Two Sides to the Same Coin?
The Positive and Negative Consequences of Severe Life Regrets in Younger versus Older Adulthood.

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ABSTRACT

Two Sides to the Same Coin? The Positive and Negative Consequences of Severe Life Regrets in Younger versus Older Adulthood.

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As we aim to accomplish desirable goals, challenges, and hurdles are omnipresent. These point to a discrepancy between current and hoped-for states, produce negative emotions and are aversive. Regret relates to one such discrepancy. Developmental theories postulate that opportunity to overcome these effects is plentiful in young adulthood. The main aim of this dissertation was to ascertain the emotional and motivational processes inherent in the regret experience across time in young adults. An additional focus lay in understanding the benefits of continued engagement in overcoming regret, despite pessimism in one's odds. Finally, these analyses were replicated in an older adult sample to assess their specificity to young adulthood.

Study 1 assessed the associations between intense negative emotions, regret engagement, implementation intentions, progress, and well-being measures over time among 121 young adults. Results indicated that regret intensity predicted increases in well-being and reduced intensity over time, through increases in regret-related progress. Additionally, increased engagement at onset and increased in implementation intentions over time mediated the increases in regret progress. This illustrates that emotional intensity can positively affect regret-related progress, and thereby well-being and distress over time, through its motivational effects.

Study 2 followed 121 pessimistic young adults to assess the benefits of continued regret engagement, despite reservations. Results showed that pessimistic participants who continued engaging in their regret displayed well-being improvements, which were mediated by improvements in their outcome expectancies over time. This points to the importance of continued pursuit in overcoming regret on well-being in pessimistic young adults.

Study 3 replicated these analyses in an older adult sample of 136 community dwelling recent retirees. Results showed that the experience of regret intensity was linked with increased intensity over time, but not with other variables. Additionally, pessimistic older adults who continued to engage in overcoming their regrets did not display expectancy or well-being improvements over time. This suggests that regret-related benefits are specific to young adulthood.

This research contributes to the literature on adaptive development across the lifespan. Findings on differing adaptive responses to the regret experience are explained with the use of developmental and motivational theories.

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CONTRIBUTIONS OF AUTHORS

This dissertation is composed of three separate research papers and two research studies. The first and second papers focused on data collected from the *Young Adult Regret Study*, which was conducted in collaboration and under the supervision of Dr. Carsten Wrosch. In preparation for this study, I contributed both to the selection of study materials and to the formulation of the study as a whole. In addition, I was in charge of advertising the study within the university and of data collection and data entry. Finally, I conducted all statistical analyses in collaboration with Dr. Wrosch, who is the principal investigator of the project. This research was supported by the SSHRC research grant obtained by the investigators, Drs. Carsten Wrosch, Adam Radomsky and Jutta Heckhausen. The third and final paper of this dissertation focused on data collected from the *Concordia Longitudinal Retirement Study*. The principal investigators for this project were Dr. Dolores Pushkar and Dr. Carsten Wrosch, who have been supported by a CIHR research grant. Additional investigators included Drs. June Chaikelson, Karen Li, Michael Conway, and Jamshid Etezadi. I contributed to the participant interviews and cognitive assessments as well as to data collection. All statistical analyses were conducted in collaboration with, and under the supervision of, Dr. Carsten Wrosch. In the completion of my dissertation and related research, I was also partially supported by my awarded SSHRC Joseph-Armand Bombardier Master's Scholarship, FQRSC Bourses de doctorat en recherche (B2) and the Concordia University Doctoral Award of Excellence. The three papers discussed are not yet published but are currently being prepared for publication. I finally declare that I am the sole author of the entire dissertation document below.

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CHAPTER 1:
GENERAL INTRODUCTION

Goals are viewed by lifespan theories as the key driving force of human life, as individuals move toward or away from important goals (Rasmussen, Wrosch, Scheier, & Carver, 2006). Indeed, goal achievement is often equated with adaptive developmental outcomes while failed goal pursuit over time is equated with reduced well-being and quality of life, depression, and physical illness (Bradtstädter & Rothermund, 1994; Klinger, 1998; Schulz & Heckhausen, 1996). The motivational system which regulates our chosen goals, operates on a discrepancy reducing loop (Carver & Scheier, 1990; Rasmussen et al., 2006), whereby it strives to minimize the difference between our input (i.e., current state) and our available reference (i.e., desired state). When goal-related progress appears too slow or inadequate, or when the discrepancy appears too large, negative emotions arise (Beike, Markman, & Karadogan, 2009; Carver & Scheier, 1990). These negative emotions, which are experienced as aversive, provide the motivational push to make the necessary behavioral and psychological adjustments in order to increase the likelihood of goal achievement (Baumeister, Vohs, DeWall, & Zhang, 2007; Frijda, 1988; Klinger, 1998). For this reason, negative emotions are viewed as catalysts of change and are vital to human developmental regulation (Nesse & Ellsworth, 2009). In the case where individuals are unable to achieve the goal, psychological adjustment becomes necessary to allow the individual to move on to other goals while buffering the negative consequences of failure on his or her sense of self (Nesse & Ellsworth, 2009; Wrosch, 2011; Wrosch & Miller, 2009). Through this system, negative emotions are directly linked to goal engagement motivational processes, goal progress as well as the resulting well-being and health of the individual. Research focused on identifying how individuals should adjust to their challenging goals and how this will affect goal progress and well-being in the long-run will help advance current knowledge pertaining to the experience of thwarted goals.

Regret, due to its universality and resulting negative implications, was chosen as an example of a state the represents a particular failed goal pursuit in this dissertation. This negative cognitive-emotional phenomenon arises when individuals view their current situation as worse off than an alternate one that was viewed to be within the individual's control (Beike et al., 2009; Epstude & Roese, 2008; Pieters & Zeelenberg, 2007). Research illustrates that a greater gap between the present and wished-for states corresponds to and elicits more intense negative

cognitions and emotions, which are considered extremely aversive (Wrosch, Bauer, & Scheier, 2005). These negative emotions help push toward behavioral and psychological change by shifting attention and resources to new paths or to the adjustment of the old ones, in a similar fashion to the processes present in other failed goal pursuits (Pieters & Zeelenberg, 2007; Roese, 1994; Roese, 1997; Roese & Summerville, 2005). Research thus far has been cross-sectional and has not specifically focused on the regret experience. For this reason, identification of a detailed longitudinal trajectory of how negative emotions affect goal intentions and future behavior in the experience of regret will help expand on current motivational theories and contribute to a greater understanding of the factors which allow individuals to regulate failed goal pursuits effectively.

Control over one's environment is viewed by the Motivational Theory of Lifespan Development (Heckhausen, Wrosch, & Schulz, 2010) as the cornerstone of adaptive development, as people strive to change the world in order to fit their needs. Heckhausen and her colleagues state that this type of control (i.e., primary control) is linked with fulfilling one's developmental potential (Heckhausen, 1997; Heckhausen & Schulz, 1995). When individuals cannot control their surroundings, they focus on changing internally to fit their environment (i.e., secondary control), either by adjusting their goal or by disengaging from it and allocating their resources to other, more fruitful, pursuits. These authors describe four types of control strategies, which pertain to the processes of goal engagement and disengagement, and are weighed to determine the best fit to the specific situation via the 'optimization' process (Heckhausen & Schulz, 1998). 'Selective primary control' pertains to the active effort and time people invest in pursuing their goals, 'selective secondary control' pertains to the internal commitment to one's goal, 'compensatory primary control' speaks to the external means people employ to achieve their goals when internal resources are insufficient, and 'compensatory secondary control' speaks to the process of disengaging both behaviorally and psychologically from goals that are unmet. These control strategies encompass behavioral and cognitive processes that help individuals adapt to, and efficiently cope with, the challenges which are part and parcel of life, thereby allowing for optimal development (Hechhausen & Schulz, 1995; Heckhausen et al., 2010; Schulz & Heckhausen, 1996).

Based on previous research, different stages across the lifespan would be characterized by varying levels of primary control (Bradtstädter & Rothermund, 1994; Heckhausen, 1997). Namely, differing motivational theories note that young adulthood is a time period when control

is at its optimal level, allowing for the achievement of important developmental tasks associated with this stage of life (e.g., education, career, relationship; Havighurst, 1972; Wrosch & Heckhausen, 2002). However, one's level of perceived control (i.e., outcome expectancy) may not completely correspond with his or her actual level of primary control (Wrosch et al., 2005). In this way, young adults may hold pessimistic views of their opportunity to achieve important goals, such as overcoming their life regrets, which of course is detrimental to their adaptive development (Havighurst, 1972; Heckhausen, 1999; Wrosch et al., 2005). To build upon current developmental theories, this dissertation also addresses the adaptive regulation of the gap between objective and perceived opportunity in young adulthood. In such a situation, a continued internal goal striving may be beneficial, as despite challenges, young adults will continue to engage and pursue in undoing the negative effects of their regrets, thus perhaps becoming aware of, or creating, new opportunities in their environment to successfully achieve their desired goals (Heckhausen et al., 2010). In this way, the present research will contribute to the understanding of differing processes inherent in the experience of regret and how outcome expectancies can be managed effectively in young adulthood. The possible relations between the outcome expectancy trajectory and future well-being will also help elaborate on motivational and personality theories.

On the other hand, older adulthood is viewed as a period of life where physical and cognitive declines increase, thereby reducing the level of control one has over their environment (Bradtstädter & Rothermund, 1994; Ebner, Freund, & Baltes, 2006). For this reason, lifespan theories suggest that successful ageing would entail accommodation of one's goals to the present circumstances or disengagement from the unattainable goal to compensate for the loss of control inherent in this phase of life (Heckhausen, 1997; Wrosch, Schulz, & Heckhausen, 2004). In fact, successful ageing theories indicate that older adults shift their focus from growth-oriented goals toward those which prevent loss (Heckhausen & Schulz, 1998). In addition, research has shown that the utilization of internal cognitive processes to buffer the negative consequences of loss on one's sense of self in this age group have been linked to increased positive affect and quality of life (Bauer & Wrosch, 2011). Not surprisingly, the experience of unattainable goals in this age group has been linked to increased stress, depressive symptoms, and negative affect when the person reported difficulties disengaging from the failed goal (Bradtstädter & Rothermund, 1994; Nesse & Ellsworth, 2009; Rasmussen et al., 2006). Research thus far has not focused on the longitudinal motivational and emotional effects of regret in old age, which becomes an additional

focus of this dissertation. In light of the limitations described, the present research focuses on illuminating the unique experience of regret, as a proxy of unattainable goals, in old age which can help guide theory and practice on how to best manage such challenges in as individuals enter older adulthood.

Research Objectives

This dissertation consists of three different studies and will contribute to a more in-depth understanding of adaptive behavioral and emotional self-regulation in the face of life regrets across the lifespan. Specifically, this research will advance a more elaborate model of the motivational role of negative emotions and internal goal engagement in failed goal pursuit in young and older adulthood. The purpose of these research studies is to explore the associations between intense regret-related negative emotions, motivational processes, regret-related progress, outcome expectancies and well-being. This dissertation has four primary objectives:

> ***Objective 1:*** *To investigate the effects of intense negative emotions on goal-related progress, emotional intensity, and well-being over time, in the context of young adults experiencing severe life regrets, as well as to determine the link between these constructs.*
>
> ***Objective 2:*** *To elucidate the importance of emotional intensity on goal-related progress vis-à-vis its motivational effects on levels of regret engagement and implementation intentions over time in the context of the regret experience in young adulthood.*
>
> ***Objective 3:*** *To explore how remaining engaged in overcoming regret despite pessimistic outcome expectancies to do so can impact young adults' expectancies and well-being over time.*
>
> ***Objective 4:*** *To determine whether the above findings will generalize across the lifespan to older individuals or prove unique to the young adult population.*

Study 1: *Motivational and emotional benefits of intense life regrets in young adulthood*

This study addresses the first two research objectives set in this dissertation. It does so by examining the particular benefits inherent in the intense emotional aftermath of the regret experience. This study builds on past research by offering a more in-depth longitudinal trajectory of the role of negative emotions on motivation, goal progress, and well-being in young adults who are faced with severe life regrets. In addition, this study utilizes hierarchical linear modeling, hierarchical regression analyses, and bootstrapping techniques to illuminate how these

processes influence one another over time in this population. The data used in this study was based on the *Young Adult Regret Study*. Study 1 addresses the following research questions:

> ***Question 1:*** *Do baseline levels of intensity of regret-related emotions impact change in levels of emotional intensity and well-being over a span of 13 months?*
>
> ***Question 2:*** *Does progress in overcoming one's regret mediate the association between baseline levels and change?*
>
> ***Question 3:*** *Does regret intensity similarly influence the motivational processes of regret engagement and implementation intentions?*
>
> ***Question 4:*** *Do these motivational processes mediate the relation between regret intensity at baseline and regret-related progress?*

Study 2: *Management of life regrets in young adulthood: Goal engagement improves pessimistic outcome expectancies and subjective well-being*

This study addresses the third research objective of this dissertation by investigating the complexity of holding pessimistic views of overcoming regret in young adulthood, a period in life that is characterized by abundant control over one's environment, thus expanding previous research and adding to the existing literature on opportunity-incongruent goal striving. This study focuses on how continued engagement in overcoming regret-related effects, despite pessimistic outcome expectancies, regulates future outcome expectancies and well-being in young adults. Hierarchical regression analyses and bootstrapping techniques are utilized to ascertain how these different processes are linked across time in data obtained from the *Young Adult Regret Study.* Study 2 addresses the following questions:

> ***Question 1:*** *How do the outcome expectancies and well-being of younger adults who are pessimistic about their opportunity to overcome their regrets, yet continue to engage in this goal, change over time?*
>
> ***Question 2:*** *Does the process of increased outcome expectancies mediate the association between initial expectancies and well-being?*

Study 3: *Can life regrets also produce adaptive effects in older adulthood? An analysis of the motivational and emotional functions of regret in old age*

This study addresses the fourth research objective of this dissertation by attempting to replicate the analyses conducted in the first two papers. In this way, a greater understanding can be reached of how the aversive state of a severe life regret uniquely affects each age group, given their differing levels of control over the environment. This study adds to the growing body of successful ageing literature focused on the detriment of continued engagement in unattainable goals within this age group. This paper is based on longitudinal data from the *Concordia Longitudinal Retirement Study*. Study 3 addresses the following questions:

> ***Question 1:*** *Are the processes evident in young adulthood pertaining to the benefits of intense negative emotions on motivational processes and well-being at play in older adults?*
>
> ***Question 2:*** *Would continued engagement in overcoming regret despite pessimistic outcome expectancies give rise to similar long-term advantages found in their younger counterparts, or are these processes unique to the young adult population?*

CHAPTER 2:
LITERATURE REVIEW

Lifespan regulation theories emphasize the importance of goal pursuit to human development (Ebner et al., 2006; Freund & Riediger, 2006; Klinger, 1998). They postulate that pursued goals offer motivation, intention and ultimately pave the path of our lives, as we constantly move toward desired outcomes and move away from undesired ones (Baumeister, 1991; Freund & Riediger, 2006; Rasmussen et al., 2006; Schulz & Heckhausen, 1996). In this way, goal pursuit is seen as directing development, as constant movement toward and away from important goals outlines and shapes our behaviors, our environment and ultimately our life's purpose and meaning (Ebner et al., 2006, King & Hicks, 2006, Klinger, 1998, Rasmussen et al., 2006; Schulz & Heckhausen, 1996; Wrosch & Scheier, 2003). Indeed, previous studies have linked success in the pursuit of important goals with greater quality of life while others use fruitful goal attainment as a sign of healthy and successful living (Ebner et al., 2006; Schulz & Heckhausen, 1996; Wrosch, Heckhausen, & Lachman, 2006; Wrosch & Scheier, 2003). By the same token, the experience of unattainable or blocked goals has been linked with reduced well-being, helplessness, and depression which may lead to increases in physical illness over time (Brandtstädter & Ruthermund, 1994; Klinger, 1998). It is therefore the way in which individuals respond to these challenges, which are a ubiquitous part of life, that can ameliorate or exacerbate these negative implications. Naturally, how one responds to such events should depend on their life's situation. Younger adults have, to the most part, sufficient opportunity to continue pursuing important goals, even in the face of challenges, and are therefore urged to continue engaging in their unattainable goals (Wrosch & Heckhausen, 2002). Older individuals are more likely to experience age- and lifetime-related limitations and constraints (Heckhausen & Schulz, 1995). In such situations, it is possible that abandoning the goal, thereby freeing resources for different pursuits and protecting the individual from the experience of failure, may offer the greatest long-term rewards (Heckhausen et al., 2010). Given the significance of successful goal achievement to healthy living, how could individuals best cope with the all too familiar experience of failed goal pursuit to ensure adaptive development across the lifespan?

The Regulatory Function of Goals

Several motivational theories view goals as mental representations of sought-after states which help regulate the individual behaviorally and psychologically (Carver & Scheier, 1990;

Heller, Komar, & Lee, 2007). Carver and Scheier (1990) describe goal pursuit as functioning to restore equilibrium and prevent fluctuations, similar to a negative feedback loop system. They note that as people progress toward or away from goals, comparisons are continuously made between the person's perception of his or her current state and their desired state, with greater discrepancies leading to more intense negative emotions. These negative emotions function as feedback to assess our goal progress and affect all future behaviors, as their aversive nature drives movement toward or away from pursued goals, in an attempt to minimize discrepancies between hoped-for and objective states (Baumeister et al., 2007; Frijda, 1988). Research supports these processes, as individuals report increased well-being when their progress towards goal achievement is perceived as satisfactory, leading to continued utilization of current behaviors (Deci & Ryan, 2000; Diener & Suh, 1997). Additionally, research has shown that an inability to make progress towards one's goals leads to increased negative affect and depressive symptoms, as well as overall reductions in well-being ratings (Wrosch, Miller, Scheier, & Brun de Pontet, 2007).

In addition to the aversive experience of these emotions themselves, affect is also viewed as the primary mediator between stress and illness (Cohen, Tyrrell, & Smith, 1993), with recent research exposing a link between unattainable goals and changes to physical health, ranging from vulnerability to disease all the way to endocrine (e.g., cortisol) dysregulation, which has been linked to mortality (Rasmussen et al., 2006; Wrosch, Miller, Lupien, & Pruessner, 2008). According to motivational theories, when individuals are faced with difficulties in completing a certain goal, along with the accompanying emotional, physical, and psychological consequences, a global assessment of behavior commences, whereby the benefits of continued engagement and effort in pursuing the goal are examined. This illustrates how emotions are used as strong motivational tools to help individuals notice and adapt to challenges in goal pursuit, based on their available internal (e.g., experience, skill, motivation) and external (e.g., environmental control) resources (Baumeister et al., 2007; Nesse & Ellsworth, 2009).

The Motivational Theory of Lifespan Development (Heckhausen et al., 2010) places a great emphasis on individuals' capacity to control the environment and their goals, which is divided into primary and secondary control, depending on the target of one's external and internal efforts. In primary control, the individual would direct his behaviors to the external environment by attempting to change the outside world to fit his needs (Heckhausen, 1997;

Heckhausen & Schulz, 1995). Secondary control targets the internal cognitive processes of the individual in order to assist in continued goal pursuit, as well as buffer any negative effects of failing to meet a goal, in the case where there is less control over one's environment. This form of control aims to minimize losses, maintain or expand primary control over one's environment by channeling internal resources toward the pursuit of selected goals (Heckhausen & Schulz, 1995; Heckhausen et al., 2010). Indeed, according to the authors, one's developmental potential may not be realized without the ability to control their environment. For this reason, the person's motivational system is utilized to maximize primary control capacity, seen as key to adaptive lifespan development (Heckhausen et al., 2010; Schulz & Heckhausen, 1996).

The importance of control in goal pursuit is also discussed in several other motivational theories. In his Theory of Planned Behavior (TPB; 1991), Ajzen stresses the motivational importance of goal intentions, which include engagement in and commitment to a goal, in predicting actual behavior, and notes that intentions are composed of attitudes concerning the specific behavior and societal norms. He additionally states that the subjective perception of control over the behavior, namely the individual's perception of the ease or difficulty of the action, also greatly influence intentions. Indeed, intentions combined with behavioral control account for a significant variance in performing the action itself, with perceived control becoming increasingly important as objective control decreases. It is possible of course that objective control may differ from perceived control which may depend on past experience, the specific situation and confidence in one's ability to accomplish the task, i.e., self-efficacy (Ajzen, 1991; Klinger, 1998; Rasmussen et al., 2006). Ajzen notes that, greater perceived control will lead to increased intentions to perform the behavior, underscoring the vital role of one's perception of control in goal pursuit (Ajzen, 1991). Thus, subjective perception of control can act as a cognitive self-regulation system, whereby those who are more optimistic about their odds to successfully control their behavior will continue goal pursuit despite challenges (Rasmussen et al., 2006; Wrosch & Scheier, 2003). These individuals who are more optimistic by nature may also take greater advantage of existing opportunities in the environment to achieve their goals as well as cope more positively should they experience failure, thereby directly affecting their well-being (Wrosch & Scheier, 2003).

Research has found that goal intentions and actual behavior correlate only modestly, as some individuals may fail to act on a certain goal despite their best intentions (e.g., losing

weight; Gollwitzer, 1999). Gollwitzer (1999) explained these findings by stating that in order to pursue a desired goal successfully, one must develop specific action plans as to how exactly the goal will be accomplished, which he referred to as implementation intentions. Implementation intentions differ from goal intentions that focus on the outcome of goal pursuit and instead hone in on the behaviors to be performed and the context in which to perform them (Sheeran, Webb, & Gollwitzer, 2005). He noted that by linking behaviors with a predetermined context helps the individual respond more automatically when certain conditions arise, thereby forgoing control of goal-related behaviors to the situation itself (Henderson, Gollwitzer, & Oettingen, 2007). This automaticity, which requires fewer cognitive resources and effort, can help protect the individual from distraction and other competing goals (Gollwitzer, 1999; Gollwitzer & Schaal, 1998; Powers, Koestner, & Topciu, 2005; Sheeran et al., 2005). Research has indeed shown that implementation intentions were related to goal progress over time and were also significantly related to goal achievement (Powers et al., 2005; Sheeran, 2002). In fact, Gollwitzer and Brandstätter (1997) indicate that implementation intentions are particularly important when people are faced with challenging goals or report low self-regulation skills. This is mainly because the mental associations formed between situational cues and certain actions or behaviors, become so-called habits, which are also automated, durable and outside of conscious awareness (Gollwitzer, 1999; Sheeran et al., 2005). It is important to note however, that implementation intentions are effective in goal pursuit when they are combined with strong goal intentions, illustrating the power of motivational engagement in one's goal (Sheeran et al., 2005).

Goal Pursuit Across the Lifespan

It appears that the ability to control, and thereby alter one's environment by achieving desired goals is vital for successful development (Brandtstädter & Ruthermund, 1994). However, research has repeatedly demonstrated that as people enter old age they begin to experience physical and cognitive decline, more commonly than gain (Ebner et al., 2006). These experiences, not surprisingly, lead to decreased control over one's environment and therefore to increasing limitations and challenges in goal pursuit (Brandtstädter & Ruthermund, 1994). This poses an important problem in today's society where over 15% of the population was 65 years of age or older in 2011 (Statistics Canada, 2014). This percentage is expected to rise to almost one quarter of the population of Canada by 2031. As successful goal pursuit is seen as the cornerstone to adaptive development, well-being, and health, it seems reasonable to expect that

older individuals will suffer from their objective limitations and lack of control. Yet this may not be the case, as research has repeatedly shown well-being to remain stable across adulthood in addition to a constant decline in negative affect with age, in a phenomenon that has been dubbed the paradox of happiness (Brandtstädter & Greve, 1994; Diener & Suh, 1997). Different models of successful aging attribute older adults' ability to maintain their subjective well-being despite age-related losses to better self- and emotional regulation.

According to Baltes and Baltes' Selective Optimization with Compensation model (SOC model; 1990), older adults who experience increasing levels of challenges and limitations need to adjust to these conditions in order to maintain and maximize gains and minimize the experience of loss (Ebner et al., 2006). First, older adults 'select' their goals in a more conscious manner, taking into consideration their current functioning, which helps maintain a sense of control and mastery (Lupien & Wan, 2004). In the process of 'optimization', older adults focus on the types of behaviors that would lead to more successful goal pursuit, again depending on their level of functioning. Finally, when one's limitations surpass what is needed to accomplish a desired goal, older adults focus on 'compensation' techniques (e.g., using a hearing aid) to allow for the most optimal functioning possible. This theory thus presupposes that older adults shift their focus to goals aimed at preventing further losses, rather than making additional gains (Ebner et al., 2006; Freund & Ebner, 2005). Research has repeatedly shown support for this theory with older adults exhibiting greater well-being and satisfaction when focusing on goals which avoid loss (Ebner et al., 2006).

In a similar vein, the Dual Process Model of Successful Aging (Brandtstädter & Greve, 1994; Brandtstädter & Renner, 1990), proposes that while individuals experience optimal control in accomplishing their goals, they focus on the process of 'assimilation' which allows them to control their environment to better fit their needs (Brandtstädter & Greve, 1994). Assimilation actions divide into activities that are instrumental in goal pursuit, activities that help attend to specific information and create a particular environment to ease goal pursuit, as well as activities employed to correct any discrepancies between one's current and desired states. However, in the event where the person's control over the environment is diminished due to incremental losses and limitations, the authors describe a process of 'accommodation', whereby the individual would adjust their goals to better fit the environment (Brandtstädter & Greve, 1994). This process focuses again on preventing further loss and also incorporates a cognitive adjustment to

the individual's goals and desired outcomes in order to increase his or her sense of control (Schulz & Heckhausen, 1996).

The Motivational Theory of Lifespan Development (Heckhausen et al., 2010) also addresses the maintenance of control despite challenges by incorporating the processes of 'selection' and 'compensation'. It is understood that people must be selective in their goal aspirations and pursuits, as resources and time are limited even when control is at its peak (Heckhausen et al., 2010). This 'selection' process allows individuals to personally shape their environment and life through the pursuit of diverse goals, as well as for focus implemented when a target outcome is selected (Schulz & Heckhausen, 1996; Wrosch, Heckhausen et al., 2006). In addition, the authors attest to the normality of challenges and failures across the lifespan and for that reason stress the importance of dealing with these experiences in an effective and empowering manner, which includes behavioral adjustment and protection of internal resources to ensure for effective functioning in the future (Heckhausen, 1997; Heckhausen et al., 2010). In this way, the process of 'compensation' protects the person's sense of mastery and promotes the maintenance, recovery and enhancement of functioning in the face of threat (Schulz & Heckhausen, 1996).

The aspects of primary and secondary control have been combined with the processes of selection and compensation to create four distinct types of control strategies that describe internal and external stages in goal pursuit (Heckhausen, 1997; Heckhausen et al., 2010). 'Selective primary control' relates to individual efforts to directly attain goals by investing time, effort, and resources and 'selective secondary control' relates to the internal commitment made to achieving the specific goal. 'Compensatory primary control' reflects attempts to make use of external means to attain goals, when internal means are insufficient (e.g., asking others for advice) and finally, 'compensatory secondary control' corresponds with cognitive attempts to minimize the effects of failure to attain one's goal (e.g., see the silver lining). It is important to note that these strategies are only effective to the extent that they promote primary control and fit with one's available control over their environment (Heckhausen & Schulz, 1998).

The process of 'optimization', which incorporates three principles, is utilized to ensure the optimal use of each strategy at the appropriate time. First, 'goal-opportunity congruence' is stressed so that chosen goals will make the best use of current circumstances as well as have the most long-term developmental potential. Second, one must be cognizant of inter-domain and

long-term consequences, namely the broader context of how each goal affects all other sought-after goals must be taken into account. Third, goal selectivity is emphasized to offer individuals diverse selection of goals as well as a buffer in the event of failure or the presence of limitations. Research has shown that optimization has been beneficial for well-being through the specific control strategies used (Heckhausen & Schulz, 1998). In addition, the process was related to fewer depressive symptoms and health declines in the elderly (Heckhausen & Schulz, 1998; Wrosch et al., 2007). In this way, this model combines the processes of selection and compensation discussed in the SOC model along with the concepts of internal and external means of control addressed in the dual process model of successful aging.

Across the lifespan, research has repeatedly shown that young adulthood is a period when the ability to control one's environment is at its peak (Havighurst, 1972; Heckhausen et al., 2010). It is therefore postulated that young adults should focus their resources on goal attainment and orient themselves towards growth, rather than loss (Ebner et al., 2006, Wrosch, Heckhausen et al., 2006). In fact, a loss, or avoidance, orientation may result in reduced well-being in younger adults (Ebner et al., 2006). This phenomenon is explained by the fact that young adults who avoid, rather than approach, desired goals are not taking advantage of control that is available to them and therefore are hindering their control potential, which negatively affects their adaptive development (Wrosch et al., 2005).

As discussed above, biological declines and losses related to the ageing process greatly influence one's resources and constraints. Society may also place constraints on the individual by predetermining age-normative goal pursuits, whereby one is met with negative consequences if their desired goals conflict with these norms (Wrosch, Heckhausen et al., 2006). Yet chronological age is not the sole reason for a loss or gain in control of one's environment. It is important to note that variability exists within each age group and that many young adults struggle with decreased primary control, despite their developmental stage (Bauer & Wrosch, 2011). In fact, research has shown that when informed that pursuing growth-oriented goals will consume all available resources, older and younger adults chose to focus on prevention of loss (Ebner et al., 2006). In addition, usage of downward social comparisons, namely comparing yourself to others who are worse off, has been proven beneficial to anyone experiencing decreased control or resources, regardless of age (Bauer & Wrosch, 2011). Moreover, as previously stated, variability may exist between one's perceived control and his or her objective

behavioral control, suggesting that adults at any age can develop pessimistic expectations about their efficacy to achieve desired outcomes. In other words, loss of one's control to achieve chosen goals relates directly to the internal and external resources available to, and perceived by, the individual in the moment as well as to constraints placed on the individual (Ebner et al., 2006; Wrosch, Heckhausen et al., 2006). This underscores the ubiquitous experience of failure within the lifespan and stresses the importance of processes aimed at effectively coping with, and transitioning from, unattainable goals.

When Goals are Unmet

As explained in the Motivational Theory of Lifespan Development, selective secondary control relates to cognitive processes used to help the individual adjust and cope efficiently in the event of challenges in goal pursuit (Heckhausen et al., 2010). Usually, individuals struggling to make progress towards their goals are encouraged to focus their efforts on increasing their primary control striving. However, when these efforts become futile, it is recommended to disengage from the goal and focus resources on other targets (Brandtstädter & Ruthermund, 1994; Wrosch, 2011). The process of goal disengagement entails withdrawing efforts (i.e., energy) and commitment (i.e., valence, importance) from the failed goal, which may relate to the preservation of well-being by eliminating negative emotions related to the lack of progress (Rasmussen et al., 2006; Wrosch & Scheier, 2003). Goals may become unattainable and require the individual to disengage for different reasons, including internal (e.g., diminishing resources) and external (e.g., normative developmental stages) constraints (Wrosch & Scheier, 2003). It is naturally more difficult to disengage, or let go, from goals that are more central to the person's sense of self (Brandtstädter & Ruthermund, 1994). In addition, individuals differ in their ability to readjust or let go of their pursued goals, which research has linked with greater likelihood of developing depressive symptoms (Brandtstädter & Ruthermund, 1994; Wrosch, Scheier, & Miller, 2013). In essence, an inability to disengage when needed can lead to a chronic state of reduced well-being which may result in depression (Brandtstädter & Ruthermund, 1994; Carver & Scheier, 1990; Klinger, 1975; Nesse, 2000; Nesse & Ellsworth, 2009; Rasmussen et al., 2006). Chronic depressive symptoms have been linked to physical health problems, including dysregulated cortisol, systemic inflammation, and illness, which together lead to cumulative effects, with people who are able to disengage reporting significantly improved sleep and fewer health problems (Rasmussen et al., 2006; Wrosch & Miller, 2009; Wrosch, Miller et al., 2007).

