negative emotions (e.g., sadness, frustration) have been found to relate in older individuals with poorer self-perceived health, more chronic health conditions, less life satisfaction (Chipperfield, Perry, & Weiner, 2003), and greater use of health care services (McKeen, Chipperfield, & Campbell, 2004). Depression, anger, and anxiety have been found to have negative implications for health in individuals with coronary heart disease (Sirois & Burg, 2003). Moreover, negative affect has been related to poor health and life satisfaction in older individuals (Meeks & Murrell, 2001); and an increase in negative affect over an 18-month period has been associated with an increase in systolic blood pressure for both men and women (Pollard & Schwartz, 2003).

In contrast, positive emotions appear to be associated with health-promoting behaviours and participation in social activities (e.g., Salovey, Rothman, Detweiler, & Steward, 2000). Similarly, positive emotional style has been related to resistance to illnesses such as colds (Cohen, Doyle, Turner, Alper & Skoner, 2003). Studies on the discrete emotion of joy have found it to be related to lower morbidity and stress (Consedine, Magai, & King, 2004). Not surprisingly, discrete positive emotions such as contentment and happiness have been associated with higher levels of life satisfaction (Chipperfield et al., 2003).

Although there has been little research on the relationship between regret and physical or psychological outcomes, what research does exist indicates that this emotion may have detrimental implications for health and life satisfaction, particularly for older adults. For example, in Lecci et al.'s (1994) study, which, as previously mentioned, involved asking 155 community college students (ages 18-59 years) to list goals they wished they had

pursued but never did, it was found that the number of reported regrets positively correlated with depression scores. Moreover, the number of reported regrets was negatively related to life satisfaction; however, this was true only for the older individuals in the sample (ages 33-59 years). From these results, the authors suggested that having more regrets may be particularly profound or detrimental later in life because older adults may have less potential to overcome their regrets.

In a study conducted on the recently-experienced discrete emotions of older individuals, 353 community-dwelling older individuals (ages 72-99 years) were asked how often during the past two days they had felt certain emotions, including regret (Chipperfield et al., 2003). Participants were also asked questions about their health and life satisfaction. Results indicated that how often individuals felt regret was related to morbidity and life satisfaction. That is, individuals who indicated experiencing regret more frequently had significantly more chronic health conditions and were less satisfied with life.

In a study on life review, regretfulness, and reminiscence in older individuals, DeGenova (1993) defined regretfulness as “a dissatisfaction or unhappiness with one’s past thoughts, feelings, actions, or accomplishments relative to a person, object, activity, or situation” (p.193). Subjects were 122 retired individuals (age range = 54-91 years; $M = 72.1$ years). Regretfulness was assessed using the Life Review Index which included questions about 7 areas of the past as follows: family, friendship, health, education, leisure, work, and religion. Specifically, participants were asked how often they felt unhappy about each area of the past. As an example, for the domain of friendship,

subjects were asked, "How often are you unhappy about the amount of time you spent with your friends in the past?" (p. 194). Participants could choose one of five responses: daily, weekly, monthly, a few times a year, or never. Controlling for health, income, social activity, gender, age, and marital status, regression results indicated that regretfulness ranked third following social activity and health as significant predictors of life satisfaction.

Taken together, these studies indicate that regret may be important for health and well-being, particularly for older individuals. From this discussion an important question that needs to be addressed is: How can individuals prevent or reduce the detrimental effects of regret on outcomes such as health and life satisfaction?

Regret Regulation

As noted by Gross, Carstensen, Tsai, Skorpen, and Hsu (1997), people do not simply let emotions come and go, they actively regulate their emotions by making "attempts to influence which emotions they have, when they have them, and how these emotions are experienced or expressed" (p. 597). Emotion regulation processes are thought to include conscious and even unconscious mechanisms that increase or decrease both positive and negative emotions (Gross, 1998).

Before discussing research on emotion regulation in older individuals in general and regret regulation specifically, it is worthwhile to note some of the challenges to studying emotion regulation. One challenge surrounds the issue of determining when regulation of emotions has indeed occurred. For example, a simple lack of emotion might reflect emotion regulation; however, it could also be the case that the emotion was never

generated. Although some researchers consider the emotion generation and regulation processes to be inseparable (e.g., Fridja, 1986) others see differentiating the two processes as crucial to a full understanding of emotion regulation (e.g., Gross, 1998). A second challenge revolves around evaluating emotion regulation processes. For example, although binge eating may serve to effectively regulate emotions, it is easy to image the long-term detrimental effects of chronic use of this strategy. On this topic Gross (1998) stated, "Given the myriad forms of emotion regulation, the important role of incompletely defined individual differences in emotion generation and regulation, and the multiple pathways to good or poor health, documenting the long-term health consequences of various forms of emotion regulation is a task as daunting as it is important" (p. 281).

Notwithstanding these challenges, a growing body of research suggests that older individuals may be particularly effective at regulating their emotions. For instance, Labouvie-Vief (1999), in examining emotional-cognitive development over the life course, characterized adulthood by an increased complexity in thinking about the self, others, and emotions. Underlying this developmental theory is the premise that the experience and knowledge gained about emotions throughout the life course can facilitate emotion regulation (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). Other research has shown that compared to younger individuals, older individuals have greater control over their emotions (Gross et al., 1997), and use more emotion-focused strategies in contexts having high emotional salience that appear to warrant these strategies (Blanchard-Fields, Jahnke, & Camp, 1995),

Studies by Carstensen and colleagues suggest that as people grow older and sense that

they have a limited time left to live, emotionally meaningful goals which can be realized in the moment take precedence over more future-oriented goals such as knowledge-seeking (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Charles & Carstensen, 1999). According to their socioemotional selectivity theory, older adults may regulate their emotional experiences by deliberately choosing social situations that will be emotionally gratifying. In this way, the theory provides a different view point from disengagement theory (Cumming & Henry, 1961), suggesting that the reduction in social relationships seen among older individuals reflects not an effort to disengage from society but an effort to select emotionally meaningful relationships.

In the regret literature, researchers have focused on two broad mechanisms that could theoretically work to lessen or dissipate the feeling of regret (i.e., after the emotion has been generated). Landman (1987) suggested that individuals could attempt to cancel a regrettable situation or “undo” regrets either through a *physical* or *mental* act. Similarly, Gilovich and Medvec (1995) cited two major ways that individuals could reduce the pain of regrettable situations. First, they described *behavioural repair* as overcoming or compensating for the regrettable situation through action. For example, if a person were to regret saying something rude to someone, to overcome the regret, s/he might apologize. Second, they described *psychological repair* as involving several potential cognitive mechanisms that could reduce regret such as identifying “silver linings” (i.e., seeing the positive in the negative situation), focusing on what they learned from the situation, or cognitive dissonance reduction. For example, a person who regrets moving to a smaller apartment might reduce their regret by thinking about a positive aspect of the situation

such as the fact that they made new friends because of the move.

Regret and Control Processes

Interestingly, these two main strategies for managing regret—actively changing the situation or actively changing one's perspective of the situation—can be mapped onto the perceived control processes of primary and secondary control (Wrosch & Heckhausen, 2002). As such, perceived control may play a role in the management of regrets. The constructs of primary and secondary control were initially formulated by Rothbaum, Weisz, and Snyder (1982) in their dual-process model of perceived control. According to this model, individuals can gain *primary control* by actively manipulating the environment. Furthermore, they argued that people can gain *secondary control* by actively accepting circumstances and accommodating to the environment. In this way, they proposed that researchers had erroneously equated primary control with perceived control and that in many cases people who appeared to be helpless or lack primary control could be actively engaging in attempts to gain secondary control.

Heckhausen and Schulz (1996; 1998) and colleagues integrated the concepts of primary and secondary control with Baltes and Baltes' (1990; from Heckhausen, 1997) notions of selection and compensation into a life-span theory of development. According to their model, optimal development involves *selectively* investing time and resources to particular goals and *compensating* for failures (including those associated with normal developmental declines in late life). Both developmental mechanisms are thought to be driven by primary control striving and are categorized in terms of primary and secondary control strategies. For example, compensatory secondary strategies (e.g., goal

disengagement or protective causal attributions) serve to buffer the effects of failure on primary control striving. Their theory further holds that as people age and the objective potential to obtain goals through primary control strategies declines, secondary control strategies become more adaptive later in life. In support of their model, Wrosch, Heckhausen, and Lachman (2000) found that it was more adaptive in terms of subjective well-being for older individuals to use secondary control strategies in the face of the age-related stressors of health and finances. Additional research has shown support for this model in relation to stressors such as health (Chipperfield, Perry, & Menec, 1999) and relationships (Wrosch & Heckhausen, 1999).

In a theoretical discussion of emotion and control, Schulz and Heckhausen (1998) argued that emotions also play an important role in their developmental model by serving as mediators and motivators of primary control striving. More specifically, emotions, elicited by successes, failures, losses, etc., are thought to instigate particular primary and secondary control strategies which, in turn, serve to enhance primary control striving. Schulz and Heckhausen use the example of a fearful event which would most likely lead to a selective primary control response. Sadness, on the other hand, caused by a loss would most likely instigate a compensatory secondary strategy. In terms of emotion regulation, a feedback loop is proposed whereby secondary and primary control processes modulate the emotional experience and either enhance or maintain positive emotions or decrease negative emotions.

A recent study by Wrosch and Heckhausen (2002) supports the notion that perceived control processes may be important in regulating regret and that secondary control

strategies, in particular, may be more adaptive for older individuals. As outlined previously, participants in this study (N=122; ages 20-87 years) were asked to report the activity they regretted most not having pursued during their lives (a regrettable omission). They were also asked the amount of personal influence that they had on the situation at the time when they did not pursue the reported activity. The authors termed these influence ratings as internal control attributions and argued that the adaptiveness of making higher vs. lower internal control attributions about regrets would be related to age. More specifically, based on their life-span model, they contended that because older adults have theoretically fewer objective opportunities to overcome their regrets than younger adults, it would be more adaptive for older adults to make attributions of *low* internal control over their regrets (self-protective attributions) because this would help to *deactivate* (i.e., repair) the regret by reducing the perceived responsibility over the situation. In contrast, for younger adults, they argued that making *higher* internal control attributions could instigate actions that could *overcome* the regrettable situation.

Results supported their predictions. Older adults making lower internal control attributions over their regrets reported experiencing the regret less intensely and having less intrusive thoughts. For younger adults, however, an opposite pattern emerged. The authors argued that these findings supported their life-span model of development in that the adaptiveness of making certain regret-specific control attributions was age-dependent.

Interestingly, the Wrosch and Heckhausen (2002) study on regret shows that at face value individuals can feel regret over events they perceive they have either *high or low* control over. In particular, younger individuals appear to feel more intense regret over a

situation that they perceive they had *low* internal control over. Thus, their findings question the assumption that to feel regret requires a perception of responsibility over the regrettable situation. The findings also suggest that it may be important to differentiate regrets on the basis of perceived influence. Moreover, in a general sense, findings show that the way people think about the causes of events in terms of personal influence can affect outcomes such as regret intensity. This cognition-emotion linkage would be expected from attribution theory (Weiner, 1985).

An assumption the authors appear to make, however, is that reporting low control attributions about a regretful situation reflects a secondary control deactivating strategy rather than the simple (perceived or objective) case that some individuals did have little control over the regrettable situation. Although this could be a fair assumption, another approach to studying how perceived control processes may influence emotions such as regret would be to focus on more general control beliefs or strategies instead of regret-related control attributions. Following from the idea that secondary control may be important for older individuals, the present study, in addition to assessing individuals' regret-specific control attributions, also takes a different approach than Wrosch and Heckhausen (2002) by exploring whether *general* (i.e., not regret-related) *secondary control beliefs* may influence the experience of regret.

The Present Study: Regret in Later Life

The present study extends research on regret, health and perceptions of control in older individuals in several ways. First, it provides a descriptive profile of regret in later life by determining what events cause older individuals to feel regret. Unlike most studies which

have focused on only certain types of regret (e.g., regrets due to actions or inactions; life regrets), participants were simply asked about their regrets in general. In this way, the study allows a comprehensive assessment of the content of regrets of older individuals.

This study also focuses on how frequently individuals feel regret and whether sociodemographic variables such as age or gender relate to the experience of regret. For example, as older individuals appear to report a fewer *number* of regrets than younger individuals (Lecci et al., 1994; Jeffries & Konnert, 2002), it is possible that age may relate to *frequency* of regrets. Given the small age range of the present study, however, it is difficult to predict whether any age effects will be found.

Another way this study extends research on regret is by investigating individuals' perceptions of personal influence over the causes of their regrets. Of special interest is whether sociodemographic variables are associated with perceived influence ratings and whether perceived influence relates to frequency of regret. Moreover, the present study provides an opportunity to examine whether it is generally more adaptive in terms of health and well-being for older individuals to perceive a low amount of personal influence over their regrets (Wrosch & Heckhausen, 2002).

In addition, this study examines the implications of experiencing regret in terms of health and life satisfaction. The question of whether people who report experiencing regret more frequently have poorer health and life satisfaction is addressed. It is predicted that frequency of regret will be associated with outcomes of health and life satisfaction. This prediction is based on past research that has found frequency of regret to be associated with health (Chipperfield et al., 2003) and number of recalled regrets to be

associated with depression and life satisfaction (Lecci et al., 1994).