Once individuals disengage, previously used resources, energy, and time free up to pursue other goals, leading to a process of 'reengagement', meaning the ability to identify, commit to, and pursue new goals (Rasmussen et al., 2006). The ability to reengage in new goals was related to greater well-being and a sense of purpose in life and was shown to decrease perceived stress (Wrosch & Miller, 2009; Wrosch, Miller et al., 2007). These processes, together encompassing goal adjustment capacities (Rasmussen et al., 2006; Wrosch, Scheier, Miller, Schulz, & Carver, 2003), have been shown to be independent and to account for unique proportions of variance in well-being (Rasmussen et al., 2006; Wrosch, Miller et al., 2007; Wrosch, Scheier et al., 2003). As the need to disengage becomes stronger when behavioral control decreases, it stands to reason that older adults will benefit from the process of disengagement given the growing physical and cognitive constraints they experience (Brandtstädter & Ruthermund, 1994). On the other hand, young adults who enjoy optimal levels of control, are believed to suffer from disengaging too quickly from important goals, as this will hinder their primary control potential (Wrosch et al., 2005).

The picture becomes more complex when considering individuals who view their outcome expectancies, or their ability to achieve the goal, as differing from actual opportunity available in the environment. As indicated previously, individuals who are more optimistic are believed to cope better with challenging goals as they possess a greater ability to scan the environment for opportunities to achieve their desired outcomes (Wrosch & Scheier, 2003). It therefore stands to reason that individuals who hold more pessimistic views, namely that they are less likely to accomplish their goals, will suffer from a disadvantage as they will more likely give up at the sign of an impasse in goal pursuit (Wrosch et al., 2005).

Young and old individuals whose perceived outcome expectancies do not correspond with actual opportunity that is available to them are expected to suffer in differing ways. Older adults who are overly optimistic may use up all available resources to advance in unattainable goals, which will ultimately lead to a reduced sense of mastery and self-efficacy as well as increased depressive symptoms and negative affect (Brandtstädter & Ruthermund, 1994). Young adults who report less optimistic outcome expectancies are also assumed to suffer negative consequences as they will be less likely to accomplish developmentally-appropriate tasks and thereby hinder their development (Havighurst, 1972, Wrosch et al., 2005). For this reason, while older adults are advised to refrain from continued engagement in failed goals, research indicates

that young adults should continue goal engagement and pursuit in order to remain open to, and receptive of, available opportunities in the environment, which would otherwise have gone unnoticed (Wrosch & Scheier, 2003).

Regret as an Example of Unmet Goals

Examining the management of life regrets may be an appropriate avenue to gain a greater understanding into the processes related to efficient coping with unsuccessful goal pursuit across the lifespan. Regret is described as a negative cognitive-emotional phenomenon that arises when people realize that their current situation could have been better had they acted differently in the past (Gilovich & Medvec, 1995; Pieters & Zeelenberg, 2007). Regret is a common emotional-cognitive experience among adults of all ages, which has been shown to result in reduced well-being (e.g., increased depressive symptoms) as well as increases in physical health problems (e.g., cortisol dysregulation) if experienced over time (Bauer & Wrosch, 2011; Pieters & Zeelenberg, 2007). In fact, the intensity of regret-related negative emotions relates to the discrepancy between one's current and sought-after states as well as to the belief that the negative outcome was within the person's ability to control (Wrosch et al., 2005).

'Counterfactual thoughts' lead to these observed discrepancies, as they are mental representations of alternatives to the current state (Byrne, 2005; Roese, 1997). In order to experience the negative effects of regret, one's reality needs to be viewed as worse than an alternate one, which represents an 'upward counterfactual' (Boninger, Gleicher, & Strathman, 1994; Epstude & Roese, 2008). In addition, the experience of regret hinges on the person feeling responsible for the negative discrepancy, leading to self-blame (Pieters & Zeelenberg, 2007).

However, counterfactual thoughts could also be seen as a coping strategy to regulate emotions following a failed goal, as in the case of a 'downward counterfactual', or when the reality is viewed as better than an alternate state, which can mediate negative emotions caused by these thoughts and ultimately lead to increased positive emotions (Boninger et al., 1994; Epstude & Roese, 2008; Roese, 1994). Counterfactual thoughts can greatly influence emotional and motivational reactions to events as well as the perception of one's responsibility, and are in fact viewed as imperative to human development (Boninger et al., 1994; Roese, 1994; Roese, 1997). Indeed, upward counterfactual thoughts can help focus the person's attention and motivation on creating alternative intentions and action plans in order to ensure future success (Pieters & Zeelenberg, 2007; Roese, 1994; Roese, 1997).

In addition to behavioral actions taken to avoid future regrets, individuals can make use of cognitive strategies to reconstruct the meaning of the regret, for example the placement of blame (Roese, Summerville, & Fessel, 2007; Wrosch & Heckhausen, 2002). Moreover, the intensity of regret-related emotions keeps the goal of undoing the regret effects at the forefront of awareness, thus increasing the likelihood of correcting the discrepancy (Förster, Liberman, & Higgins, 2005; Gilovich & Medvec, 1995). In this way, counterfactual thoughts and negative emotions are seen to influence each other and are both viewed as motivational regulators, which push toward avoiding this negative state in the future (Reb, 2008; Roese, 1997). Thus, while the initial cognitive and emotional effects of regret are viewed as aversive, it may be necessary to push individuals to alter what was not helpful and focus their resources on what will lead to success, thereby creating the secondary long-term beneficial effect of regret (Beike et al., 2008; Roese & Summerville, 2005). Moreover, the desire to avoid future regret is often referred to as 'anticipated regret', which has been shown to relate to more careful and vigilant strategizing and decision making (Reb, 2008). In fact, research has shown that anticipated regret contributed significantly to goal intentions, adding support to its inclusion in Ajzen's TPB (1991).

Regrets may be divided into regrets of action, which relate to regretting something that you have done in the past ('commission'; e.g., speaking harshly to loved ones), and regrets of inaction relating to the regret of something that you haven't done ('omission'; e.g., not continuing one's education). Interestingly, these types of regrets lead to different initial cognitive and emotional reactions, as individuals tend to regret making mistakes (i.e., commission) more strongly than not acting at all (i.e., omission; Beike et al., 2008; Gilovich & Medvec, 1995). However, research has also shown that over time this pattern is shifted, whereby omission regrets relate to stronger negative consequences while commission regrets showed reductions in accompanying negative emotions (Beike & Crone, 2008; Gilovich & Medvec, 1995; Gilovich, Medvec & Kahnman, 1998; Pieters & Zeelenberg, 2007). Three different mechanisms have been linked with this pattern (Gilovich & Medvec, 1995). First, the initial strong negative effect of commission regrets may lead to faster and greater change. In addition, mistakes are seen as offering only one alternative and therefore allow the individual to accept responsibility and move on (Gilovich & Medvec, 1995; Roese & Summerville, 2005). At the same time, regrets over inaction become more challenging to set aside over time as they offer endless alternatives as well as unrealized ambitions, thus revealing greater opportunity to have acted differently in the past

(Roese & Summerville, 2005).

According to Beike and her colleagues (2008), the experience of regret can also differ based on the perceived opportunity to change one's outcome. The 'lost opportunity principle' (Beike et al., 2008) states that while high future opportunity perceptions lead to reduced regret, a situation which could have been avoided in the past (high past opportunity) but can no longer be changed (low future opportunity) leads to increased hopelessness and the myriad of aversive regret effects. The authors continue to state that regret could be used to regulate future behavior until the point at which future opportunity is viewed as lost. At this time, regret can be used as a learning experience for future actions, but cannot itself be undone. Indeed, research has illustrated the power of perceived opportunity (or outcome expectancies) in regulating changes made, whereby high perceived opportunity was linked to behavioral changes made in an effort to undo the regret effects while affect regulation was used to help cope with low perceived opportunity to make concrete changes to one's circumstances (Epstude & Roese, 2008). Research has further shown that the domains which people most often regret, namely one's most valued goals (e.g., education, relationships, career), are those which present with high opportunity in the past but little to no options to alter their outcomes in the present. Additionally, this the underscores the greater regret-related intensity experienced by older adults, relating this to their reduced opportunity to produce change, as opposed to younger adults who are less negatively affected given their greater behavioral control (Beike et al., 2008; Newall, Chipperfield, Daniels, Hladkyj, & Perry, 2009).

For this reason, in correspondence with findings from the Motivational Theory of Lifespan Development, it is expected that regret should be dealt with differently across the lifespan. In young adulthood, when opportunity to undo the negative effects of one's regret is seen as optimal, individuals are encouraged to focus on directly tackling the negative effects of regret through behavior regulation (Bauer, Wrosch & Jobin, 2008; Wrosch et al., 2005; Wrosch & Heckhausen, 2002). Research has lent initial support to this notion by showing that perceptions of high control were related to lower emotional intensity and rumination over the regret among young adults (Wrosch et al., 2005; Wrosch & Heckhausen, 2002). In addition, young adults reported greater control over their regret and greater fluidity of the regret experience as well as endorsed low depressive symptoms and helplessness levels, due to the high opportunity they espouse (Jokisaari, 2003; Wrosch et al., 2005). In contrast, the regret experience

in older adulthood was related to cortisol dysregulation, more physical problems, greater depressive symptoms, and helplessness, due to the low opportunity available to them to undo the negative regret-related effects (Torges, Stewart, & Miner-Rubino, 2005; Wrosch, 2011; Wrosch et al., 2005). Given these age-related declines in opportunity, older adults are advised to engage in cognitive strategies to help protect their sense of mastery and allow them to disengage from the regret (Bauer et al., 2008).

Summary

Overall, the pattern of findings in the above reviewed literature points to the importance of goals as motivational tools, which shape our world (Klinger, 1998). In particular, research has illustrated that the aversive nature of emotions, arising from a lack of progress in accomplishing desired goals, acts as a catalyst to behavioral change (Baumeister et al., 2007; Heller et al., 2007). In this way, negative emotions are viewed as vital to behavioral and emotional regulation, aimed at increasing one's efficiency in pursuing similar goals in the future (Nesse & Ellsworth, 2009). Moreover, the processes of goal engagement and implementation intentions are seen as motivational processes that allow for continued goal pursuit, even in the event of an impasse, while goal progress is viewed as a barometer of success (Cohen et al., 1993; Nesse & Ellsworth, 2009). Given the increased capacity young adults possess to control their environment in order to achieve their aims, research has shown that these individuals benefit from directing their efforts to change their behaviors in order to overcome their regrets, used as an example of failed goal pursuit (Wrosch & Heckhausen, 2002). Research has shown however that one's perceived outcome expectancies do not always correspond to the objective level of control available to him or her. In such cases, which are extremely detrimental to young adult optimal development, it is advised to continue pursuing one's goal in order to allow for a more in-depth scanning of opportunity in the environment before disengaging from the goal for good (Wrosch et al., 2005). Older adults on the other hand, who suffer from increasing levels of limitations and challenges which constrain the control they hold over their environment, report experiencing greater distress following the experience of regret (Wrosch, Bauer, Miller, & Lupien, 2007; Wrosch et al., 2005). Fittingly, research has shown that with age it becomes imperative to adjust, or disengage from, undoing one's regret, rather than use resources to change a situation which is outside of one's control (Bauer et al., 2008).

Limitations in the Research Literature

Together, the literature discussing the adaptive role of negative emotions in goal pursuit points to associations with motivational processes, outcome expectancies and well-being. There are however, important limitations in the extant literature which the current research aims to address:

1) *First, while several studies assessed the adaptive function of negative emotions in the development of behavioral intentions in young adults, there have been few studies examining the experience of regret in this population as well as how it affects the development of young adults longitudinally. In addition, none has directly addressed how regret-related negative emotions and their intensity affect intentions and actual future behavior.*
2) *Second, past studies demonstrated that lower outcome expectancies can damage the ability of young adults to complete important developmental tasks, thereby leading to maladaptive development, while optimistic outcome expectancies were linked to improved quality of life. There have been no studies to date examining the consequences of generalized goal engagement tendencies, despite lower outcome expectancies. It is important for research to assess the trajectories of these young adults, as compared to those who are less able to remain engaged, to identify any effects on outcome expectancies and well-being.*
3) *Third, research thus far has not followed older adults over time to assess the effects of intense regrets. It is believed, based on previous studies, that older adults will experience unique effects following the regret experience, as compared to younger adults. For this reason, longitudinal studies examining the effects of intense regret-related emotions, goal engagement, and outcome expectancies on well-being in this population may help shed light on the lifespan differences in this experience.*

The Present Research

This dissertation includes three longitudinal studies that were designed to address the limitations described in existing research. The present research aims to expand current motivational models of development by investigating the experience of intense life regrets over time in young and older adults and assessing the motivational role of negative emotions and outcome expectancies.

Study 1 (Chapter 3) explored the longitudinal effects of intense regret-related emotions on regret engagement and implementation intentions, regret-related progress and well-being in a large sample of young adults recruited at Concordia University which was followed over a period of 13 months. The specific hypotheses of this study were:

Hypothesis 1.1: *High regret intensity at baseline will lead to a reduction in levels of intensity and increases in well-being over time, through the progress obtained towards undoing the negative regret effects.*

Hypothesis 1.2: *High engagement in the current regret at baseline as well as strong implementation intentions across the duration of the study will mediate the association between regret intensity at baseline and regret progress.*

Study 2 (Chapter 4) investigated the effects of internal goal engagement on the outcome expectancies and well-being of young adults who were less optimistic concerning their opportunity to overcome their regrets. These individuals were compared with young adults who endorsed optimistic outcome expectancies in a 13-month longitudinal study of a young adult population recruited at Concordia University. The specific hypotheses of this study were:

Hypothesis 2.1: *Young adults who are less optimistic about their opportunity to undo the negative effects of their regrets, yet continue to engage, will demonstrate increased well-being over time.*

Hypothesis 2.2: *The increase over time in outcome expectancies in this population will mediate the relation between baseline outcome expectancies and well-being changes over time.*

Study 3 (Chapter 5) focused on understanding the processes inherent in the experience of intense regret-related emotions on older adults and how it affected changes over time in regret-related intensity, regret engagement, and well-being. The implications of continuing to engage in undoing regret effects despite being less optimistic about the opportunity to do so, in this age group, was also explored with regard to its effects on changes in outcome expectancies and well-being over time. These investigations utilized data from a large sample of older adults recruited from the Greater Montreal Area which were followed for a period of 26 months. The specific hypotheses of this study were:

Hypothesis 3.1: *Older adults who experience intense regret-related negative emotions will not experience positive outcomes in motivation and well-being as displayed in*

younger adults.

Hypothesis 3.2: *Less optimisitc older adults who continue to engage in undoing the negative effects of their regret will not experience changes over time in outcome expectancies and therefore none of the well-being benefits found in young adults.*

CHAPTER 3:

STUDY 1

Motivational and emotional benefits of intense life regrets in young adulthood

Abstract

This study examined in a sample of young adults whether intense regret would promote motivational processes aimed at undoing the negative consequences of life regrets (i.e., regret engagement, regret-specific implementation intentions, and regret-related progress) and facilitate associated reductions of negative emotional states (i.e., regret intensity, depressive symptoms, positive, and negative affect). The data were based on a 13-month longitudinal study of 121 young adults who reported having an unresolved life regret. Results from growth-curve and regression analyses demonstrated that baseline levels of regret intensity were associated with higher levels of regret engagement, and predicted over time increases in regret-specific implementation intentions, regret-related progress, reductions in regret intensity and improvements in subjective well-being. Mediation analyses further clarified that baseline regret intensity forecasted subsequent reductions in negative emotional states through regret-related progress. Moreover, intensity of life regrets predicted regret-related progress through high baseline levels of regret engagement and increases in implementation intentions. These findings suggest that intense life regrets can serve adaptive functions in young adulthood by influencing motivational processes aimed at overcoming life regrets and ameliorating associated emotional distress.

KEY WORDS: regret; young adulthood; regret intensity; regret engagement; implementation intentions; well-being.

Introduction

Regret is an omnipresent negative cognitive-emotional phenomenon, which is felt in situations where past decisions have led to less than optimal consequences (Beike et al., 2009; Pieters & Zeelenberg, 2007). Research indicates however, that the negative emotional effects of regret are important motivational forces which may catapult future behavioral change (Carver & Scheier, 1990, 1998; Frijda, 1988). These effects have not been found in older adulthood, where it is believed that the lack of opportunity to undo the negative effects of one's regret are less desirable than young adulthood, and therefore disengagement from one's goal may be more adaptive (Wrosch et al., 2005). It is consequently assumed that the process discussed above would be prominent in young adulthood, where opportunity to undo the negative effects of one's regret are optimal (Wrosch et al., 2005; Wrosch, Heckhausen et al., 2006). Moreover, specific motivational processes have been suggested to affect the progress one makes in undoing their negative regret effects, namely regret engagement and implementation intentions (Heckhausen et al., 2010; Gollwitzer, 1999). However, these effects have only been assessed indirectly and within cross-sectional research thus far. It is the goal of this paper to assess these effects in a longitudinal sample of young adults experiencing regret. Specifically, it was hypothesized that the initial intensity of the negative emotions following a regret experience will lead to progress in the process of undoing the negative effects of one's regret. This progress will in turn lead to reduced intensity of negative emotions as well as to improved well-being at follow-up. Additionally, it was expected that it is the processes of regret engagement and implementation intentions specifically, that allow one to make progress toward the undoing of negative effects of his or her regret.

The Emotional Functionality of Regret

Regret is a universal experience, with severe life regrets reported by as many as 90% of adults across the lifespan (Bauer & Wrosch, 2011; Wrosch, Bauer et al., 2007; Wrosch et al., 2005). It is often experienced when a past decision results in a current situation that is less than ideal (Beike et al., 2009; Pieters & Zeelenberg, 2007). In such circumstances, the past event is compared to alternative situations that could have been, had we made a different choice, (Gilovich & Medvec, 1995) in a process called counterfactual thinking (i.e., 'what would have happened if…' Kahneman, 1995; Coricelli et al., 2005). 'Upward counterfactuals', namely the contemplation of how one's circumstances could have been better, may result from both

commission (i.e., having done something we regret doing) and omission (i.e., regretting something we have not done; Gilovich & Medvec, 1995; Roese, 1997). Such counterfactuals usually arise when one fails to achieve a desired goal, while at the same time believing that past events, and therefore his or her present circumstances, are within their control (Coricelli et al., 2005; Roese & Summerville, 2005).

Research shows that regret may negatively affect emotional well-being (Roese, 1997, Roese & Summerville, 2005; Roese et al., 2006). Indeed, the experience of regret has been linked with decreased life satisfaction and increased depressive symptoms to name a few (Bauer & Wrosch, 2011; Wrosch, Bauer et al., 2007; Wrosch et al., 2005). In fact, many researchers now view regret itself as an emotional experience whereby the individual feels responsible for negative outcomes of his or her past choices (Coricelli et al., 2005; Gilovich & Medvec, 1995). Yet it is precisely its strong emotional effect that makes regret an adaptive behavioral tool (Roese, 1994). Specifically, negative emotions are viewed as catalysts for behavioral guidance (Carver & Scheier, 1990, 1998; Frijda, 1988; Nesse & Ellsworth, 2009; Pieters & Zeelenberg, 2007), whereby the adverse state they elicit is used to regulate future activity to help reorient the individual to his or her major life goals (Frijda, 1988). As the experience of regret is emotionally aversive, this provides the incentive and any corrective actions necessary to avoid, or reduce, any future regret (Beike et al., 2009; Reb, 2008; Roese, 1997; Wrosch & Heckhausen, 2002). Therefore, the ability to experience counterfactual thinking and regret, as aversive as it may be, can be viewed as paramount to human growth and development (Beike et al., 2009; Roese, 1994).

In fact, it is not only the negative emotions resulting from regret but also their intensity that serve motivational functions (Gilovich & Medvec, 1995; Lecci, Okun, & Karoly, 1994; Wrosch & Heckhausen, 2002). The intensity of experienced regret may help individuals to keep failed goals in consciousness, thereby maximizing the likelihood of acting to achieve these goals in future situations that present the opportunity to do so (Beike et al., 2009). Individuals may thus learn to regulate behavior and goal pursuit on the basis of feedback from previous attempts (Carver & Scheier, 1990; Lecci et al., 1994; Zeelenberg, 1999). These motivational processes appear to lead to progress in overcoming regret and consequently lead to positive emotions (Carver & Scheier, 1990, 1998; Frijda, 1988; Nesse & Ellsworth, 2009).

It is therefore reasonable to assume that the experience of regret will ultimately enhance positive emotions, however research does not support this notion. Indeed, research has shown that experiencing an elevated number of regrets leads to lower life satisfaction, as well as increased depressive symptoms and helplessness, in older adults (Bauer, Wrosch, & Jobin, 2008; Wrosch et al., 2005). These findings for this population relate to the low opportunity to overcome regrets in older adulthood (Heckhausen, 1997; Wrosch et al., 2005; Heckhausen & Schulz, 1995). In fact, in the face of reduced opportunity to regulate future behavior to avoid regret, cognitive processes lead to disengagement (Roese & Summerville, 2005). These findings point to the notion that the motivational processes of regret may be most beneficial in young adulthood, a life period characterized by optimal opportunity to overcome regret (Heckhausen et al., 2010; Wrosch et al., 2005; Wrosch, Heckhausen et al., 2006). Motivational processes related to the adaptive role of regret may be most useful for young adults, given their increased opportunity and control potential (Wrosch et al., 2005; Jokisaari, 2003).

Research thus far has indirectly supported this claim. In a meta-analysis by Sandberg and Conner (2008), negative emotions experienced by young adults predicted intentions to act in corrective ways and led to goal-directed behavior. Moreover, neuroimaging studies have shown immediate activity in the lateral orbitofrontal cortex (OFC) following regret, presumably reflecting cognitive processes associated with avoidance of future regrettable behavior (Coricelli et al., 2005). Additionally, the medial OFC and amygdala were both involved in behavioral regulation related to regret avoidance (Coricelli et al., 2005). However, few such studies are longitudinal and none examined the effects of intense regrets on developmental outcomes. Essentially, no studies directly assessed young adults experiencing regret and how the negative emotions associated with regret and their intensity affect future intentions and behavior. The present study will attempt to address this research gap.

Motivational Processes at Play in Young Adulthood Behavioral Regulation Following Regret

There are two specific motivational processes that may be at play in linking intense negative emotions, resulting from the experience of regret, to one's progress in overcoming their regret and resulting well-being improvements. First, as intense regret experiences are aversive, it is human nature to engage in whatever means necessary to prevent them (Reb, 2008). For this reason, intense negative emotions may be associated with processes of regret engagement, namely the investment of effort and commitment towards undoing the corollaries of regret, thus

leading to progress in undoing the negative consequences of regret. Goal engagement has indeed been conceptualized as a core aspect of goal regulation in motivational theories of adaptive lifespan development (e.g., selective primary and selective secondary control; Heckhausen et al., 2010) and was in fact studied in research pertaining to regret experienced in older adulthood (Wrosch et al., 2005). Second, research by Gollwitzer (1999) suggests that for goal pursuit to be effective, specific action plans for the attainment of the goal must be developed. Interestingly, motivational research has shown that goal intentions, or the commitment to a desired outcome, correlated poorly with actual behavior (Gollwitzer, 1999). In fact, in order to execute effective behaviors, individuals may have to specify the exact behaviors required to obtain the desired goal as well as the precise context in which these behaviors will be executed (Sheeran et al., 2005). These more specific implementation intentions have been shown to significantly predict successful goal attainment (Gollwitzer, 1999). It is therefore reasonable to assume that negative regret emotions and their intensity could also influence regret-related progress by contributing to the building of implementation intentions.

The Present Research

This research examined relations between young adults' high levels of regret intensity, active motivational processes, and regret-related progress in a 13-month longitudinal study of young adults. Furthermore, the association between young adults' regret-related progress and consequences on individuals' emotional well-being as well as change in intensity of regret was explored. It was hypothesized that increased levels of intensity of negative emotions due to regret would be associated with reduced levels of intensity as well as increased well-being over time. Moreover, it was expected that this process would be mediated by progress made toward undoing the negative effects of the regret. Finally, it was hypothesized that regret-related progress would be mediated by the motivational processes of regret engagement and implementation intentions.

Method

Participants

The present study is based on a sample of young adults, which was recruited at Concordia University, Montreal, in 2008. To be eligible for the study, participants needed to have an

unresolved life regret. There were 164 young adults who met this criterion.[1] They completed a self-report questionnaire in the laboratory at baseline (T1), and returned to the laboratory to complete follow-up questionnaires approximately six months (T2: *M* = 6.32 months, *SD* = .70 months, *N* = 123) and thirteen months (T3: *M* = 13.28 months, *SD* = .84 months, *N* = 121) after baseline. The final sample included those 121 young adults who participated at T3. Participants who were included into the analyses were on average 22.83 years old (*SD* = 3.51, *range* = 18 to 36 years), and 75 were female (62%). Study attrition was not significantly associated with T1 levels of any of the constructs used in the reported analyses.

Materials

The main study variables included measures of participants' regret intensity, regret-specific motivational processes (i.e., regret engagement, implementation intentions), regret-related progress, as well as well-being measures (i.e., depressive symptomatology, negative, and positive affect). For zero-order correlations between main constructs assessed at T1 and T3, see Table 1. In addition, measures of regret characteristics (i.e., omission versus commission regrets, time since regretted event, and regret domain) and sociodemographic variables (age and sex) were incorporated as covariates into the study.

Life Regrets. Participants were asked at T1 to think about their lives and to write down their most severe life regret. In addition, they responded to a number of questions concerning their reported regret (see descriptions below). Consistent with previous research (Roese & Summerville, 2005), the majority of regrets were associated with education or work (37.2%, e.g., "Not getting a higher education when I was younger"), personal relationships (30.6%, e.g., "Not telling a person how I felt about them"), family (11.6%, e.g., "being so distant with my parents at my teen age"), and self (11.6%, e.g., " Not taking as many risks as I could have"). Participants' life regrets occurred on average 4.68 years ago (*SD* = 3.98) and 43% of participants reported a commission regret. All regret-related information collected in the follow-ups was related to the specific regret that each participant reported at T1.

Regret intensity was measured across assessments by asking participants to report the extent to which they experienced six different emotions during the

[1] Four potential participants did not report a regret when asked in the baseline assessment, and another two participants indicated at baseline that they had completely resolved the negative consequences of their regretted event. Because I was interested in examining how individuals can overcome regrets across time, these 6 individuals were excluded from further study.

Table 1 - *Zero-Order Correlations at Baseline (T1) and 13-Month Follow-Up (T3)* * $p < .05$; ** $p < .01$. [a]

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Regret intensity (T1)													
2. Regret intensity (T3)	.36***												
3. Regret engagement (T1)	.21*	.14											
4. Regret engagement (T3)	.22*	.06	.68**										
5. Implementation intentions (T1)	-.16	-.02	.39**	.45**									
6. Implementation intentions (T3)	.10	-.08	.46**	.60**	.50**								
7. Regret-related progress (T2) [a]	.15	-.11	.35**	.36**	.14	.29**							
8. Regret-related progress (T3)	.26**	-.18*	.38**	.46**	.14	.44**	.46**						
9. Depressive symptoms (T1)	.41**	.34**	.04	.15	.05	.13	-.03	.10					
10. Depressive symptoms (T3)	.18*	.48**	-.08	-.17	-.12	-.14	-.15	-.12	.44**				
11. Negative Affect (T1)	.49**	.40**	.25**	.20*	.05	.19*	-.18	.15	.53**	.27**			
12. Negative Affect (T3)	.28**	.62**	.07	.03	-.04	-.05	-.02	-.14	.35**	.64**	.49**		
13. Positive Affect (T1)	-.26**	-.13	.09	.04	.20*	.12	.16	.07	-.35**	-.26**	-.10	-.08	
14. Positive Affect (T3)	-.13	-.20*	.08	.23*	.26**	.26**	.08	.16	-.28**	-.59**	-.05	-.27**	.59**

Note. [a] Progress towards overcoming the reported regret was not assessed at T1 and was therefore reported here for the 6-months follow-up (T2).

past few months when they thought about their reported regret. These emotions were selected on the basis of previous research (Wrosch & Heckhausen, 2002; Wrosch et al., 2005) and represented three "hot" regret emotions (i.e., angry, irritated, and embarrassed) and three "despair-related" regret emotions (i.e., desperate, helpless, and sorrow; see Gilovich et al., 1998). Participants answered the 6 emotion items by using 5-point Likert-type scales (endpoints: 0 = *not at all*; 4 = *extremely*). Because research has shown that hot and despair-related regret emotions are highly correlated and show similar effects (e.g., Wrosch & Heckhausen, 2002), mean scores of the hot and despair-related emotions were computed to obtain indicators of participants' regret intensity for each assessment (M_{T1} = 1.49, SD_{T1} = .80; M_{T2} = 1.09, SD_{T2} = .86; M_{T3} = .96, SD_{T3} = .82). The scales for measuring regret intensity showed good reliability (αs = .79 to .59).

Regret engagement was measured with two items across assessments, which assessed core motivational factors involved in the regulation of participants' reported life regrets (i.e., effort and commitment; Wrosch et al., 2005). Participants were asked 1) how much effort they invest in, and 2) how strongly they are committed to, undoing the negative consequences of their regretted event. They responded to these two items by using 5-point Likert-type scales (endpoints: 1 = *no effort at all/not at all committed*; 5 = *a lot of effort/very much committed)*. Within each assessment, the two items were highly correlated (*r*s = .71 to .80; ps < .001) and averaged to obtain indicators of participants' regret engagement across assessments (M_{T1} = 3.50, SD_{T1} = 1.29; M_{T2} = 3.37, SD_{T2} = 1.19; M_{T3} = 3.54, SD_{T3} = 1.19). Higher scores on the scales indicated that participants were engaged in undoing their regrets, while lower scores indicated less engagement or disengagement.

Regret-specific implementation intentions were assessed with two items across assessments. Participants were asked to report whether they had specific ideas about 1) how and 2) when they would undo the negative consequences of the reported regret. They responded to these two items by using 5-point Likert-type scales (endpoints: 1 = *not at all*; 5 = *a great deal*). The two items were highly correlated within each assessment (*r*s = .70 to .73; *p*s < .001) and averaged to obtain indicators of participants' regret-specific implementation intentions across assessments (M_{T1} = 3.26, SD_{T1} = 1.37; M_{T2} = 3.47, SD_{T2} = 1.20; M_{T3} = 3.77, SD_{T3} = 1.13). Participants were then asked to elaborate on the specific steps they have planned with which to undo the negative effects of their regret as well as elaborate on the specific context in which they plan to implement these steps.

Regret-related progress was assessed at T2 and T3 by asking participants whether they had made any progress towards overcoming their reported regret in the past few months. This item was not administered at T1 because the assessment of progress inherently required participants to report perceived change towards overcoming their regret. Participants answered the two items by using 5-point Likert-type scales (endpoints: 1 = *no progress at all*; 5 = *much progress;* $M_{T2} = 3.31$, $SD_{T2} = 1.27$; $M_{T3} = 3.84$, $SD_{T3} = 1.20$).

*Depressive symptomatology w*as measured as an indicator of their general subjective well-being across waves by administering the 10-item version of the Center for Epidemiologic Studies – Depression scale (CES-D; Andresen, Malmgren, Carter, & Patrick, 1994; Radloff, 1977). Sample items included "I felt depressed" or "I felt that everything I did was an effort." Participants were asked to indicate how often they felt this way during the past week by using 4-point Likert-type scales (endpoints: 0 = *less than a day*, 3 = *5 to 7 days*). The CES-D scales showed good reliability across assessments (αs = .80 to .83), and sum scores were computed for each of the 10 items in each assessment ($M_{T1} = 8.92$, $SD_{T1} = 5.64$; $M_{T2} = 8.19$, $SD_{T2} = 5.25$; $M_{T3} = 7.98$, $SD_{T3} = 5.18$).

Positive and negative affect were measured as a second indicator of general subjective well-being across waves by utilizing the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Sample negative items included 'upset' or 'distressed' and sample positive items included 'excited' or 'proud'. Participants were asked to indicate the extent they have experienced these emotions during the past six months by using a 5-point Likert-type scale (endpoints: 0 = *very slightly or not at all*, 5 = *extremely*). The PANAS scales showed good reliability across assessments ($\alpha_{negative}$ = .86 to .87, $\alpha_{positive}$ = .89 to .90) and sum scores were computed for each of the 20 items in each assessment (negative affect - $M_{T1} = 2.47$, $SD_{T1} = .73$; $M_{T2} = 2.26$, $SD_{T2} = .70$; $M_{T3} = 2.17$, $SD_{T3} = .72$; positive affect - $M_{T1} = 3.65$, $SD_{T1} = .73$; $M_{T2} = 3.55$, $SD_{T2} = .73$; $M_{T3} = 3.50$, $SD_{T3} = .73$).

Covariates. To minimize the presence of spurious associations, sociodemographic variables (age and sex) and regret characteristics (time since regretted event, omission versus commission regrets, and regret domain) were included into the analyses. Age and sex were measured at T1 through self-reports. In addition, participants were asked to report at T1 whether their life regret was related to a behavior that they had done (i.e., commission regret; coded as "0") or that they had not done (i.e., omission regret; coded as "1"). Moreover, participants

reported at T1 when exactly the behavior that had led to the regret occurred, and a variable representing the months that had passed since the regretted event occurred was computed. Finally, participants' regret descriptions were coded with respect to five different domains: 1) education/work, 2) personal relationships, 3) family, 4) self-related, and 5) other regrets. A second independent domain coding of participants' regret descriptions showed acceptable inter-rater reliability (91%). Four separate dummy variables were computed, contrasting participants who experienced a regret in each of the first four domains (coded as "1") against other participants (coded as "0").

Analyses Plan

To test the study's hypotheses regression analyses (using SPSS 20) and growth curve modeling (using HLM 6.0) were applied to the data. The first set of analyses tested in two separate regression analyses whether T1 levels of regret intensity would predict T2 and/or T3 levels of regret-related progress, controlling for the previously described covariates.[2]

In the second set of analyses, it was examined whether T1 levels of regret intensity would also predict T1 levels and 13-month changes in regret engagement and regret-specific implementation intentions (see Appendix O). Because three different measures were available for each outcome across assessments, HLM growth-curve analyses were conducted to predict in the Level-1 models the respective outcomes by months since study entry and a residual term. The intercepts of these analyses represented participants' T1 levels of the outcomes, and the slopes indicated the rate of monthly change in the outcomes over 13 months of study. In the subsequent Level-2 models, the coefficients obtained in the Level-1 models were predicted by participants' T1 levels of regret intensity and the covariates. Results are reported for robust standard errors.

The third set of analyses repeated the previously described HLM growth-curve models, but predicted participants' regret intensity and depressive symptoms, positive affect, and negative affect (instead of motivational variables). In these analyses, a particular emphasis was placed on whether the Level-2 models would show significant effects of T1 regret intensity (controlling for the covariates) on the slope coefficients obtained in the Level-1 models, as such

[2] Missing data for regret-related progress at T2 of 16 subjects who did not participate at T2 (but T1 and T3) were replaced with the sample mean. Significant effects were the same if these missing values would not have been replaced. For the remaining T2 variables, missing data were replaced in the HLM growth-curve analyses. There were few remaining missing data (age = 1; commission vs. omission = 1; time since regret = 3; regret engagement T3 = 5; implementation intentions T3 = 1), which were also replaced by the respective sample means.

effects could provide evidence for the hypothesis that high regret intensity would be associated with subsequent declines in levels of regret intensity as well as subsequent improvements in emotional outcomes, namely declines in depressive symptoms and negative affect and increases in positive affect.

In the final set of analyses, two sets of mediation analyses were conducted. First, I tested whether regret-related progress would exert significant indirect effects in the associations between T1 levels of regret intensity and 13-month changes in regret intensity and emotional outcomes. Second, I examined whether T1 levels and/or 13-month changes in regret engagement and implementation intentions would exert indirect effects in the association between T1 regret intensity and regret-related progress. Both mediation analyses controlled for the covariates. The specific variables used in the mediation analyses were selected on the basis of significant effects obtained in the first three sets of analyses. Mediation was tested by conducting bootstrap analyses, using the "indirect SPSS macro" (Preacher & Hayes, 2008). The mediation analyses were based on 5000 bootstraps and the indirect effect was evaluated as significant if the 95% bias-corrected confidence interval of the indirect effect did not cross zero (Preacher & Hayes, 2008). Change measures of the respective mediators and outcomes were operationalized by saving in the Level-1 models of the above-described HLM analyses each participants' slope values (i.e., monthly rate of change in mediators and outcomes) and using these scores in the mediation analyses. Across analyses all predictor variables were standardized.

Results

The study's results are reported in four different sections, examining the associations between T1 regret intensity and participants' 1) progress towards overcoming regret, 2) T1 levels and 13-month changes in regret-specific motivational processes, and 3) 13-month changes in emotional outcomes. The final section tested whether effects of regret intensity on emotional outcomes would be mediated by participants' regret-related progress, and whether the effect of regret intensity on regret-related progress would be mediated by participants' motivational processes.

Regret-Related Progress

Two multiple regression analyses were conducted to predict participants' progress towards overcoming their regrets at T2 and T3 as dependent variables by T1 levels of regret intensity and the covariates. None of the covariates was associated with regret-related progress at T2, and only

sex and the 'work/education' regret category were significantly associated with regret-related progress at T3, $F(1, 111) = 6.69$, $p = .01$ and $F(1, 111) = 4.46$, $p = .04$, respectively. These results indicate that women reported more progress towards overcoming their regrets than men. Furthermore, participants who categorized their regret as 'education/work'-related, indicated less progress over time than their counterparts. In addition, Table 2 shows that regret intensity was not associated with regret-related progress at T2, but significantly predicted participants' progress towards undoing their regrets at T3, $F(1, 111) = 7.12$, $p < .01$. Participants who experienced higher T1 levels of regret intensity reported more regret-related progress at T3 than their counterparts who experienced lower T1 levels of regret intensity.[3]

Regret-Specific Motivational Processes

Two HLM growth-curve models were estimated to examine the effects of T1 regret intensity and the covariates on T1 levels and 13-month changes in regret-specific motivational processes (for a specification of these within-person HLM models, see Appendix O). With respect to predicting regret engagement, Table 3 shows that the Level-1 model exerted a significant effect for the intercept, *T-ratio* = 30.80, $p < .01$, but not the slope, indicating that T1 levels of regret engagement were significantly different from zero and did not significantly change over time. In addition, the Level-1 model showed considerable variability around the average T1 level of regret engagement (intercept: $\chi 2(118) = 552.89$, $p < .01$) and the average within-person changes in regret engagement (slope: $\chi 2(118) = 148.26$, $p = .03$).[4] In the Level-2 model, I attempted to explain this variability by T1 levels of regret intensity and the covariates. The results of the Level-2 model showed that none of the covariates were significantly associated with T1 levels or 13-month changes in regret engagement. However, Table 3 documents that regret intensity significantly predicted T1 levels of regret engagement, *T-ratio* = 2.37, $p = .02$, indicating that participants who experienced more intense regret at T1 reported higher T1 levels of regret engagement than participants who experienced less intense regret. There was no significant effect of T1 regret intensity on 13-month changes in regret engagement over time.

The Level-1 model for predicting participants' implementation intentions showed significant effects for both intercept, *T-ratio* = 27.07, $p < .01$, and slope, *T-ratio* = 4.55,

[3] Post-hoc analyses showed that the obtained effect of regret intensity on regret-related progress at T3 was also significant if T2 levels of regret-related progress were additionally controlled for, $F(1, 110) = 4.92$, $\beta = .18$, $R^2 = .03$, $p = .03$, indicating that this effect was independent of previously reported levels of regret-related progress.

[4] The variability estimates for participants' implementation intentions were based on 120 dfs because two participants' did not show variability in this variable over time.

Table 2

Regression Analyses Predicting Regret-Related Progress at 6 Months (T2) and 13 Months (T3)

	Regret-related progress			
	T2		T3	
Predictor [a]	R^2	*Beta*	R^2	*Beta*
Regret intensity (T1)	.02	.13	.05*	.23*

Note. [a] Coefficients were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and self-related regrets).

* $p < .05$. ** $p < .01$.

$p < .01$ (see Table 3). This implies that participants' T1 levels of implementation intentions were different from zero and linearly increased over 13 months of study. In addition, there was significant variability around the average intercept, $\chi 2(120) = 487.71$, $p < .01$, and average slope, $\chi 2(120) = 184.30$, $p < .01$, of participants' implementation intentions, which I attempted to explain in the subsequent Level-2 model. None of the covariates was significantly associated with participants' levels of, or changes in, implementation intentions in the Level-2 model. In addition, Table 3 shows that T1 levels of regret intensity were statistically unrelated to participants' T1 levels of implementation intentions. However, there was a significant effect of T1 regret intensity on 13-month changes in implementation intentions, *T-ratio* = 2.52, $p = .01$ (see results for slope in Table 3).

To illustrate the significant effect, I used the obtained coefficients from the HLM model and plotted in Figure 1 participants' levels of implementation intentions over 13 months of study for the average upper and lower quartiles of the distribution of T1 regret intensity (Preacher, Curran, & Bauer, 2006). In support of the above hypotheses, Figure 1 shows that regret-specific implementation intentions increased significantly among participants who experienced high T1 levels of regret intensity, *coefficient* = .07, *SE* = .01, $t = 4.67$, $p < .01$, but not among their counterparts who experienced low T1 levels of regret intensity, *coefficient* = .01, *SE* = .01, $t = .85$, $p = .39$.

Emotional Outcomes

Next, HLM growth-curve models were conducted to examine variability in participants' regret intensity, depressive symptoms, as well as positive and negative affect over time (please see Appendix O). The analyses were identical to the previously reported models, except for predicting regret intensity, positive and negative affect, and depressive symptoms (instead of motivational processes). The Level-1 model for predicting regret intensity showed significant effects for the intercept, *T-ratio* = 20.44, $p < .01$, and slope, *T-ratio* = -6.51, $p < .01$, indicating that participants' T1 levels of regret intensity were different from zero and that levels of regret intensity linearly declined over time. Moreover, the Level-1 model showed that there was significant variability around both the averaged T1 levels of regret intensity (intercept: $\chi 2(120) = 300.63$, $p < .01$) and changes in regret intensity (slope: $\chi 2(120) = 166.75$, $p < .01$).

The subsequent Level-2 model showed that none of the covariates was significantly associated with T1 levels or changes in regret intensity. Not surprisingly, Table 4 further documents a

Table 3

Growth-Curve Models Predicting T1 Levels and 13-Month Changes in Participants' Regret Engagement and Regret-Specific Implementation Intentions

	Regret engagement		Implementation intentions	
	Intercept (T1)	Slope (Δ T1-T3)	Intercept (T1)	Slope (Δ T1-T3)
	coefficient (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)
Level-1	3.481 (.113)**	.006 (.007)	3.244 (.120)**	.040 (.009)**
Level-2 [a]				
Regret intensity (T1)	.263 (.111)*	-.001 (.007)	-.167 (.109)	.022 (.009)*

Note. [a] Level-2 coefficients were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and self-related regrets). Intercepts represent T1 levels of outcomes and slopes represent monthly increase in outcomes over 13 months. The Level-1 models had 120 *df*s and the Level-2 models had 111 *df*s. * $p < .05$. ** $p < .01$.

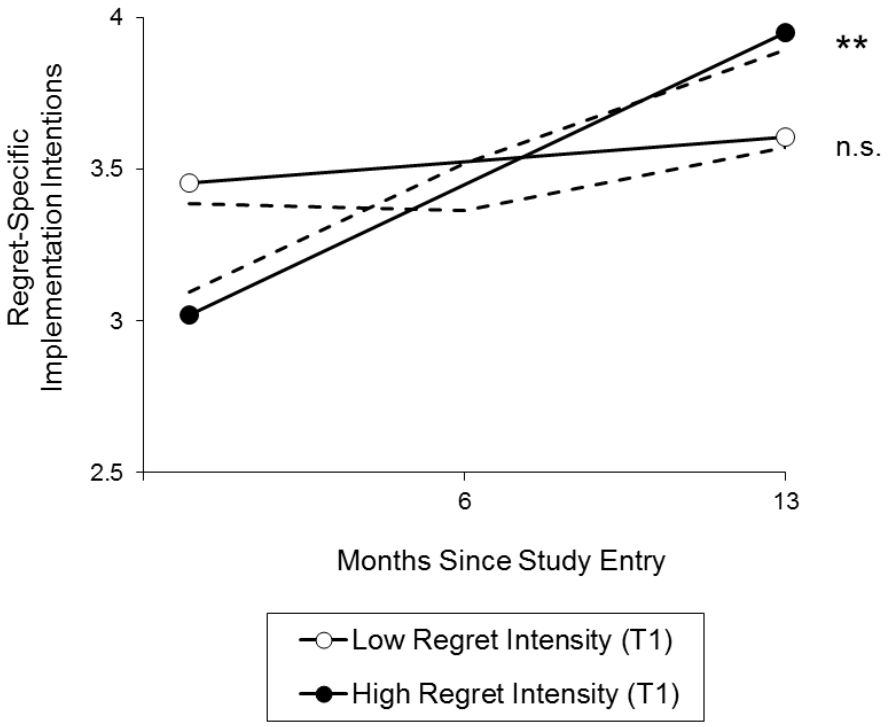

Figure 1. 13-month changes in regret-specific implementation intentions as a function of T1 regret intensity. Solid lines are based on HLM coefficients and plotted for the averaged upper and lower quartiles. Dotted lines represent raw data based on a median split of the sample.

Table 4

Growth-Curve Models Predicting T1 Levels and 13-Month Changes in Participants' Regret Intensity and Depressive Symptoms

	Regret intensity		Depressive symptoms	
	Intercept (T1)	Slope (Δ T1-T3)	Intercept (T1)	Slope (Δ T1-T3)
	coefficient (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)
Level-1	1.459 (.071)**	-.040 (.006)**	8.877 (.492)**	-.070 (.039)
Level-2 [a]				
Regret intensity (T1)	.750 (.019)**	-.036 (.005)**	2.332 (.452)**	-.105 (.042)*

Note. [a] Level-2 coefficients were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and self-related regrets). Intercepts represent T1 levels of outcomes and slopes represent monthly increase in outcomes over 13 months. The Level-1 models had 120 *df*s and the Level-2 models had 111 *df*s.

* $p < .05$. ** $p < .01$.

strong positive effect of T1 regret intensity on participants' baseline levels of regret intensity, *T-ratio* = 38.56, $p < .01$. In addition, and more importantly, the Level-2 model demonstrated that T1 regret intensity was significantly associated with 13-months changes in regret intensity, *T-ratio* = -6.70, $p < .01$.

The latter effect was illustrated in the upper panel of Figure 2 by plotting participants' levels of regret intensity over 13 months of study for the average upper and lower quartiles of the distribution of T1 regret intensity. The observed pattern of results showed that levels of regret intensity significantly declined among participants who experienced high T1 levels of regret intensity, *coefficient* = -.09, *SE* = .01, $t = -10.27$, $p < .01$, but not among participants who experienced low T1 levels of regret intensity, *coefficient* = -.01, *SE* = .01, $t = .67$, $p = .51$.

With respect to predicting variability in participants' depressive symptoms, the Level-1 model showed significant effects for the intercept, *T-ratio* = 18.05, $p < .01$, but not the slope, *T-ratio* = -1.778, $p = .08$, indicating that participants' T1 levels of depressive symptoms were significantly different from zero however did not change across 13 months of study. In addition, there was significant variability around participants' average T1 levels (intercept: $\chi 2(120) = 422.81$, $p < .01$) and average changes of depressive symptoms (slope: $\chi 2(120) = 199.30$, $p < .01$).

The subsequent Level-2 model showed significant effect of some of the covariates. Participants who reported commission regrets experienced higher T1 levels of depressive symptoms, *coefficient* = -1.05, *SE* = .45, *T-ratio* = -2.34, $p = .02$, while participants who reported regrets of omission reported larger increases in depressive symptoms over time, *coefficient* = .09, *SE* = .04, *T-ratio* = 2.27, $p = .03$. Finally, the Level-2 model showed significant effects for the intercept, *T-ratio* = 5.16, $p < .01$, and also predicted 13-month changes in depressive symptomatology, *T-ratio* = -2.51, $p = .01$ (see Table 4).

The latter effect was illustrated in the lower panel of Figure 2 by plotting participants' levels of depressive symptoms over time for the average upper and lower quartiles of the distribution of T1 regret intensity. The pattern obtained in Figure 2 showed that levels of depressive symptoms significantly declined among participants who experienced high T1 levels of regret intensity, *coefficient* = -.21, *SE* = .07, $t = -2.88$, $p < .01$, but not among their counterparts who experienced low T1 levels of regret intensity, *coefficient* = .06, *SE* = .06, $t = 1.10$, $p = .27$.

The Level-1 model for predicting negative affect showed significant effects for the

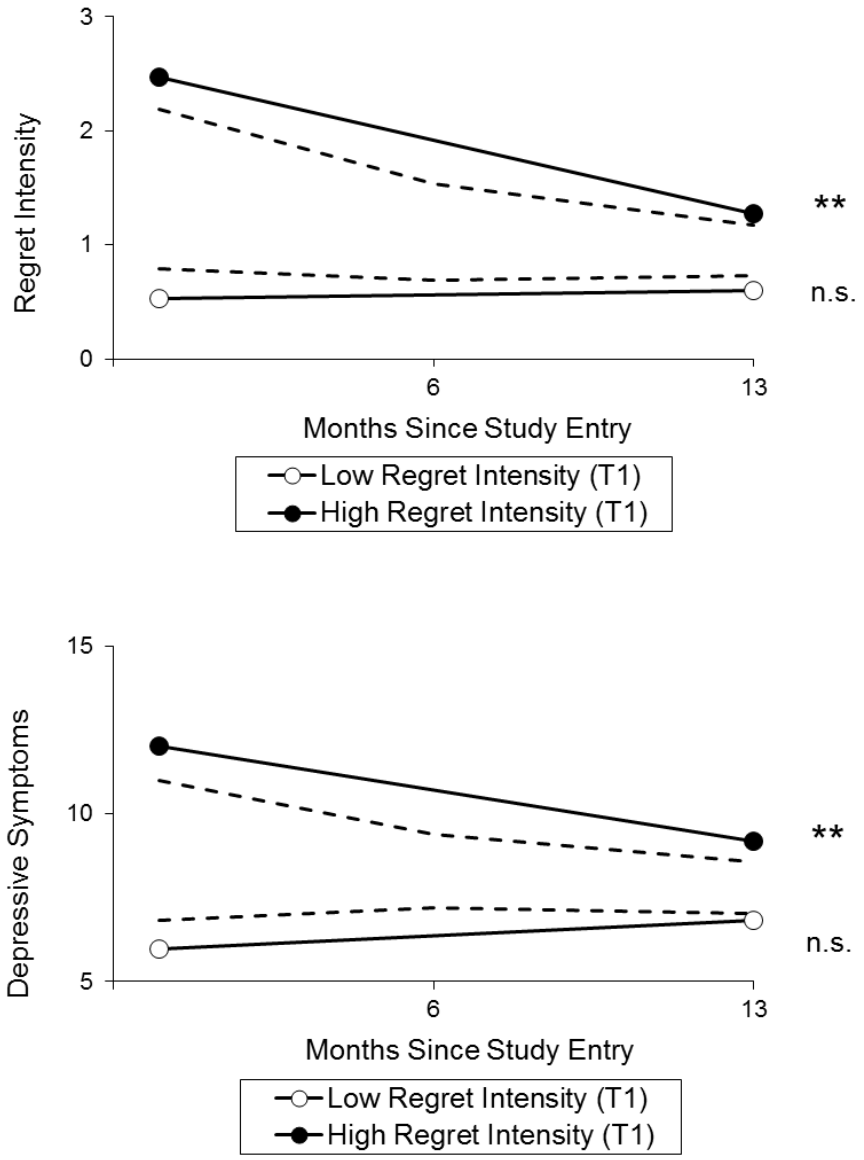

Figure 2. 13-month changes in regret intensity (upper panel) and depressive symptoms (lower panel) as a function of T1 regret intensity. Solid lines are based on HLM coefficients and plotted for the averaged upper and lower quartiles. Dotted lines represent raw data based on a median split of the sample.

intercept, *T-ratio* = 37.93, $p < .01$, and slope, *T-ratio* = -4.51, $p < .01$, indicating that participants' T1 levels of negative affect were different from zero and that these levels declined linearly across time. Moreover, the Level-1 model showed that there was significant variability around the averaged T1 levels of negative affect (intercept: $\chi 2(120) = 536.86$, $p < .01$) as well as around the changes in negative affect (slope: $\chi 2(120) = 231.38$, $p < .01$). According to the Level-2 model, sex was significantly associated with T1 levels in negative affect *T-ratio* = 2.31, $p < .05$, indicating that women displayed greater negative affect at T1 than men. Table 5 documents a strong positive effect of T1 regret intensity on participants' baseline levels of negative affect, *T-ratio* = 6.479, $p < .01$. More importantly, the Level-2 model demonstrated that T1 regret intensity was significantly associated with changes across time in negative affect, *T-ratio* = -2.56, $p < .05$.

This effect was illustrated in the upper panel of Figure 3 by plotting participants' levels of negative affect across 13 months for the average upper and lower quartiles of the distribution of T1 regret intensity. The observed pattern of results showed that levels of negative affect significantly declined among participants who experienced high T1 levels of regret intensity, *coefficient* = -.04, *SE* = .01, *t* = -4.25, $p < .01$, but not among participants who experienced low T1 levels of regret intensity, *coefficient* = -.01, *SE* = .01, *t* = -1.37, $p = .17$.

Finally, the Level-1 model for predicting positive affect showed significant effects for the intercept, *T-ratio* = 54.96, $p < .01$, and slope, *T-ratio* = -2.49, $p < .05$, indicating that participants' levels of positive affect at baseline were different from zero and that these levels showed a linear decline over the 13 months of the study. Moreover, the Level-1 model showed that there was significant variability around the averaged T1 levels of positive affect (intercept: $\chi 2(120) = 503.65$, $p < .01$) as well as around the changes in positive affect (slope: $\chi 2(120) = 173.31$, $p < .01$). According to the Level-2 model, type of regret was significantly associated with changes in positive affect over time *T-ratio* = -2.979, $p < .01$, indicating that participants who reported a regret of omission experienced a greater decrease in positive affect over time than participants who reported a regret of commission. Table 5 documents a strong negative effect of T1 regret intensity on participants' baseline levels of positive affect, *T-ratio* = -3.79, $p < .01$. Interestingly, the Level-2 model demonstrated that T1 regret intensity was significantly positively associated with changes over time in positive affect, *T-ratio* = 2.06, $p < .05$.

Table 5

Growth-Curve Models Predicting T1 Levels and 13-Month Changes in Participants' Negative and Positive Affect

	Negative Affect		Positive Affect	
	Intercept (T1)	Slope (Δ T1-T3)	Intercept (T1)	Slope (Δ T1-T3)
	coefficient (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)	*coefficient* (*SE*)
Level-1	2.455 (.065)**	-.022 (.005)**	3.640 (.066)**	-.011 (.005)*
Level-2 [a]				
Regret intensity (T1)	.326 (.050)**	-.011 (.004)*	-.220 (.058)**	.009 (.004)*

Note. [a] Level-2 coefficients were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and self-related regrets). Intercepts represent T1 levels of outcomes and slopes represent monthly increase in outcomes over 13 months. The Level-1 models had 120 *df*s and the Level-2 models had 111 *df*s.
* $p < .05$. ** $p < .01$.

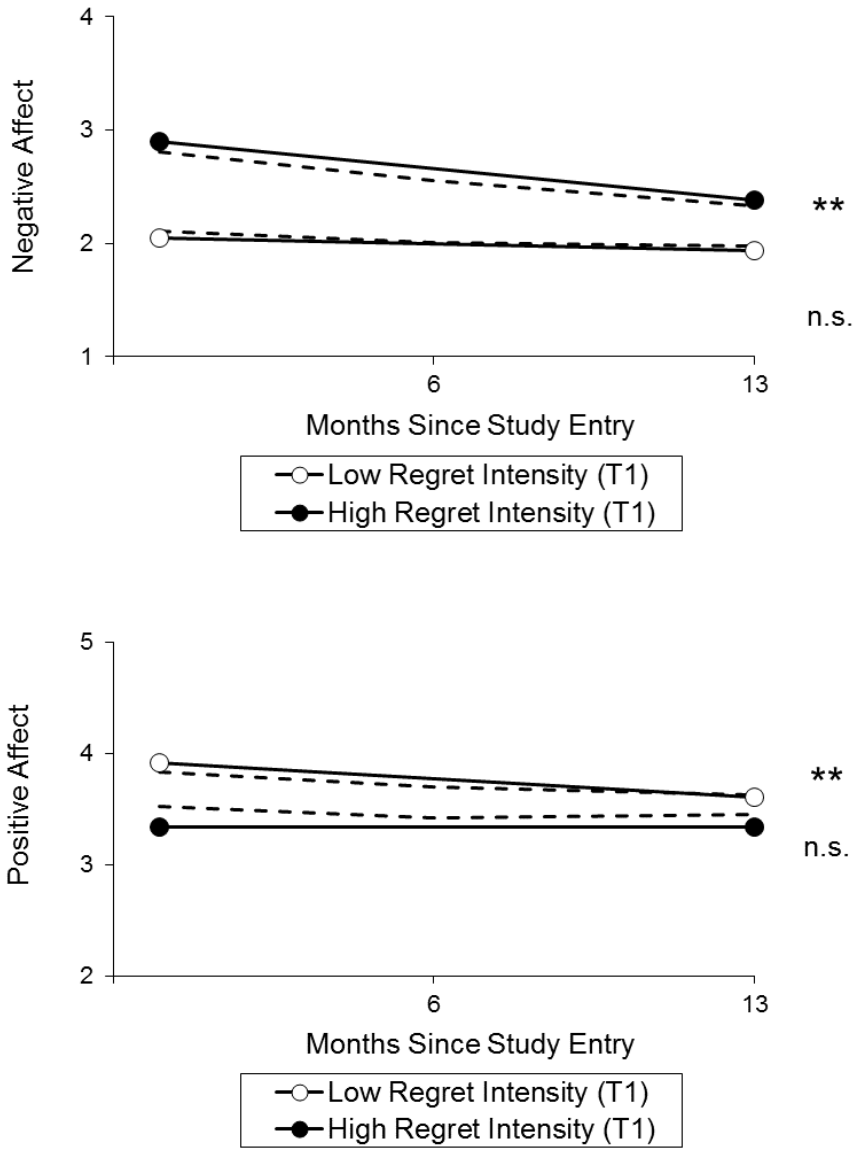

Figure 3. 13-month changes in negative affect (upper panel) and positive affect (lower panel) as a function of T1 regret intensity. Solid lines are based on HLM coefficients and plotted for the averaged upper and lower quartiles. Dotted lines represent raw data based on a median split of the sample.

I illustrated the Level-2 effect in the lower panel of Figure 3 by plotting participants' levels of positive affect across 13 months for the average upper and lower quartiles of the distribution of T1 regret intensity. The observed pattern of results showed that levels of positive affect significantly declined among participants who experienced low T1 levels of regret intensity, *coefficient* = -.02, *SE* = .01, t = -3.62, $p < .01$, but not among participants who experienced high T1 levels of regret intensity, *coefficient* = .00, *SE* = .01, t = .00, p = .99.

Mediating Pathways

The results presented so far demonstrated that T1 levels of regret intensity were significantly associated with higher T1 levels of regret engagement, 13-month increases in implementation intentions, accelerated regret-related progress at T3, and 13-months declines in participants' levels of regret intensity, depressive symptoms, and negative affect. Additionally, these results indicate that lower T1 levels of regret intensity were significantly associated with 13-month decreases in positive affect.

To finally examine potential mediating pathways among these variables, two sets of mediation analyses were conducted, using the "indirect SPSS macro" (see Analysis Plan section). The first set of mediation analyses examined whether regret-related progress at T3 would mediate the associations between T1 regret intensity and 13-month changes in the negative emotional outcomes (i.e., regret intensity, depressive symptomatology, and negative affect).[5] As depicted in Figure 4, results showed that if the mediators were not included into the analysis (see coefficients in brackets), the direction of obtained effects of T1 regret intensity on 13-month changes in regret intensity, $F(1, 111) = 44.44$, $R^2 = .27$, $p < .01$, depressive symptoms, $F(1, 111) = 6.63$, $R^2 = .053$, $p = .01$, and negative affect, $F(1, 111) = 4.57$, $R^2 = .04$, $p < .05$, were identical to the findings obtained in the HLM analyses.[6] However, if regret-related progress was treated as a potential mediator in the analyses, the effect of regret intensity on declines in regret intensity and depressive symptoms were reduced, $F(1, 110) = 35.82$, $R^2 = .21$, $p < .01$ and $F(1, 110) = 4.43$, $R^2 = .04$, $p = .04$, respectively. Moreover, when regret-related progress was included as a potential mediator in the analyses, the effect of regret intensity on declines in negative affect

[5] Positive affect was excluded from the mediation analyses as the observed pattern of findings was different from those observed in the negative emotional outcomes. For this reason it was not tested in the same mediation model.