Lastly, the present study considers perceived control as modifying emotions by exploring the role that the process of secondary control may play in the experience of regret. A strength to this study is that it uses multi-item scales to assess two types of secondary control in older adults. In particular, this study will focus on secondary interpretive control beliefs. As conceptualized by Rothbaum et al. (1982), secondary interpretive control is thought to be gained through attempts to derive meaning from negative outcomes so as to accept them. One way that individuals may derive meaning is to look for the positive or what they have gained from a negative situation. For example, a person may see his/her illness in a positive light because it resulted in becoming closer to family members. This can be likened to Gilovich and Medvec's (1995) psychological repair strategy of finding a "silver lining" and it is possible that through attempts at gaining interpretive control, this may function to regulate regret. Other concepts related to interpretive control include perceiving (Affleck, Tennen, Croog, & Levine, 1987) or finding benefit (e.g., Sears, Stanton, & Dannoff-Burg, 2003) and positive reappraisal (e.g., Folkman & Moskowitz, 2000). In general, research has found this tendency to focus on the positive to be beneficial in terms of health and well-being (e.g., Affleck et al., 1987; Folkman & Moskowitz, 2000).

Also considered in the present study are secondary illusory control beliefs. Specifically, *secondary illusory control* is thought to be gained by aligning oneself with fate or chance (Rothbaum et al., 1982). Again, although not considered in past regret research, it seems possible that through attempts at gaining illusory control and strongly believing that life

events are guided by fate or a higher spiritual power (e.g., “God knows best”), this might help to prevent or reduce feelings of regret. It is predicted that both types of beliefs will serve as “repair mechanisms” so that those individuals having stronger secondary control beliefs will report experiencing regret less frequently. In particular, if *general beliefs* translate into a general tendency to use certain control strategies (e.g., actively looking for the positive in negative situations), then these beliefs may also be associated with less regret and better well-being outcomes.

Further to this, the relationship between secondary control beliefs, frequency of regret, health and life satisfaction is also explored. It is possible that secondary control beliefs not only directly relate to better health and greater life satisfaction in older individuals but also indirectly influence these outcomes through regret. That is, it is hypothesized that regret will partially mediate the regret-health and regret-life satisfaction connections. This prediction is based on the notion that secondary control processes (both interpretive and illusory) act as “psychological repair mechanisms” that will lessen regret intensity and any detrimental effects that regret may have on health and well-being.

In summary, the main research questions and hypotheses of the present study are as follows:

Descriptive Profile of Regrets in Older Individuals

- a) What do older individuals regret in general?
- b) Do certain sociodemographic factors relate to how frequently individuals experience regret?
- c) Do certain sociodemographic factors relate to ratings of perceived influence?

Regret, Secondary Control and Health and Life Satisfaction

- Hypothesis #1: Secondary control beliefs (interpretive and illusory) will be negatively related to regret frequency.
- Hypothesis #2: Regret frequency will negatively predict health and life satisfaction.
- Hypothesis #3: Secondary control beliefs will positively predict health and life satisfaction.
- Hypothesis # 4: Frequency of regret will partially mediate the relationships between secondary control and health and life satisfaction.

Method

The present study included 228 participants who were interviewed in-person as part of the Successful Aging Study 2003 (SAS 2003), a follow-up to SAS 1996 and an offshoot of the Aging in Manitoba (AIM) longitudinal studies. Ethical approval was received for SAS 2003 from the Health Information Privacy Committee, Manitoba Health and the Education/Nursing Research Ethics Board, Human Ethics Secretariat, University of Manitoba and permission to analyze the data for the present study was gained from the Principle Investigator of SAS 2003 (Appendix A). Prior to describing the SAS 2003 methodology and sample characteristics, a brief overview of the AIM studies and SAS 1996 is provided.

Aging in Manitoba

The Aging in Manitoba (AIM) population-based longitudinal studies have been ongoing for over 30 years. The initial 1971 survey was conducted by the Manitoba Provincial Department of Health and Social Development in order to identify needs of

older persons (for more details see Mossey, Havens, Roos, & Shapiro, 1981). A random sample of Manitobans over the age of 65 years was drawn from the Manitoba Health population registry, stratified by place of residence (i.e., community or personal care home) and region. In total, 4,803 older individuals participated in the initial AIM study.

Using similar techniques, two additional cross-sectional samples of older individuals over the age of 60 years were selected in 1976 (N=1302) and again in 1983 (N=2877). Since then, there have been several follow-up data collection waves in AIM in which sociodemographic, health, and psychosocial information has been obtained. Specifically, follow-up data were obtained from the survivors of the two initial cross-sections in 1983 and from survivors of all three cross-sections in 1990, 1996, and 2001. In the most recent follow-up study (AIM 2001), 1,012 individuals were re-interviewed.

Important to the objectives of the AIM study was that the study samples be representative of the broader population of older Manitobans. Thus, it is important to note that the initial 1971 sample was found to be representative in terms of age and gender of the Manitoba population aged 65 and over in 1971 (Mossey et al., 1981). Furthermore, the AIM 1990 sample was found to be comparable to the older Manitoba population in 1990 in terms of gender and marital status. The sample was also generally representative in terms of age, although the oldest age category (90+) was overrepresented in AIM 1990 and the youngest age category (70-74) was underrepresented due to the fact that new younger participants were not being included in the study (Chipperfield, Havens, & Doig, 1997).

Successful Aging Studies

Successful Aging Study 1996. In 1996, individuals who had participated in the 1996 Aging in Manitoba follow-up study and who met specific eligibility criteria were interviewed as part of the Successful Aging Study 1996 (SAS 1996). As described in more detail elsewhere (Chipperfield, Perry, Volk, & Hladkyj, 2003) those eligible for SAS 1996 met the following criteria: (1) Were living in the community (i.e., not institutionalized) in Winnipeg, Brandon, or Selkirk, in the province of Manitoba; (2) Had indicated English as the language of choice for the AIM 1996 interview; (3) Had received no or only some assistance from a proxy for the AIM 1996 interview; (4) Had fully satisfactory, adequate, or fairly satisfactory comprehension, as rated by the AIM 1996 interviewer; and (5) Had indicated they would be willing to participate in future studies at the time of the AIM 1996 interview. Of those eligible for SAS 1996 (N=461), 353 individuals were able to be interviewed.

Successful Aging Study 2003. Approximately six years later, the Successful Aging Study 2003 (SAS 2003) follow-up study was conducted (for a detailed description of the methods, refer to Newall, Chipperfield, Blandford, Perry, & Havens, 2004). Data collection took place over the period of September 2002 to March 2003. Participants were interviewed in their own place of residence at their preferred time. All participants signed a consent form indicating they understood that taking part in the study was voluntary and that their responses were confidential. The interview schedule took on average 1.5 hours to administer and contained questions relevant to the present study on demographics, perceptions of control, health, and life satisfaction.

The eligibility criteria for SAS 2003 were the same as outlined above for SAS 1996;

however, the relevant information was obtained from the more recent AIM 2001 interview rather than from AIM 1996. For example, individuals were eligible for SAS 2003 only if they had indicated they were willing to participate in future studies at the time of the *AIM 2001* interview. Out of the 353 original SAS 1996 participants, 225 were still eligible based on the selection criteria for SAS 2003. In addition to the 225 follow-up participants, 114 “new” individuals who had not participated in SAS 1996 but who had participated in AIM 2001 and met the SAS 2003 eligibility criteria were included in the SAS 2003 sample. In summary, a total of 339 (225 follow-up and 114 new) individuals were eligible for SAS 2003 prior to data collection.

Individuals eligible for the SAS 2003 study were sent a letter that informed them of the study and asked for their participation. Two female interviewers then telephoned individuals to set up appointments. At this time interviewers identified non-participants, that is, those individuals who either did not wish to participate (N=11) or could not participate due to another reason (N=96). For these latter 96 individuals, the majority of reasons for non-participation reflected changes in status between AIM 2001 and the SAS 2003 data collection and included the following: Moved to a personal care home (N=30), deceased (N=27), too ill (N=13), too deaf (N=6), severe memory loss (N=6), moved out of province (N=4), unable to schedule interview or away for study period (N=4), hospitalized (N=3), severe speech problems (N=1), language difficulties (N=1), and unable to locate (N=1). In total, 232 individuals completed SAS 2003 interviews.

It should be noted that in comparison to the larger AIM 2001 study sample, the SAS 2003 sample was found to be similar in terms of gender and self-rated health; and yet they

were younger, more physically capable, and better educated (Newall et al., 2004). This has implications for the generalizability of study findings; however, the differences between samples are not surprising given the SAS study focused on a population of individuals residing in urban communities (and not in institutions) who were cognitively and physically capable of completing interviews with little or no assistance from others.

Sample for Present Study

For the purposes of the present study, the sample included only 228 individuals. In particular, because the majority of analyses included regret-related measures, the four individuals who had missing data for all the questions relating to regret were excluded.

Measures

Data were obtained from SAS 2003, or, where indicated, from AIM 2001. Table 1 provides details of the descriptive statistics for each study measure.

Sociodemographics. Information on age, gender, marital status, and socioeconomic status (i.e., education level and annual income) was obtained from the SAS 2003 interview, and, where appropriate, from AIM 2001. In particular, birth dates were obtained from self-reports provided in the AIM 2001 interview. This allowed participants' *age in years* at the time of the SAS 2003 interview to be identified by calculating the difference between their birth date (day/month/year) and SAS interview date (day/month/year) (and rounding up to nearest year where necessary). Information on *gender* (1= *male*, 2= *female*) was obtained from the AIM 2001 interview.

Table 1

Description of Study Measures

| Measures | Anchors | # of items | M | SD | Skewness | Kurtosis | Range |
|---|---|------------|-------|------|----------|----------|-------|
| Age (yrs) | -- | 1 | 84.99 | 4.29 | 0.74 | -0.15 | 79-98 |
| Gender | 1= <i>men</i> (38%) 2= <i>women</i> (62%) | 1 | -- | -- | -- | -- | -- |
| Marital Status | 1= <i>not married</i> (62%) 2= <i>married</i> (38%) | 1 | -- | -- | -- | -- | -- |
| Education (yrs) | -- | 1 | 10.47 | 2.63 | 0.44 | 1.69 | 3-21 |
| Annual Income | 1= <5k; 8= >40k | 1 | 4.61 | 1.91 | 0.30 | -0.99 | 1-8 |
| Frequency of Regret | 1= <i>never</i> ; 3= <i>often</i> | 1 | 1.85 | 0.71 | 0.23 | -1.01 | 1-3 |
| Perceived Influence - First Regret | 1= <i>almost no influence</i> 10= <i>total influence</i> | 1 | 4.24 | 3.14 | 0.41 | -1.19 | 1-10 |
| Perceived Influence- Second Regret | 1= <i>almost no influence</i> 10= <i>total influence</i> | 1 | 3.68 | 2.97 | 0.76 | -0.65 | 1-10 |
| Interpretive Control (mean) ^a | 1= <i>strongly disagree</i> 6= <i>strongly agree</i> | 4 | 4.52 | 0.84 | -0.33 | 0.14 | 1.5-6 |
| Illusory Control (mean) ^a | 1= <i>strongly disagree</i> 6= <i>strongly agree</i> | 6 | 4.41 | 1.02 | -0.34 | -0.38 | 1.5-6 |
| General Perceived Health | 1= <i>poor</i> 4= <i>excellent</i> | 1 | 2.59 | 0.68 | -0.28 | -0.07 | 1-4 |
| Health Conditions (sum) ^b | 0= <i>no</i> 1= <i>yes</i> | 21 | 5.26 | 2.77 | 0.49 | -0.11 | 0-14 |
| Recent Perceived Health (mean) ^a | 1= <i>almost always true</i> 5= <i>almost never true</i> | 3 | 3.58 | 1.08 | -0.46 | -0.5 | 1-5 |
| Life Satisfaction (mean) ^a | 0= <i>disagree</i> 1= <i>agree</i> | 20 | 0.71 | 0.20 | -0.59 | -0.17 | .12-1 |
| 2001 Perceived Health | 1= <i>poor</i> 4= <i>excellent</i> | 1 | 2.59 | 0.67 | -0.48 | 0.06 | 1-4 |
| 2001 Health Conditions (sum) ^b | 0= <i>no</i> 1= <i>yes</i> | 21 | 4.41 | 2.65 | 0.73 | 0.08 | 0-12 |
| 2001 Life Satisfaction | 1= <i>fair</i> 3= <i>excellent</i> | 1 | 2.05 | 0.57 | 0.01 | 0.11 | 1-3 |

^a mean scores; ^b sum scores

Details on current *marital status* (married, widowed, single, or divorced/separated) were obtained in SAS 2003 by asking participants if their marital status had changed since their last interview in 2001, and updating the information, as necessary. Because of the small number of participants who were single ($n=15$) or divorced ($n=7$), for the purposes of the present study, a dichotomous marital status variable was created that distinguished between participants who were not married ($=1$) vs. married ($=2$).

Education level was assessed in AIM 2001 by asking participants to indicate the number of years or grades completed in school. One missing case was replaced with the mean, which is an accepted method of replacing few missing cases (Tabachnick & Fidell, 2001). Participants were also asked in AIM 2001 to indicate an income range that best corresponded to their *annual income* before deductions (categories ranged from 1= \leq \$5,000 to 8= \geq \$39,999). Eighteen missing values were replaced using predicted values from a regression equation, a method outlined by Tabachnick and Fidell (2001). More specifically, a step-wise regression analysis was used in which the income variable (with 18 missing) was regressed onto the sociodemographic variables of education level, marital status, gender, and age. All of the sociodemographic variables were found to significantly predict annual income ($F(4, 207) = 26.27, p < .001, adjR^2 = .34$); thus, the missing income values were replaced using the following equation derived from the regression analysis: $\text{Income} = 10.857 + .289 (\text{education}) - .899 (\text{marital status}) - 1.926 (\text{gender}) - .058 (\text{age})$.