[6] To facilitate interpretation, standardized regression coefficients are reported in Figures 3 and 4, which differ from the unstandardized coefficients reported in the HLM analyses. It is of note that the unstandardized regression coefficients and associated standard errors of the mediation analyses were either identical or almost identical to the coefficients reported in the HLM analyses.

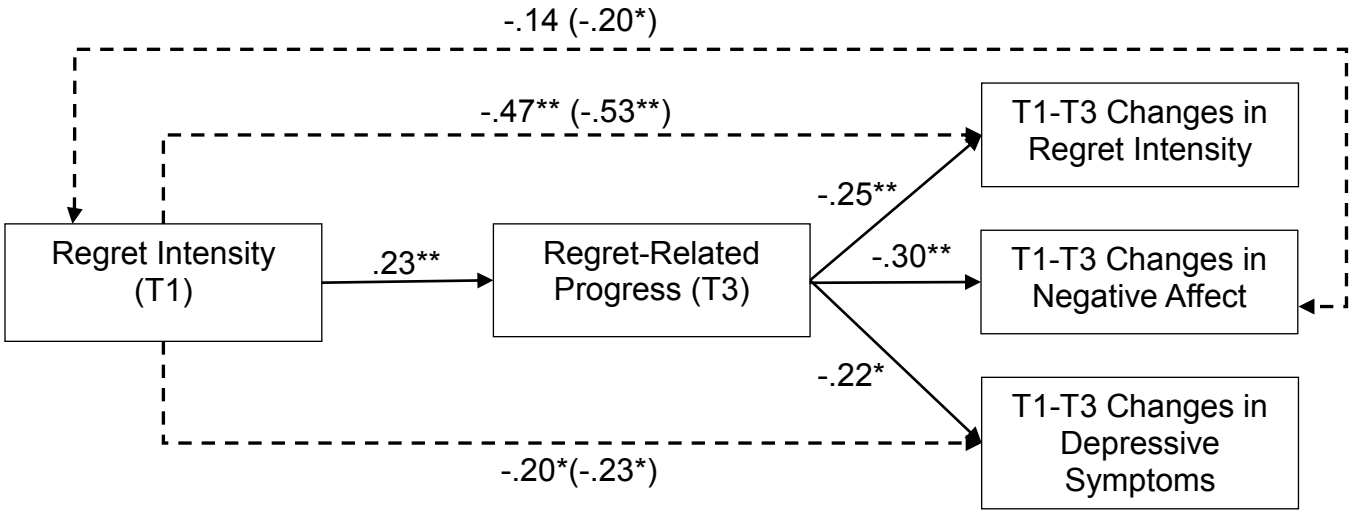

Figure 4. Mediation Model testing the indirect effects of regret-related progress at T3 on the associations between T1 levels of regret intensity and T1-T3 changes in regret intensity, depressive symptomatology, and negative affect. Values represent standardized regression coefficients. Dotted lines indicate a significant reduction of the total effect through the mediator, as demonstrated by indirect effects in the bootstrap analyses.

was rendered insignificant, $F(1, 110) = 2.21$, $R^2 = .02$, $p > .05$. [7] In fact, bootstrap analyses demonstrated that regret-related progress exerted significant indirect effects on the association between T1 levels of regret intensity and 13-month declines in regret intensity (95% BCI [-.132, -.014]), depressive symptoms (95% BCI [-.107, -.002]), and negative affect (95% BCI [-.146, -.016]). Regret-related progress explained 36.84% of the effect of T1 regret on changes in regret intensity, 13.91% of the effect of T1 regret intensity on changes in depressive symptoms and 13.73% of the effect of T1 regret intensity on changes in negative affect.

The final set of mediation analyses examined whether T1 levels of regret engagement and 13-month changes in implementation intentions would mediate the obtained effect of T1 regret intensity on regret-related progress at T3. Again, Figure 5 shows that the results of the mediation model matched closely the findings reported in the HLM analyses by documenting that T1 levels of regret intensity were significantly associated with T1 levels of regret engagement, $F(1, 111) = 5.20$, $R^2 = .041$, $p = .03$, and 13-month changes in implementation intentions, $F(1, 111) = 6.86$, $R^2 = .054$, $p = .01$. In addition, the inclusion of T1 regret engagement and 13-month changes in implementation intentions as potential multiple mediators into the model rendered the effect of regret intensity on regret-related progress non-significant, $F(1, 109) = 1.92$, $R^2 = .011$, $p = .193$. Further, the bootstrap analyses clarified that both T1 levels of regret engagement (95% BCI [.010, .173]) and 13-month changes in implementation intentions (95% BCI [.005, .125]) exerted significant indirect effects on the association between T1 regret intensity and regret-related progress at 13 months. Regret engagement and changes in implementation intentions together explained 29.15% of the effect of T1 regret engagement on participants' regret-related progress.

Discussion

This study has shown that when young adults report intense negative regret-related emotions, they experience greater engagement in the regret at baseline as well as elevated implementation intentions over time. It appears that the activation of these motivational processes later leads to greater progress toward undoing one's regret. In fact, being engaged and developing specified plans of action to undo the negative effects of regret statistically mediated the relation between intensity of emotions at baseline and progress made over the course of the study. Moreover, each of the two motivational processes displayed significant indirect effects on

[7] Positive affect was not included in this figure as regression analyses indicated that T1 levels of regret intensity did not significantly affect changes in positive affect over time, $F(1, 111) = 3.00$, $R^2 = .02$, $p = .09$.

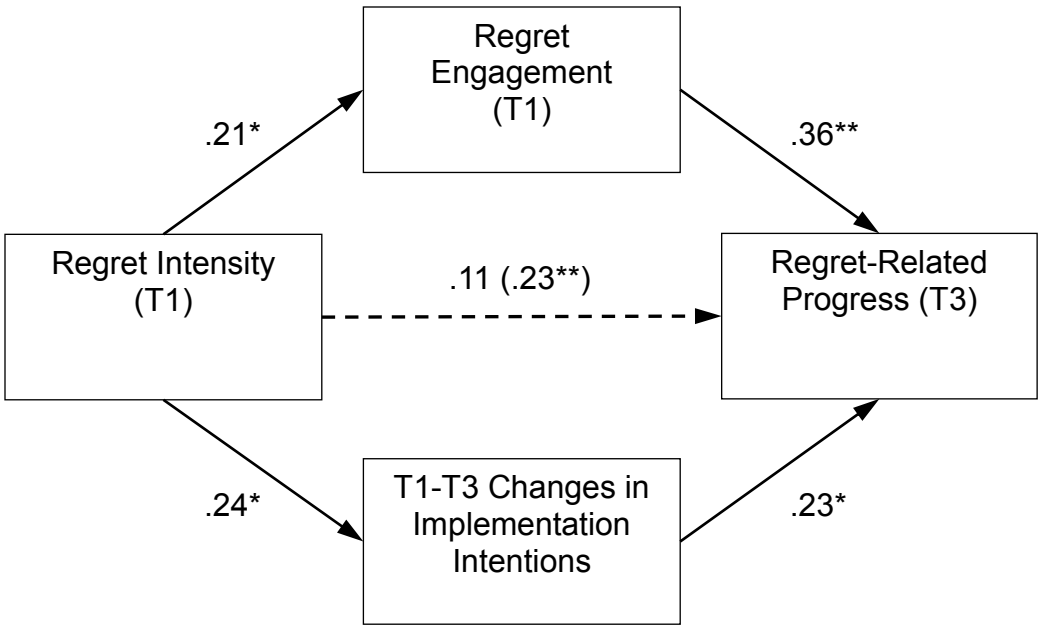

Figure 5. Mediation Model testing the indirect effects of T1 regret engagement and 13-month changes (T1-T3) in regret-specific implementation intentions on the association between T1 regret intensity and regret-related progress at T3. Values represent standardized regression coefficients. Dotted lines indicate a significant reduction of the total effect through the mediator, as demonstrated by indirect effects in the bootstrap analyses.

making progress towards one's regret in this sample. Finally, young adults who reported greater regret-related progress indicated a reduction in the intensity of their negative emotions, as well as in the experience of the negative emotions themselves. Indeed, the progress made over time, observed among regret-engaged participants, statistically mediated reductions in negative affect, and exerted a marginally significant mediation effect on reductions in depressive symptoms and emotional intensity.

These findings illustrate the power of regret as an aversive emotional experience, which acts as a catalyst to push young adults towards behavioral change. According to the results described above, it becomes clear that when individuals of this age group experience their regret as a highly negative event, they hone their focus into setting their current situation to right. Furthermore, these individuals whose attention is focused on undoing the negative effects of their regret later reported not only greater progress in accomplishing this goal but also a later reduction in their negative emotions and their intensity. It was the intensity of negative emotions that pushed individuals' motivation into engaging in the regret and into creating specific implementation intentions that set the foundation for the progress these individuals reported. It was also this initial emotional intensity that ultimately led to improved well-being and reduced emotional intensity in those individuals who reported making strides in undoing their regret effects.

Conversely, as these results illustrate, individuals who did not experience these negative emotions as intense also did not follow this chain of events. Namely, they did not engage in the goal of undoing the negative effects of their regret, nor did they devise specific steps as to how and when to accomplish this goal. As their focus was not on the after-effects of their regret, it stands to reason that these individuals also did not report making progress in undoing these effects. Finally, as these young adults did not progress toward improving their situation, it is not surprising that they did not experience a reduction in the intensity of their negative emotions and an improvement in their well-being. It is therefore clear that the negative emotional experience which follows regret is an adaptive psychological process that can benefit young adult development over time.

This finding was expected based on previous emotion research which has shown that negative emotions will lead to a desire to move away from the current situation (Frijda, 1988; Reb, 2008). It stands to reason that the greater the intensity of the negative emotions, the more

energy and resources will be utilized to address the current situation (i.e., greater engagement and specific implementation intentions). This implies that those young adults who did not experience their regret as intense would therefore not be equally invested in altering their current circumstances, leading to less progress in undoing their regret as well as no change in their negative emotions and/or their intensity over time.

It is important to note that these mediation effects did not exist for positive affect. This may be due to the fact that it is negative emotions specifically that lead to motivational and behavioral change, rather than positive ones. It stands to reason that those emotions will be the ones to display greater change once the regret is successfully undone, or in the process towards being undone. In addition, it will be the negative emotions that will present with the most change following progress toward a goal which was intended to eliminate these emotions in the first place. Interestingly, however, positive affect displayed reductions over time for the sample. In addition, those young adults who display low intensity at baseline reported greater reductions in positive affect across time. One potential explanation is that while negative emotions increase immediately following regret and are used as vehicles to change, positive emotions are not affected so quickly. It is possible that positive emotions react only once some time has passed. Taking this explanation one step further, individuals who reported low intensity at baseline did not experience motivational changes, and thus did not address their regret. It is these individuals who reported greater positive affect decline, compared to those who did experience the regret as intense and made the corresponding changes. While all individuals suffered from a reduction in positive affect over time given the regret experience, it was those young adults who did not address their regret who experienced a significant reduction in positive affect over time.

While elevated regret intensity at the onset of the study led to increased implementation intentions over time, it only corresponded to regret engagement at baseline rather than to changes in this variable. In addition, regret engagement did not change over the course of the study whereas implementation intentions displayed an increase over time for the sample. It is possible that the patterns of these two motivational processes differ as they each become important at different stages of the regret trajectory. Regret-related engagement is conceptualized as a shift in energy and resources to the goal of undoing that regret. It stands to reason that this shift would be imperative at the onset of the motivational process, immediately following the intense regret experience, as the person makes an internal selection of this particular goal. On the other hand,

implementation intentions are viewed as the more in-depth, specified method by which the person will accomplish this goal. For this reason, this motivational process requires constant monitoring, refining, and updating, should new steps be necessary, throughout the process of undoing one's regret. It therefore is no surprise that baseline regret intensity will predict regret engagement at the study's onset, while predicting increases in implementation intentions over time. It further stands to reason that it is the initial level of regret engagement that will predict progress, not any change over time in that variable.

The results of this study were statistically independent of demographic factors (i.e., age, sex). Nonetheless, some sex-related differences were found within the sample. First, females reported greater negative affect at the onset of the study. It is possible that women felt more negatively at baseline, however it is also possible that women are simply more in tune with, and more willing to express, negative emotions than men are (Fisher & LaFrance, 2015; Grossman & Wood, 1993). Interestingly, females also reported greater progress across the 13-month duration of the study. This pair of findings nicely corroborate with the initial hypothesis that it is those who experience greater negative emotions that ultimately make the most progress in undoing their regret.

Additional differences in the sample were revealed with regards to the type of regret reported. According to the results described above, individuals who endorsed a regret of commission (regretting something they had done) reported greater depressive symptoms at baseline whereas individuals who reported a regret of omission (regretting something they did not do) displayed greater increases in depressive symptoms as well as decreases in positive affect over time. Notably, depressive symptoms remained stable over the course of the study for the sample as a whole. Both these findings provide further support to conclusions made by Gilovich and Medvec (1995) who compared commission (action) and omission (inaction) regrets. These authors demonstrated that in the short-term regrets of commission are hardest to endure, yet their intensity pushes to greater lengths, thereby producing greater and faster rewards. Moreover, these researchers indicated that it may be easier to work through regrets of commission as individuals feel more responsible and therefore expect greater ability to change the course of events in the future, which would apply to young adults more than any other age group, as their ability to exert control over their environment is at its peak (Roese, 1994). However, individuals often regret inaction more than action over the long term. Indeed, the authors indicate that

omission regrets may be harder to accept overtime as individuals magnify consequences of inaction, relative to action (Gilovich & Medvec, 1995). They also note that it becomes increasingly difficult to justify inaction versus action as time progresses, leading to greater frustration and sadness (Gilovich & Medvec, 1995). This corresponds well with findings observed, namely a greater initial negative impact of commission (or action) regrets, while at the same time more negative long-term challenges for regrets of omission (or inaction).

One final finding that was not anticipated is that individuals who endorsed a work/education-related regret displayed reduced progress over the 13 months of the study, compared to individuals who reported regrets in other domains. Interestingly this finding did not appear at the 6-month mark. This finding may relate to the timing of the different points of measurement of the study. While the 6-month follow-up time point fell at the end of the school year, the 13-month follow-up corresponded to the fall, which is the beginning of a new school year for the student sample. It is possible that by the midpoint of the study, nearing the end of the school year individuals felt that they were able to progress in their academic/work-related goals. It may be the case that individuals had greater difficulty observing or assessing academic progress during the final time point of the study, as it corresponded to the beginning of a new academic year, similar to baseline.

There are several ways in which the findings of this study are important. First, they contribute to the understanding of the importance of negative emotions, thereby supporting theoretical propositions made by emotion-based research. Previous studies focusing on emotion noted the imperative motivational role that negative emotions, specifically, and their intensity play in goal selection and pursuit (Beike et al., 2009; Frijda, 1988; Nesse & Ellsworth, 2009; Reb, 2008). Moreover, lifespan developmental theories postulate that this motivational process was expected to present itself, and be most adaptive, for young adults who experience optimal opportunity to achieve their desired goals (Bauer et al., 2008; Wrosch et al., 2005; Wrosch & Heckhausen, 2002). Research thus far however, has resulted in mixed findings relating to the motivational benefits of regrets and negative emotion in general (Heckhausen & Schulz, 1995; Wrosch et al., 2005). Moreover, extant research did not follow young adults across time, looking directly at the effects of regret on well-being. Therefore, these findings help support both these theories by illuminating the significance of intense negative emotions on behavioral change when experiencing regret in young adulthood.

Finally, these findings offered an in-depth analysis of the steps of the regret trajectory, illustrating the motivational power and developmental purpose of regret. Namely, this research focused on how intense emotion leads to motivation change, thereby leading to progress. Furthermore, these findings illustrated how progress in undoing ones' regrets further impacted changes in emotional well-being. Ultimately, this study demonstrated that young adults who experience regret can improve their subjective well-being if they actively engage in overcoming their regretted behaviors as well as specify how they intend to do so, vis-à-vis the progress they make towards conquering their regret. This thorough understanding of the motivational impact of regret helped elucidate the link between the experience of regret and goal selection, pursuit and achievement as well as between the experience of regret and well-being. This knowledge will prove useful both in the research and clinical realms as professionals assist individuals in this process.

Limitations and Future Directions

There are limitations to this study that need to be addressed in future research. First, while these findings indicate that changes in regret-related progress mediated the relation between regret intensity and changes in future well-being, it is important to note that there was an overlap in the time span for both measures. It is therefore possible to postulate that changes in well-being, i.e., reduction in depressive symptoms and negative affect and their intensity, can lead to making progress towards undoing the negative effects of one's regret. However, it is notable that this interpretation of findings is consistent with past regret research demonstrating that advances in one's goal, be it regret or otherwise, lead to improvements in well-being (Heckhausen et al., 2010). Future research should replicate these findings by using a more detailed and prolonged longitudinal design to test whether progress made preceded well-being improvements in order to bypass this limitation.

A similar argument may be made concerning the overlap in time between change in implementation intentions and progress made to undo the regret. One could argue that these processes continuously influence each other, whereby intentions lead to progress and progress leads to increases in intentions as they become reinforced, edited and redefined. Yet as illustrated above, these findings were interpreted based on a large body of research indicating that implementation intentions are not only paramount to goal pursuit, but in fact that it is impossible to predict goal progress without knowing of the person's intentions (Gollwitzer, 1999). In order

to more fully shed light on how these processes intertwine, future research should focus on longitudinal designs whereby changes in these variables could be tested on a continuous basis over longer periods of time.

Third, this study was based on the premise that young adulthood is a period in life in which individuals enjoy optimal levels of opportunity and control over their environment. However, some of the participants endorsed regrets that they were unable to undo, e.g., 'not having seen a dear friend before her passing'. Such an individual will not experience the same opportunities as other young adults with different regrets. Despite this, the majority of the participants endorsed work or education-related regrets, which are associated with favorable age-normative opportunities as they correspond to the developmental stage these young adults are currently in (Havighurst, 1972). Even so, future researchers are urged to identify the objective opportunity available for each individual in order to clarify how such opportunity, or lack thereof, may influence motivational and emotional processes experienced in regret within the young adult population.

CHAPTER 4:

STUDY 2

Management of life regrets in young adulthood:
Goal engagement improves pessimistic outcome expectancies and subjective well-being

Abstract

This study examined whether young adults who endorsed less optimistic views on their available opportunity to undo their severe life regret, yet remained engaged, would display changes in their view of their outcome expectancy thereby facilitating reductions of negative well-being (i.e., depressive symptoms, negative affect, and anxiety sensitivity) as well as improvements of positive well-being (i.e., satisfaction in life, positive affect, and purpose). The data reported were based on a 13-month longitudinal study of 121 young adults who reported having an unresolved severe life regret. Results utilizing regression analyses supported the hypotheses, namely that young adults who continued to actively engage in undoing their regret, despite being less optimistic concerning their ability to do so, displayed improvements in their outcome expectancies as well as significant improvements in positive and negative subjective well-being. Mediation analyses clarified that baseline internal regret engagement when less optimistic predicted improvements in negative and positive well-being via the reported improvement in young adults' outcome expectancies over time. These findings indicate that continued engagement in severe life regrets in young adulthood, despite subjective reservations, is likely to benefit their prospective development and forecast greater subjective well-being.
KEY WORDS: regret; young adulthood; outcome expectancies; well-being.

Introduction

Facing a life regret often leads to the experience of negative emotions. While these could be detrimental to one's well-being, several theories view emotions as a catalyst for action (Frijda, 1988). This process is shown to be particularly strong in young adulthood, when one's opportunities to achieve his/her goals are favorable (Wrosch & Heckhausen, 2002). In this manner, favorable goal opportunity can enhance the adaptive value of goal engagement processes, while unfavorable opportunity has been shown to require individuals to use self-protective control strategies and disengage from unattainable goals (Heckhausen et al., 2010). However, there may be circumstances, in which a person expects a poor outcome to emerge, although the contextual conditions for attaining a goal or solving a problem are generally favorable. In such situations, it is suggested that individuals could close this gap by improving their outcome expectancies through their general tendency to engage in the attainment of a threatened goal. This process may facilitate subjective well-being and could be particularly useful in young adulthood when objective opportunities for accomplishing a variety of developmental tasks are plentiful. In the present study, I investigated this possibility in a longitudinal sample of young adults who reported a severe life regret. It was hypothesized that young adults who are relatively less optimistic about undoing their most severe life regret, could become more optimistic and improve their subjective well-being if they engage in actively overcoming regretted behaviors.

The Adaptive Functions of Life Regrets

Research suggests that regret is a highly common life phenomenon, with the majority of adults experiencing severe life regrets (Landman, 1987; Wrosch et al., 2005). Life regrets are typically encountered when individuals experience failure associated with omissions or commissions (Gilovich & Medvec, 1995) in major life domains such as romance, education, or career (Beike et al., 2009; Roese & Summerville, 2005). Such regret experiences are associated with counterfactual thoughts about how a person's life would be better had s/he made a different decision in the past (Beike et al., 2009; Byrne, 2005; Epstude & Roese, 2008; Pieters & Zeelenberg, 2007; Roese, 1997). These thoughts are accompanied by the experience of negative emotions (e.g., feeling angry, desperate, or sentimental; Gilovich et al., 1998) regarding how a particular outcome could have been altered had the person acted differently. These negative emotions can often threaten a person's well-being and lead to maladaptive outcomes (Bauer &

Wrosch, 2011; Lecci et al., 1994; Wrosch, et al., 2005; Wrosch, Bauer et al., 2007).

Interestingly, different theories postulate that negative emotions may also foster positive outcomes. Frijda (1988) argued that the negative affect that is triggered by failure experiences can act as a catalyst for the person to engage in behaviors aimed at change. Similarly, Carver and Scheier (1990, 1998) noted that negative emotions may lead the person to reevaluate the situation and engage in goal-directed behaviors. Such benefits to negative emotions in the face of life regrets can be most evident in young adulthood, a time when opportunities are seen as plentiful for undoing the negative consequences of such hurdles (Jokisaari, 2003; Wrosch & Heckhausen, 2002; Wrosch et al., 2005; Wrosch, Dunne, Scheier, & Schulz, 2006). The study reported in Chapter 3 of this text tested this notion by following a group of young adults who reported experiencing a severe life regret. This study has shown that for young adults, the intensity of one's regret was positively correlated with active goal-oriented motivational processes (i.e., implementation intentions and regret-specific engagement) that led to progress in undoing one's regret. This change in progress later led to decreases in reported intensity of that regret and to improved well-being. This study helps illustrate how motivational processes aimed at goal attainment are particularly adaptive in younger adulthood in the face of challenges and negative emotionality, as this time period provides individuals with favorable opportunities for overcoming problems and realizing desired outcomes (Heckhausen et al., 2010).

However, a person's subjective perception of opportunity for goal attainment can differ greatly from his/her objective opportunity. In fact, there is considerable variability in how people perceive their opportunities for goal attainment even within different age groups (Bauer & Wrosch, 2011). These perceptions of opportunity reflect differences in individuals' expectancy to succeed in accomplishing a goal or overcoming a problem (for outcome expectancies, see Bandura, 1997; Carver & Scheier, 1998; Seligman, 1991).

Developmental Regulation and Opportunity-Incongruent Goal Striving

Theoretical approaches of adaptive developmental regulation proclaim that individuals strive to influence the world around them. Thus, successful development has been defined as active selection and pursuit of goals with the aim of achieving desired developmental outcomes while avoiding undesired outcomes (Brandtstädter & Rothermund, 1994; Heckhausen, 1999; Lerner & Busch-Rossnagel, 1981; Marsiske, Lang, Baltes, & Baltes, 1995; Schulz & Heckhausen, 1996). Goal engagement and goal disengagement can help guide adaptive

behaviors and therefore play a major role in successful development across the lifespan (Brandtstädter & Renner, 1990; Heckhausen, 1999).

Primary and secondary control strategies have been defined as the main vehicles of goal engagement and disengagement processes (Heckhausen et al., 2010). Primary control includes behaviors that are aimed at actively influencing the external environment to fit the needs of the individual, while secondary control encompasses processes that are aimed at helping individuals adjust internally to contextual constraints (Heckhausen & Schulz, 1995; Rothbaum, Weisz, & Snyder, 1982; Schulz & Heckhausen, 1996). Further, primary and secondary control strategies have been distinguished with respect to whether they are used to support the pursuit of goals (i.e., selectivity) or to respond to failure (i.e., compensation, Heckhausen & Schulz, 1995). Goal engagement control strategies reflect investments of time and effort (i.e., selective primary control), recruitment of external support (i.e., compensatory primary control), and an increased volitional focus on a chosen goal (i.e., selective secondary control). Control strategies that facilitate goal disengagement, by contrast, typically incorporate the activation of self-protective processes if individuals experience failure (i.e., avoiding self-blame, or using downward comparisons), and protect a person's emotional and motivational resources (Heckhausen et al., 2010).

As indicated earlier however, neither goal engagement nor goal disengagement processes are adaptive in and of themselves. By contrast, optimal development is thought to rely on the match between specific goals and the opportunities that are available for a person to make progress in realizing these goals (Heckhausen et al., 2010). Individuals should benefit from goal engagement when they have ample opportunity to attain a goal (i.e., young adulthood) because this process is likely to promote progress with attaining the goal and improve individuals' subjective well-being. However, when opportunities to pursue a desired goal have become sharply reduced, self-protective control strategies can facilitate disengagement from this goal, thereby preventing repeated failure experiences and freeing up resources that can be used for the pursuit of other meaningful goals (Heckhausen et al., 2010; for research on goal disengagement, see also Wrosch, 2011).

Research has supported these assumptions by showing that opportunity-congruent control striving is beneficial to a person's subjective well-being. Such effects have been documented in age-comparative studies, which are based on the assumption that opportunities for goal

attainment are plentiful in young adulthood and show sharp declines in older adulthood (Heckhausen, 1999; Heckhausen, Dixon, & Baltes, 1989). A corollary of this argument, which has been described previously, is that regret could fulfill adaptive functions in young adulthood when individuals typically have plentiful opportunities to address their life regrets (Wrosch et al., 2005). In fact, research has shown that young adults who take responsibility for their regretted behaviors may experience high levels of subjective well-being (Wrosch & Heckhausen, 2002). Given that internal attributions of responsibility are likely to foster active behaviors aimed at undoing a problem, these findings imply that individual differences in goal engagement may determine whether regret experiences can lead to improved well-being in young adulthood.

These studies have shown that more optimistic outcome expectancies, whether they are goal-specific or general, can benefit subjective well-being, either directly, or indirectly through adaptive coping and supportive social networks (see Brissette, Scheier, & Carver, 2002; Carver, Scheier, & Segerstrom, 2010; Oettingen & Mayer, 2002; Seligman, Schulman, & Tryon, 2007; Wrosch & Scheier, 2003). On the other hand, these findings imply that less optimistic[8] expectancies can interfere with adaptive development. Moreover, pessimistic outcome expectancies may be particularly problematic in young adulthood, given that individuals are at risk of not taking advantage of supportive opportunity structures for achieving developmental tasks (Havighurst, 1972; Heckhausen, 1999). In such situations, it is proposed that the general tendency for active control striving can contribute to improvements of young adults' goal-specific outcome expectancies. For example, a student who received poor grades in his/her first semester, or a young adult who experienced a partnership separation, may be pessimistic about getting into graduate education or building a family, respectively. However, by continuing the investment of time and effort in the accomplishment of their goals, these individuals may become aware of, or create, new opportunities (Heckhausen et al., 2010), thereby increasing their expectancy to accomplish desired goals (e.g., improving their grades over time or forming a new intimate relationship). These possibilities illustrate how general tendencies to engage may override goal-specific poor outcome expectancies, thereby closing the gap between the subjective and objective opportunities for goal attainment, which is likely to contribute to young adults' subjective well-being.

[8] Despite not including a face-valid measure of pessimism in this study, young adults who possessed less optimistic, or lower, outcome expectancies were defined as 'pessimistic' for the purpose of illustration.

Such a process could become particularly important for young adults who are pessimistic about undoing their regrets. If they expect that a regret can hardly be overcome (e.g., getting into graduate school or forming a new relationship), young adults who have a general tendency to make use of engagement control strategies may detect or create new opportunities, become more optimistic about overcoming the specific regret over time, and thus improve their subjective well-being. By contrast, their counterparts who do not utilize these strategies may not discover new opportunities, thus maintain poor outcome expectancies and suffer declines in their subjective well-being. Interestingly, this process may not take place among young adults who already have optimistic outcome expectancies because it is rather unlikely that goal engagement further increases favorable expectancies, and optimistic beliefs can benefit subjective well-being through a number of mechanisms above and beyond goal engagement processes (e.g., emotion-focused coping or supportive social networks; Brissette et al., 2002; Carver et al., 2010).

The Present Research

This research examined the associations between generalized control strategy tendencies, expectancies for undoing regrets, and indicators of subjective well-being in a 13-month longitudinal study of young adults. It was hypothesized that goal engagement tendencies would be associated with improvements in expectancies for undoing regrets and in subjective well-being. In addition, it was expected that this process would be particularly pronounced among young adults who are pessimistic about undoing their specific regrets. Finally, it was hypothesized that improvements in regret-related outcome expectancies would mediate the effect of regret engagement on increases in subjective well-being.

Of note, elements of negative as well as positive well-being were tested to examine whether they are affected differently by these processes, as a continuation of the work reported in Chapter 3 where observed longitudinal changes differed between negative and positive well-being outcomes. It was therefore hypothesized that the effects described above would be more pronounced for negative elements of well-being (e.g., negative affect), versus positive elements (e.g., positive affect). Because examining this research question required the development a new measurement instrument for assessing regret-related general control strategy tendencies, the role of self-protective secondary control strategies was additionally explored in the association between outcome expectancies and subjective well-being, although a-priori hypotheses for this type of control strategies were not created.

Method

Participants

The present study is based on 13-month longitudinal data of young adults from Montreal. In 2008, a sample of 164 young adults, aged 18 – 36 years, was recruited at Concordia University. The only inclusion criterion was that participants have a severe life regret. Participants were invited to the laboratory to complete a self-report questionnaire and received $20 for their study participation. Participants completed another questionnaire approximately thirteen months after baseline (M = 13.3 months, SD = .84 months). One-hundred-twenty-four individuals participated in the 13-month follow-up. Three participants did not report a life regret and were excluded from the study, resulting in a final sample of 121 participants. At baseline, participants' average age was 22.83 years (SD = 3.52), and 75 were female (62%). Study attrition over thirteen months was not associated with any of the constructs used in the reported analyses. Missing data for individual items consisted of less than 1%, and were replaced by the sample mean of each item.

Materials

The main study variables included measures of participants' regret-related control strategies, outcome expectancies for undoing regret, and subjective well-being. In addition, baseline measures of sociodemographic characteristics (age, sex and relationship status) were incorporated as covariates into the study.

Regret-related control strategies were assessed at baseline with a newly developed instrument. Participants were asked how they usually react when they experience regret about a behavior or decision. The specific items are reported in Appendix P and were formulated on the basis of previously developed domain-specific control strategies scales (e.g., Wrosch & Heckhausen, 1999). The regret-related control strategies scale consisted of 12 items, of which three items represented one of the four categories of control strategies (selective primary control [investment of time and effort], compensatory primary control [using external means], selective secondary control [increasing the volitional focus on goal attainment], and compensatory secondary control [using self-protective attributions or downward comparisons]). All items were measured by using 5-point Likert-type scales (0 = *almost never true*; 4 = *almost always true*).

To examine the structure of the regret-related control strategies scale, a principal component analysis was conducted using oblimin rotation. The analysis suggested three separate

factors with Eigenvalues of 4.20, 1.49, and 1.32, respectively. Two of the obtained factors were associated with control strategies that support goal engagement, while the third included items associated with self-protection. As reported in Appendix P, the first factor included the six items measuring selective primary control (e.g., investment of effort) and selective secondary control (e.g., enhanced volitional commitment) as well as one item measuring compensatory primary control (i.e., usage of external information resources such as magazines or internet[9]) and was labeled "internal regret engagement". The second factor included two items measuring compensatory primary control (i.e., recruitment of external help) and was labeled "external regret engagement". The final factor incorporated three items measuring compensatory secondary control (i.e., self-protective attributions and downward comparisons) and was labeled "regret-related self-protection". The factor loadings of the single items ranged from .51 to .92. Measures of internal regret engagement, external regret engagement, and regret-related self-protection were computed by averaging the raw scores of the items composing each factor (see Table 6 for means and correlations of the three resulting factors).

Regret-Related Outcome Expectancies. Participants were asked to think about their lives and report their most severe life regret. Consistent with previous research (Roese & Summerville, 2005), the majority of reported regrets were associated with education or work (37.2%, e.g., "not pursuing a course of study that was of most interest to me"), personal relationship (30.6%, e.g., "cheating on my boyfriend"), family (11.6%, e.g., "not telling my parents how I really feel about their divorce"), and self (11.6%, e.g., "not being more physically active"). Subsequently, participants were asked to estimate the likelihood for undoing the negative consequences of the reported regret by responding to two items that were used in previous research (Bauer et al., 2008). Participants reported how likely it is that the consequences of their regret "can be undone" and "will be undone." Each item was rated on a 5-point Likert-type scale (1 = *very unlikely*; 5 = *very likely*). The two items were aggregated to obtain a measure of regret-related outcome expectancy (α = .82 and .90). Higher scores indicated more optimistic expectancies for undoing the consequences of the regret. Regret-related outcome expectancies significantly increased over time, $t(120) = 8.24$, $p < .01$.

[9]Although this strategy represents using external means, it also involves a significant amount of internal resources, which may explain why this item was more closely associated with the items representing internal regret engagement.

Table 6

Zero-Order Correlations Between Main Constructs Used in the Study.

	M (*SD*)	1	2	3	4	5	6	7	8
(1) Internal regret engagement (T1)	2.35 (0.72)								
(2) External regret engagement (T1)	2.26 (1.11)	.48**							
(3) Regret-related self-protection (T1)	2.00 (0.71)	.12	.04						
(4) Regret-related outcome expectancy (T1)	2.62 (1.31)	.22*	.01	-.05					
(5) Regret-related outcome expectancy (T2)	3.71 (1.28)	.30**	.01	.15	.36**				
(6) Positive well-being (T1)	3.76 (0.73)	.39**	.24**	.31**	.03	.03			
(7) Positive well-being (T2)	3.78 (0.75)	.29**	.18	.35**	.02	.19*	.70**		
(8) Negative well-being (T1)	2.01 (0.46)	-.12	.08	-.13	.15	.04	-.41**	-.28**	
(9) Negative well-being (T2)	1.85 (0.46)	-.01	.11	-.17	.12	-.18*	-.27**	-.52**	.54**

Note. T1 = baseline; T2 = 13-month follow-up. ** $p < .01$. * $p < .05$.

Subjective Well-being. It was intended to build on previous findings described in Chapter 3 that show beneficial well-being outcomes for undoing life regrets for young adults. As discussed earlier, these results illustrate a significant pattern for negative, but not positive, elements of well-being (i.e., depressive symptomatology, negative affect), hinting that perhaps negative and positive aspects of well-being are affected differently by the process of undoing life regrets. I sought to further elucidate this pattern by measuring participants' subjective well-being at baseline and follow-up by administering five previously developed self-report scales that would assess both positive and negative aspects of well-being. *Depressive symptoms* were assessed using the 10-item version of the Center for Epidemiologic Studies – Depression scale (CES-D10; Radloff, 1977; e.g., I felt depressed, αs = .83 and .81). Anxiety sensitivity was assessed using the 21-item Anxiety Sensitivity Index – Revised (ASI-R; Armstrong, Khawaja, & Oei, 2006; e.g., faint, αs = .87 and .90). *Positive and negative affect* were assessed using the 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; e.g., upset or distressed, αs = .86 and .87, or excited or proud, αs = .89 and .89). *Life satisfaction* was assessed using the 5-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; e.g., I am satisfied with my life, αs = .87 and .90). *Purpose in life* was assessed by administering the 6-item Life Engagement Test (LET; Scheier et al., 2006; e.g., I value my activities a lot, αs = .79 and .85).

To reduce the number of analyses, I subjected the five baseline measures of subjective well-being to a principal component analysis using varimax rotation. The analysis revealed two separate factors with *Eigenvalues* greater than one. The first factor (*Eigenvalue* = 2.99) included positive affect, life satisfaction, and purpose in life (factor loadings = .89, .79 and .80). Based on the content of the scales, this factor was labeled as "positive well-being". The second factor (*Eigenvalue* = 1.34) included the remaining three scales measuring depressive symptomatology, anxiety sensitivity, and negative affect (factor loadings = .73, .85, and .84). This factor was labeled as "negative well-being". Indicators of positive and negative well-being were computed by averaging the scores of the subscales composing each factor. Across waves, there was no significant change in positive well-being in the entire sample. However, negative well-being significantly decreased across time for the sample as a whole, $t(120) = -3.98$, $p < .01$. The means and standard deviations of these factors are described in Table 6.

Sociodemographics. Age, sex, and relationship status into the analyses as covariates

because these factors could be associated with participants' subjective well-being.

Statistical Analyses. The described hypotheses were examined by conducting hierarchical regression analyses. In the first set, I examined whether baseline levels of regret-related control strategies would predict changes in participants' regret-related outcome expectancies. To this end, I predicted follow-up levels of outcome expectancies by 1) centered baseline scores of outcome expectancies, control strategies (internal regret engagement, external regret engagement, and regret-related self-protection), and sociodemographic factors (i.e., age, sex, and relationship status) and 2) by the interactions between baseline outcome expectancies and the three types of control strategies (tested separately). In the second set, I investigated whether the same main and interaction effects of baseline levels of regret-related control strategies and outcome expectancy would also predict follow-up levels of subjective well-being (controlled for baseline well-being). In the final set of analyses, I tested whether the obtained effects on increases in subjective well-being over time would be mediated by improved expectancies for undoing life regrets. To this end, I applied bootstrap analyses, which tested the significance of indirect effects (Preacher & Hayes, 2008). The analyses were based on 5000 bootstraps and the indirect effect was evaluated as significant if the bias-corrected 95% confidence interval of the indirect effect did not cross zero (Preacher & Hayes, 2008).

Results

Control Strategies Predicting Changes in Outcome Expectancy

The results of the regression analysis for predicting changes in regret-related outcome expectancies are reported in Table 7. Baseline levels of outcome expectancies were positively associated with changes in outcome expectancies, $F(1, 114) = 13.62$, $p < .01$, $R^2 = .09$. The analysis further showed that none of the demographic variables were significantly associated with participants' outcome expectancies, Fs$(1, 114) < 1.78$, R^2s $< .02$, $ps > .19$. Moreover, baseline levels of internal regret engagement were significantly associated with increases in participants' outcome expectancies over time, $F(1, 114) = 7.73$, $p < .01$, $R^2 = .05$. The main effects of external engagement and self-protection, however, did not predict participants' outcome expectancies, Fs$(1, 114) < 1.81$, $ps > .18$. The second step of the analysis demonstrated a significant two-way interaction between baseline levels of outcome expectancies and internal regret engagement in predicting changes in outcome expectancies, $F(1, 113) = 6.91$, $p = .01$, $R^2 = .04$. The interactions between baseline outcome expectancy and external regret engagement (or

Table 7

Regression Analyses Predicting 13-Month Levels in Regret-Related Outcome Expectancy by Baseline Outcome Expectancy, Internal Regret Engagement, External Regret Engagement, and Regret-Related Self-Protection.

	13-month outcome expectancy	
	R^2	Beta
Baseline main effects [a]	.24**	
Outcome expectancy (OE)	.09**	.32**
Internal regret engagement (IE)	.05**	.28**
External regret engagement (EE)	.01	-.12
Regret-related self-protection (RS)	.01	.11
Baseline interactions		
OE X IE	.04*	-.22*
OE X EE	.00	-.03
OE X RS	.02	-.15

Note. [a] The analyses were controlled for age, sex, and relationship status. ** $p < .01$. * $p < .05$.

self-protection) were not significant, Fs(1, 113) < 3.30, ps > .07.[10] To illustrate the significant interaction, I plotted in Figure 6 the association between internal regret engagement and follow-up levels in regret-related outcome expectancies (controlled for baseline levels), separately for participants who scored low (-1 *SD*) and high (+1 *SD*) on baseline outcome expectancies (see Aiken & West, 1991). The shape of the interaction suggests that being internally engaged in undoing a regret was significantly associated with an increase in levels of outcome expectancies among participants who were relatively pessimistic about undoing their regret at baseline, -1 *SD*: $\beta = .54$, $p < .01$, but not among participants who were more optimistic, +1 *SD*: $\beta = .10$, $p = .38$. In addition, while young adults who do not engage in undoing their regrets maintain their differing outcome expectancies over the 13 months, $\beta = .54$, $p < .01$, young adults who actively engaged in undoing their regrets are able to bridge the difference in expectancies over the 13 month period to a point where it is no longer significantly different from young adults who reported optimistic outcome expectancies at baseline, $\beta = .10$, $p = .39$. This pattern of findings suggests that internal regret engagement can be particularly strongly associated with improvements of expectancies for undoing regrets over time if participants were pessimistic about overcoming their regret at baseline.

Control Strategies Predicting Changes in Subjective Well-being

The results of the regression analysis for predicting changes in positive and negative well-being are reported in Table 8. Baseline levels of positive and negative well-being were positively associated with follow-up levels of the respective variables, Fs(1, 113) > 62.62, ps < .01. Further, age and sex were unrelated to changes in positive or negative well-being over time, Fs(1, 113) < .79, R^2s < .01, ps > .38. Relationship status, while being unrelated to changes in negative affect, was positively related to changes in positive well-being, $F(1, 113) = 12.19$, $p < .01$, $\beta = .31$, indicating that young adults who reported being in a relationship displayed greater positive well-being (e.g., satisfaction with life) over time than those who were not. Moreover, the main effects of internal and external regret engagement did not predict changes in positive or negative well-being, Fs(1, 113) < .41, ps > .52. However, self-protection was associated with increases in positive well-being, $F(1, 113) = 3.94$, $p = .05$, $\beta = .14$, but not with changes in

[10] It is important to note that when including all interaction terms into one regression model, results remained the same. Namely, the interaction of outcome expectancies and internal regret engagement significantly predicted changes in outcome expectancies, $F(1, 111) = 5.08$, $p < .03$, $R^2 = .03$, whereas the interactions between outcome expectancies at baseline with external regret engagement and regret-related self-protection did not, Fs(1,111) < 1.46, ps > .23.

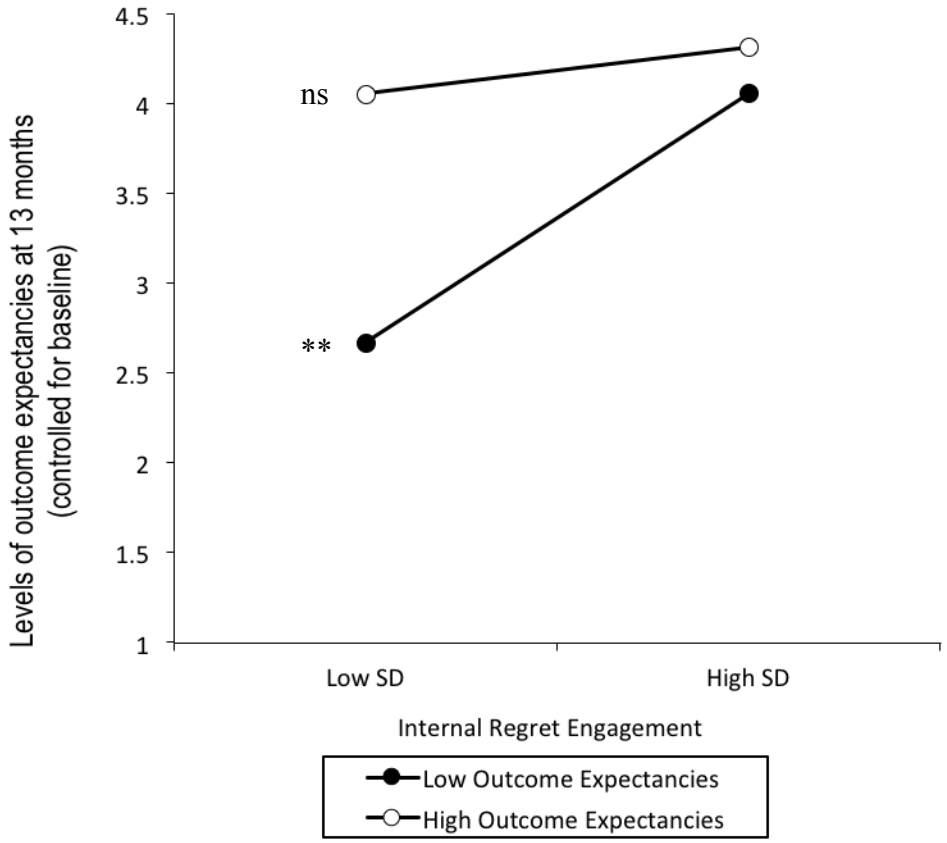

Figure 6. Association Between T1 Levels of Internal Regret Engagement (+- 1 *SD*) and T2 Levels of Outcome Expectancy, Separately for Participants with a High versus Low T1 Levels of Outcome Expectancy (1 *SD* Above and Below the Mean).

Table 8

Regression Analyses Predicting 13-Month Levels in Positive Well-Being and Negative Well-Being by Baseline Well-Being, Regret-Related Outcome Expectancy, Internal Regret Engagement, External Regret Engagement, and Regret-Related Self-Protection.

	13-month negative well-being		13-month positive well-being	
	R^2	Beta	R^2	Beta
Baseline main effects [a]	.32**		.53**	
Respective well-being measure	.24**	.52**	.26**	.60**
Outcome expectancy (OE)	.00	.04	.00	.00
Internal regret engagement (IE)	.00	.02	.00	.03
External regret engagement (EE)	.00	.06	.00	.04
Regret-related self-protection (RS)	.01	-.09	.02*	.14
Baseline interactions				
OE X IE	.04**	.21**	.03**	-.19**
OE X EE	.00	-.07	.00	.00
OE X RS	.00	-.03	.01	-.07

Note. [a] The analyses were controlled for age and sex. ** $p < .01$. * $p < .05$.

negative well-being. The second step of the analyses demonstrated significant two-way interaction effects between baseline outcome expectancies and internal regret engagement on changes in positive well-being, $F(1, 112) = 8.33$, $p < .01$, and negative well-being, $F(1, 112) = 7.45$, $p < .01$. The interaction effects between outcome expectancies and external regret engagement (or self-protection) were not significant, Fs(1,112) < .98, ps > .33.

To illustrate the significant interaction effects, I plotted in Figure 7 the association between internal regret engagement (1 *SD* above and below the scale mean) and follow-up levels in positive (upper panel) and negative (lower panel) aspects of well-being (controlled for baseline levels), separately for participants who scored 1 *SD* above and below the mean of baseline outcome expectancies. The obtained pattern for positive well-being (upper panel) showed that internal regret engagement predicted significant increases in positive well-being, $\beta = .25$, $p < .03$, among young adults who reported pessimistic expectancies at baseline, but not among their counterparts who reported optimistic expectancies, $\beta = -.13$, $p = .19$. Moreover, young adults who reported pessimistic outcome expectancies who did not engage in undoing their regret displayed significantly lower levels of positive well-being relative to their counterparts, $\beta = .20$, $p < .04$, yet when they chose to engage displayed significantly higher levels of positive well-being relative to their counterparts, $\beta = -.18$, $p = .05$. The obtained pattern for negative well-being (lower panel) showed that when pessimistic young adults chose to engage in undoing their regret, their reported levels of negative well-being, as compared to more optimistic young adults, approached a significant decline, $\beta = -.25$, $p = .07$, while such declines did not exist for their more optimistic counterparts, $\beta = .19$, $p = .10$. In addition, when pessimistic young adults chose to not engage in undoing their regrets, they displayed levels similar to those of their more optimistic counterparts, $\beta = -.18$, $p > .12$, yet if they chose to engage displayed significantly lower levels of negative well-being, $\beta = .25$, $p < .03$. These patterns of findings suggest that participants who reported pessimistic expectancies at baseline and engaged in overcoming their regrets could improve their subjective well-being over time to a level significantly greater than that of participants who were optimistic at baseline.

Outcome Expectancies as a Mediator of Subjective Well-Being

I finally tested whether changes in outcome expectancies would statistically mediate the observed interactions between baseline expectancies and internal regret engagement in predicting changes in subjective well-being. To this end, the previously reported analyses were repeated for

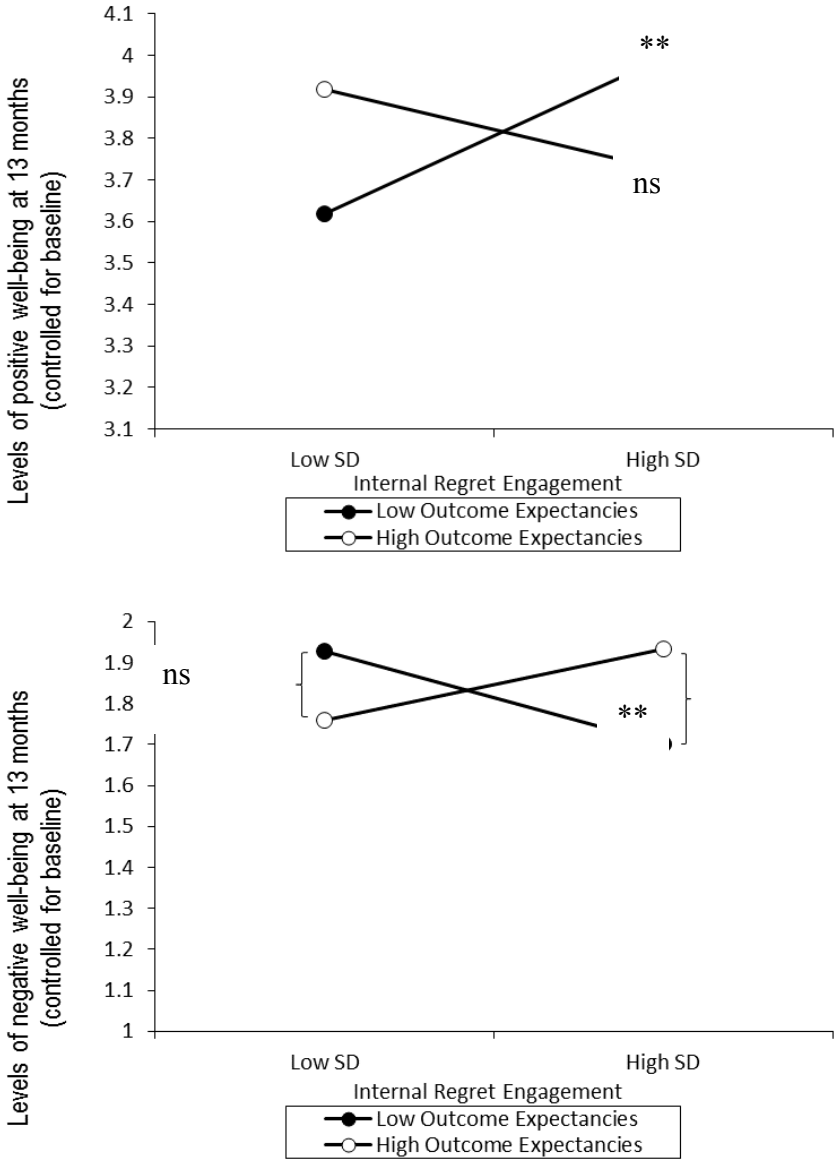

Figure 7. Association Between T1 Levels of Internal Regret Engagement (+- 1 *SD*) and T2 Levels of Positive Well-being (Upper Panel) and Negative Well-being (Lower Panel), Separately for Participants with a High versus Low T1 Levels of Outcome Expectancy (1 *SD* Above and Below the Mean).

predicting changes in positive and negative well-being and additionally included follow-up levels of outcome expectancies as potential mediator. Note that the analysis controlled for baseline outcome expectancies, which implies that the mediator variable represented changes in outcome expectancies over time.

The results of the mediation analyses are illustrated in Figure 8. Consistent with the above reported results, the interaction between baseline levels of outcome expectancies and internal regret engagement significantly contributed to changes in outcome expectancies. In addition, improvements in outcome expectancies were significantly associated with increases in positive well-being, $F(1, 112) = 4.83$, $R^2 = .02$, $\beta = .16$, $p = .03$, and declines in negative well-being, $F(1, 112) = 9.97$, $R^2 = .06$, $\beta = -.27$, $p < .01$. Moreover, the significant interaction effects between internal regret engagement and outcome expectancies in predicting changes in positive well-being, $F(1, 111) = 5.97$, $R^2 = .02$, $\beta = -.16$, $p < .02$, and negative well-being, $F(1, 111) = 4.34$, $R^2 = .02$, , $\beta = .16$, $p < .04$, were reduced if the mediator was included into the analysis. The bootstrap analyses further clarified that changes in outcome expectancies exerted a significant indirect effect on the interaction between baseline outcome expectancies and internal regret engagement in predicting changes in negative (95% BCI [.010, .126]) as well as positive subjective well-being (95% BCI [-.072, -.002]). In fact, improvements in outcome expectancies accounted for 40.20% of the interaction effect on reductions in negative well- being and 57.49% of the effect on improvements in positive well-being. Together, these findings are consistent with the hypothesis that increases in perceived opportunity to undo regret can mediate the beneficial effect of internal regret engagement on improvements in subjective well-being among participants who perceived low levels of opportunity to overcome their regret at baseline.

Discussion

The results of this study demonstrate that young adults who were relatively pessimistic about overcoming their most severe life regret experienced significant improvements in these expectancies if they actively invested time and effort in undoing their regret (i.e., internal regret engagement). In addition, benefits to positive and negative well-being appeared among young adults who had relatively pessimistic outcome expectancies yet chose to actively engage in undoing their regrets. These beneficial effects of internal regret engagement were not obtained among young adults who already had relatively favorable outcome expectancies at baseline. Moreover, the increases in outcome expectancies, observed among regret-engaged

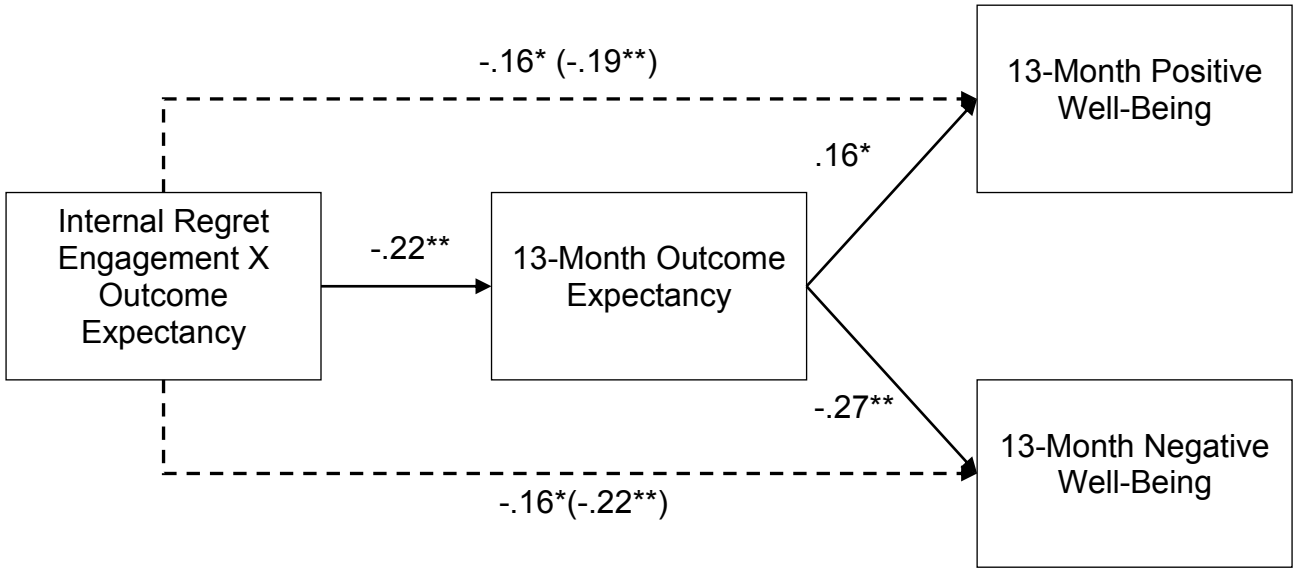

Figure 8. Mediation model examining the indirect effect of 13-month expectancies for undoing regret on the interaction between baseline levels of internal regret engagement and outcome expectancies in predicting 13-month levels of subjective well-being (controlled for baseline). Effects on 13-month outcomes were controlled for the respective baseline measures and sociodemographic factors. Values represent standardized regression coefficients. Dotted lines indicate a significant reduction of the total effect through the mediator, as demonstrated by indirect effects in the bootstrap analyses.

participants who initially had pessimistic outcome expectancies, partially statistically mediated reductions in negative and improvements in positive well-being.

This pattern of findings suggests that internal regret engagement can play a pivotal role in improving regret-related outcome expectancies. Young adults who do not expect to overcome their most severe life regret can improve these relatively poor outcome expectancies if they keep investing time and energy in overcoming regretted behaviors. This process may take place because goal engagement increases the awareness of opportunity cues in the environment or contributes to creating new possibilities for overcoming regret. These improvements in outcome expectancies, in turn, are adaptive psychological processes that can forecast greater subjective well-being. It is therefore important that young adults keep investing time and energy in overcoming life's problems because these motivational processes are likely to benefit their prospective development.

While internal regret engagement was shown to be advantageous for young adults who had relatively pessimistic outcome expectancies, their counterparts who were more optimistic about undoing their regretted behaviors did not experience further benefits from goal engagement processes. In fact, regret engagement was not associated with improvements in outcome expectancies or subjective well-being in this subgroup of young adults. This pattern of findings may be observed because internal regret engagement did not further increase already favorable outcome expectancies. Moreover, it is plausible that internal regret engagement is less influential among these participants because their favorable outcome expectancies can influence well-being through other mechanisms, such as emotion-focused coping or supportive social networks (Carver et al., 2010; Chang, 1998; Brissette et al., 2002).

It is important to point out that unlike the findings discussed in Chapter 3, the association between internal regret engagement for pessimistic young adults and changes in their positive well-being over time was partially significantly mediated by improvements in outcome expectancies, similarly to negative well-being. This is perhaps the case given as my focus was on change in outcome expectancies as opposed to intensity of negative emotions. It is possible that while intensity of negative emotions focuses on the reduction of negative aspects of well-being, outcome expectancies also influence positive aspects of well-being.

No effects of external regret engagement (i.e., recruitment of external help for undoing regrets) on changes in outcome expectancies or subjective well-being were found. This finding

suggests that only the investment of internal resources can predict improvements of pessimistic outcome expectancies and associated well-being. In this regard, it is possible that a reliance on the help of others for overcoming regrets may reduce the likelihood of searching for, and recognizing, new opportunities for addressing a regret. As a consequence, young adults who use external control strategies may not experience an improvement in their outcome expectancies. In addition, young adults who recruit the help of others for overcoming regret may experience a threat to their self-efficacy or self-esteem, which could counteract potential benefits on subjective well-being.

The study's findings finally showed that regret-related self-protection (i.e., using downward comparisons or external attribution) was associated with improvements of participants' positive well-being over time. Although a-priori hypotheses for this type of control strategy were not formulated, this finding may imply that despite generally favorable conditions for undoing regret in young adulthood, some participants may have confronted a regret that is more difficult to overcome than those of others. In such circumstances, participants who engage in self-protection to manage their life regrets may successfully protect their emotional and motivational resources (Heckhausen et al., 2010) and make subsequent progress with other life goals. This process could explain their increases in positive well-being, and is consistent with research showing that regret-related downward comparisons can benefit new goal pursuits and positive affect among individuals who have few opportunities for overcoming their life regrets (Bauer & Wrosch, 2011).

Overall, the findings from this study are important for several reasons. First, they support theoretical propositions made by the motivational theory of lifespan development (Heckhausen et al., 2010). Research based on this theory has shown that age-related differences in opportunity structures (Heckhausen, 1999) determine the adaptive value of control strategies. From this perspective, goal engagement strategies are particularly beneficial in young adulthood, when individuals have favorable opportunities for attaining goals and overcoming problems (Heckhausen, Wrosch, & Fleeson, 2001; Wrosch & Heckhausen, 1999; Wrosch, Heckhausen, & Lachman, 2000). These findings are consistent with this body of research by showing that goal engagement can be adaptive among young adults who experience regret. In addition, they extend current theory and research by addressing individual differences in outcome expectancies. Given that there are circumstances in which young adults have reasons to be pessimistic about solving a

problem or realizing an attainable goal (e.g., after a setback), these findings suggest that goal engagement strategies are useful for closing this gap between pessimistic outcomes expectancies and the generally favorable conditions for goal attainment. These strategies can improve poor outcome expectancies for overcoming problems and through this mechanism facilitate young adults' subjective well-being.

Second, the study's findings contribute to the understanding of the functions of regret experiences in young adulthood. While beneficial effects of regret experiences have been conceptualized by theory research and explained by the possibility that individuals can learn from their regrets (Beike et al., 2009; Feeney, Gardiner, Johnston, Jones & McEvoy, 2005; Pieters & Zeelenberg, 2007; Roese & Summerville, 2005), life-span developmental studies have shown mixed results. For example, some research suggests that regret experiences are largely unrelated to indicators of subjective well-being in young adults (Wrosch et al., 2005). However, other research has shown that young adults who attribute the causes of regret-related problems to their own behaviors can experience reduced intensity of regret and intrusive thoughts (Wrosch & Heckhausen, 2002). Moreover, the findings described in Chapter 3 have shown that the experience of intense negative emotions in the face of a regret can assist in motivating young adults to make progress toward undoing its negative effects, thus reducing the intensity of these emotions and increasing well-being over time. This study contributes to the latter pattern of results by demonstrating that young adults who experience regret can improve their subjective well-being if they actively engage in overcoming their regretted behaviors. This conclusion is further consistent with research and theory suggesting that failure experiences can provide opportunities for creating adaptive developmental pathways if individuals engage in adaptive self-regulation processes (King & Hicks, 2007). Furthermore, this study broadens current knowledge of the functions of regret for young adults in situations where, despite elevated objective opportunities, they are pessimistic about accomplishing their goals. These findings illustrate how young adults' tendency to internally engage can override these pessimistic views, allowing them to be more open to, or perhaps create, new opportunities to obtain their desired outcome.