Regrets. To assess *frequency of regret*, participants were asked to think about their feelings of regret over the past couple of years and to indicate on a 7-point response scale

how often they felt regret (0= *never*, 3= *sometimes*, 6= *almost always*). Because of the large number of individuals who reported never experiencing regret ($n=78$) and the small number of people who reported certain values (e.g., $n=10$ for responses of '1' or '2'), responses for this variable were subsequently re-coded into 3 levels. In particular, a value of 0 was recoded as 1, values ranging from 1-3 were recoded as 2, and values of 4-6 were recoded as 3. These levels could be conceptualized as 1 = *never* ($n=78$), 2 = *sometimes* ($n=107$), and 3 = *often* ($n=43$).

Next, to determine the content of *causes* of regret, those individuals who indicated that they had felt regret at least sometimes over the past couple of years ($n= 150$) were then asked, "Can you tell me what has caused you to feel regret?" Interviewers recorded up to two causes of regret for each participant. A complete listing of responses to this question is provided in Appendix B. For each reported cause of regret, individuals then rated their *perceived influence over the regret*. Specifically, participants were asked to indicate how much influence they had over the cause of their reported regrets on a scale ranging from 1 (*almost no influence*) to 10 (*total influence*). This item is similar to the one included in Wrosch and Heckhausen's (2002) study. It also parallels items used in prior research (Chipperfield, Campbell, & Perry, 2004) to assess perceived influence or perceived control over particular domains such as health.

Secondary control. Secondary interpretive control was measured using 4 items designed to assess a tendency to see the positive in negative experiences ("Negative experiences can often be a 'blessing in disguise'"; "I'm a believer in the idea that 'every cloud has a silver lining'"; "I often tell myself I should 'count my blessings'"; "Things will

work out in the end”). For each item, participants were asked to choose the alternative that best reflected their view using a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

Two steps were taken to select items for this measure of interpretive secondary control. As a first step, a principle components analysis of the 4 items was performed using responses from N=228 individuals and pair-wise deletion of missing values. As expected, one component emerged, accounting for 57% of the total variance (eigenvalue=2.28; all 4 items loading above .72). As a second step, the reliability of the 4-item measure was assessed. A Cronbach’s alpha value of .74 indicated acceptable reliability for the scale. Thus, all 4 items were retained to create a composite mean score for each participant in which higher scores reflected stronger interpretive control beliefs

Secondary *illusory control* was measured using 6 items designed to assess general beliefs about how life events may be guided by fate or a higher spiritual power (“What happens in my life is determined by a higher spiritual power”; “Much of what happens in our lives is part of the way ‘Mother Nature’ works”; “I believe that God or a higher spiritual power often influences what happens to each of us in our lives”; “I believe that the way nature works is all for the best in the end”; “I accept that God or a higher spiritual power has an overall plan for each of us”; I believe that ‘Mother Nature’ knows best”). Participants were asked to indicate their agreement with statements using a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

The 6 items were selected from a listing of 17 illusory control items on the basis of how well they reflected beliefs that life events are guided by fate or higher spiritual

powers. The other 11 items were conceptually different as they related to *instrumental* beliefs in religion (e.g., “I act in accordance with religious or spiritual beliefs because it leads to good things”) as well as instrumental and non-instrumental beliefs in luck (e.g., “I try do things to improve my luck”).

A principal components analysis of the 6 items was performed using responses from N=228 individuals and pairwise-deletion of missing values. Two components emerged from this analysis. To aid in distinguishing the components, an oblique rotation method was used (as opposed to an orthogonal rotation method which assumes no theoretical relation between factors). Factor 1 (3 items; all loading above .85) appeared to reflect a tendency to believe that life events are controlled by a higher religious power. Factor 2 (3 items; all loading above .75) appeared to reflect beliefs that ‘Mother Nature’ controls events. Together, the components accounted for 78.76% of the total variance (eigenvalue=1.35). To determine how well items would load onto one factor, a second principal components analysis was then performed in which the 6 items were forced onto one factor. This analysis revealed that all items loaded satisfactorily (all loaded above .65) and the factor accounted for 56.30% of the total variance (eigenvalue = 3.38). A Cronbach’s alpha of .84 indicates good reliability for this 6-item measure. Empirical support from the factor analyses and the assessment of scale reliability justified retaining all 6 items. A mean composite score was created for each participant in which higher scores reflected stronger illusory control beliefs.

Health. Health was assessed in several ways. First, a measure of *general perceived health* was obtained by asking individuals how they would rate their health in general for

their age (1= *excellent*; 2=*good*; 3=*fair*; 4=*poor*; 5= *bad*). As there was only one case in which “bad” was a response, this was recoded to “poor”. Responses were then subsequently reverse-coded, making an actual range of 1-4 with higher scores reflecting better perceived health. It should be noted that this simple self-rated measure has been shown to predict health status (Bailis, Segall, & Chipperfield, 2003), mortality (Menec, Chipperfield, & Perry, 1999), and health care use (Mossey et al., 1981). In their review of 27 studies, Idler and Benyamini (1997) concluded that perceived health was a reliable predictor of mortality, even after other health indicators were taken into account.

Second, a measure of total number of *health conditions* was obtained by asking individuals to report whether in the *past year* they had experienced— or felt after-effects of having experienced — any of 21 specific health problems (e.g., diabetes, cancer, incontinence) (0=*no*, 1=*yes*). A composite measure was created by summing the number of health conditions (possible range 0-21). Although not taking into account the severity or seriousness of each health problem, a count of the number of health problems an individual has is a useful index of the burden of illness (Morbidity and Mortality Weekly Report, 1989).

Third, as an indicator of *recent perceived health*, individuals were asked how often in the *past month* they: (1) had felt physically unwell or sick; (2) had some physical symptoms (e.g., dizzy, headaches); and (3) had wished they felt physically better. Possible responses ranged from 1 (*almost never true*) to 5 (*almost always true*). After reverse-coding these 3 items, a mean composite score was calculated for each participant such that higher scores reflected better health. The reliability of the measure was good as

indicated by a Cronbach's alpha of .80.

Life Satisfaction. Older individuals' life satisfaction was assessed using the Life Satisfaction Index A (Neugarten, Havighurst, & Tobin, 1961). This scale contained 20 items (e.g., I am just as happy as when I was younger) and response options ranged from 0 (*disagree*) to 1 (*agree*). After reverse-coding the appropriate negative statements, mean composite scores were calculated for each participant (possible range 0-1). The Cronbach's alpha for the measure was .73.

Past health and life satisfaction (2001). It was possible to obtain information on participants' past health and life satisfaction as assessed approximately two years earlier in AIM 2001. Specifically, assessments of individuals' 2001 *general perceived health* and *health conditions* were obtained. These variables were created in the same way as the previously described SAS 2003 measures. An assessment of individuals' 2001 *general life satisfaction* was also obtained by asking individuals, "How would you describe your satisfaction with life in general at present?" (1= *excellent* to 4= *poor*). As there were only two individuals who answered "poor," these were combined with "fair" responses. Responses were also reverse-coded so that higher scores reflected more satisfaction (possible range 1-3). As will be seen in the results section, having this information permitted an assessment of whether certain variables predicted outcomes even after controlling for participants' past health and life satisfaction.

Results

Descriptive Profile of Regret in Older Individuals

Regret Content Analysis. To address the first research question pertaining to what

older individuals regret, a content analysis as described below was used to classify the reported causes of regrets. Up to two regrets were recorded per participant. Out of the 228 participants, 150 reported experiencing regret in the past couple of years. Of these, 140 individuals indicated a specific cause of regret (7 individuals could not identify a specific cause and 3 individuals refused to provide one). An additional 75 individuals specified a second cause of regret (and 4 refused to provide the second specific cause). Thus, a total of 215 regrets were reported.

Regrets reported *first* (N=140) were categorized separately from regrets reported *second* (N=75) to allow for the possibility that they might differ in certain ways. Focusing on first reported regrets, two raters (author and a volunteer from the Emotion, Motivation, and Control Research Group) independently sorted the regrets into groups on the basis of similarities in content. Those regrets that did not appear to fit within any group were placed into an 'other' category. Although it was possible for raters to come up with very different categories given this methodology, on the first categorization attempt, raters identified 11 similar categories. Moreover, they classified 67% (94/140) of regrets into the same categories (this included 4 regrets that both raters classified into an 'other' category). After meeting to consider the 46 cases in which there was disagreement, raters created 6 more categories and were able to agree on how to categorize the remaining responses. Thus, first regrets were classified into 18 categories, including the final 'other' category. Ultimately, however, as shown in Table 2, all of the regret categories relating to 'things not done' were subsumed into one category. Similarly, all regrets relating to death (e.g., spouse or family/friends) and health (self or other) were subsumed into these

Table 2

Summary of Content of Regrets

| Regret Categories | Examples | Regrets | |
|--|--|---------|------|
| | | # | % |
| Things not done | | 42 | 19.5 |
| General | “Something I should have done” (14) | | |
| Being better to others | “Regretted not helping someone” (14) | | |
| Doing things for others who are now dead | “Did not visit [friend] before she died” (6) | | |
| Getting better education | “Regret not getting better education” (8) | | |
| Death-related | | 40 | 18.6 |
| Spouse | “That my husband passed away” (15) | | |
| Family /friend | “Loss of my brother and sister” (25) | | |
| Health-related | | 27 | 12.6 |
| Self | “My heart attack” (10) | | |
| Others | “Husband’s illness” (17) | | |
| Lack of connection with others | “My children don’t live here” “Living by myself” | 19 | 8.8 |
| Being limited | “Can’t do the physical things I used to do” “Regret I can’t go to work” | 18 | 8.4 |
| Moving / relocating | “Regret moving to the city” “Regret we went back to the country” | 13 | 6.0 |
| Hurting others | “I yelled at people” | 12 | 5.6 |
| Family conflicts | “A little misunderstanding with family” | 8 | 3.7 |
| Other’s behaviours | “Regret the way my son is running farm” | 7 | 3.3 |
| Unmet expectations | “When things don’t go the right way” “Things not going my way” | 5 | 2.8 |
| Getting older | “I regret getting old and I can’t do anything about it” | 6 | 2.3 |
| Finance-related | “Family estate not going as it should” | 4 | 1.9 |
| Other | “Indecision in general” | 14 | 6.5 |
| Total | | 215 | 100 |

two categories. This resulted in a final total of 13 categories.

The same method was used to classify the regrets reported second. On the first categorization attempt, when raters independently grouped the regrets, they agreed on the categorization of 60% (45/75) of the regrets. After meeting to discuss those cases in which there was disagreement, they were able to agree on how to categorize the remaining 30 responses. The identification of categories for second regrets did not differ from the first regrets. Note that the four most common regrets reported *first* were those relating to death of a loved one (n=32), things not done (n=29), health (n=13), and moving/relocating (n=13). The most common regrets reported *second* were those related to health (n=14), things not done (n=13), lack of connectedness (n=11) and being limited (n=11).

Table 2 summarizes all 215 regrets together, whether reported first or second. Categories are listed in order of *most to least* commonly mentioned. By far the most commonly mentioned regrets resulted from things not done (n=42) and death (n=40). The next most commonly reported regrets resulted from health (n=27), lack of connection with others (n=19) and being limited (n=18). Although retained as separate categories, many regrets were the result of interpersonal problems, e.g., 'hurting others' (n=12), 'family conflicts' (n=8), and 'other's behaviours' (n=7). This interpersonal theme as a cause is further implied in the categories of 'lack of connection with others' and the two subcategories within 'things not done' (being better to others/doing things for others). Also noteworthy, at least four of the categories reflected age-related regrets such as 'getting older' (n=6), 'being limited' (n=18), 'death' (n=40) and 'health' (n=22), together

representing a large proportion of the total regrets (86/215=40%).

The top four most common first regret categories (death of a loved one, things not one, health, and moving) were analysed in terms of whether they related to perceived influence ratings. In particular, similar to Wrosch and Heckhausen (2002) dichotomous variables were created which reflected whether an individual had reported a regret in a category or not (yes = 1; no = 0). Perceived influence was found to be negatively correlated with the 'death' category (yes=32; no=108) (*Spearman's rho*(137) = -.47, $p < .01$), suggesting that, in general, people perceived they had little influence over the cause of these regrets. In contrast, perceived influence was positively correlated with the categories of 'things not done' (yes=29; no=111) (*rho*(137) = .29, $p < .01$) and 'moving' (yes=13; no=127) (*rho*(137) = .26, $p < .01$). Perceived influence ratings were not correlated with the health category (yes=13; no=127) (*rho*(137) = -.10, $p > .05$).

Frequency of Regret. A second research question related to the frequency that older individuals experience regret. A mean of 1.85 (Table 1) suggests that, on average, individuals experience regret fairly often. On the other hand, over one third (78/228=34%) of participants answered "never" when asked how frequently in the past couple of years they had experienced regret. This finding is similar to Baum's (1999) study results in which 42% of older individuals reported having no regrettable life events.

Perceived Influence over Regret. To embellish an understanding of regret in later life it is valuable to consider how individuals rate their regrets in terms of perceived influence. Focusing on first regrets, overall, 39% of respondents perceived they had "almost no influence" over their first reported regret, which is the lowest influence rating

possible given the 10-point response scale ranging from 1 (almost no influence) to 10 (total influence). In fact, the majority (67%) of respondents rated their first reported regret as equal to or less than 5 on the 10-point scale. Similarly, respondents gave low ratings of perceived influence over second regrets. Taken together, these results suggest that the majority of older individuals perceive their regrets to be caused by factors outside of their personal influence or control. This finding is consistent with the strong correlation $r = -.50, p < .01$ between age and ratings of perceived influence over regret as reported by Wrosch and Heckhausen's (2002).