Finally, the study's findings may have some implications for research on outcome expectancies. These longitudinal findings illustrate considerable fluidity and flexibility in people's expectations for successfully overcoming a specific problem. In addition, these intra-

individual changes in outcome expectancies can be reliably predicted by the use of general control strategy tendencies. This pattern of results is important, given that a large body of research has shown that optimistic expectancies benefit quality of life through influencing active control or coping processes (Carver et al., 2010; Oettingen & Mayer, 2002; Wrosch & Scheier, 2003). Thus, these results point to a reciprocal association between goal engagement processes and outcome expectancies in their influence on subjective well-being. While goal engagement processes can make a person more optimistic about solving a problem in the future, becoming optimistic may result in even greater investments of subsequent time and effort. These reciprocal associations may create an upward spiral that could improve the subjective well-being of young adults who have pessimistic expectancies for overcoming important life problems.

Limitations and Future Directions

There are limitations to this study that need to be addressed in future research. First, the described hypotheses relied on the assumption that young adults generally have favorable opportunities for goal attainment; however, the present study did not include a measure of individual differences in objective opportunity. While it is believed that it is well-supported by life-span developmental theory and research that young adulthood can be characterized by favorable opportunities for goal attainment (e.g., Heckhausen, 1999), some young adults in the sample may have had regrets that cannot be overcome through active efforts (e.g., being responsible for an accident). However, it is note that the majority of regrets in the sample was associated with education- and relationship-related regrets (see Methods), which are associated with age-normative developmental tasks for which young adults typically have favorable opportunities to achieve gains (Havighurst, 1972). Nonetheless, future research should address individual differences in objective opportunities to examine more directly how active goal engagement can reduce the discrepancy between pessimistic outcome expectancies and objective opportunity structures.

Second, although these results suggest that changes in outcome expectancies mediated the observed effect on changes in subjective well-being, it is important to note that the time interval of both change measures overlapped. Thus, improvements in subjective well-being may also have contributed to more favorable outcome expectancies. Although this explanation cannot excluded empirically, the offered interpretation of findings is consistent with a large of body of research demonstrating that optimistic outcome expectancies can influence subsequent goal

attainment and increases in subjective well-being (Carver et al., 2010; Oettingen & Mayer, 2002). To overcome this limitation, however, future research should replicate these findings by using a more fine-grained longitudinal design and examining whether changes in outcome expectancies precede changes in subjective well-being.

Finally, this research did not examine the specific processes that link goal engagement processes with improvement of poor outcome expectancies as well as improvements in outcome expectancies with increases in subjective well-being. It is expected that the observed improvements in outcome expectancies are associated with the recognition or creation of new opportunities for addressing life regrets. In addition, improvements in outcome expectancies may result in greater subjective well-being through the maintenance of high levels of goal engagement and associated progress with overcoming regret. Future research should therefore examine these possibilities to discover the entire process that enables young adults who are pessimistic about overcoming problems to become more optimistic and increase their quality of life. Special attention should also be paid to positive versus negative elements of well-being, as it is possible that different mechanisms affect each.

CHAPTER 5:
STUDY 3

Can life regrets also produce adaptive effects in older adulthood?
An analysis of the motivational and emotional functions of regret in old age

Abstract

This study assessed whether intense regret-related emotions would promote older adults' motivational processes aimed at overcoming severe life regrets (i.e., regret engagement) and facilitate improvement in well-being and a reduction in reported distress (i.e., regret intensity, depressive symptoms, positive and negative affect). The described analyses were based on a 26-month longitudinal study of 136 older adults who reported having a severe life regret. Results from hierarchical regression analyses indicated that baseline levels of regret intensity predicted higher levels of regret intensity over time, however, regret intensity was not associated with increases in regret engagement or with improvement in well-being. Further hierarchical regression analyses were conducted to assess the benefit of engaging in undoing one's regret when older adults are pessimistic about their opportunity to do so. Results demonstrated that older adults who were pessimistic did not experience an increase in regret-related engagement, nor did they report well-being improvements that would have been associated with this engagement in young adults. These findings suggest that intense life regrets may prove detrimental to older adult well-being, and therefore do not serve the same adaptive motivational and emotional functions observed in young adulthood.

KEY WORDS: regret; lifespan development; regret intensity; regret engagement; outcome expectancies; well-being.

Introduction

Regret is an omnipresent cognitive-emotional experience across the lifespan, associated with a discrepancy between one's current state and a desired state of affairs (Pieters & Zeelenberg, 2007). This discrepancy often leads to negative and intense emotions, which are vital for behavioral change (Frijda, 1988). Emotional research has shown that regret, through the negative emotions it produces, can act as an important catalyst for action, as individuals adjust their goals and behaviors to correct their situation (Baumeister et al., 2007; Beike et al., 2009). Lifespan developmental theories have demonstrated repeatedly the importance of the regret experience in improving the quality of life for young adults. These theories postulate that such an effect can be due to the optimal ability of this age group to take charge of their circumstances and make changes that will lead to long-term successful goal pursuit (Heckhausen et al., 2010). Moreover, results presented in Chapter 4 showed that even when young individuals expressed doubt and pessimism as to their ability to overcome their regret, they were able to experience similar benefits to their well-being, in addition to increases in their perception of their opportunity to make a change over time, if they simply continued engaging in undoing their regret. On the other hand, research has illustrated that older adults, given the ever-increasing challenges and losses they face with age and physical decline, do not benefit from regrets in the same way. In fact, previous scholars noted that regret may be a detrimental experience as people age because of their reduced capacity to overcome their regrets and correct the situation, leading to a decrease in well-being over time (Wrosch et al., 2005). This study aimed to explore the effects of life regrets in an older adult sample over a span of 26 months. The purpose of the present research was to explore the presence of the benefits of regret found in young adults (see Chapters 3 and 4), in an older age group, in order to determine the generalizability of these benefits across the lifespan. Specifically, it was expected that the initial intensity of the negative emotions following a regret experience will not lead to increased engagement in undoing the regret, and thus to any of the emotional benefits (i.e., decreases in depressive symptoms and negative affect) found in younger adults across time. In contrast, it was predicted that the presence of intense regret at baseline will correspond with continued intense emotions across the study waves. Additionally, it was expected that continued engagement in undoing one's regret would not have a positive impact on perceptions of opportunity and therefore on well-being over time in this sample.

Emotional and Motivational Functions of Regret

The vast majority of adults will experience a major life regret at some point in their lives (Bauer & Wrosch, 2011). Regret occurs when people believe their current circumstances could have been improved had they acted differently in the past (Beike et al., 2009; Pieters & Zeelenberg, 2007; Newall et al., 2009). This process of 'what might have been' is made possible through counterfactual thoughts, namely when the current situation, action or state are compared to imagined alternatives (Byrne, 2005; Epstude & Roese, 2008; Gilovich & Medvec, 1995; Roese, 1997). Counterfactual thoughts can aim downward, namely when one's reality is preferable to the imagined alternative, or upward, when a thought-of alternative is viewed as better than one's reality (Boninger et al., 1994; Epstude & Roese, 2008; Newall et al., 2009). Not surprisingly, the experience of an upward counterfactual often leads to the experience of regret, while a downward counterfactual may offer a protective buffer for the individual from experiencing regret (Bauer & Wrosch, 2011; Gilovich & Medvec, 1995; Roese, 1994; Zeelenberg, 1999).

Indeed, previous research has shown that the experience of regret, and specifically upward counterfactual thoughts, can lead to greater distress, lower life satisfaction and more depressive symptoms (Bauer & Wrosch, 2011; Pieters & Zeelenberg, 2007; Wrosch, Bauer et al., 2007; Wrosch et al., 2005). In fact, regret has been repeatedly linked to the experience of self-blame and guilt, thus leading to further decreases in well-being (Pieters & Zeelenberg, 2007). Moreover, past studies have illuminated a direct path between emotions and health through physiological mechanisms, thus hinting at the possibility that regret may also affect one's physical health (Newall et al., 2009). Indeed, regret has been ranked as the most intense negative emotion (Pieters & Zeelenberg, 2007), thereby describing its negative effect but at the same time its inherent motivational mechanism.

Current emotional theories postulate that emotions, in particular negative emotions, act as feedback mechanisms that directly alter behavior (Baumeister et al., 2007). They note that the role of negative emotions that arise when important goals or needs are not met, is to alert the individual of the discrepancy between current and desired states and thereby push for change (Baumeister et al., 2007; Frijda, 1988). This view classifies emotions as key motivational forces, which help guide behavior and move individuals toward or away from specific goals (Carver & Scheier, 1990; Frijda, 1988; Nesse & Ellsworth, 2009). As regret is an aversive emotional

experience, it provides a strong incentive for the person to correct her behavior in order to reduce or avoid regret, when possible (Beike et al., 2009; Reb, 2008; Roese et al., 2007). As the intensity of the regret increases, the person is motivated to engage in her regret by attempting to undo it or by disengaging from it (Newall et al., 2009; Roese, 1997; Wrosch et al., 2005; Wrosch et al., 2003). This can be achieved by behaviorally changing the conditions that have led to the regret or by internally adjusting the perception of the regret to protect the individual (e.g., 'it wasn't really my fault'; Roese et al., 2007; Wrosch & Heckhausen, 2002). Indeed, the anticipation of regret is in itself a powerful force, which affects the decision making and goal engagement process of the individual (Lecci et al., 1994; Reb, 2008). This potency of the regret emotion makes it paramount and even crucial to human experience, in particular when the regret is viewed to be within the person's control (Beike & Crone, 2008; Roese, 1994; Roese & Summerville, 2005).

Differing Corollaries of Regret Experiences Across the Lifespan

Findings pertaining to the motivational power of regrets have thus far been mixed. Research has shown that young adults exhibited reduced regret intensity when engaging on undoing, or overcoming, their regret (Wrosch & Heckhausen, 2002). Indeed, several researchers have found that young adults reported a greater ability to control their regret as well as greater change in the emotional experience of regret over time, as their ability to control their environment is optimal (Havighurst, 1972; Jokisaari, 2003; Wrosch, Heckhausen et al., 2006). In this vein, my previous study reported in Chapter 3, which focused on young adults experiencing severe life regrets over time, found that greater initial regret intensity led to stronger engagement and intentions to act to undo the regret, which further led to increased well-being and reduced regret intensity over time. These conclusions are in direct opposition to findings obtained in older adulthood, whereby number of regrets related to lower satisfaction with life, as well as dysregulated cortisol secretion which resulted in physical health impairments (Torges et al., 2005; Wrosch, Bauer, et al., 2007; Wrosch et al., 2005; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007). Theories of lifespan development have attributed these findings to the notion that control opportunity increases from childhood to young adulthood, peaks in midlife and steadily declines as people enter into old age. Older adults experience goal constraints due to gradual and cumulative loss of control over one's environment (Heckhausen, 1997; Heckhausen & Schulz, 1995; Wrosch, Dunne et al., 2006).

As one's opportunities to pursue and achieve important goals varies across the lifespan, given the aforementioned loss of control, so does the perception of these opportunities (see Chapter 4; Bauer & Wrosch, 2011). Indeed, research has shown that regret is more likely to act as a catalyst for action when the person perceives that they have ample opportunity to do so, or in other words, when they have positive expectations concerning the outcome of their efforts (Roese & Summerville, 2005). In fact, Epstude and Roese have shown that one's outcome expectancies were able to moderate behavioral and affective responses (2008). Specifically, they noted that optimistic outcome expectancies (i.e., believing you have the opportunity to undo your regret) led to direct behavioral actions to correct the discrepancy. In addition, pessimistic outcome expectancies (i.e., the perception you do not have the opportunity to overcome your regret) led to regulation of affect in order to protect the individual's sense of mastery (Epstude & Roese, 2008). Indeed, findings discussed in Chapter 4 illustrate how continued internal engagement in undoing one's regret, despite pessimistic outcome expectancies, allowed for the increase of perceived opportunity as well as improved well-being over time in the sample. In contract to these findings, research by Epstude and Roese (2008) has shown that pessimistic older adults did not benefit from these improvements and rather presented with reduced well-being and other problems. For this reason, these individuals chose to regulate their emotions by shifting their attention from their own responsibility to that of others, in correcting the situation. Regret has indeed been linked to increased depressive symptoms and helplessness in older adults due to their experienced losses and constraints, as well as perceived lack of opportunity to accomplish important goals (Wrosch et al., 2005).

The Present Study

In essence, due to actual environmental constraints as well as perceived pessimistic outcome expectancies, older adults appear to be more negatively affected by the experience of regret, as compared to younger adults (Wrosch et al., 2005). However, research thus far has not focused on the motivational and emotional effects of regret on older adults across time. This study hopes to identify the unique longitudinal processes inherent in the experience of regret as people age. For this purpose, I compared longitudinal findings from previous studies focusing on the functions of regret in young adults with its functions in their older counterparts (see Chapters 3 and 4 of this dissertation). More specifically, the first study reported in Chapter 3 demonstrated that young adults who reported greater initial intensity of regret experienced

greater engagement in the regret at baseline as well as reductions in regret intensity, depressive symptoms and negative affect over time. In the second study reported in Chapter 4, young adults who perceived their opportunity to undo their regret as low (i.e., had pessimistic outcome expectancies) reported positive increases in their outcome expectancies and improvements in well-being over time if they continued to engage in undoing their regret. Based on the body of research described above, I theorized that these results may not be replicated in an older adult population. Instead, I expected that the presence of older adults' intense emotions at the onset of this study will result in continued regret intensity over time. I further predicted that as the intensity of regret-related emotions will not dissipate, older adults will not experience similar benefits to their well-being over time (i.e., changes in depressive symptoms, negative, and positive affect). Finally, I hypothesized that despite continued engagement in undoing their regrets, pessimistic older adults will not benefit from increases in their outcome expectancies and correspondingly, from any improvements to their well-being, as their younger counterparts did. My aim is to show that the positive effects of regret on both motivation and emotion do not occur for people in the old age period of the life course and therefore, that these positive effects of regret are unique to young adulthood.

Method

Participants

This study is based on a 26-month longitudinal data set of recent retirees in Montreal. A sample of 463 older adults, between the ages of 44 and 77 years, was recruited from the greater Montreal area, with the use of newspaper advertisements as well as letters sent to local retirement associations. Participants needed to have worked full time for a minimum of 20 years, been able to complete assessments at the university annually and be fluent in English and French. Participants could not be currently employed for over 10 hours per week. Participants were invited to the laboratory to complete self-report as well as cognitive questionnaires at baseline (T1). Pilot participants (n = 17) as well as participants who had difficulty understanding instructions (n = 13) were excluded from the study, leaving an initial sample of 433 older adults. These older adults were invited to the laboratory to complete follow-up questionnaires approximately 13 months (T2: M = 12.99 months, SD = 2.02 months, N = 393) and 26 months (T3: M = 25.77 months, SD = 2.67 months, N = 373) after baseline. There were 373 individuals who participated in the 26-month follow-up (retention rate = 86.14%). Participants who did not

report a life regret (n = 22) or did not report the same regret across waves (n = 215) were excluded from the study resulting in a final sample of 136 participants.[11] At baseline, participants' average age was 58.46 years (*SD* = 5.00), and 76 were female (55.9%). Study attrition over 26 months was not associated with any of the constructs used in the reported analyses. Missing data for individual items consisted of less than 1%, and were replaced by the sample mean of each item.

Materials

The main study variables included measures of participants' regret intensity, regret engagement, regret-related outcome expectancies, and subjective well-being (i.e., depressive symptomatology, negative, and positive affect). In addition, sociodemographic characteristics (age and sex) as well as baseline measures of regret characteristics (i.e., time since regretted event, domain of the regret and omission versus commission regrets) were incorporated into the study as covariates.

Life Regrets. Participants were asked at T1 to write down their most severe life regret. Mostly consistent with previous research (Roese & Summerville, 2005), the majority of regrets were associated with education or work (40.4%, e.g., "Returning to school to complete my degree"), family (23.6%, e.g., "Giving up a son for adoption"), and personal relationships (14.7%, e.g., "Not having kept a marriage together"). The final domain of regret that individuals most endorsed was that of leisure (5.9%, e.g., "Not traveling more") as opposed to the self-development domain which was described by Roese and Summerville (2005). All regret-related information collected in the follow-up waves was related to the specific regret that each participant reported at baseline.

Regret intensity was measured by asking participants to report the extent to which they experienced six different emotions when thinking about their reported regret over the past few months, which were based on previous research (Wrosch et al., 2005; Wrosch & Heckhausen, 2002). These emotions represented three "hot" regret emotions (i.e., angry, irritated, and embarrassed) and three "despair-related" regret emotions (i.e., desperate, helpless, and sorrow, see Gilovich et al., 1998). Participants used a 5-point Likert-type scale (0 = *not at all*; 4 = *extremely*). Previous research has shown that hot and despair-related regret emotions are highly

[11] As my goal was to study the motivational and emotional functions of regret over time in this sample, older adults who did not focus on the same regret across the three waves of the study were excluded from further analyses.

correlated and show similar effects (e.g., Wrosch & Heckhausen, 2002), and for this reason mean scores of the hot and despair-related emotions were computed to obtain indicators of participants' regret intensity for each assessment (M_{T1} = 1.80, SD_{T1} = .80; M_{T2} = 1.64, SD_{T2} = .63; M_{T3} = 1.62, SD_{T3} = .64). The scales for measuring regret intensity showed good reliability (αs = .75 to .83). Regret intensity significantly decreased over time for the sample, $t(135)$= -3.354, $p < .01$.

Regret engagement was measured with two items, which assessed core motivational factors involved in the regulation of participants' reported life regrets (i.e., effort and commitment, Wrosch et al., 2005). Participants were asked 1) how much effort they invest in, and 2) how strongly they are committed to, undoing the negative consequences of their regretted event. They responded to these two items by using a 5-point Likert-type scale (1 = *no effort at all/not at all committed*; 5 = *a lot of effort/very much committed).* The two items were highly correlated within each assessment (rs = .79 to .83; ps < .001) and they were averaged to obtain indicators of participants' regret engagement across assessments (M_{T1} = 2.77, SD_{T1} = 1.40; M_{T2} = 2.63, SD_{T2} = 1.36; M_{T3} = 2.70, SD_{T3} = 1.34).

Regret-Related Outcome Expectancies were assessed by asking participants to estimate the likelihood for undoing the negative consequences of the reported regret by answering how likely it is that the consequences of their regret 1) can be undone and 2) will be undone. These two items were used and verified in previous research (Bauer et al., 2008). Each item was rated on a 5-point Likert-type scale (1 = *very unlikely*, 5 = *very likely*). The two items were highly correlated with each other in both waves (r_{T1} = .84 to .92, $p_{T2} < .001$) and were aggregated to obtain a measure of regret-related outcome expectancy across assessments (M_{T1} = 2.53, SD_{T1} = 1.50; M_{T2} = 2.55, SD_{T2} = 1.58; M_{T3} = 2.71, SD_{T3} = 1.57).

*Depressive symptomatology w*as measured at both follow-up assessments by administering the 10-item version of the Center for Epidemiologic Studies – Depression scale (CES-D; Radloff, 1977). Sample items included "I felt depressed" or "I felt that everything I did was an effort." Participants were asked to indicate how often they felt this way during the past week by using a 4-point Likert-type scale (0 = *less than a day*, 3 = *5 to 7 days*). The CES-D scales showed good reliability across assessments (αs = .79 to .84), and all items were aggregated to obtain a measure of depressive symptomatology across assessments (M_{T2} = .45, SD_{T2} = .45; M_{T3} = .45, SD_{T3} = .41).

Positive and negative affect were measured by utilizing the 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Sample negative items included 'upset' or 'distressed' and sample positive items included 'excited' or 'proud'. Participants were asked to indicate the extent they have experienced these positive and negative emotions during the past six months by using a 5-point Likert-type scale (0 = *very slightly or not at all*, 4 = *extremely*). The PANAS scales showed good reliability across assessments ($\alpha_{positive}$ = .89 to .91, $\alpha_{negative}$ = .85 to .87) and sum scores were computed for each of the 20 items in each assessment (positive affect - M_{T1} = 3.76, SD_{T1} = .72; M_{T2} = 3.74, SD_{T2} = .67; M_{T3} = 3.79, SD_{T3} = .64; negative affect - M_{T1} = 1.52, SD_{T1} = .52; M_{T2} = 1.51, SD_{T2} = .52; M_{T3} = 1.59, SD_{T3} = .56). Change scores for the variables in the study were computed by predicting in regression analysis subsequent levels of all outcome measures (T3) by previous levels of these measures (T2) and saving the standardized residuals for further analysis (see Table 9 for inter-item correlations).[12] *Sociodemographics* (age and sex) and *Regret Characteristics* (time since regretted event, omission versus commission regrets, and regret domain) obtained at baseline were included into the analyses as these variables could have an effect on the regret trajectory and well-being in the sample. Participants' life regrets occurred on average 24.13 years prior to baseline (*SD* = 12.90 years). Participants were also asked to indicate whether their life regret was related to a behavior that they had done (i.e., commission regret; coded as "1") or that they had not done (i.e., omission regret; coded as "2"), with 80.1% of participants reporting an omission regret. Finally, participants' regret descriptions were coded with respect to five different domains: 1) work and education, 2) personal relationships, 3) family, 4) leisure, and 5) other regrets. A second independent domain coding of participants' regret descriptions showed acceptable inter-rater reliability (94%). Four separate dummy variables were computed, contrasting participants who described a regret in each of the first four domains (coded as "1") against other participants (coded as "0").

Statistical Analyses. I tested the above hypotheses by conducting two sets of hierarchical regression analyses (using SPSS 20). In the first set, I attempted to investigate the motivational and emotional effects of regret intensity in older adulthood and compare these findings to previous results obtained in a young adult sample (see Chapter 3). In the first set of results, I

[12] As depressive symptomatology was not assessed at baseline (T1), all outcome measure standardized residual change scores were calculated from T2 to T3.

Table 9 - *Zero-Order Correlations of Main Constructs Used in the Study* * $p < .05$; ** $p < .01$. [a]

	1	2	3	4	5	6	7	8	9	10	11
1. Regret intensity (T1)											
2. Regret intensity (T3)	.65***										
3. Regret engagement (T2) [a]	.22**	.16ǂ									
4. Regret engagement (T3)	.23**	.15	.65**								
5. Outcome expectancies (T2)	-.19*	-.17*	.41**	.34**							
6. Outcome expectancies (T3)	-.21*	-.15	.24**	.33**	.62**						
7. Depressive symptoms (T2)	.33**	.43**	.09	.08	-.06	.01					
8. Depressive symptoms (T3)	.30**	.44**	.03	-.02	-.05	.12	.77**				
9. Positive affect (T2)	-.23**	-.32**	-.04	.06	.05	.12	-.58**	-.51**			
10. Positive affect (T3)	-.16	-.27**	-.01	.06	-.01	.11	-.42**	-.44**	.72**		
11. Negative Affect (T2)	.28**	.25**	.14	.19*	-.09	.01	.67**	.54**	-.30**	-.18*	
12. Negative Affect (T3)	.30**	.32**	.05	.19*	-.03	.06	.54**	.64**	-.24**	-.09	.65**

Note. T1 = Baseline; T2 = 13-month follow-up; T3 = 26-month follow-up. [a] Depressive symptomatology was not assessed at T1 and therefore all outcome measures were reported for the 13-month follow-up (T2). ǂ Result was marginally significant ($p < .06$).

hypothesized that older adults who report greater regret intensity at baseline will not experience a change in engagement in their regret, as was evident for younger adults, thereby they will not benefit from positive changes in depressive symptomatology or negative andpositive affect. Moreover, I hypothesized that these older adults will present with increases in regret intensity across time. With this purpose, I conducted five separate hierarchical regression analyses to assess the effects of regret intensity at T1 on changes over time in regret engagement, regret intensity and well-being (i.e., depressive symptoms, negative affect, and positive affect). All predictors were centered prior to conducting the analysis. In the second set of analyses, I attempted to examine the fluidity of outcome expectancies for pessimistic older adults who remain engaged in undoing the negative effects of their regret, with the aim of comparing these findings to those obtained in a young adult population (see Chapter 4). I theorized that pessimistic older adults will not display increases in their perceived outcome expectancies with continued engagement in their regret, and thus will not experience any changes to their well-being over time. I therefore conducted four separate hierarchical regression analyses to assess change over time in outcome expectancies and well-being by 1) centered baseline scores of outcome expectancies, well-being variables and all covariates and 2) by the interaction between baseline outcome expectancies and regret engagement.

Results

Benefits of Regret Intensity in Older Adulthood

To examine the effects of regret intensity on changes in motivation and well-being in older adults, five hierarchical regression analyses were conducted, predicting changes from T2 to T3 in regret intensity, regret engagement, depressive symptomatology, positive, and negative affect by T1 levels of regret intensity. The first step included sociodemographic and regret characteristics, whereas the second step included the main effect of regret intensity at baseline. The results of these analyses are reported in Table 10. Firstly, time since the regretted event was significantly associated with changes in negative affect, $F(1, 127) = 4.08$, $R^2 = .03$, indicating that as more time elapsed since the regretted event, individuals reported greater decline in their negative affect over time, $\beta =$ -.18, $p < .05$. In addition, baseline levels of regret engagement, positive, and negative affect were associated with positive changes in their respective variables over time, Fs$(1, 127) > 6.41$, ps $< .02$. Baseline levels of regret intensity were associated with increases in regret intensity over time, $F(1, 127) = 18.39$, $p < .001$, $R^2 = .12$. However, baseline

Table 10

Regression Analyses Predicting 13-Month Changes (T2-T3) in Regret Intensity, Regret Engagement and Well-Being by T1 Regret Intensity

	Δ Regret Intensity		Δ Regret Engagement		Δ Depressive Symptoms		Δ Negative Affect		Δ Positive Affect	
Predictor [a]	R^2	*Beta*	R^2	*Beta*	R^2	*Beta*	R^2	*Beta*	R^2	*Beta*
Regret intensity (T1)	.12**	.36**	.01	.11	.01	.11	.02	.15	.00	.05

Note. [a] Coefficients were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and leisure-related regrets). * $p < .05$. ** $p < .01$.

levels of regret intensity were not significantly associated with changes in participants' regret engagement, $F(1, 126) = 1.44$, $p = .23$, $R^2 = .01$, or any of the well-being indicators, Fs$(1, 126) < 2.36$, R^2s $< .02$, $ps > .13$. In support of my hypotheses, these findings indicate that to the extent older adults experienced more intense negative emotions at baseline, they endorsed increased distress over time, in the form of continued and increased regret intensity over the course of the study. Moreover, the experience of greater regret intensity did not lead to any of the positive changes in well-being or regret engagement seen in young adults over time.

Functions of Regret Engagement Despite Pessimistic Outcome Expectancies in Older Adults

To examine the effects of regret-related outcome expectancies and regret engagement on changes in older adults' motivational and emotional processes, four hierarchical regression analyses were conducted, predicting changes from T2 to T3 in outcome expectancies, depressive symptomatology, positive and negative affect. The first step included all sociodemographic and regret characteristics, while the second step included the baseline main effects of regret-related outcome expectancies and regret engagement. Finally, the third step included the two-way interaction between regret-related outcome expectancies and regret engagement. These results are displayed in Table 11. These analyses indicated that sex was significantly related to changes over time in outcome expectancies, $F(1, 127) = 7.05$, $R^2 = .05$, indicating that women showed less increases in regret-related outcome expectancies over time, $p < .01$, $\beta = -.23$. The inclusion of baseline levels of regret-related outcome expectancies and regret engagement in the analyses did not reveal significant effects on changes in outcome expectancies, or any of the well-being indicators, Fs$(1, 126) < 2.37$, R^2s $< .02$, $ps > .13$. Moreover, the interaction between regret-related outcome expectancies and regret engagement was not significantly associated to changes over time in any of the outcome variables, Fs$(1, 125) < 1.08$, R^2s $< .01$, $ps > .30$. These findings support the hypothesis that continued engagement in undoing the negative effects of regret, for pessimistic older adults, does not offer distinct benefits in perceived outcome expectancies or any of the well-being indicators, as opposed to recent findings in a young adult sample (see Chapter 4).

Discussion

This study showed that when older adults experience intense regret-related emotions at baseline, they reported increased intensity of negative emotions over time as expected. Also in accordance with hypotheses, the reported initial

Table 11

Regression Analyses Predicting 13-Month Changes (T2-T3) in Regret-Related Outcome Expectancy, Depressive Symptoms, Positive and Negative Affect by T1 Regret-Related Outcome Expectancy and Regret Engagement.

	Δ Outcome expectancy		Δ Depressive Symptoms		Δ Positive Affect		Δ Negative Affect	
	R^2	Beta	R^2	Beta	R^2	Beta	R^2	Beta
Baseline main effects [a]	.11		.08		.08		.14	
Outcome expectancy (OE)	.01	.13	.00	.03	.01	-.13	.02	-.15
Regret engagement (RE)	.01	-.08	.01	-.08	.01	.11	.01	.10
Baseline interactions								
OE X RE	.00	.04	.01	-.09	.00	-.02	.00	-.04

Note. [a] Analyses were controlled for participants' age, sex, commission vs. omission regret, time since regretted event, and regret domain (work/education, relationship, family, and leisure-related regrets). ** $p < .01$. * $p < .05$.

intensity of emotions did not affect other elements of emotional well-being (i.e., depressive symptoms, positive, and negative affect) over the course of the study. Additionally, these results demonstrate that when pessimistic older adults continue to engage in undoing their regrets, they do not experience any changes in their perceived outcome expectancies over time, nor do they report any changes in well-being due to this continued engagement.

These findings indicate that the emotional and motivational benefits of regret intensity and continued engagement that have been shown in young adulthood (see Chapter 3 and 4) may not continue into older adulthood. Together, the results of this study illustrate the specificity of the motivational and emotional benefits of the experience of regret and the continued engagement in undoing the negative effects of that regret in young adulthood. These results were expected based on lifespan developmental theories which state that older adults may benefit from disengaging from severe life regrets, as opposed to continuing to tackle them (Bauer et al., 2008). These theories postulate that given the inherent constraints and restrictions to control in old age, older adults should protect themselves by adjusting their regret-related goals or their internal view of the situation (Bauer et al., 2008; Wrosch, 2011). This will presumably reduce the intensity of the regret, which is imperative, as the above results show that the experience of intense regret-related emotions led to greater distress over time in this sample.

Importantly, regret intensity at baseline did not affect well-being indicators (i.e., depressive symptoms, negative, and positive affect) over the span of the study. In addition, the sample as a whole reported a decrease in regret intensity over time. These findings may relate to the nature of the sample, which is discussed in greater detail in the limitations and directions for future research section below.

The time elapsed since the regretted event was related to reductions in negative affect over time. This finding stands to reason when considering that the range of reported time elapsed since the regret occurred is between 11 to 37 years. This findings is not surprising and is in accordance with the hedonic adaptation theory proposed by Lucas (2007), stating that individuals are able to adapt to many challenges in life over time by returning in close proximity to predetermined set-points in subjective well-being, even if these well-being levels are not identical to the original ones. This process is most likely also present in the experience of regret, which while distressful, is an omnipresent fact of life that people must endure. Additionally, it appears that women reported greater reductions in outcome expectancies over time, relative to

men. It is possible that women and men experience slightly differing ageing trajectories, whereby men benefit from longer duration of control over their environment or alternatively, an increased view of their opportunity to overcome a regret over time.[13]

The findings in this study are important for several reasons. First, these results provide further evidence to lifespan developmental theories by showing that the benefits of regret as a motivational and emotional catalyst are unique to younger adults. In fact, according to the results discussed above, the experience of intense negative regret-related emotions led to continued distress over a two-year span in older adults, indicating that in this stage in life, the experience of regret may actually be detrimental to well-being, and possibly health, rather than beneficial. The reason for this difference is attributed to the decline in opportunity to control one's environment and the increasing constraints that are the hallmark of ageing (Bauer & Wrosch, 2011; Schulz & Heckhausen, 1996).

One option by which older adults are advised to protect themselves is by internally changing their perception of their situation (Bauer & Wrosch, 2011). Some strategies to achieve this goal have been previously discussed in the literature, for example the utilization of downward social comparisons, whereby individuals compare themselves to others who are in a worse situation (Bauer & Wrosch, 2011). Indeed, previous research has shown that these social comparisons were associated with increased positive affect over time in adults of different age groups who reported low opportunity to control their circumstances (Bauer & Wrosch, 2011). This process was further associated with fewer cold symptoms in an older adult sample. In addition, the reality of an unattainable goal in and of itself can often lead to the experience of reduced well-being and enhanced distress (Wrosch et al., 2003). Past research has shown repeatedly that disengaging from unattainable goals has been related to less reported distress and improved well-being as well as reduced inflammation, illness symptoms, and cortisol dysregulation (Wrosch & Miller, 2009). Moreover, as individuals experience increasing limitations and reduced resources with age, it is advised to disengage from unattainable goals in order to free what resources are left to pursue goals that will lead to the experience of success and mastery, as well as shield from further failure, thus protecting the individual's sense of control (Wrosch, 2011; Wrosch et al., 2003).

[13] Another possibility would have been the nature of the reported regrets themselves, however further analyses indicated that males and females did not significantly differ in the domains of their reported regrets, $t(133)= 1.046$, $p > .05$.

These findings and recommendations are important not only theoretically, but also clinically. Older adults, or others who experience low opportunity, presenting for psychological treatment, should be made aware of the available research and be provided with empirically-based counsel and guidance. Variability exists of course, and each situation must be investigated for the risks and benefits of continued engagement versus disengagement. However, knowledge of normative processes is paramount in the protection of well-being and health in older adults.

Limitations and Future Directions

Certain limitations were inherent in this study and should be addressed in future research. First, it is interesting to note that the experience of intense regret-related emotions did not affect well-being indicators within this sample (i.e., depressive symptoms, positive and negative affect), except for the continued experience of overall distress (namely, regret intensity). It is thus possible that the longitudinal nature of the study was too short to observe such changes in well-being. Another alternative relates to the type of sample that was used. In order to participate in this study, individuals were required to commute to the laboratory (increased mobility), partake in cognitive assessments (improved cognitive functioning), as well as be retired for no longer than two years (young-old sample). These conditions have led to a sample which was younger, as well as more physically and cognitively capable as compared to the general older adult population. It is possible that these factors provide protection from the experience of regret, as these older adults have the external and internal capacities, as well as the increased opportunities of their relative younger age, to partake in other important goals. These factors may have allowed them to disengage from, or be less affected by, their life regrets. Additionally, the sample displayed overall reductions in regret intensity over time, a finding which is in line with the reasoning that the participants as a group, present with certain characteristics that allow them to protect themselves from the prolonged consequences of regret. It is suggested that future studies should focus on older-old adults, as well as older individuals who are more normative, or perhaps even on the lower end of the spectrum, with regards to their physical and cognitive abilities and constraints.

Second, the study's premise was such that older adulthood is a period in life that is characterized by increased limitations, restrictions and constraints, thus leading to reduced opportunity to control one's environment. However, it is possible that the negative effects of regret that were shown in this sample relate to the specific regret content, as opposed to the age

of the participants. These individuals may have focused on regrets which are more difficult to undo or which happened too far in the past to be amenable to change. This is different from the nature of regrets among younger adults who usually reported work/education-related regrets, which correspond with age-normative development, as well as regrets which have occurred within the past 5 years or less (Wrosch et al., in preparation). Future studies should address this limitation by exploring the objective opportunity available to participants on an individual basis, thus gaining a more in-depth understanding of the trajectory of the regret experience as people age.

Third, this study did not investigate the implications of disengagement or self-protection strategies in the face of regret. It is therefore unclear whether the ability to disengage from the regret or the ability to utilize downward social comparisons, for example, had the potential to preserve and protect the well-being of the older adult sample. It would prove vital for future research to investigate how the ability to disengage and protect the self may be useful in order to illuminate the importance of these processes on well-being in this and any other sample of individuals who report reduced opportunity to pursue their desired goals.

Moreover, while this study has demonstrated differences in the motivational and emotional effects of regret on older adults as opposed to younger ones, young and older adults were not directly compared. Accordingly, future age-comparative studies are needed in order to provide a more clear and apparent juxtaposition of the lifespan regret effects. Though these findings in and of themselves are important in the understanding of regret across the lifespan, it would prove beneficial to assess differences between two age groups in one comprehensive investigation.

CHAPTER 6:
GENERAL DISCUSSION

Summary of the Research Findings

This dissertation aimed to explore adaptive behavioral and emotional self-regulation in the face of unsuccessful goal pursuit across the lifespan. Specifically, this research focused on the motivational role of negative emotions and internal goal engagement when experiencing regret across the lifespan. Furthermore, this body of research sought to expand current lifespan motivational theories by addressing the limitations inherent in existing studies. In particular, Study 1 explored the effects of intense negative emotions, following the regret experience, on progress made in overcoming these regrets, as well as emotional intensity and well-being in young adults over a span of 13 months. Additionally, this study investigated and illustrated the motivational effects of these negative emotions on regret engagement and implementation intentions and how these processes ultimately led to regret-related progress. Study 2 focused specifically on young adults who are pessimistic about their odds to overcome their regrets yet continue to engage in this goal in order to examine how such generalized internal engagement tendencies may alter one's expectations and well-being over 13 months. This investigation sought to build on existing motivational theories and address the processes inherent when subjective outcome expectancies differ from objective ones in young adults. Finally, Study 3 investigated the generalizability of the results obtained in the previous studies across the lifespan by studying similar processes in older individuals over a span of 26 months. The goal of this study was to gain a better understanding of forces at play in older versus younger adulthood and how these may affect adaptive self-regulation in this age group.

The results from the described studies strongly supported the hypotheses. Study 1 illustrated the aversive and powerful nature of negative emotions resulting from regret by emphasising their motivational force. Namely, this study, which followed young adults longitudinally, found that those who reported greater intensity of regret-related negative emotions displayed greater progress in undoing the negative effects of their regret which led to a greater reduction in this emotional intensity alongside greater improvements in their well-being over time.

A second objective of this study was to investigate the processes, which mediated the effects of negative emotional intensity on greater regret-related progress. It was discovered that

two specific processes were responsible for this effect. First, engagement in the goal of undoing one's regret at baseline mediated the association between emotional intensity and goal-related progress. In addition, increases in implementation intentions over time in the study also mediated this relation. These findings suggest that intensity of regret emotions act as a catalyst for engaging in overcoming the regret as well as the creation of implementation intentions concerning this goal over time. These processes allow the individual to make adequate progress relating to a specific goal, which improves well-being and reduces the intensity of the regret emotions over time.

Study 2 addressed the important role of internal, or engagement in overcoming one's regret in the face of pessimistic (versus optimistic) expectations as to the likelihood of accomplishing this goal. Specifically, this study showed that young adults who had pessimistic outcome expectancies regarding undoing the negative effects of their regret, yet continued to engage in this goal, displayed improvements in their outcome expectancies over time. These results were not found for their more optimistic counterparts and suggest that pessimistic individuals became more optimistic, leading to additional improvements in their subjective well-being across the 13 months of the study. Bootstrap analyses confirmed that this change in outcome expectancies partially mediated the associations between initial outcome expectancies and positive, and negative well-being. These findings help clarify the motivational processes present in circumstances where a gap may exist between objective and subjective goal-related outcome expectancies in young adults, and how these processes protect individual primary control potential in a life stage where it is vital to do so.

Study 3 emphasized the specificity of the above findings to the young adult population by illustrating that initially intense regret-related emotions in older adults related to greater emotional intensity over time and did not affect subjective well-being over the 26 months of the study. In addition, the longitudinal analyses used in this study indicated that when older adults report pessimistic outcome expectancies regarding their opportunity to overcome their regret, continued engagement in that goal was not related to changes in these expectancies, nor to changes in well-being over time. In support of my hypothesis, what proves as adaptive in young adulthood does not correspond with similar benefits as people advance in age.

Contributions to Theory and Research

The results described above resonate and provide further support to the importance of negative emotions as the driving force in unsuccessful goal pursuit. These findings illustrate how the experience of hindered or unsuccessful goal pursuits, using the example of regret, can lead to a discrepancy when comparing the environment with a sought-after ideal scenario. The discrepancy between these two scenarios directly results in the experience of intense negative emotions, which work to move the individual into action (Carver & Scheier, 1990). The findings described above emphasize the pivotal role of these negative emotions and their intensity on individual motivation to either change the method of goal pursuit, or disengage from the goal altogether, thus lending further support to research on the adaptive value of specific emotions (see also Baumeister et al., 2007; Nesse & Ellsworth, 2009). Essentially, the reported results suggest that individuals who experience regret-related emotions as intense, and therefore highly aversive, will invest time, effort, and resources, in correcting their current situation, or in this case undoing the negative effects of regrets. On the other hand, those individuals who did not report regret-related emotions as intense did not report the presence of enhanced motivational processes (i.e., engagement, implementation intentions) to alter the state they are in. These findings solidify the role of negative emotions in motivational processes, as they lead to conscious movement toward or away from specific goals (Frijda, 1988; Klinger, 1998; Rasmussen et al., 2006). Moreover, the important role of negative emotions as vehicles of engagement and pursuit, illustrated in these findings, adds to a body of research supporting the addition of emotional processes, such as anticipated regret (AR), to the model of TPB (Ajzen, 1999; Conner, Sandberg, McMillan, & Higgins, 2006; Sandberg & Conner, 2008). In fact, recent studies indicate that the inclusion of AR in the TPB model has significantly improved variance explained in the prediction of intention of future behavior, namely that the anticipation of regret has significant links to future actions (Sandberg & Conner, 2008).

It is important to note that positive affect displayed trajectories over time that differed from negative emotional states. Specifically, positive affect was not mediated by regret-related progress, which corresponds to the notion that negative emotions specifically, not positive ones, lead to the cascade of changes examined and would therefore be most affected by these changes. Interestingly, the sample as a whole reported reductions in positive affect overtime, with individuals who did not perceive their negative emotions as intense suffering the greatest decline.

This finding suggests separate slopes for positive versus negative emotions, as the latter increase sharply initially and produce change, while the former are slower to react in the short-term but are increasingly affected as time progresses. This finding expands emotion-based research by elucidating the separate trajectories negative and positive emotions follow when individuals encounter unattainable goals.

In addition, the findings described in this dissertation build on previous motivational research by focusing on the processes of goal engagement and implementation intentions and their role in adaptive development. As illustrated in Study 1, the experience of intense negative emotions led to progress in accomplishing one's goal and thereby to improvements in subjective well-being, through these two motivational processes. The finding that regret engagement was important at onset and that implementation intentions showed cumulative effects also corroborates with previous research. Indeed, goal engagement comprises of a general focus on the specific goal and therefore may not display significant changes throughout the process of pursuit (Gollwitzer, 1999). However, while goals require an initial commitment of resources, effort, and time, research focusing on implementation intentions stresses the role of these intentions as highly specific, continuously evolving, trouble-shooting techniques used to promote unconscious action and habit formation, thereby decreasing conscious mental effort and distraction (Gollwitzer, 1999; Sheeran et al., 2005). These findings focus and exemplify how each of these processes is important at differing stages of goal pursuit, adding to the appreciation of the intricacies of the motivational processes at play in the pursuit of desired goals.

The reported findings provide several pieces of evidence in support of the motivational theory of lifespan development which distinguishes different forms of adaptive self-regulation needed for optimal development among younger and older adults (Heckhausen et al., 2010). First, this theory postulates that young adults, for the most part, enjoy ample opportunity to pursue and successfully achieve desired goals and that this process goes hand in hand with the multitude of developmental tasks inherent in this life period (e.g., education, romantic partnership, raising a family; Havighurst, 1972; Hackhausen et al., 2010). This assumption was supported by the above findings, as young adults benefitted from experiencing intense negative emotions, which pushed them to commit to and show progress in overcoming their regret. Overall, findings focusing on young adults indicated that pursuing their regrets leads to positive changes in motivation, emotional intensity, goal progress, and well-being over time.

On the other hand, Heckhausen and her colleagues (2010) specify that as adults move into old age, their control over the environment decreases which necessitates them to alter how they approach a challenging goal, or to abandon the goal altogether, in order to maintain a sense of mastery. The findings using the retirement sample lends support to this assumption, as older adults did not exhibit similar benefits following the experience of intense negative emotions or when individuals continued engaging in their regret despite pessimistic outcome expectancies. In fact, these results show that older adults who reported intense negative emotions at onset, reported an increase in the intensity of emotions over the duration of the study, indicating that this experience is detrimental to their well-being.

In addition, these findings extend this theory with regards to individual differences in subjective outcome expectancies. It appears that when young adults reported pessimistic outcome expectancies, continued engagement in overcoming their regrets led to increased optimism and improved well-being over time. This finding speaks to the importance of the opportunity-congruent optimization process (Heckhausen et al., 2010). Namely, that differences in opportunity available, in this case based on age, influence which control strategy becomes most appropriate for adaptive development. Thus, young adults are encouraged to continue engaging in their desired goals, despite having pessimistic expectations, which can help them to narrow the gap between subjective and objective outcome expectancies and benefit from continued goal pursuit. As individuals age and their opportunities decrease in old age, however, these findings illustrate that continued engagement does not carry the same benefits, and is therefore not as adaptive, as is was shown in young adulthood.

Moreover, these results point to flexibility in one's expectations to accomplish a goal, depending on general tendencies to control regret-related circumstances. This finding provides greater depth to theories on optimism, which show that possessing optimistic outcome expectancies related to greater well-being, as optimistic individuals were more likely to continue engaging despite hurdles as well as more likely to notice and take advantage of opportunity available in the environment (Ajzen, 1999; Carver et al., 2010; Oettingen & Mayer, 2002; Wrosch & Scheier, 2003). According to the present findings, it is also possible for individuals to become more optimistic following continued engagement, thereby illustrating that even pessimistic young adults can generate a more optimistic outlook that will ultimately lead to positive changes in their well-being.

Finally, the present research broadens current understanding of the function and importance of regret and its emotions in young adulthood. Thus far, regret theorists have hypothesized that young adults benefit from regret to the extent that they learn from the experience of such setbacks (Pieters & Zeelenberg, 2007; Roese & Summerville, 2005). Research, however, has provided mixed results as to the benefits of regret in this age group, with some studies reporting no correlation between regret and well-being and others pointing to reduced emotional intensity and intrusiveness of the regret when young adults assume responsibility for the regret effects (Wrosch et al., 2005; Wrosch & Heckhausen, 2002). These findings provide further support for the latter trend by establishing that young adults can improve well-being if they engage in overcoming their regret.

Clinical Implications

While the present research points to great benefits inherent in regret engagement for young adults, several caveats were also revealed, all of which may have strong implications for clinical practice. First and perhaps most importantly, this body of research stresses and gives credence to the benefits of regret in young adulthood, both in terms of motivational processes and potential to change negative circumstances as well as in well-being. For this reason, clinicians should be made aware of the findings described above and make use of this research in their practice to benefit young adults who report experiencing severe life regrets.

In addition, while young adulthood is viewed as a period of life where opportunity to accomplish one's goals and overcome hurdles is plentiful, some young adults may objectively possess low opportunity to undo the negative effects of their regret. One such example - 'not having seen a dear friend before her passing' – illustrates a situation where the individual's opportunity to make amends for their situation are genuinely non-existent. In situations such as these, the present research showed that engaging in self-protection (e.g., downward social comparisons) was associated with increases in positive well-being over time. This finding points to the importance of such processes in the protection of emotional resources and builds upon previous research illustrating that regret-related downward comparisons can benefit well-being and engagement in new goals, when individuals report low opportunity, regardless of age (Bauer & Wrosch, 2011). Individuals of any age who seek support and clinical guidance in the process of regret could benefit from this knowledge and thereby protect their sense of self-mastery and well-being.

Moreover, the reported findings point to differing emotional trajectories when young adults report a regret of commission (i.e., regretting an action they had done) versus a regret of omission (i.e., regretting something they had not done). Namely, individuals reporting a regret of commission displayed greater initial negative consequences, specifically more depressive symptoms, while those reporting a regret of omission reported greater increases in depressive symptoms and reductions in positive affect over time. These findings offer support to research conducted by Gilovich and Medvec (1995), and illustrate greater initial negative impact of action regrets, while more negative long-term effects for inaction regrets. Indeed, significant differences were observed between the two age groups' reported regret types, with nearly half of the young adult sample reporting regrets of commission, as opposed to the 80% of older adults who reported regrets of omission. This information could be utilized in clinical practice to assist young adults reporting a severe life regret by alerting them to these specific trajectories. While individuals reporting a regret of inaction may not experience the same negative effects as those reporting regrets of action, they may benefit from the understanding that resolution of their regret may be beneficial, despite low current emotional intensity, as the negative impact of their regret may present itself later on, and thus possibly become more difficult to undo.

Finally, this dissertation has shown that the benefits found in young adulthood did not replicate themselves in an older sample, indicating that adaptive development requires differing processes across the lifespan. Specifically, while the experience of intense negative emotions acts as a catalyst for change and development in young adulthood, it proved detrimental to older adult' regret-related affect. In addition, pessimistic older adults who continued engaging in overcoming their regrets did not display similar benefits to those reported by young adults, indicating that goal engagement may not be adaptive across the entire lifespan. These processes should therefore become apparent to older adults who present to therapy with severe life regrets, and alternative avenues should be explored. Such alternatives may consist of either changing one's view of their predicament or of psychologically disengaging from their regret altogether. Research has found significant associations between self-protection, well-being, and health in older adults. For example, Bauer and Wrosch (2011) report increased positive affect when adults with low opportunity utilized downward social comparisons. In addition, older adults who used social comparisons suffered from fewer cold symptoms. Finally, research has linked disengagement from unattainable goals with improved well-being and reduced illness symptoms,

cortisol dysregulation and systemic inflammation (Wrosch & Miller, 2009). The present findings correspond well with this body of research, which states that disengagement from such goals will allow individuals to utilize their limited resources to pursue other goals which will protect their sense of control and well-being (Wrosch, 2011; Wrosch, Scheier et al., 2003). It is important to note however, that variability in objective opportunity to accomplish one's goals is present across the entire lifespan. For this reason, individuals should be made aware of age-normative processes, yet the consequences of continued engagement in one's regret, or any other goal, should also be assessed on a case by case basis.

Limitations and Future Directions

There were several limitations in this body of research that should be addressed in future studies. First, these studies followed the premise of lifespan developmental theories (see Heckhausen et al., 2010). These theories postulate that while young adults enjoy ample opportunity to accomplish their desired goals, older adulthood is characterized by low levels of primary control. This assumption, while describing age-normative development, does not take into account individual variability which exists in primary control within each age group across the lifespan. It has been discussed above that some young adults reported regrets which present with low opportunity to overcome their negative effects (see example in Clinical Implications). By the same token, it is possible that some older individuals reported regrets that involve high opportunity to undoing the regret, such as 'not purchasing a house'. This type of variability may have influenced how one's regret affected both short- and long-term well-being, intensity of emotions and outcome expectancies. Future studies would benefit from ascertaining objective opportunity on a case-by-case basis in order to account for such individual differences. This approach could help develop a greater understanding of variability across the lifespan and how such variability affects the regret experience at different ages.

An additional limitation relates to the nature of the samples used in these studies. First, the young adult sample used included students at a university in a large metropolitan area. These individuals are assumed to be well-educated and perhaps more introspective than their counterparts. It is possible that the results obtained in these studies would differ had the young adults participating would have consisted of a more heterogeneous sample. Moreover, the individuals who took part in the older adulthood study composed another homogeneous sample. These participants are considered on the younger-range of older adulthood (average age of 58.46

years). It is possible that a sample including, or focusing on, older-old adults would have produced differing results. Finally, the individuals participating in the retirement study were instructed to arrive at the laboratory for testing, as well as undergo a long series of questionnaires and cognitive tests. This indicates that these participants were self-sufficient, highly mobile and possessed elevated cognitive functioning than can be expected in more age-normative older adults. Future research would benefit from investigating more heterogeneous samples as well as older and more age-normative older adults in order to obtain a greater understanding of the regret experience across older adulthood, thereby gaining an in-depth appreciation of the generalizability of the results discussed to the older adult population as a whole.

While engagement in the pursuit of desired goals has been proven essential when opportunity to do so is at its optimal level, research has repeatedly shown that processes of self-protection and disengagement are adaptive when opportunity to successfully pursue one's goal is low (Baltes & Baltes, 1990; Bradtstädter & Greve, 1994; Heckhausen et al., 2010; Wrosch, 2011). The present studies have investigated the role of such processes in young adulthood and results have shown that such protection may sometimes be used in this sample and produce measurable benefits. However, the use of such strategies was not studied in older adulthood. It is possible that the use of self-protection mechanisms or goal disengagement allowed certain individuals to be less negatively affected by the experience of their regret, as opposed to others who are less able to utilize such strategies. These findings would be in line with previous research on the matter and would help build on this literature (Bradtstädter & Rothermund, 1994; Wrosch & Scheier, 2003). Studying the experience of regret, or other challenging goal pursuits, in older adulthood specifically, could benefit from this focus.

Further, in studying the benefits of continued engagement in pessimistic young adults it was expected that poor outcome expectancies improve over time as individuals continuously engage in their chosen goal, thereby opening themselves to noticing, or perhaps creating, available opportunity in their environment. Moreover, it was presumed that such increases in outcome expectancies led to improved well-being as individuals progress toward achieving their desired goals. Future studies should focus on assessing the underlying processes that drive and result from changes in outcome expectancies and the inherent benefits of this process. Perhaps separating positive and negative elements of well-being will provide an even greater understanding of these processes, as they may influence and drive each other.

Finally, the reported research has found that two separate motivational processes, namely regret engagement and implementation intentions, mediated the relation between regret intensity and regret-related progress. However, a time overlap exists in the variables assessing change in implementation intentions and progress. It is indeed possible that these processes continuously influence each other across time, whereby progress is influenced by implementation intentions and they are in turn influenced by progress made toward one's goal. Although this possibility cannot be excluded empirically, these results were interpreted based on a large body of research indicating that goal progress can only be predicted by assessing one's intentions, thereby stressing the role of implementation intentions as the corner stone to goal pursuit (Gollwitzer, 1999). In a similar vein, while these findings show that progress made toward undoing the negative effect of one's regret mediated the association between regret intensity and well-being, a temporal overlap also exists between regret-related progress and well-being changes over time. As described above, changes in well-being over time could certainly promote progress in overcoming a regretted event. However, past regret research has repeatedly demonstrated that making progress in one's regret led to improvements in well-being rather than the reverse (Diener & Suh, 1997; Heckhausen et al., 2010; King & Hicks, 2006). This led to the specific interpretation used in the present research. Finally, this overlap also existed between changes reported in outcome expectancies and well-being over time. It is in fact possible that improvements in well-being, namely an increase in positive elements of well-being and a reduction in negative ones, may lead to increased outcome expectancies. Nonetheless, the current interpretation relies on previous research illuminating the path from optimistic outcome expectancies and its positive influence on well-being and continued goal engagement and pursuit (Carver et al., 2010; Oettingen & Mayer, 2002). Future studies would be wise to address these limitations and build on the present research by continuously measuring these constructs in a longitudinal fashion in order to better ascertain the effects they have on each other over time.

As the experience of regret is shown to be the overwhelming norm, rather than the exception, it is important to continue studying its effects on motivation and emotion across the lifespan. Additionally and perhaps even more important, is the continued investigation of adaptive strategies to cope with the experience of regret over time and across differing age groups and levels of control. Such endeavours will allow us to assist all those individuals suffering from the aftermath of severe life regrets, by guiding them on the path toward adaptive

development. Because while the experience of regret is a part of life, suffering from this experience doesn't have to be.

References

Aiken, L.S., & West, S.G. (1991). Multiple regression: Testing and interpreting interactions. Sage Publications Inc.: Thousand Oaks, CA.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.doi: http://0-dx.doi.org.mercury.concordia.ca/10.1016/0749-5978(91)90020-T

Armstrong, K.A., Khawaja, N.G., & Oei, T.P.S. (2006). Confirmatory factor analysis and psychometric properties of the anxiety sensitivity index – revised in clinical and normative populations. *European Journal of Psychological Assessment, 22*(2), 116-125. doi: 10.1027/1015-5759.22.2.116

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

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman: New York, NY.

Bauer, I., & Wrosch, C. (2011). Making up for lost opportunities: The protective role of downward social comparisons for coping with regrets across adulthood. *Personality and Social Psychology Bulletin, 37*(2), 215-228. doi: 10.1177/0146167210393256

Bauer, I., Wrosch, C., & Jobin, J. (2008). I'm better off than most other people: The role of social comparisons for coping with regret in young adulthood and old age. *Psychology and Aging, 23*(4), 800-811. doi: 10.1037/a0014180

Baumeister, R.F. (1991). The self against itself: Escape or defeat? In R.C. Curtis (Ed.), *Theoretical convergences in psychoanalysis and social psychology* (pp. 238-256). New York, NY: Guilford Press.

Baumeister, R.F., Vohs, K.D., DeWall, C.N., & Zhang, L. (2007). How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation. *Personality and Social Psychology Review, 11*(2), 167-203. doi: 10.1177/1088868307301033

Beike, D.R., & Crone, T.S. (2008). When experienced regret refuses to fade: Regrets of action and attempting to forget open life regrets. *Journal of Experimental Social Psychology, 44*(6), 1545-1550. doi: 10.1016/j.jesp.2008.06.008

Beike, D.R., Markman, K.D., & Karadogan, F. (2009). What we regret most are lost opportunities: A theory of regret intensity. *Personality and Social Psychology Bulletin, 35*(3), 385-397. doi: 10.1177/0146167208328329

Boninger, D.S., Gleicher, F., & Strathman, A. (1994). Counterfactual thinking: From what might have been to what may be. *Journal of Personality and Social Psychology, 67*(2), 297-307. doi: 10.1037/0022-3514.67.2.297

Brandtstädter, J., & Greve, W. (1994). The aging self: Stabilizing and protective processes. *Develpomental Review, 14*(1), 52-80. doi: 1994-29055-001

Brandtstädter, J., & Renner, G. T. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychology and Aging, 5*(1), 58-67. doi: 10.1037/0882-7974.5.1.58

Brandtstädter, J., & Rothermund, K. (1994). Self-percepts of control in middle and later adulthood: Buffering losses by rescaling goals. *Psychology and Aging, 9*(2), 265-273. doi: 10.1037/0882-7974.9.2.265

Brissette, I. Scheier, M.F., & Carver, C.S. (2002). The role of optimism in social network development, coping, and psychological adjustment during a life transition. *Journal of Personality and Social Psychology, 82*(1), 102-111. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0022-3514.82.1.102

Byrne, R.M.J. (2005). *The rational imagination: How people create alternatives to reality*. Cambridge, MA: MIT Press.

Carver, C.S., & Scheier, M. (1990). Principles of self-regulation: Action and emotion. In E.T. Higgins (Ed.), *Handbook of motivation and cognition* (Vol 2, pp. 3-52). New York, NY: Guilford Press.

Carver, C.S., & Scheier, M.F. (1998). *On the self-regulation of behavior*. New York, NY: Cambridge University Press.

Carver, C.S., Scheier, M.F., & Segerstrom, S.C. (2010). Optimism. *Clinical Psychology Review, 30*(7), 879-889. doi: 10.1016/j.cpr.2010.01.006

Chang, E.C. (1998). Dispositional optimism and primary and secondary appraisal of a stressor: Controlling for confounding influences and relations to coping and psychological and physical adjustment. *Journal of Personality and Social Psychology, 74*(4), 1109-1120. doi: 10.1037/0022-3514.74.4.1109

Cohen, S., Tyrrell, D.A., & Smith, A.P. (1993). Negative life events, perceived stress, negative affect, and susceptibility to the common cold. *Journal of Personality and Social Psychology, 64*(1), 131-140. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0022-3514.64.1.131

Conner, M., Sandberg, T., McMillan, B., & Higgins, A. (2006). Role of anticipated regret, intentions, and intention stability in adolescent smoking initiation. *British Journal of Health Psychology, 11*(1), 85-101. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1348/135910705X40997

Coricelli, G., Critchley, H.D., Joffily, M., O'Doherty, J.P., Sirigu, A., & Dolan, R.J. (2005). Regret and its avoidance: A neuroimaging study of choice behavior. *Nature Neuroscience, 8*(9), 1255-1262. doi: 10.1038/nn1514

Deci, E.L., & Ryan, R.M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1207/S15327965PLI1104_01

Diener, E., Emmons, R.A., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75. doi: 10.1207/s15327752jpa4901_13

Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social and subjective indicators. *Social Indicators Research, 40*(1-2), 189-216. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1023/A:1006859511756

Ebner, N.C., Freund, A.M., & Baltes, P.B. (2006). Developmental changes in personal goal orientation from young to late adulthood: From striving for gains to maintenance and prevention of losses. *Psychology and Aging, 21*(4), 664-678. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0882-7974.21.4.664

Epstude, K., & Roese, N.J. (2008). The functional theory of counterfactual thinking. *Personality and Social Psychology Review, 12*(2), 168-192. doi: 10.1177/1088868308316091

Feeney, A., Gardiner, D.R., Johnston, K., Jones, E., & McEvoy, R.J. (2005). Is regret for inaction relatively self-enhancing? *Applied Cognitive Psychology, 19*(6), 761-777. doi: 10.1002/acp.1113

Fisher, A., & LaFrance, M. (2015). What drives the smile and the tear: Why women are more emotionally expressive than men. *Emotion Review, 7*(1), 22-29. doi: 10.1177/1754073914544406

Förster, J., Liberman, N., & Higgins, E.T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41*(3), 220-239. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1016/j.jesp.2004.06.009

Freund, A.M., & Ebner, N.C. (2005). The aging self: Shifting from promoting gains to balancing losses. In W. Greve, K. Rothermund & D. Wentura The adaptive self: Personal continuity and intentional self-development (pp. 185-202). Ashland, OH: Hogrefe & Huber Publishers.