Sociodemographics and regret. Pearson (for continuous variables) and Spearman (for dichotomous variables) correlations were used to examine whether sociodemographic variables related to how frequently individuals experience regret or to perceptions of influence over regrets. These correlations are embedded within Table 3 which also shows the correlations between all study variables which are discussed in more detail later. Interestingly, none of the sociodemographic variables significantly correlated with frequency of regret. This suggests that the frequency with which older individuals experience regret is similar for men and women, for those married and not married, and so forth.

Similarly, individuals' perceived influence ratings over first or second regrets were not significantly correlated with any of the sociodemographic variables, although being married was associated with reporting greater influence over the first reported regret, *Spearman's rho*(141) = .16, $p = .05$ (Table 3). Thus, how participants rated the causes of their regrets in terms of perceived influence did not appear to depend on

Table 3

Correlations between study variables

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|------------------------------|--------|--------|-------|-------|--------|--------|-------|------|--------|------|--------|--------|--------|--------|--------|-------|----|
| 1. Age | -- | | | | | | | | | | | | | | | | |
| 2. Gender* | .02 | -- | | | | | | | | | | | | | | | |
| 3. Marital status* | -.23** | -.42** | -- | | | | | | | | | | | | | | |
| 4. Education level | -.09 | .05 | .10 | -- | | | | | | | | | | | | | |
| 5. Annual income | -.13* | -.37** | .04 | .40** | -- | | | | | | | | | | | | |
| 6. Frequency of regret | -.08 | -.00 | -.01 | -.01 | -.01 | -- | | | | | | | | | | | |
| 7. Influence-1st regret | -.09 | .05 | .16* | .07 | -.11 | -.09 | -- | | | | | | | | | | |
| 8. Influence-2nd regret | .08 | -.11 | .16 | .01 | -.13 | -.05 | .55** | -- | | | | | | | | | |
| 9. Interpretive Control | .02 | .10 | -.07 | .01 | -.08 | -.17* | -.03 | .10 | -- | | | | | | | | |
| 10. Illusory Control | .03 | .11 | -.07 | -.08 | -.21** | -.08 | -.10 | .06 | .37** | -- | | | | | | | |
| 11. General Perceived Health | .02 | -.04 | .07 | .15* | .10 | -.10 | .01 | -.06 | .24** | -.05 | -- | | | | | | |
| 12. Health Conditions | .02 | .04 | -.07 | -.10 | .03 | .18** | .11 | .10 | -.23** | -.10 | -.39** | -- | | | | | |
| 13. Recent Perceived Health | .11 | -.18** | -.01 | .06 | .06 | -.15* | -.05 | .07 | .14* | .06 | .49** | -.41** | -- | | | | |
| 14. Life Satisfaction | -.08 | -.04 | .07 | .13+ | .12+ | -.26** | .02 | .09 | .31** | .12 | .30** | -.24** | .42** | -- | | | |
| 15. '01 Perceived Health | -.03 | -.07 | .01 | .22** | .18** | -.15* | .06 | .06 | .11 | -.00 | .41** | -.34** | .35** | .26** | -- | | |
| 16. '01 Health Conditions | .09 | .06 | -.05 | -.12 | -.02 | .09 | .07 | .09 | -.13+ | -.05 | -.37** | .77** | -.39** | -.23** | -.38** | -- | |
| 17. '01 Life Satisfaction | -.05 | -.10 | .18** | .09 | .13* | -.11 | -.01 | .10 | .11 | .03 | .15* | -.12+ | .21* | .25** | .31** | -.16* | -- |

Notes. Pearson correlations used for all variables with the exception that Spearman correlations were used for the dichotomous variables of gender and marital status. *N*=228 for all correlations except *N*=143 for correlations with influence-1st regret and *N*=79 for correlations with influence-2nd regret. +marginal *p*<.08 **p*<.05 ***p*<.01

sociodemographic factors. By the same token, whether individuals reported higher or lower influence over their regrets did not appear to relate to their health or life satisfaction. Indeed, interestingly, the only significant association that these variables had was with one another, the perceived influence over the first and second regret being strongly positively correlated, $r(77) = .55, p < .01$. Given that the majority of individuals perceived they had relatively low influence over the cause of their regrets, this finding is perhaps not surprising.

It is of value to point out several other relationships from Table 3. First, as expected, several statistically significant correlations were found between the sociodemographic variables. For example, in regards to age, being younger was associated with being married ($\rho(226) = -.23, p < .01$) and having a greater annual income ($r(226) = -.13, p < .05$). Similarly, being male was associated with being married ($\rho(226) = -.42, p < .01$) and having a greater income ($\rho(226) = -.37, p < .01$). Not surprisingly, having a higher level of education was related to having a higher income ($r(226) = .40, p < .01$).

Several interesting relationships also emerged in the analysis of how the sociodemographic variables related to health and life satisfaction. For example, a higher level of education was associated with better general perceived health ($r(226) = .15, p < .05$) and was related at a marginally significant level to greater life satisfaction ($r(226) = .13, p = .06$). Being female was associated with poorer recent perceived health ($\rho(226) = -.18, p < .01$). Rather unexpectedly, age appeared to be unrelated to any of the health or life satisfaction variables.

Turning to correlations between the main independent variables and health and life

satisfaction, as expected, reporting a higher frequency of regret was significantly associated with having more health conditions ($r(226) = .18, p < .01$), poorer recent perceived health ($r(226) = -.15, p < .05$), and poorer life satisfaction ($r(226) = -.26, p < .01$). Having a higher level of secondary interpretive control was associated with better general and recent perceived health ($r(226) = .24, p < .01$; $r(226) = .14, p < .05$), fewer health conditions ($r(226) = -.23, p < .01$) and greater life satisfaction ($r(226) = .31, p < .01$). Interestingly, although there was a relatively strong positive correlation between secondary illusory control and interpretive control ($r(226) = .37, p < .01$), contrary to the pattern seen with interpretive control, illusory control was unrelated to any of the health or life satisfaction variables. Lastly, it can be seen from Table 3 that the 2003 and 2001 health and life satisfaction variables correlated with one another in the expected directions.

Hypothesis 1: Relationship Between Secondary Control and Regret

Interpretive control. To test Hypothesis # 1, that individuals with stronger secondary control beliefs will report experiencing regret less frequently, correlations were examined (Table 3). Focusing first on secondary *interpretive* control, as expected, people with stronger interpretive control beliefs experienced regret less frequently ($r(226) = -.17, p < .05$). This is consistent with the proposed logic that possessing a general tendency to strive to see the positive in a negative situation (or find a 'silver lining') will serve to prevent or deactivate feelings of regret.

Illusory control. Examination of the relationship between secondary *illusory* control and regret revealed a different story. Contrary to the hypothesis that illusory control

beliefs may also serve as a 'repair mechanism' for feelings of regret, there was no statistically significant correlation between secondary illusory control beliefs and frequency of regret ($r(226) = -.08, p = .24$).

Hypotheses 2 to 4 Preliminary Analyses: Limited Models with Background Variables Predicting Health and Life Satisfaction

Before considering the proposed hypotheses involving the main independent variables predicting the outcomes of health and life satisfaction, preliminary analyses using ordinary least squares (OLS) regression were performed to examine the "limited" models including only the background variables (sociodemographic and past health/life satisfaction) as predictors. These models provide an important comparison point to the full models that are subsequently outlined. Table 4 shows these analyses for the four outcomes. The F values indicating the significance of the overall regression equations are shown together with the adjusted R^2 values. First, when *life satisfaction* was regressed onto the sociodemographic characteristics (age, gender, marital status, education, and income) as well as past life satisfaction, not surprisingly, past life satisfaction predicted current life satisfaction ($B = .23, p < .01$), and together the variables explained a significant amount of the variance of *current* life satisfaction ($F(6, 221) = 3.26, p < .01, adjR^2 = .06$).

Second, regressing *health conditions* onto the sociodemographics and past health conditions indicated that these variables explained a considerable amount of the variance of health conditions ($F(6, 221) = 54.72, p < .01, adjR^2 = .59$). In particular, past health conditions was a very strong predictor of current health conditions ($B = .77, p < .01$),

Table 4

Regression Beta Weights for Sociodemographic and Past Life Satisfaction/Health Variables Predicting

Current Life Satisfaction and Health

| | Life Satisfaction | Health Conditions | Recent Perceived Health | General Perceived Health |
|-------------------------------|-------------------|-------------------|-------------------------|--------------------------|
| Variables | <i>B</i> | <i>B</i> | <i>B</i> | <i>B</i> |
| Age | -.06 | -.05 | .11 | .05 |
| Gender | -.05 | -.04 | -.22** | -.01 |
| Marital status | -.01 | -.04 | -.06 | .05 |
| Education | .09 | -.03 | .04 | .07 |
| Income | .03 | .03 | -.09 | .00 |
| 2001 Life satisfaction | .23** | -- | -- | -- |
| 2001 Health Conditions | -- | .77** | -- | -- |
| 2001 General Perceived Health | -- | -- | .35** | .40** |
| <i>F</i> | 3.26** | 54.72** | 7.60** | 8.05** |
| <i>adj R</i> ² | .06 | .59 | .15 | .16 |

+marginal $p < .08$ * $p \leq .05$ ** $p \leq .01$

even after accounting for the sociodemographic variables. Given that past health was assessed only 2 years prior and that this is a relatively 'objective' measure requiring individuals to indicate the presence of certain health problems, this result may not be unexpected and indeed reinforces the notion that this is a reliable measure of health.

Third, Table 4 also shows the results of *recent perceived health* regressed onto the sociodemographic background variables and past general perceived health. It should be noted that past *general* as opposed to *recent* perceived health was used as a covariate because the latter was not assessed in AIM 2001. Results indicated that together the variables accounted for a significant amount of variance of recent health ($F(6, 221) = 7.60, p < .01, adjR^2 = .15$). In particular, being male ($B = -.22, p < .01$) and having better past general perceived health ($B = .35, p < .01$) predicted better health.

Lastly, *general perceived health* was regressed onto the sociodemographic background variables together with the past health measure (Table 4). Together the variables explained a significant amount of variance of current perceived health ($F(6, 221) = 8.05, p < .01, adjR^2 = .16$), and *past* health was a strong predictor of *current* health ($B = .40, p < .01$).

In summary, when controlling for past health/life satisfaction, it appears that sociodemographic factors such as age or education have little predictive effect on current health/life satisfaction for this sample. An exception was that gender predicted recent perceived health. It should be kept in mind that statistically controlling for *past* outcomes makes it more difficult for other variables to significantly predict *current* outcomes because of high correlations between past and current outcomes. However, an advantage

to this more conservative approach is that it reduces the possibility that the effects of predictor variables onto, for example, health are not simply due to past health.

Hypothesis 2: Regret Predicting Health and Life Satisfaction

It was hypothesized that frequency of regrets would independently predict the outcomes of health and life satisfaction even after controlling for the background sociodemographic and past health/life satisfaction variables as shown in Table 4. Testing this hypothesis involved performing separate multiple regression analyses in which frequency of regret and the background variables were included as predictors of each of the four outcome variables. Table 5 shows the results of these regression analyses. It is important to highlight that in an effort to simplify the tables, the sociodemographic background variables, although included in the analyses, are not shown in Tables 5 through 8. In cases in which a sociodemographic variable was a significant predictor of a particular outcome, this was noted in the text below.

Focusing first on *life satisfaction*, as expected, even after controlling for sociodemographics and past life satisfaction, frequency of regret predicted current life satisfaction ($B = -.24, p < .01$). In other words, as hypothesized, individuals who reported more frequently experiencing regret were less satisfied with their life. It should be noted that adding frequency of regret as a predictor with the background variables increased the amount of explained variance in life satisfaction by a considerable amount: from $adjR^2 = .06$ (Table 4) to $adjR^2 = .11$ (Table 5).

Next, turning to the hypothesis that frequency of regret would predict number of *health conditions*, results indicated that having a higher frequency of regret predicted

Table 5

Regression Beta Weights for Regret Predicting Life Satisfaction and Health

| | Life Satisfaction | Health Conditions | Recent Perceived Health | General Perceived Health |
|-------------------------------|-------------------|-------------------|-------------------------|--------------------------|
| Variables | <i>B</i> | <i>B</i> | <i>B</i> | <i>B</i> |
| <i>Covariates*</i> | | | | |
| 2001 Life satisfaction | .21** | -- | -- | -- |
| 2001 Health Conditions | -- | .76** | -- | -- |
| 2001 General Perceived Health | -- | -- | .33** | .39** |
| <i>Independent Variables</i> | | | | |
| Frequency of regret | -.24** | .11** | -.10 | -.04 |
| <i>F</i> | 5.05** | 49.16** | 6.90** | 6.93** |
| <i>adj R</i> ² | .11 | .60 | .15 | .16 |

**Note.* Other covariates include age, gender, marital status, education, and income.

+marginal $p < .08$ * $p \leq .05$ ** $p \leq .01$

having more health conditions ($B = .11, p < .01$) even after controlling for sociodemographic factors and past health. This result is particularly compelling given the strong association between past health and current health ($B = .76, p < .01$; Table 5).

Focusing on *recent perceived health* (Table 5), results showed that frequency of regret was not a significant predictor of this outcome ($B = -.10, p > .05$). Being female ($B = -.23, p < .01$) as well as worse prior health ($B = .33, p < .01$) did predict poorer recent health. Lastly, frequency of regret did not predict *general perceived health* as shown in Table 5 ($B = -.04, p > .05$). The only significant predictor was past health ($B = .39, p < .01$).

In summary, as expected, frequency of regret predicted life satisfaction and number of health conditions, findings which are particularly remarkable given that demographic factors and prior measures of life satisfaction and health conditions were included as covariates. However, in contrast to the hypothesis, frequency of regret had no predictive effect on either recent or general perceived health.

Hypothesis 3: Secondary Control Beliefs Predicting Health and Life Satisfaction

It was hypothesized that both interpretive and illusory secondary control beliefs would predict the life satisfaction and health outcomes, after controlling for sociodemographic factors and past outcomes. To test this hypothesis, separate multiple regression analyses were performed for each outcome, including either interpretive or illusory control as the main independent variables along with the covariates.

Table 6 shows the results for secondary interpretive control. First, as expected, it was found that having stronger interpretive control beliefs predicted better *life satisfaction* ($B = .31, p < .01$) and together the variables accounted for a significant amount of the

Table 6

Regression Beta Weights for Secondary Interpretive Control Predicting Life Satisfaction and Health

| | Life Satisfaction | Health Conditions | Recent Perceived Health | General Perceived Health |
|-------------------------------|-------------------|-------------------|-------------------------|--------------------------|
| Variables | <i>B</i> | <i>B</i> | <i>B</i> | <i>B</i> |
| <i>Covariates*</i> | | | | |
| 2001 Life Satisfaction | .19** | -- | -- | -- |
| 2001 Health Conditions | -- | .76** | -- | -- |
| 2001 General Perceived Health | -- | -- | .33** | .37** |
| <i>Independent Variables</i> | | | | |
| Interpretive Control | .31** | -.13** | .12+ | .20** |
| <i>F</i> | 6.51** | 49.91** | 7.12** | 8.83** |
| <i>adj R</i> ² | .15 | .60 | .16 | .19 |

*Note. Other covariates include age, gender, marital status, education, and income.

+marginal $p < .08$ * $p \leq .05$ ** $p \leq .01$

variance in life satisfaction ($adjR^2 = .15$). Similar to frequency of regret, by adding interpretive control as a predictor this increased the amount of explained variance in life satisfaction from $adjR^2 = .06$ (Table 4) to $adjR^2 = .15$ (Table 6).

Interpretive control also predicted number of *health conditions* ($B = -.13, p < .01$) even after controlling for past health. Similarly, focusing on *recent perceived health*, interpretive control predicted this outcome, albeit at a marginal level of significance ($B = .12, p = .06$). Gender ($B = -.23, p < .01$) along with past health ($B = .33, p < .01$) also predicted this outcome. Finally, interpretive control was also found to predict *general perceived health* ($B = .20, p < .01$) and together the variables accounted for a significant amount of variance ($adjR^2 = .19$).

Table 7 shows parallel analyses as above incorporating illusory control as the main independent variable instead of interpretive control. First, as expected, even after controlling for background variables, having stronger illusory control beliefs predicted better *life satisfaction* ($B = .14, p < .01$), although together the variables accounted for only 7% of the variance in life satisfaction. This is a small amount compared to results for parallel analyses with frequency of regret ($adjR^2 = .11$; Table 5) or interpretive control ($adjR^2 = .15$; Table 6). Contrary to expectations, Table 7 shows that illusory control failed to predict *health conditions* ($B = -.06, p > .05$), *recent* ($B = .07, p > .05$) or *general perceived health* ($B = -.04, p > .05$). These lack of predictive effects are especially intriguing, in light of the relatively strong correlation between illusory control and interpretive control ($r(226) = .37, p < .01$; Table 3).

To summarize, hypothesis 3 was partially supported in that interpretive control beliefs

Table 7

Regression Beta Weights for Secondary Illusory Control Predicting Life Satisfaction and Health

| | Life Satisfaction | Health Conditions | Recent Perceived Health | General Perceived Health |
|-------------------------------|-------------------|-------------------|-------------------------|--------------------------|
| Variables | <i>B</i> | <i>B</i> | <i>B</i> | <i>B</i> |
| <i>Covariates*</i> | | | | |
| 2001 Life satisfaction | .22** | -- | -- | -- |
| 2001 Health Conditions | -- | .77** | -- | -- |
| 2001 General Perceived Health | -- | -- | .34** | .40** |
| <i>Independent Variables</i> | | | | |
| Illusory Control | .14* | -.06 | .07 | -.04 |
| <i>F</i> | 3.44** | 47.46** | 6.71** | 6.94** |
| <i>adj R</i> ² | .07 | .59 | .15 | .16 |

*Note. Other covariates include age, gender, marital status, education, and income.

+marginal $p < .08$ * $p < .05$ ** $p < .01$

significantly predicted all four outcomes in the expected directions. However, illusory control was only shown to predict life satisfaction.

Hypothesis 4: Regret as a Mediating Variable

Hypothesis #4 stated that part of the predictive effect of secondary control beliefs onto life satisfaction and health may be mediated through frequency of regret. According to Baron and Kenny (1986), establishing that a variable functions as a mediator requires satisfying a series of steps or conditions (see Figure 1). That is, fulfillment of these conditions is a demonstration of mediation. Step (1): First, it is necessary to show that the independent variable significantly predicts the mediating variable. Step (2): Second, the independent variable must predict the dependent variable. Step (3): Third, the mediating variable must predict the dependent variable. Step (4): Finally, the mediator should predict the dependent variable even when controlling for the independent variable. Furthermore, it must be shown that the independent variable's predictive effect on the dependent variable is either completely (full mediation) or partly (partial mediation) reduced when controlling for the mediating variable, as indicated by comparing the beta weights for the independent variable between Steps 2 and 4.

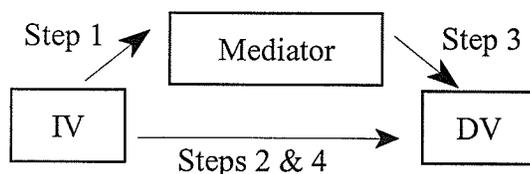


Figure 1. Steps in basic mediation model

Following these guidelines for the present mediational analyses, Step 1 involved conducting a multiple regression analysis to assess whether secondary control predicted frequency of regret, taking into account the background variables. Next, the results of hypothesis 3 (Table 6) and hypothesis 2 (Table 5) were used to judge the viability of the Step 2 and 3 conditions of the mediational analysis. Finally, where all these conditions were met, analyses were performed to examine the Step 4 condition. A more detailed account of this procedure is outlined in the next paragraphs. The analyses involving interpretive control are presented prior to those involving illusory control.

Regret Mediating Interpretive control and Health and Life Satisfaction. Figure 2 shows the model in which life satisfaction is the dependent variable. A multiple regression analysis established that interpretive control significantly predicted frequency of regret ($B = -.16, p < .05$), after controlling for sociodemographic variables and past life satisfaction (regression results shown in Appendix C), satisfying the Step 1 fulfillment of mediation. It should also be noted that this provides a further test of hypothesis 1. That is, the analysis indicates that even after controlling for background variables, having stronger secondary interpretive control beliefs predicts lower frequency of regret. Continuing with Steps 2 and 3, as previously discussed, interpretive control ($B = .31, p < .01$; Table 6) and frequency of regret ($B = -.24, p < .01$; Table 5) predicted life satisfaction, satisfying these conditions. Thus, the first three conditions (steps 1 to 3) of the mediational analysis were met.

The results of the analysis considering the Step 4 condition are shown in Figure 2 and Table 8. First, it can be seen that when both interpretive control and frequency of regret

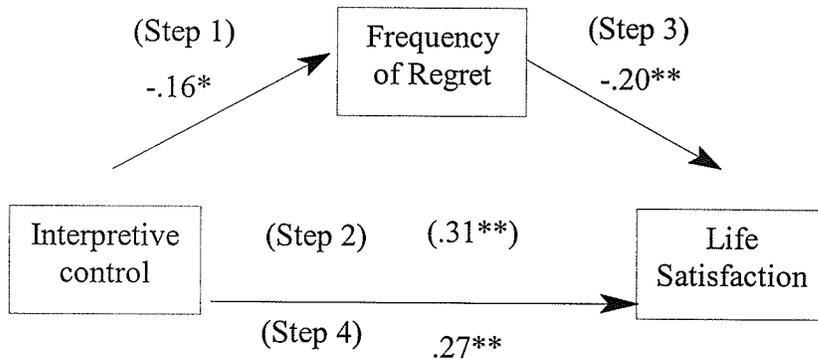


Figure 2. Mediation Model: Regret as Mediator of Interpretive control and Life Satisfaction

Table 8

Regression Beta Weights for Frequency of Regret and Secondary Interpretive Control Predicting Life Satisfaction and Health Conditions

| Variables | Life Satisfaction | Health Conditions |
|------------------------------|-------------------|-------------------|
| | <i>B</i> | <i>B</i> |
| <i>Covariates*</i> | | |
| 2001 Life satisfaction | .18** | -- |
| 2001 Health Conditions | -- | .75** |
| <i>Independent Variables</i> | | |
| Interpretive Control | .27** | -.11** |
| Frequency of Regret | -.20** | .10* |
| <i>F</i> | 7.25** | 45.07** |
| <i>adj R</i> ² | .18 | .61 |

*Note. Other covariates include age, gender, marital status, education, and income.
+marginal $p < .08$ * $p < .05$ ** $p < .01$

were included as predictors in the same regression analysis along with the background variables, together these variables accounted for a significant amount of variance ($adjR^2 = .18$), a slight increase as compared to the same model excluding frequency of regret ($adjR^2 = .15$; Table 6). Second, even when controlling for interpretive control, frequency of regret predicted life satisfaction ($B = -.20, p < .01$; Table 8), thus satisfying this condition of the mediational model. Finally, as depicted in Figure 2, a comparison of beta weights for interpretive control between the model with ($B = .27, p < .05$, Table 8) and without regret ($B = .31, p < .01$, Table 6), indicated a slight reduction ($.31 - .27 = .04$). This suggests that frequency of regret partially mediated the relationship between interpretive control and life satisfaction.

A test of the significance of this mediation effect was conducted as recommended by Baron and Kenny (1986). It should be noted that many studies do not include this extra step, perhaps because the methods are not widely known (Mackinnon, Lockwood, Hoffman, West & Sheets, 2002) or because there is lack of consensus of the appropriate method to use. For the present study, the method reported in Kenny and Baron (1996) using Sobel's equation was adopted as this method appears to be the most commonly used approach (Mackinnon et al. 2002; Baron & Kenny, 1986) and many other approaches use only slight variations of Sobel's equation. Briefly, Sobel's equation calculates a z-test value of the mediation effect by dividing the product of the two unstandardized regression coefficients for the indirect pathway (interpretive control \rightarrow regret; regret \rightarrow life satisfaction) by the standard error of the mediation effect. The critical value of 1.96 is used at the .05 level. Results indicated that this indirect

pathway was statistically significant at a marginal level ($z = .007/.004 = 1.91, p = .06$) (see Appendix D for calculations). Of note, using a smaller critical value (.97), as advocated by Mackinnon et al. (2002), the present effect would reach significance at the .05 level.

Turning to the mediation model in which *number of health conditions* was the dependent variable (shown in Figure 3), the analysis examining the Step 1 condition established that secondary interpretive control predicted frequency of regret, even after controlling for the sociodemographic variables and past health conditions ($B = -.16, p < .05$) (results shown in Appendix C). The results of the analyses testing the Step 2 and 3 conditions confirmed that interpretive control ($B = -.13, p < .01$; Table 6) and frequency of regret ($B = .11, p < .01$; Table 5) predicted health conditions. Thus, the first three conditions of the mediational model were met.

The results of the analysis considering the Step 4 condition in which both frequency of regret and interpretive control predicted health conditions are shown in Table 8 and depicted in Figure 3. First, frequency of regret predicted health conditions ($B = .10, p < .05$) even when controlling for interpretive control. Second, a comparison of the beta weights for interpretive control between Step 2 ($B = -.13, p < .01$, Table 6) and Step 4 ($B = -.11, p < .01$, Table 8) when frequency of regret was added to the model, suggested only a weak partial mediation, as indicated by a very slight reduction ($-.13 - -.11 = .02$) in the standardized beta weight of interpretive control. Moreover, the test of significance for the mediation pathway indicated that the mediation effect was non-significant ($z = 1.62, p = .11$) (see Appendix D).

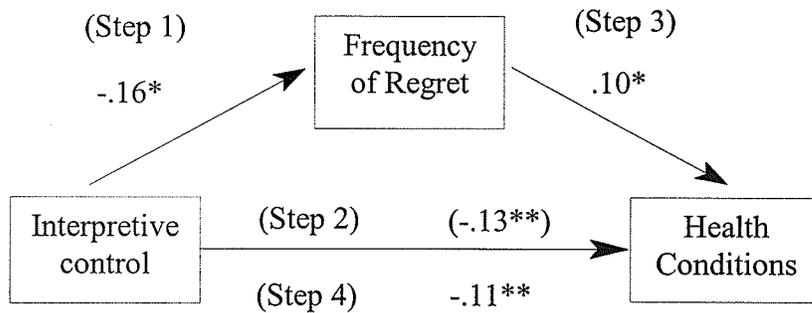


Figure 3. Mediation Model: Regret as Mediator of Interpretive Control on Health Conditions

In regards to the other health outcomes involving *recent* or *general perceived health*, no support was found for the mediational hypotheses. This conclusion was formed from the observation that, as documented previously, frequency of regret failed to predict either of these outcomes (see Table 5); and thus this essential (Step 3) condition of the mediation model was not met.

Regret mediating illusory control and health and life satisfaction. The hypothesis #4 analyses involving illusory control showed no support for regret as a mediator of illusory control and any of the outcomes. More exactly, for the outcome of life satisfaction, the Step 1 analysis showed that secondary illusory control was not a significant predictor of frequency of regret ($B = -.08, p > .05$), after controlling for background variables (age, gender, marital status, education, income, and past life satisfaction) (results shown in Appendix C). Again, this can be seen to replicate the findings of Hypothesis 1 which showed that illusory control was not correlated with frequency of regret (Table 3).