Freund, A.M., & Riediger, M. (2006). Goals as building blocks of personality and development in adulthood. In D.K. Mroczek and T.D. Little (Eds.), *Handbook of personality development* (pp. 353-372). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Frijda, N.H. (1988). The laws of emotion. *American Psychologist, 43*(5), 349-358. doi: 10.1037/0003-066X.43.5.349

Gilovich, T., & Medvec, V.H. (1995). The experience of regret: What, when, and why. *Psychological Review, 102*(2), 379-395. doi: 10.1037/0022-3514.69.4.603

Gilovich, T., Medvec, V.H., & Kahneman, D. (1998). Varieties of regret: A debate and partial resolution. *Psychological Review, 105*(3), 602-605. doi: 10.1037/0033-295X.105.3.602

Gollwitzer, P.M. (1999). Implementation intentions: Strong effects of simple plans. *American Pscyhologist, 54*(7), 493-503. doi: 10.1037/0003-066X.54.7.493

Gollwitzer, P.M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*(1), 186-199. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0022-3514.73.1.186

Gollwitzer, P.M., & Schaal, B. (1998). Metacognition in action: The importance of implementation intentions. *Personality and Social Psychology Review, 2*(2), 124-136. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1207/s15327957pspr0202_5

Grossman, M., & Wood, W. (1993). Sex differences in intensity of emotional experience: A social role interpretation. *Journal of Personality and Social Psychology, 65*(5), 1010-1022. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0022-3514.65.5.1010

Havighurst, R. J. (1972). *Developmental tasks and education*. New York: Davis McKay.

Heckhausen, J. (1997). Developmental regulation across adulthood: Primary and secondary control of age-related challenges. *Developmental Psychology, 33*(1), 176-187. doi: 10.1037/0012-1649.33.1.176

Heckhausen, J. (1999). *Developmental regulation in adulthood: Age-normative and sociostructural constraints as adaptive challenges*. Cambridge, U.K.: Cambridge University Press.

Heckhausen, J., Dixon, R. A., & Baltes, P. B. (1989). Gains and losses in development throughout adulthood as perceived by different adult age groups. *Developmental Psychology, 25*(1), 109-121. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0012-1649.25.1.109

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review, 102*(2), 284-304. doi: 10.1037/0033-295X.102.2.284

Heckhausen, J., & Schulz, R. (1998). Developmental regulation in adulthood: Selection and compensation via primary and secondary control. In J. Heckhausen & C.S. Dweck (Eds.), *Motivation and self-regulation across the life span* (5-77). NewYork, NY: Campbridge University Press.

Heckhausen, J., Wrosch, C., & Fleeson, W. (2001). Developmental regulation before and after a developmental deadline: The sample case of "biological clock" for child-bearing. *Psychology and Aging, 16*(3), 400-413. doi: 10.1037/0882-7974.16.3.400

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of lifespan development. *Psychological Review, 117*(1), 32-60. doi: 10.1037/a0017668

Heller, D., Komar, J., & Lee, W.B. (2007). The dynamics of personality states, goals, and well-being. *Personality and Social Psychology Bulletin, 33*(6), 898-910. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1177/0146167207301010

Henderson, M.D., Gollwitzer, P.M., Oettingen, G. (2007). Implementation intentions and disengagement from a failing course of action. *Journal of Behavioral Decision Making, 20*(1), 81-102. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1002/bdm.553

Jokisaari, M. (2003). Regret appraisals, age, and subjective well-being. *Journal of Research in Personality, 37*(6), 487-503. doi: 10.1016/S0092-6566(03)00033-3

Kahnman, D. (1995). Varieties of counterfactual thinking. In: What might have been: The social psychology of counterfactual thinking. N.J. Roese and J.M. Olsen (Eds.); Hillsdale, England: Lawrence Erlbaum Associates, pp. 375-396.

King, L.A., & Hicks, J.A. (2006). Narrating the self in the past and the future: Implications for maturity. *Research in Human Development, 3*(2-3), 121-138. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1207/s15427617rhd0302&3_4

King, L.A., & Hicks, J.A. (2007). Whatever happened to 'what might have been'? Regrets, happiness, and maturity. *American Psychologist, 62*(7)*,* 625-636. doi: 10.1037/0003-066X.62.7.625

Klinger, E. (1998). The search for meaning in evolutionary perspective and its clinical implications. In P.T.P. Wong & P.S. Fry (Eds.), *The human quest for meaning: A handbook of psychological research and clinical applications* (27-50). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Landman, J. (1987). Regret: A theoretical and conceptual analysis. *Journal for the Theory of Social Behaviour, 17*(2), 135-160. doi: 10.1111/j.1468-5914.1987.tb00092.x

Lecci, L., Okun, M. A., & Karoly, P. (1994). Life regrets and current goals as predictors of psychological adjustment. *Journal of Personality and Social Psychology, 66*(4), 731–741. doi: 10.1037/0022-3514.66.4.731

Lerner, R.M., & Busch-Rossnagel, N.A. (Eds.). (1981). *Individuals as producers of their development: A life-span perspective*. New York, NY: Academic Press.

Lucas, R.E. (2007). Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science, 16*(2), 75-79.

Lupien, S.J., & Wan, N. (2004). Successful ageing: From cell to self. *Philosophical transactions of the Royal Society B: Biological Sciences, 359*(1449), 1413-1426. doi: 10.1098/rstb.2004.1516

Marsiske, M., Lang, F.R., Baltes, P.B., & Baltes, M.M. (1995). Selective optimization with compensation: Life-span perspectives on successful human development. In R.A. Dixon & L. Bäckman (Eds.), Compensating for psychological deficits and declines: Managing losses and promoting gains (pp. 35-79). Hillsdale, NJ: Erlbaum Associates.

Milan, A., Wong, I., & Vézina, M. (2014). *Emerging trends in living arrangements and conjugal unions for current and future seniors* (*Insights on Canadian Society*, Statistics Canada Catalogue no. 75-006-X). Ottawa, Canada: Statistics Canada.

Nesse, R.M. (2000). Is depression an adaptation? *Archives of General Psychiatry, 57*(1), 14-20. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1001/archpsyc.57.1.14

Nesse, R.M., & Ellsworth, P.C. (2009). Evolution, emotions, and emotional disorders. *American Psychologist, 64*(2), 129-139. doi: 10.1037/a0013503

Newall, N.E., Chipperfield, J.G., Daniels, L.M., Hladkyj, S., & Perry, R.P. (2009). Regret in later life: Exploring relationships between regret frequency, secondary interpretive control beliefs, and health in older individuals. *The International Journal of Aging & Human Development, 68*(4), 261-288. doi: 10.2190/AG.68.4.a

Oettingen, G., & Mayer, D. (2002). The motivating function of thinking about the future: Expectations versus fantasies. *Journal of Personality and Social Psychology, 83*(5), 1198-1212. doi: 10.1037/0022-3514.83.5.1198

Pieters, R., & Zeelenberg, M. (2007). A theory of regret regulation 1.0. *Journal of Consumer Psychology, 17*(1), 3-18. doi: 10.1207/s15327663jcp1701_3

Powers, T.A., Koestner, R., & Topciu, R.A. (2005). Implementation intentions, perfectionism, and goal progress: Perhaps the road to hell is paved with good intentions. *Personality and Social Psychology Bulletin, 31*(7), 902-912. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1177/0146167204272311

Preacher, K.J., Curran, P.J., & Bauer, D.J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31*(4), 437-448. http://quantpsy.org/pubs/preacher_curran_bauer_2006.pdf

Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. doi: 10.3758/BRM.40.3.879

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. doi: 10.1177/014662167700100306

Rasmussen, H.N., Wrosch, C., Scheier, M.F., & Carver, C.S. (2006). Self-regulation processes and health: The importance of optimism and goal adjustment. *Journal of Personality, 74*(6), 1721-1747. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1111/j.1467-6494.2006.00426.x

Reb, J. (2008). Regret aversion and decision process quality: Effects of regret salience on decision process carefulness. *Organizational Behavior and Human Decision Processes, 105*(2), 169-182. doi: 10.1016/j.obhdp.2007.08.006

Roese, N.J. (1994). The functional basis of counterfactual thinking. *Journal of Personality and Social Psychology Bulletin, 66*(5), 805-818. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0022-3514.66.5.805

Roese, N.J. (1997). Counterfactual thinking. *Psychological Bulletin, 121*(1), 133-148. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0033-2909.121.1.133

Roese, N.J., Pennington, G.L., Coleman, J., Janicki, M., Li, N.P., & Kendrick, D.T. (2006). Sex differences in regret: All for love or some for lust? *Personality and Social Psychology Bulletin, 32*(6), 770-780. doi: 10.1177/0146167206286709

Roese, N.J., & Summerville, A. (2005). What we regret most… and why. *Personality and Social Psychology Bulletin, 31*(9), 1273-1285. doi: 10.1177/0146167205274693

Roese, N.J., Summerville, A., & Fessel, F. (2007). Regret and behavior: Comment on Zeelenberg and Pieters. *Journal of Consumer Psychology, 17*(1), 25-28. doi: 10.1207/s15327663jcp1701_5

Rothbaum, F., Weisz, J.R., & Snyder, S.S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology, 42*(1), 5-37. doi: 10.1037/0022-3514.42.1.5

Sandberg, T. & Conner, M. (2008). Anticipated regret as an additional predictor in the theory of planned behavior: A meta-analysis. *British Journal of Social Psychology, 47*(4), 589-606. doi: 10.1348/014466607X258704

Scheier, M.F., Wrosch, C., Baum, A., Cohen, S., Martire, L.M., Matthews, K.A., Schulz, R., & Zdaniuk, B. (2006). The life engagement test: Assessing purpose in life. *Journal of Behavioral Medicine, 29*(3), 291-298. doi: 10.1007/s10865-005-9044-1

Schulz, R., & Heckhausen, J. (1996). A life span model of successful aging. *American Psychologist, 51*(7), 702-714. doi: 10.1037/0003-066X.51.7.702

Seligman, M.E.P. (1991). *Learned optimism*. New York: Knopf.

Seligman, M.E.P., Schulman, P., & Tryon, A. (2007). Group prevention of depression and anxiety symptoms. *Behaviour Research and Therapy, 45*(6), 1111-1126. doi: 10.1016/j.brat.2006.09.010

Sheeran, P. (2002). Intention-behavior relations: A conceptual and empirical review. *European Review of Social Psychology, 12*(1), 1-36. doi: 10.1080/14792772143000003

Sheeran, P., Webb, T.L., & Gollwitzer, P.M. (2005). The interplay between goal intentions and implementation intentions. *Personality and Social Psychology Bulletin, 31*(1), 87-98. doi: 10.1177/0146167204271308

Torges, C.M., Stewart, A.J., & Miner-Rubino, K. (2005). Personality after the prime of life: Men and women coming to terms with regrets. *Journal of Research in Personality, 39*(1), 148-165. doi: 10.1016/j.jrp.2004.09.005

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070. doi: 10.1037/0022-3514.54.6.1063

Wrosch, C. (2011). Self-regulation of unattainable goals and pathways to quality of life. In S. Folkman (Ed.). *The Oxford Handbook of Stress, Health, and Coping* (pp. 319-333). New York: Oxford University Press.

Wrosch, C., Bauer, I., Miller, G.E., & Lupien, S. (2007). Regret intensity, diurnal cortisol secretion, and physical health in older individuals: Evidence for directional effects and protective factors. *Psychology and Aging, 22*(2), 319-330. doi: 10.1037/0882-7974.22.2.319

Wrosch, C., Bauer, I., & Scheier, M.F. (2005). Regret and quality of life across the adult life span: The influence of disengagement and available future goals. *Psychology and Aging, 20*(4), 657-670. doi: 10.1037/0882-7974.20.4.657

Wrosch, C., Dunne, E., Scheier, M.F., & Schulz, R. (2006). Self-regulation of common age-related challenges: Benefits for older adults' psychological and physical health. *Journal of Behavioral Medicine, 29*(3), 299-306. doi: 10.1007/s10865-006-9051-x

Wrosch, C., & Heckhausen, J. (1999). Control processes before and after passing a developmental deadline: Activation and deactivation of intimate relationship goals. *Journal of Personality and Social Psychology, 77*(2), 415-427. doi: 10.1037/0022-3514.77.2.415

Wrosch, C., & Heckhausen, J. (2002). Perceived control of life regrets: Good for young and bad for older adults. *Psychology and Aging, 17*(2), 340-350. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0882-7974.17.2.340

Wrosch, C., Heckhausen, J., & Lachman, M.E. (2000). Primary and secondary control strategies for managing health and financial stress across adulthood. *Psychology and Aging, 15*(3), 387-399. doi: 10.1037/0882-7974.15.3.387

Wrosch, C.; Heckhausen, J.; Lachman, M. E. (2006). *In:* Handbook of personality development. Mroczek, D. K. and Little, T. D. (Eds.); Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, pp.399-421.

Wrosch, C., & Miller, G.E. (2009). Depressive symptoms can be useful: Self-regulatory and emotional benefits of dysphoric mood in adolescence. *Journal of Personality and Social Psychology, 96*(6), 1181-1190. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/a0015172

Wrosch, C., Miller, G.E., Lupien, S., & Pruessner, J.C. (2008). Diurnal cortisol secretion and 2-year changes in older adults' physical symptoms: The moderating roles of negative affect and sleep. *Health Psychology, 27*(6), 685-693. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1037/0278-6133.27.6.685

Wrosch, C., Miller, G.E., Scheier, M.F., & Brun de Pontet, S. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin, 33*(2), 251-265. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1177/0146167206294905

Wrosch, C., & Scheier, M.F. (2003). Personality and quality of life: The importance of optimism and goal adjustment. *Quality of Life Research, 12*(Suppl1), 59-72. doi: 10.1023/A:1023529606137

Wrosch, C., Scheier, M.F., & Miller, G.E. (2013). Goal adjustment capacities, subjective well-being, and physical health. *Social and Personality Psychology Compass, 7*(12), 847-860. doi: 10.1111/spc3.12074

Wrosch, C., Scheier, M.F., Miller, G.E., Schulz, R., & Carver, C.S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin, 29*(12), 1494-1508. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1177/0146167203256921

Wrosch, C., Schulz, R., & Heckhausen, J. (2004). Health stresses and depressive symptomatology in the elderly: A control-process approach. *Current Directions in Psychological Science, 13*(1), 17-20. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1111/j.0963-7214.2004.01301005.x

Wrosch, C., Schulz, R., Miller, G.E., Lupien, S., Dunne, E. (2007). Physical health problems, depressive mood, and cortisol secretion in old age: Buffer effects of health engagement control strategies. *Health Psychology, 26*(3), 341-349. doi: 10.1037/0278-6133.26.3.341

Zeelenberg, M. (1999). The use of crying over spilled milk: A note on the rationality and functionality of regret. *Philosophical Psychology, 12*(3), 325-340. doi: http://0-dx.doi.org.mercury.concordia.ca/10.1080/095150899105800

APPENDIX A

Consent Form - Young Adult Regret Study

CONSENT FORM

This is to state that I agree to participate in a program of research being conducted by Dr. Carsten Wrosch of the Psychology Department at Concordia University.

A. PURPOSE

I have been informed that the purpose of this research is to study life regrets and well-being in young adults.

B. PROCEDURES

This research will involve three parts. In the first phase of this study, I will be invited to the laboratory to complete a questionnaire. The questionnaire will focus on self-reports of life regrets, life-management strategies, well-being, and health. At this time, I will receive $10 for my participation.

Six months and 12 months after the first phase of this study, I will be contacted again. I will be asked to complete a short questionnaire at the laboratory. For both follow-up sessions, I will receive additional $10 for my participation by mail.

C. ETHICAL CONCERNS & CONFIDENTIALITY

We do not anticipate any risk or discomfort as a result of the subject's participation in our study. This is true for all phases of the study, including the completion of the questionnaires.

The participant's name will not be attached to the questionnaire, although the signatures and names on the consent forms will be collected and stored separately by the supervising professor. The participant is free to refuse to answer any question that makes him/her uncomfortable or to entirely discontinue their participation.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences. Even if I discontinue my participation, I will receive payment for the session.
- I understand that my participation in this study is CONFIDENTIAL (i.e., the researcher will know, but will not disclose my identity)
- I understand that the data from this study might be published but with NO reference to my name.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

DATE _____

APPENDIX B

Consent Form – Concordia Longitudinal Retirement Study

Consent Form

This is to state that I agree to continue my participation in the retirement study being conducted by Drs Pushkar, Conway, Li and Wrosch from the Centre for Research in Human Development and the Department of Psychology at Concordia University.

I have been informed that:

1. My participation in this study entails my completing a battery of questionnaires, including questionnaires about the activities I do, my physical health, as well as about various life domains including my well-being, memory, cognition and my attitudes.

2. All information about me or any other person will remain completely confidential. Results from this study will be accessible only to the researchers involved in this study. They will be able to use the information for scientific purposes, such as for publications in scientific journals or presentations at scientific conferences, as long as I cannot be identified as a participant in this study.

3. I am free to withdraw my consent and discontinue my participation at any time without negative consequences.

4. This interview should last approximately four hours. I will receive a monetary compensation of $50 for the four hours.

5. Because this is a longitudinal study, I may be contacted again for an annual interview in 2006. Each annual interview will last approximately four hours. I will receive $50 for each annual interview in which I will take part.

6. I understand the purpose of this study; I know that there is no deception involved.

7. The person in charge of this study is Dr. Dolores Pushkar. She can be reached at (514) 848.2424, extension 7540, e-mail: retraite@alcor.concordia.ca .

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

Name (please print) _____

Signature _____

Date _____

Witness _____

APPENDIX C

Assessment of Basic Sociodemographic Characteristics – Young Adult Regret Study

Personal information

1. **Sex** ☐ Female ☐ Male

2. **Age** _____ yrs.

3. **First Language** ☐ English ☐ French ☐ Other_____

4. **Family Status?**

   - ☐ Single
   - ☐ In a relationship
   - ☐ Live with partner, but not married
   - ☐ Married
   - ☐ Divorced; please indicate since when _____
   - ☐ Widowed; please indicate since when _____

5. **Highest Level of Education Completed**

   - ☐ High School
   - ☐ Collegial or Trade School
   - ☐ Bachelor's Degree
   - ☐ Masters
   - ☐ Doctorate Degree
   - ☐ Other: Please describe _____

6. **Current Family income (per year):**

   ☐ Less than 10 000$ ☐ 10 001$ - 30 000$ ☐ 30 001$ - 50 000$
   ☐ 50 001$ - 80 000$ ☐ 80 001$ - 100 000$ ☐ Over 100 000$

7. Height (in inches): _____

8. Body weight (in pounds): _____

9. Major: _____

10. Year: _____ of _____

APPENDIX D

Assessment of Basic Sociodemographic Characteristics – Concordia Longitudinal Retirement Study

Socio-demographic Questionnaire

ID# _____
Date _____

1. What is your sex? Male _____ Female _____
2. What is your date of birth? Year _____Month _____Date _____
3. What is your age? _____
4. What is the highest level of education you have completed? (please circle that which corresponds best)

   Primary School : 1 2 3 4 5 6
   Secondary School : 7 8 9 10 11 12
   CEGEP/College : Diploma
   University : Bachelor's Master's Doctorate
   Other (please indicate what, how many years) _____
5. What was your occupation? _____
6. When did you retire?
   Year _____ Month _____ Date _____
7. How many years were you employed? _____
8. Do you receive a pension from your employer? Yes _____ No _____
9. At the time of your retirement, what was your annual salary? _____
10. What is your present annual income (include all sources, e.g. RRSP's, etc.)?
    _____
11. What is your total family income from all sources? _____
12. Compared to other people of your age that you know, how would you rate your financial situation? (please circle the corresponding number)

    a. A lot worse than most
    b. Worse than most
    c. A little worse than most
    d. About the same as most
    e. A little better than most
    f. Better than most
    g. A lot better than most

APPENDIX E

Assessment of Severe Life Regret

Life Regrets

People make a lot of important decisions during their lives and they sometimes think that they should have done something differently than they did. For example, a person may believe that she/he would be better off today if she/he had behaved in a different way in the past. In such situations, people might regret their behaviors. In addition, some of these regrets have negative consequences and people often want the negative consequences of their regrets to be undone.

Life regrets might result from things that people have done (e.g., having pursued a fruitless goal) and from things that people have not done (e.g., not having pursued a certain goal) across a number of different life domains (e.g., work, family, spouse, health). Regrets are related to decisions in people's daily lives (e.g., not having visited a friend) and to people's long-term development (e.g., having pursued inappropriate career goals).

Please think for a moment about your life. Is there anything in your life that you regret having done or not having done? Please think about your regrets and write down your most severe life regret.

_____

_____

APPENDIX F

Assessment of Regret Outcome Expectancies and Regret Engagement

Life Regrets

We would like to ask you some specific questions concerning the regret that you have noted.

a. Does the regret that you have noted relate to a behavior
- ☐ that you have done
- ☐ that you have *not* done

b. When did the behavior occur that has lead to the regret? (please try to indicate the exact number of months and years ago that the event occurred)

_____ months ago _____ years ago

c. How likely is it that the negative consequences of the event <u>can</u> in fact be undone?

Very Unlikely				**Very Likely**
☐	☐	☐	☐	☐
1	2	3	4	5

d. How likely is it that the negative consequences of the event <u>will</u> in fact be undone?

Very Unlikely				**Very Likely**
☐	☐	☐	☐	☐
1	2	3	4	5

e. How much effort do you invest in undoing the negative consequences of the event?

No Effort at all				**A Lot of Effort**
☐	☐	☐	☐	☐
1	2	3	4	5

f. How strongly are you committed to undoing the negative consequences of the event?

Not at all Committed			**Very Much Committed**	
☐	☐	☐	☐	☐
1	2	3	4	5

APPENDIX G

Assessment of Emotional Intensity and Regret-related Progress: Regret-Specific Emotion Scale

Life Regrets (cont'd)

People usually experience different emotions when they think about their regrets. We would like to ask you to what extent you usually experienced the following emotions **during the past few months** when and if you thought about the regret that you noted.

	Not at all	**A little**	**Somewhat**	**Quite a bit**	**Extremely**
a. Sorrow					
b. Angry					
c. Sentimental					
d. Desperate					
e. Irritated					
f. Nostalgic					
g. Helpless					
h. Embarrassed					
i. Contemplative					

Please answer the following question with regards to the regret you have described above.

a. How close are you to undoing the negative effects of this regret?

☐ 0% Formulated ☐ 25% Have taken a plan ☐ 50% Well on a few steps ☐ 75% Completely my way ☐ 100% Very Far undone

APPENDIX H

Assessment of Implementation Intentions

Life Regrets (cont'd)

We would like some information about any specific ideas you may have concerning undoing the negative consequences of the regret you have specified.
Please answer the following questions in regards to the regret you had described above.

g. Do you have any ideas about **how** to undo this regret?

Not at all				**A Great Deal**
☐	☐	☐	☐	☐
1	2	3	4	5

h. Do you have any ideas about **when** to undo this regret?

Not at all				**A Great Deal**
☐	☐	☐	☐	☐
1	2	3	4	5

Please answer the following question with regards to the regret you had described above.

What, if any, are your specific ideas about **how and when** to undo this regret?
Please explain:

APPENDIX I

Assessment of General Control Strategy Tendencies: Regret-Related Control Strategies

Regret Management

People make a lot of important decisions during their lives and they sometimes think that they should have done something differently than they did. For example, a person may believe that she/he would be better off today if she/he had behaved in a different way in the past. In such situations, people might regret their behaviors. Please indicate the extent to which of the following statements *usually* apply to you.

	Almost Never	**Seldom True**	**Some-times**	**Often True**	**Almost Always**
1. I do whatever I can to undo the negative consequences.					
2. I look for all available information (e.g., in magazines, internet) to learn about how I can					
3. I try not to blame myself.					
4. I remind myself that most other people my age have more severe regrets.					
5. I tell myself that I can change this situation and undo the regret.					
6. I stop investing effort in overcoming the consequences.					
7. I ask other people for help, if overcoming the consequences myself is too difficult.					
8. I put a lot of time and effort into changing the negative things that resulted from it.					
9. I take a step back and try to figure out whether the consequences can be undone.					
10. I reflect on whether overcoming the regret could enrich my life in the long run.					
11. I put it out of my mind.					
12. I think about whether working on the regret would interfere with other important aspects					
13. I try to stop thinking about how to undo the negative consequences.					

Regret Management (Con't)

When experiencing regret about a behavior or decision …	Almost Never True	Seldom True	Some-times True	Often True	Almost Always True
14. I imagine how good I will feel once I have overcome the negative consequences.					
15. I try hard to undo the negative consequences, even if that proves to be difficult.					
16. I seek advice from other people, if I don't know how to undo the consequences.					
17. I tell myself that things could have turned out even worse than they did.					
18. I don't allow other things to distract me from undoing the regret.					

APPENDIX J

Assessment of Depressive Symptoms:
Center for Epidemiologic Studies Depression Scale – 10 Item

Well-Being

Below is a list of the ways you might have felt or behaved. Please indicate how often you have felt this way **during the past week** by putting a check in the appropriate box next to the statement.

.

Rarely or None of the Time (Less than 1 Day)
Some or a Little of the Time (1 – 2 Days)
Occasionally or a Moderate Amount of the Time (3 - 4 Days)
Most or All of the Time (5 - 7 Days)

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

APPENDIX K

Assessment of Positive and Negative Affect:
Positive and Negative Affect Schedule

Well-Being

This scale consists of a number of words that describe different feelings and emotions. Read each item and indicate to what extent you experienced the following emotions **during the past year** by putting a check in the appropriate box next to the statement.

	Very slightly or not at all	**A little**	**Moderately**	**Quite a bit**	**Extremely**
1. Interested					
2. Distressed					
3. Excited					
4. Upset					
5. Strong					
6. Guilty					
7. Scared					
8. Hostile					
9. Enthusiastic					
10. Proud					
11. Irritable					
12. Alert					
13. Ashamed					
14. Inspired					
15. Nervous					
16. Determined					
17. Attentive					
18. Jittery					
19. Active					
20. Afraid					

APPENDIX L

Assessment of Anxiety Sensitivity:
Anxiety Sensitivity Index – Revised

Well-Being

Please rate how much you have been bothered by each symptom **during the past week.**

	Not at all	**A little**	**Quite a lo**	**Could barely stand it**
1. Numbness or tingling.				
2. Feeling hot.				
3. Wobbliness in legs.				
4. Unable to relax.				
5. Fear of the worst happening.				
6. Dizzy or lightheaded.				
7. Heart pounding or racing.				
8. Unsteady.				
9. Terrified.				
10. Nervous.				
11. Feelings of choking.				
12. Hands trembling.				
13. Shaky.				
14. Fear of losing control.				
15. Difficulty breathing.				
16. Fear of dying.				
17. Scared.				
18. Indigestion or discomfort in				
19. Faint.				
20. Face flushed.				
21. Sweating (not due to heat).				

APPENDIX M

Assessment of Life Satisfaction:
Satisfaction with Life Scale

Well-Being

Below are five statements with which you may agree or disagree. Please indicate your agreement with each item by putting a check in the appropriate box next to the statement.

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
1. In most ways my life is close to my ideal.							
2. The conditions of my life are excellent.							
3. I am satisfied with my life.							
4. So far I have gotten the important things I want in							
5. If I could live my life over, I would change almost nothing.							

APPENDIX N

Assessment of Purpose in Life:
Life Engagement Test

Describe Yourself

Please answer the following questions about yourself by indicating the extent of your agreement using the following scale: strongly disagree; disagree; neutral; agree; strongly agree. Be as honest as you can throughout, and try not to let your response to one question influence your response to other questions. There are no right or wrong answers. Please indicate your agreement with each item by putting a check in the appropriate box next to the statement.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. There is not enough purpose in my life.					
2. To me, the things I do are all worthwhile.					
3. Most of what I do seems trivial and unimportant to me.					
4. I value my activities a lot.					
5. I don't care very much about the things I do.					
6. I have lots of reasons for living.					

APPENDIX O

Specification of Within-Person HLM Models

Specification of HLM Models Examining Within-Person Associations Between Regret Intensity at Baseline (T1) and 13-Month Changes in Motivational Processes and Well-Being.

Level-1:

Regret Intensity = $\beta_{0j} + \beta_{1j}$ (Time) + r_{ij}

Level-2 Main Effects:

$\beta_{0j} = \gamma_{00} + \gamma_{01}$ (Age) + γ_{02} (Sex) + γ_{03} (Regret Type) + γ_{04} (Time since Regret) + γ_{05} (Work-Education Domain) + γ_{06} (Family Domain) + γ_{07} (Relationship Domain) + γ_{08} (Self-Development Domain) + γ_{09} (Regret Intensity) + u_{0j}

$\beta_{1j} = \gamma_{10} + \gamma_{11}$ (Age) + γ_{12} (Sex) + γ_{13} (Regret Type) + γ_{14} (Time since Regret) + γ_{15} (Work-Education Domain) + γ_{16} (Family Domain) + γ_{17} (Relationship Domain) + γ_{18} (Self-Development Domain) + γ_{19} (Regret Intensity) + u_{1j}

Note. While this Appendix specifies the HLM analysis conducted for predicting regret intensity, identical sets of analyses were conducted for predicting other variables. These variables include regret engagement, implementation intentions, depressive symptoms, negative affect, and positive affect. All Level-1 predictors were person-centered. Time represented months since study entry. The Level-1 models had 120 *df*s and the Level-2 models had 111 *df*s.

APPENDIX P

Assessment of Factor Loadings:
Control Strategies for Managing Life Regrets

Factor Loadings - Control Strategies for Managing Life Regrets.

Items	Internal regret engagement	External regret engagement	Regret-related self-protection
When experiencing regret about a behavior or decision…			
I do whatever I can to undo the negative consequences. (SPC)	**.753**	-.003	.030
I put a lot of time and effort into changing the negative things that resulted from it.	**.693**	.311	-.166
I try hard to undo the negative consequences, even if that proves to be difficult.	**.813**	.170	-.029
I tell myself that I can change this situation and undo the regret. (SSC)	**.681**	-.052	.386
I imagine how good I will feel once I have overcome the negative consequences.	**.618**	.182	.119
I don't allow other things to distract me from undoing the regret. (SSC)	**.609**	.339	.266
I look for all available information (e.g., in magazines, internet) to learn about how I	**.550**	.248	.173
I ask other people for help, if overcoming the consequences myself is too difficult.	.200	**.867**	-.023
I seek advice from other people, if I don't know how to undo the consequences.	.307	**.864**	.038
I try not to blame myself. (CSC)	.199	.000	**.550**
I remind myself that most other people my age have more severe regrets. (CSC)	.107	-.133	**.763**
I tell myself that things could have turned out even worse than they did. (CSC)	-.172	.361	**.638**
Eigenvalue	4.197	1.495	1.319

Note. SPC = selective primary control; CPC = compensatory primary control; SSC = selective secondary control; CSC = compensatory secondary control.