Because this condition of the mediation model was not met, it was concluded that frequency of regret did not mediate the relationship between illusory control and life satisfaction.

For the outcomes of *health conditions and recent* and *general perceived health*, because no significant association was found between illusory control and any of these three health outcomes (Table 7), it could be concluded that frequency of regret did not mediate the relationship between illusory control and health.

To summarize the findings for hypothesis #4, the predicted mediational analyses were restricted to interpretive control and two of the four outcomes, namely life satisfaction and number of health conditions. The results provided some evidence that the relationship between interpretive control and life satisfaction may be partially mediated through frequency of regret. However, regret does not appear to mediate the relation between interpretive control and health conditions. Moreover there was no evidence that regret mediated the relationship between illusory control and any of the outcomes.

Discussion

This study began with the question: Is old age “a regret”? It appears it need not be, as approximately one third of this sample of 79 to 98 year-olds reported feeling no regret in the past couple of years. By the same token, approximately two-thirds of participants indicated experiencing regret, some more frequently than others. What factors can explain why certain individuals feel regret more frequently than others? Based on results from the present study, sociodemographic variables appear to have little bearing on regret. That is, being male or female, married vs. unmarried, or having a higher vs. lower annual income

or level of education did not relate to how frequently older individuals experienced regret.

The absence of a gender difference is consistent with the study by Lecci et al. (1994)

showing that *number* of reported regrets was unrelated to being male or female.

Furthermore, again in response to the question of whether age relates to regret, contrary perhaps to stereotypes, being older was not associated with experiencing regret more frequently, although it is possible that no age differences were found because of the relatively restricted age range of the present study sample. Lecci et al.'s (1994) study in which they found that the older middle-aged adults reported a fewer number of regrets than the younger adults, further questions this stereotype, however.

Although the frequency that individuals experienced regret was found to have little relation to several sociodemographic variables, it was found to relate to health and life satisfaction. In particular, as hypothesized, frequency of regret predicted number of health conditions and life satisfaction even when controlling for these same variables measured two years prior. These findings correspond to past studies (using different measures of regret) which have found an association between regret and life satisfaction (Chipperfield, Perry & Weiner, 2003; Lecci et al., 1994; DeGenova, 1992) and depression (Lecci et al., 1994). The findings also add to the larger body of theoretical and empirical studies suggesting linkages between negative emotions or negative affect and physical and psychological well-being (e.g., Meeks & Murrell, 2001; Salovey et al., 2000) as well as objective indicators including physician visits and hospitalizations (Mckeen et al., 2004). However, the mechanisms (e.g., physiological, behavioural) through which negative emotions such as regret may affect health deserve further study.

Of note, contrary to expectations, frequency of regret had no predictive effect on either recent or general perceived health. Why this was so is unclear. Perhaps it may be that had people been asked about their regret in a more *recent* timeframe (as opposed to in the past couple of years), regret may have had a stronger connection to these measures of health. In particular, this could have been the case for *recent* health. That is, recent health may be affected by the more day-to-day emotional experiences of individuals.

Content of Regret

In simply asking about people's regrets either in terms of frequency or content, the present study allowed participants themselves to define regret. That is, the definition of regret was not prescribed by the researcher as being, for example, a goal that they had never achieved (Lecci et al., 1994). As such, the present study may have tapped into regrets not typically considered in past studies; moreover, comparing findings across studies is difficult. For example, contrary to past research which has shown that people commonly report regretting education-related inactions (e.g., Jeffries & Konnert, 2002) participants in the present study cited only a small number of regrettable inactions relating to education (n=8). However, methodological differences makes it difficult to compare past study results with the present study. It is possible that had participants been asked to think back over their entire lives and identify their *biggest* regrettable *inaction*, a larger number may have reported education-related regrets.

Results surrounding the content of regrets are particularly intriguing in light of the idea that they can be indicators of what people value or perhaps what events people are facing at a given time in their life. When asked about the causes or content of their regrets,

individuals in the present study reported a wide variety of regrets that fell into 12 qualitatively different categories. Interestingly, there were several regret categories elucidated that seemed particularly unique to an older population. These included such categories as 'death of a loved one', 'getting older', 'being limited', and arguably even 'health' and 'lack of connection with others'. As people get older and face difficult events such as deaths of friends or age-related changes in health or capabilities, it is perhaps not surprising that the content of regrets would focus around these events. This contrasts with the career-related regrets faced at midlife (Stewart & Vandewater, 1999).

Results from Baum's (1999) study, in which older adults were asked what they regretted in life, support the finding that older individuals commonly feel regret over events relating to health and death of a loved one. Indeed, this strengthens the reliability of the present study's findings. In Baum's study, regrets relating to personal illness (18%) and education/career (18%) were the most frequently mentioned. Had Baum combined regrets relating to death into one category (i.e., death of parent, child, or spouse) as done in the present study, this category would have also have been included in the top most commonly mentioned regrets (18%).

Using an approach that incorporated a broad definition of regret revealed that many regrets older people identified were not necessarily goal-related or associated with a sense of responsibility over an act or failure to act. Indeed, it was empirically shown that in the majority of cases people perceived they had little influence over the cause of their regret. Researchers studying regrets in the context of decision-making have concluded that regret stems from making counterfactual thoughts that manipulate a personally

controllable feature of the event (Zeelenberg et al., 1998). Roese (1997) has discussed this 'if only' thinking as having causal inference effects as guided by attribution theory. However, one could speculate that regrets that do not reflect unattained goals (e.g., the regret someone feels about the death of a loved one or about getting older) may arise through a contrast effect, rather than a causal inference effect. That is, the emotion may be arising out of a simple comparison of reality with "what was" or "what could be". Constraining the definition of regret to those events that result either from inactions or actions, for example, ignores these types of regret that appear to be commonly experienced by older individuals.

That the categories for regret included mostly uncontrollable causes such as death and getting older, this may suggest that the influence ratings represent the actual amount of control over the regrettable event, rather than a *deactivating strategy* as suggested by Wrosch and Heckhausen's (2002) study. It should be noted again that methodological differences make it difficult to compare the findings across these two studies. For example, participants in the Wrosch and Heckhausen study were asked to name an activity they had wished they had done but did not do. By applying this methodology, they assessed inaction and failed goal attainment, under which conditions lower influence ratings for these regrettable inactions may represent a repair strategy, as argued by the authors.

Secondary Control, Health and Regret

The question was posed earlier, what factors influence how frequently older individuals experience regret? It appears that one individual difference factor is the

strength of belief in finding the positive in negative situations and the strategies and sense of interpretive control that presumably follow from these beliefs. As hypothesized, more strongly endorsing interpretive control beliefs was associated with lower frequency of regret, and this relationship emerged even when accounting for sociodemographic characteristics and past health/life satisfaction. This finding is compelling as it suggests that interventions designed to enhance secondary interpretive control may help individuals manage their negative emotions like regrets.

Indeed, findings from this study suggest that secondary control beliefs, and the strategies that presumably arise from these beliefs, not only have the potential to influence how frequently individuals experience emotions such as regret, but also have important implications for the health and life satisfaction of older individuals. More specifically, as hypothesized, having stronger secondary interpretive control beliefs directly predicted better life satisfaction as well as health, assessed by number of chronic conditions and recent and general perceived health. That this finding was consistent across the four outcomes of this study is particularly noteworthy. Moreover, it is remarkable that these predictive effects were found even when controlling for prior health/life satisfaction outcomes. This demonstrates the beneficial effects of looking for the positive or finding benefit in negative situations, as found in past research in specific contexts (e.g., Affleck et al., 1987).

It was hypothesized that secondary interpretive control beliefs may not only influence health and life satisfaction directly but also indirectly through its effects on emotions. In the present study there was some evidence that this could be the case for life satisfaction.

In particular, regret was found to partially mediate the relationship between interpretive control and life satisfaction; however, the mediation effect was found to be only marginally significant. No other mediation effects were found with the health outcomes. Thus, the processes through which secondary interpretive control, regret and health are connected remain unclear. Of future interest would be to examine what other negative or even positive emotions might be affected by interpretive control beliefs. It may be that for strong mediation effects to be observed, a more global measure of affect would need to be incorporated into a model.

In contrast to interpretive control, and contrary to expectations, illusory control beliefs had no relation with how frequently older individuals experienced regret. Thus, strongly believing that events in life are guided by a higher spiritual power was not associated with experiencing less regret. Indeed, endorsing such beliefs only appeared to predict better life satisfaction; secondary illusory control beliefs did not predict any of the health outcomes.

There are several possibilities why secondary illusory control may not have the hypothesized relation with any of the regret or health variables. For one, it is possible that the measure used in the present study did not adequately assess the construct. However, its relatively strong and expected correlation with the interpretive secondary control measure suggests otherwise. Another possibility is that more meaning and hence control is derived through finding benefit in negative experiences as opposed to attributing them to certain causes. Researchers studying bereavement have touched on this issue. In one study on adjusting to death of a family member, Davis, Nolen-Hoeksema, and Larsen

(1998) discriminated between two construals of meaning: 'making sense of' (e.g., attributing events to God's will) and 'finding benefit from' the experience. They found that both of these constructs independently influenced the adjustment process but that finding benefit was more strongly associated with adjustment over time. This would seem to suggest that interpretive control (or finding benefit) is a powerful psychological process that is related to but perhaps extends beyond merely attributing a cause to an event. Related to this, another speculation is that finding benefit may be more difficult and require more work than making causal attributions relating to fate or higher powers. There may be greater benefit derived from this greater work.

Finally, another possibility is that having strong illusory control beliefs may not lead to gaining a sense of illusory control. That is, it is possible that for some individuals, passive endorsement of these external control beliefs may reflect a lack of control or helplessness. As only control beliefs were assessed in the present study (and not a sense of control or helplessness), this issue can not be resolved. Future research would do well to directly assess the amount of perceived (illusory etc.) control people gain from certain strategies or beliefs, or perhaps the amount of persistence in holding on to certain beliefs.

Again the speculative nature of these ideas should be underscored. However, one could envision how these speculations may be tested empirically. Ultimately, however, it should be noted that based on the results of the present study, having stronger illusory control beliefs was not *harmful* to individuals' in terms of frequency of regret or health.

Strengths and Limitations

It is important to state that, as with all correlational and cross-sectional study designs,

research questions relating to *causality* could not be answered in the present study; it was only possible to determine how concepts varied in relation with one another and not whether one variable caused changes in another. For example, although it was argued that frequency of regret predicted health, it is also possible that the reverse pattern holds true and that regret is a consequence and not a cause of poor health. Although the present study design does not preclude this possible interpretation, the study findings as presented are consistent with several longitudinal studies that have shown negative affect to predict health outcomes measured at a later time (Barefoot, Dahlstrom, & Williams, 1983; Pollard & Schwartz, 2003; and see Taylor, 1990).

Limitations surrounding the measure of regret are important to point out. For example, the study could be criticized for the use of a one-item measure of frequency of regret. By their nature, one-item measures can not be assessed in terms of their internal reliability; and it could be argued that complex constructs can not be measured with only one item. However, by simply asking people about the frequency to which they experienced regret, it can certainly be argued that the item had good face validity as a measure of frequency of regret. Moreover, most studies focusing on people's regret have used one-item measures. Another criticism of the regret measures could be that this study could have benefitted by the inclusion of a measure of regret intensity. Knowing the intensity of people's regrets may have provided insight into the linkages between regret and health. This is a valid point, however, in order to complement the question on regret frequency, participants would have needed to provide an indication of how intense their regret had been over the last couple of years, which may have been difficult. The study perhaps

would have needed to ask about more recently-experienced regret or to use Wrosch and Heckhausen's (2002) method of asking about the intensity of one particular regret.

The strengths of the study should be pointed out as well. For one, this study used multi-item scales with good reliability to measure most constructs of interest. Another strength was the rich dataset which allowed for the development of models of well-being which could take into consideration how sociodemographic variables as well as prior outcomes may influence health and life satisfaction. In addition, by focusing on two types of secondary control this allowed for a comparison of the different relationships they had with the other study variables.

In conclusion, this study adds to the small body of literature on regret in older individuals. In addition, it must be highlighted that study results point to the important role that secondary interpretive control may play in enhancing or maintaining older individuals' health and life satisfaction. In light of the potential to modify people's beliefs or use of strategies, these findings have practical implications.

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Appendix A: Ethics Approval



HEALTH INFORMATION
PRIVACY
COMMITTEE

File No. 2000/2001-33

20 November, 2002

Dr. J. Chipperfield
Health, Leisure and Human
Performance Research Institute
Max Bell Centre
Winnipeg MB R3T 2N2

Dear Dr. Chipperfield:

Re: Health and Aging: Study of Adaptive Strategies

The Health Information Privacy Committee would like to thank you for submitting the amendments to your protocol and for confirming that the requested changes were made to the consents.

Yours truly,

Leonie Stranc
Coordinator
Health Information Privacy Committee
(204) 7

Please quote the file number on all correspondence

cc: L. Barre

APPROVAL CERTIFICATE

26 June 2002

TO: Judith G. Chipperfield
Principal Investigator

FROM: Lorna Guse, Chair
Education/Nursing Research Ethics Board (ENREB)

Re: Protocol #E2002:057
"Health and Aging: Study of Adaptive Strategies (2002)"

Please be advised that your above-referenced protocol has received human ethics approval by the **Education/Nursing Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.



UNIVERSITY OF MANITOBA | Health, Leisure & Human
Performance Research Institute

January 21, 2004

Faculty of Physical Education
and Recreation Studies
Max Bell Centre
Winnipeg, Manitoba
Canada R3T 2N2
Telephone (204) 474-7087
Fax (204) 261-4802

Nancy Newall
Health, Leisure, and Human
Performance Research Institute
307 Max Bell Centre
Winnipeg, MB, R3T 2N2

Dear Nancy:

RE: Successful Aging Survey Data

Upon the suggestion of Dr. Stan Straw, Chair of ENREB, I am hereby providing you with a statement of permission to access the dataset that pertains to my Successful Aging Study and that includes selected variables from the larger Aging in Manitoba dataset. The dataset you receive will not allow you to identify the original study participants in any way.

Sincerely,

(

Dr. Judith G. Chipperfield, Professor
Laboratory of Health and Aging Research (LAHR)
HLHP Research Institute
305 Max Bell Centre
University of Manitoba
Winnipeg, MB
R3T 2N2



----- Original Message -----

From: <tefft@cc.umanitoba.ca>

To: "Nancy Newall" <N_Newall@umanitoba.ca>

Sent: Monday, December 13, 2004 6:29 PM

Subject: Re: ethics approval process

Dear Ms. Newall:

As long as the dataset you receive does not contain any personal identifiers, your understanding is correct.

Regards,
Bruce Tefft, Chair
P/SREB

Quoting Nancy Newall <N_Newall@umanitoba.ca>:

Dr. Bruce Tefft, Chair
PSREB

Re: Ethics Approval Process

Dear Dr. Tefft,

I am emailing to confirm my understanding of an issue concerning ethics approval of my MA thesis project. I am a graduate student pursuing my Master's in Psychology under the supervision of Dr. J. Chipperfield. The data I am using for my Master's thesis was collected previously as part of the larger Successful Aging Study (SAS) directed by Dr. Chipperfield. That is, I am undertaking a secondary analysis of data for my thesis. Ethics approval for the larger SAS project has already been given from the appropriate sources.

My understanding is that in cases like this, it is not necessary for me to go through another ethics review process for my project, given that the larger project from which my data are derived has received approval. I will not be receiving any identifying information (names etc.) with my dataset. Also, I obtained a letter from Dr. Chipperfield stating her permission for me to access the data.

Please confirm whether I have taken sufficient steps or whether there are other steps that I should take with my project in terms of ethics approval. Thank you very much for your time. I look forward to hearing from you.

Sincerely,

Nancy Newall

Appendix B: Open-Ended Responses to Causes of Regret

Feelings of Regret in Last Couple of Years

Now I would like you to think about your feelings of regret over the past couple of years.

Q. a) Can you tell me how often you have felt regret? (Responses range from 0 - Never to 6- Almost Always).

Those who gave a response of '1' or more were asked -

b) Can you tell me what has caused you to feel regret? (Up to 2 causes)

Note: Whether regret was reported 1st or 2nd was noted in brackets below.

REGRET CATEGORIES

THINGS NOT DONE-GENERAL

STUD_ID CAUSES of REGRET (1ST or 2nd)

| | |
|------|--|
| 776 | The way my life went. At this stage you can figure that some things you thought you couldn't do, you could have done. (1 st) |
| 1639 | That I didn't do more with my life. (1 st) |
| 2239 | I could have done better things in the past. (1 st) |
| 2959 | Things that I could have done that I didn't do. (1 st) |
| 3001 | Something that I didn't do years ago. (1 st) |
| 3209 | I should have gone to work on the railroad. (1 st) |
| 3381 | Things that I didn't do earlier and I've lost the chance now to do it. (1 st) |
| 3423 | Things I feel I could have done but didn't do. (1 st) |
| 3510 | That I did not sell my house and move into an apartment. (1 st) |
| 4122 | Something I should have done. (1 st) |
| 5583 | Something that I should have done and didn't do it. (1 st) |
| 6766 | Regret not having more drive. Regret just staying home. (1 st) |
| 7462 | Not learning to drive a car. (1 st) |
| 7480 | Things left undone. (1 st) |

THINGS NOT DONE-BEING BETTER TO OTHERS

| STUD_ID | CAUSES of REGRET (1ST or 2nd) |
|----------------|--|
| 1088 | Regretted not helping someone. (1 st) |
| 2206 | That I couldn't help my children. (2 nd) |
| 2239 | I should have been nicer to people. (2 nd) |
| 3001 | That I didn't get more help for my first wife-doctor's help. (2 nd) |
| 3123 | Might make a greater effort to help others. (2 nd) |
| 3500 | Not getting sister involved more in group when I took her down south-I don't think she had a good time. (1 st) |
| 3836 | Forgot daughter-in-law's birthday. (2 nd) |
| 4066 | Learn to swim save a life. Should have learned to swim. (1 st) |
| 5903 | I didn't get my husband to hospital soon enough. (1 st) |
| 5999 | Not doing more with her (wife) which we could have. (2 nd) |
| 6385 | Wish I had helped my children more. (2 nd) |
| 7961 | Not doing simple acts of kindness. (1 st) |
| 8142 | That I wasn't a better person. (1 st) |
| 8284 | Something I've done or not done, e.g., I don't always speak up for someone. (1 st) |

THINGS NOT DONE-DOING THINGS FOR OTHERS WHO ARE NOW DEAD

| STUD_ID | CAUSES of REGRET (1ST or 2nd) |
|----------------|--|
| 3517 | Some things I didn't do, i.e., written somebody a letter, phoned somebody. (1 st) |
| 3845 | Regret I didn't marry Jack and now he's dead. (1 st) |
| 5178 | When I was in Poland visiting relatives, I didn't get to all the places I wanted to and I didn't see brother that time. Now he is dead. (1 st) |
| 6152 | Personal things that you'd wish you'd done or said to family and to those who have passed away. (1 st) |
| 7669 | Some of the things that I didn't do with my husband. (1 st) |

8385 A good friend died and I regret I did not go and visit her before she died.
(1st)

THINGS NOT DONE-GETTING BETTER EDUCATION

STUD_ID CAUSES of REGRET (1ST or 2nd)

615 That I didn't get more education. (2nd)

3423 I often wished I had taken a course after we came here and got a little more involved in things. (2nd)

4105 Furthered my education. (1st)

4040 Lack of improving your educational qualifications when younger. (2nd)

4508 Not furthering my education. (2nd)

6766 Regret not taking more courses. Regret not pursuing driving a car. (2nd)

6965 I regret not having a better education. (1st)

7039 Regret not getting better education. (2nd)

DEATH OF SPOUSE

STUD_ID CAUSES of REGRET (1ST or 2nd)

63 Regret my husband died before we had a chance to travel together. (1st)

246 Lost my husband in 1987. (1st)

2774 That husband isn't with me. (1st)

3266 My husband died at 77 after several strokes and heart attack. (1st)

3306 Regret my husband died 41 years ago. (1st)

3443 Wife's death. (1st)

4324 Husband died in 2000. (1st)

4578 Regret losing my wife. (1st)

4669 I regret my wife passed way. (1st)

5649 The loss of my husband. (1st)

5999 Losing my wife. (1st)
7366 That my husband passed away. (1st)
7982 Lost wife. Feelings for my wife. (1st)
8542 When wife died, regretted not having talked more with her over the
years. (1st)
8803 The death of my husband. (1st)

DEATH-RELATED-FAMILY/FRIEND

STUD_ID CAUSES of REGRET (1ST or 2nd)

360 My friends dying. (2nd)
812 Relatives dying, lots of funerals. (1st)
1216 Loss of my brother and sister. (1st)
1343 Lost my cat of 16 years. (1st)
1429 Death of grandson. (1st)
2223 Friends passing away. (2nd)
2877 Sister dying of cancer, in St. Boniface palliative care unit. (1st)
3155 Death of friends. (1st)
3328 My sister-in-law died. (1st)
4020 Lost a sister last October. (1st)
4020 Lost a sister-in-law in January. (2nd)
4040 Family deaths. (1st)
5166 My two sisters and brother passing away. (1st)
5411 Lost a sister-in-law (died). (1st)
6221 Man friend passing away. (2nd)
6454 Lost two nephews. (1st)
6616 Family (sister, mother) deaths, miss them. (2nd)
6640 Death of two good friends, one was best friend. (1st)
6640 Death of my darling sister. (2nd)

| | |
|------|---|
| 6719 | Lost my son three years ago to diabetes. (1 st) |
| 6932 | Lost both my children. (2 nd) |
| 6888 | Lost my brother. (1 st) |
| 7116 | My brother passed away. (1 st) |
| 7669 | That a friend died and I'm lost without friends. (2 nd) |
| 7849 | Losing a friend. (1 st) |

HEALTH-RELATED-SELF

STUD_ID CAUSES of REGRET (1ST or 2nd)

| | |
|------|--|
| 293 | My heart attack. (2 nd) |
| 2774 | That I have this itch. (2 nd) |
| 3194 | My health. (1 st) |
| 3888 | That my leg bothers me and I can't get out. (1 st) |
| 5499 | Unsteady hand. (2 nd) |
| 5651 | Regret not getting my hip looked at sooner. (1 st) |
| 8142 | That I didn't take better care of myself throughout life. (2 nd) |
| 8295 | Smoking for many years. (1 st) |
| 8515 | Becoming blind. (1 st) |
| 8803 | My broken hip. (2 nd) |

HEALTH-RELATED-OTHER

STUD_ID CAUSES of REGRET (1ST or 2nd)

| | |
|-----|--|
| 63 | My oldest son ill for many years and unable to enjoy life after retirement. (2 nd) |
| 141 | Daughter's health. (2 nd) |
| 204 | Brother's illness. (1 st) |
| 204 | Husband's illness. (2 nd) |

- 812 Sickness (wife, family). (2nd)
- 966 Health of my friends. (1st)
- 3857 Health deterioration of my partner. (2nd)
- 4297 Illness of my friends. (1st)
- 5871 That my husband didn't get diagnosed early enough to be able to do anything about it. (1st)
- 6675 Sister-in-law is ill. (1st)
- 6675 Wife needs heart surgery. (2nd)
- 6802 The fact that my older brother is not that well. (2nd)
- 7116 Grandson got hurt. (2nd)
- 8272 Sickness of spouse. (1st)
- 8272 Sickness of brother. (2nd)
- 8485 My wife broke her hips. (1st)
- 8818 I feel sad for people who had their eyesight and now are losing it. (1st)

LACK OF CONNECTION WITH OTHERS

STUD_ID CAUSES of REGRET (1ST or 2ND)

- 246 Daughter lives in Winnipeg and I only see her once or twice a year for a brief visit. (2nd)
- 878 Regret not hearing from her daughter who lives in Brandon. (2nd)
- 1005 Marriage breakup. (1st)
- 1216 Inability to travel to be there [Re: deaths of brother and sister?]. (2nd)
- 1343 My neighbour moved and she was over every day to watch the soap with me. (2nd)
- 1764 I cancelled two visits to children out of town. (1st)
- 1939 Did not know someone became ill because I didn't keep in touch. (2nd)
- 3107 That I haven't kept in touch with relatives as much as I could have. (2nd)

- 3149 About 7 or 8 years ago my son said you never tell me anything about my father so he said not to give any more money to his children. (Haven't talked to him [son] in all that time). (2nd)
- 3195 Regret a certain relationship with a lady friend, not going well. (1st)
- 3888 Not being able to be with some of the people I know because I'm caring for my sister and I don't leave her alone and get no respite help. (2nd)
- 5392 My children don't live here. (1st)
- 5392 I regret that we (the children) don't have the communication that we could have. (2nd)
- 6091 Living by myself. (1st)
- 6385 Spent more time with my children, quality time with my children. (1st)
- 6454 Regret one [nephew?] lived so far away. (2nd)
- 6616 Lost touch with some girl friends. (1st)
- 6932 Not having a husband and family. (1st)
- 7366 That my grandchildren don't come over as often as I would like. (2nd)

BEING LIMITED

STUD_ID CAUSES of REGRET (1ST or 2ND)

- 689 Unable to continue day-to-day activities. (1st)
- 865 Regret I can't go to work. (1st)
- 966 Not feeling like traveling overseas because of health problems. (2nd)
- 2206 That I couldn't do more activities. (1st)
- 2223 Couldn't go away last winter. (1st)
- 2306 Not driving the car often enough so I'm getting hesitant. (2nd)
- 2832 Regret not trying new things. (2nd)
- 2386 I'm not as fast on things. (2nd)
- 2924 That we can't go away in the winter anymore because of my health (Hawaii). (1st)
- 3127 Sometimes the weather, I can't get out. (2nd)

- 3155 That we couldn't travel with our son to Mexico because of Husband's health. (2nd)
- 4277 Things that I can't do to improve the situation. (2nd)
- 4297 Unable to visit family in Edmonton because of poor health. (2nd)
- 4387 Not able to work as hard anymore. (2nd)
- 5499 Can't do the physical things I used to do. (1st)
- 6802 Not having my husband on so many occasions because he did all the repairs around the house and now I have to hire someone and they don't do it nearly as well. (1st)
- 7051 I can't do all the things I want to do. (2nd)
- 7480 Unable to do things I'd like to do. (2nd)

MOVING/RELOCATING

- STUD_ID CAUSES of REGRET (1ST or 2nd)**
- 226 Regret moving to the city. (1st)
- 293 Leaving own home and moving to a condo (no open spaces and yard). (1st)
- 360 Moving into a rented place. I wish we had stayed in our house. (1st)
- 878 Regret having sold house in Winnipeg and moving to Brandon. (1st)
- 987 When moved from Balmoral to Winnipeg because sister lives there in Balmoral but daughter lives in Winnipeg. (1st)
- 2306 Moving back to Winnipeg from B.C. with regards to weather. (1st)
- 2434 Regret moving from the 12th floor to the 5th floor. (1st)
- 2832 Daughter not happy in Canada, therefore respondent feels regret that she did not stay in Scotland. (1st)
- 3883 Should have waited for a two bedroom apartment in the block. (1st)
- 4143 Regret we went back to the country. I couldn't handle it. (1st)
- 4508 Moving back to Winnipeg from down East because I loved it there. (1st)
- 6486 Regret having moved to Vancouver. Had to re pack and move back. (1st)

7821 Regret selling farm. (1st)

HURTING OTHERS

| STUD_ID | CAUSES of REGRET (1ST or 2nd) |
|----------------|---|
| 406 | Hurting people's feelings, i.e., I hurt niece's feelings by cleaning up the yard. (1 st) |
| 499 | I could have been nicer to my sister. (1 st) |
| 968 | Having said something not nice to someone I care about. (1 st) |
| 1088 | Cut someone off when they are talking. (2 nd) |
| 1088 | Something I regretted saying to someone. (2 nd) |
| 1328 | I yelled at people. (1 st) |
| 1963 | Some of the things that I've argued about when husband was living. (1 st) |
| 2760 | Regret saying something. (1 st) |
| 2917 | Because you've done something you shouldn't have done and even though its years ago, it still lingers. (1 st) |
| 3074 | Something I said that I shouldn't have. (1 st) |
| 4783 | That it upset my parents that I married a man who was not Mennonite like them. (2 nd) |
| 6187 | Losing my temper and telling somebody off. (1 st) |

FAMILY CONFLICTS

| STUD_ID | CAUSES of REGRET (1ST or 2nd) |
|----------------|--|
| 3295 | My marriage, but I don't regret the children. (1 st) |
| 3301 | Family regret over something that happened in their lives. (1 st) |
| 3857 | Difficulty with a brother. Relationship problems gone on for years. (1 st) |
| 4322 | A little misunderstanding with family. (1 st) |
| 6221 | Jealous husband. (1 st) |

- 6856 Thinking back of things gone by. Thinking of how my sister and I grew up and nothing but fighting by our parents. (1st)
- 7039 Didn't get along with my sister. Now she's dead and that's on my mind. (1st)
- 8799 That I have one grandson who has given up on his family. (1st)

OTHERS' BEHAVIOURS

STUD_ID CAUSES of REGRET (1ST or 2nd)

- 1366 Somebody not listening to me. (1st)
- 3127 Someone said they would come for a visit and they don't come. (1st)
- 3149 That my first husband never came back to me and our son after the war (found somebody else). (1st)
- 4482 Son has Schizophrenia and he uses it to get his way so he is difficult to deal with—regret that can't find anything to change his attitude. (2nd)
- 6192 Daughter: gave money and it doesn't help. Always has her hand out and she doesn't seem to understand the value of money. (1st)
- 6965 I regret accepting what my family dictated to me and not asserting myself. (2nd)
- 7821 Regret the way my son is running my farm. (2nd)

UNMET EXPECTATIONS

STUD_ID CAUSES of REGRET (1ST or 2nd)

- 615 I never got to the top. (1st)
- 1939 Situation turns out different than one thinks. (1st)
- 3107 The Lodge was going to move to a new building. I was in favor but was voted down. (1st)
- 4139 When things don't go the right way. (1st)
- 4277 Things not going my way. (1st)

GETTING OLDER

STUD_ID CAUSES of REGRET (1ST or 2nd)

- 865 Regret getting old. I'd like to stay young. (2nd)
- 2386 Because I'm getting older. (1st)
- 4387 Getting older. (1st)
- 6559 The changes in life as you get older. (1st)
- 6192 That I'm getting older. (2nd)
- 7051 I regret getting old and I can't do anything about it. (1st)

FINANCE-RELATED

STUD_ID CAUSES of REGRET (1ST or 2nd)

- 141 Family estate not going as it should. (1st)
- 3836 Buying a stock. (1st)
- 4235 World markets— grain and investment markets. (1st)
- 4783 Being unable to do anything to keep the family from sinking into poverty. (1st)

OTHER

STUD_ID CAUSES of REGRET (1ST or 2nd)

- 689 Disappointment regarding life in general. (2nd)
- 1005 Former teachers (went to U of M a couple of years ago). (2nd)
- 2760 Regret some things from the past. (2nd)
- 2917 Actions that caused the regret were bad influences in my life. (2nd)
- 3074 Something I forgot to do. (2nd)
- 3123 Not understanding a certain situation more fully. (1st)
- 4122 Some things that I wished I had paid more attention to. (2nd)
- 4322 That I moved to Kiwanis Courts and had to come back here. (2nd)

- 4641 Not enough has been done to alleviate problems and despair of poor in the world. (2nd)
- 4669 I regret I didn't become a millionaire. (2nd)
- 4482 Indecision in general. (1st)
- 4641 No peace in the world. (1st)
- 6152 Son going through a divorce. (2nd)
- 7185 September 11th events. (1st)

Appendix C: Step 1 Mediation Analyses

Step 1 Mediation Analyses

Step 1 mediation regression analysis including sociodemographics, past life satisfaction, and interpretive control predicting regret

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|--------------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | 4.281 | 1.153 | | 3.713 | .000 |
| AGE | -.017 | .011 | -.100 | -1.448 | .149 |
| SEX | -.035 | .122 | -.024 | -.282 | .778 |
| MARITAL STATUS | -.069 | .115 | -.047 | -.602 | .548 |
| EDUCATION | .085 | .020 | .003 | .042 | .966 |
| INCOME | -.011 | .031 | -.030 | -.370 | .712 |
| LIFE SATISFACTION (2001) | -.112 | .086 | -.089 | -1.304 | .194 |
| INTERPRETIVE CONTROL | -.132 | .056 | -.157 | -2.348 | .020 |

Dependent Variable: REGRET

Step 1 mediation regression analysis including sociodemographics, past chronic conditions, and interpretive control predicting regret

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---------------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | 4.159 | 1.151 | | 3.613 | .000 |
| AGE | -.018 | .012 | -.108 | -1.559 | .120 |
| GENDER | -.051 | .123 | -.035 | -.417 | .677 |
| MARITAL STATUS | -.100 | .114 | -.068 | -.878 | .381 |
| EDUCATION | .003 | .020 | .012 | .166 | .868 |
| INCOME | -.018 | .031 | -.049 | -.600 | .549 |
| CHRONIC CONDITIONS (2001) | .020 | .018 | .075 | 1.111 | .268 |
| INTERPRETIVE CONTROL | -.133 | .056 | -.158 | -2.359 | .019 |

Dependent Variable: REGRET

Step 1 mediation regression analysis including sociodemographics, past life satisfaction, and illusory control predicting regret

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|------------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | 4.012 | 1.165 | | 3.445 | .001 |
| AGE | -.017 | .012 | -.101 | -1.448 | .149 |
| SEX | -.048 | .123 | -.032 | -.387 | .699 |
| MARITAL STATUS | -.067 | .117 | -.046 | -.574 | .567 |
| EDUCATION | -.000 | .020 | -.001 | -.012 | .991 |
| INCOME | -.013 | .031 | -.035 | -.413 | .680 |
| LIFE SATISFACTION 2001 | -.130 | .086 | -.103 | -1.511 | .132 |
| ILLUSORY CONTROL | -.054 | .048 | -.078 | -1.135 | .257 |

Dependent Variable: REGRET

Appendix D: Mediation Effect Calculations

Calculation of Significance of Mediation Pathways Using Sobel's (1982) Method

Mediation Model: Interpretive Control----->Regret----->Life satisfaction

1. Determine Regression Coefficients and Standard Errors for the 2 pathways making up the indirect pathway in mediation model

Pathway A: Interpretive control beliefs-----> Frequency of Regret

Coefficients

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|--------------------------|-----------------------------|-------------|---------------------------|---------------|-------------|
| | B | Std. Error | Beta | | |
| (Constant) | 4.281 | 1.153 | | 3.713 | .000 |
| AGE | -1.664E-02 | .011 | -.100 | -1.448 | .149 |
| SEX | -3.453E-02 | .122 | -.024 | -.282 | .778 |
| MARITAL | -6.948E-02 | .115 | -.047 | -.602 | .548 |
| EDUCATION | 8.468E-04 | .020 | .003 | .042 | .966 |
| INCOME | -1.135E-02 | .031 | -.030 | -.370 | .712 |
| LIFE SATISFACTION (2001) | -.112 | .086 | -.089 | -1.304 | .194 |
| INTERPRETIVE | -.132 | .056 | -.157 | -2.348 | .020 |

a Dependent Variable: REGRET

a=-.132 Sa=.056

Pathway B: Regret-----> Life satisfaction, partialling interpretive control

Coefficients

| Predictors | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|--------------------------|-----------------------------|-------------|---------------------------|---------------|-------------|
| | B | Std. Error | Beta | | |
| (Constant) | .685 | .298 | | 2.296 | .023 |
| AGE | -3.767E-03 | .003 | -.082 | -1.299 | .195 |
| SEX | -2.883E-02 | .031 | -.071 | -.938 | .349 |
| MARITAL STATUS | -2.451E-03 | .029 | -.006 | -.085 | .933 |
| EDUCATION | 6.282E-03 | .005 | .084 | 1.249 | .213 |
| INCOME | 4.730E-03 | .008 | .046 | .613 | .541 |
| LIFE SATISFACTION (2001) | 6.088E-02 | .022 | .176 | 2.823 | .005 |
| REGRET | -5.486E-02 | .017 | -.199 | -3.240 | .001 |
| INTERPRETIVE | 6.339E-02 | .014 | .274 | 4.434 | .000 |

Dependent Variable: Life Satisfaction (2003)

b=-.05486 Sb=.017

2. Determine Regression Coefficient of the Indirect Mediating Pathway

$$ab = B_a * B_b, \quad ab = -.132 * -.05486, \quad \mathbf{ab = .0072415}$$

3. Determine the Standard Error of the Regression Coefficient of the Indirect Mediating Pathway

$$S_{ab} = \sqrt{a^2 S_b^2 + b^2 S_a^2}$$

$$S_{ab} = \sqrt{(.017424)(.000289) + (.0030096)(.003136)}$$

$$S_{ab} = \sqrt{(.000005) + (.0000094)}$$

$$S_{ab} = .0037947$$

4. Determine if the indirect pathway is significant using a test value

$$z = ab / S_{ab}$$

$$z = .0072415 / .0037947$$

$$z = 1.9083$$

Because the ratio does not exceed +/-1.96 which would indicate significance at a $\alpha = .05$ level, it is concluded that the null hypothesis, that the indirect pathway is non-significant, should not be rejected.

Mediation Model: Interpretive Control----->Regret----->Chronic Conditions

1. Determine the regression coefficients and their standard errors for the 2 pathways making the indirect pathway in the mediation model.

Pathway A: Interpretive control beliefs-----> Frequency of Regret

| Coefficients | | | | | |
|---------------------------|-----------------------------|-------------|---------------------------|---------------|-------------|
| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | 4.159 | 1.151 | | 3.613 | .000 |
| AGE02 | -1.800E-02 | .012 | -.108 | -1.559 | .120 |
| SEX | -5.144E-02 | .123 | -.035 | -.417 | .677 |
| MARITAL STATUS | -.100 | .114 | -.068 | -.878 | .381 |
| EDUCATION | 3.356E-03 | .020 | .012 | .166 | .868 |
| INCOME | -1.840E-02 | .031 | -.049 | -.600 | .549 |
| CHRONIC CONDITIONS (2001) | 2.024E-02 | .018 | .075 | 1.111 | .268 |
| INTERPRETIVE | -.133 | .056 | -.158 | -2.359 | .019 |

Dependent Variable: REGRET

a=-.133 Sa=.056

Pathway B: Regret-----> Chronic Conditions, partialling interpretive control

| Coefficients | | | | | |
|---------------------|-----------------------------|-------------|---------------------------|---------------|-------------|
| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | 5.527 | 2.896 | | 1.909 | .058 |
| AGE02 | -2.487E-02 | .028 | -.039 | -.877 | .382 |
| SEX | -.128 | .301 | -.022 | -.425 | .671 |
| MARITAL STATUS | -.216 | .279 | -.038 | -.773 | .440 |
| EDUCATION | -2.846E-02 | .049 | -.027 | -.576 | .565 |
| INCOME | 4.244E-02 | .075 | .029 | .566 | .572 |
| CHRONIC CONDITIONS | .782 | .045 | .748 | 17.527 | .000 |
| REGRET | .367 | .165 | .095 | 2.225 | .027 |
| INTERPRETIVE | -.370 | .139 | -.113 | -2.651 | .009 |

Dependent Variable: Chronic Conditions

b=.367 Sb=.165

2. Determine the Regression Coefficient of the Indirect Mediating Pathway

$$ab = a * b, \quad ab = -.133 * .367, \quad ab = .048811$$

3. Determine the Standard Error of the Regression Coefficient of the Indirect Mediating Pathway

$$Sab = \sqrt{a^2 Sb^2 + b^2 Sa^2}$$

$$Sab = \sqrt{(.017689) (.027225) + (.134689) (.003136)}$$

$$Sab = \sqrt{.0004815 + .0004223}$$

$$Sab = .0300632$$

4. Determine if the indirect pathway is significant using a test value

$$z = ab/Sab \quad z = .048811/.0300632 \quad z = 1.6236$$

Because the ratio does not exceed +/-1.96 (which would indicate significance at $\alpha=.05$ level), it is concluded that the null hypothesis, that the pathway is non-significant, should not be rejected.