Opportunity and the Adaptive Management of Regret

Across the Lifespan


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**ABSTRACT**

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The experience of life regrets can motivate individuals to change their life circumstances or contribute to declines in psychological and physical health. Theory and research suggest that either outcome may depend on the regulatory approach used to manage the experience of regret and the availability of opportunity to undo the negative consequences of the regret. When opportunity is favourable, engaging in undoing the regret is adaptive whereas disengagement maintains unsatisfactory life circumstances. In contrast, when opportunity is low, disengagement is protective whereas engagement leads to impaired health. The current research includes three studies designed to examine the role of opportunity in the regulation of life regrets.

Study 1 examined the associations between regret management, everyday activities, and retirement satisfaction in a sample of recent retirees. Cross-sectional results showed that retirees who perceived favourable opportunities for addressing their life regrets and also reported high levels of engagement to undo their regrets experienced high baseline levels of activity (e.g., volunteering, traveling) and retirement satisfaction. Three-year longitudinal analyses revealed that this pattern was also associated with increases in activity engagement. In contrast, disengagement protected retirees with unfavourable opportunity from three-year declines in retirement satisfaction. These findings suggest that the outcome of regulatory approach depends upon the availability of opportunity.

Study 2 examined younger and older adults assigned to one of three writing activities designed to alter how they addressed their most severe life regrets (engagement, disengagement, or control). Comparisons of three-month change in well-being determined that younger adults, a group that possesses relatively high levels of objective opportunity, experienced larger decreases in wistful emotions and larger increases in closure when assigned to engagement or control in comparison to disengagement, as well as larger decreases in regret intensity when assigned to engagement in comparison to disengagement. In contrast, older adults, a group who possesses relatively lower levels of objective opportunity, experienced larger improvement in sleep quality when assigned to disengagement than the other two conditions. These findings provide evidence that the outcome of adjusting one's regulatory approach depends on the availability of opportunity.

Study 3 examined the baseline levels of regret engagement of younger and older adults who completed writing activities designed to alter their regulatory approach (engagement or disengagement). Among younger adults, being assigned to engage in, rather than disengage from, undoing their regrets produced larger decreases in regret intensity, hot emotions, and despair emotions and larger increases in closure, but only for younger adults who had low baseline levels of engagement. In contrast, among older adults, being assigned to disengage from, rather than engage in, undoing their regrets produced larger decreases in regret intensity, hot emotions, and despair emotions and larger increases in regret closure and sleep quality, but only for older adults initially disengaged from their regrets. These findings suggest that the adaptiveness of a

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regulatory approach not only depends on the availability of opportunity, but also the individual's initial levels of engagement.

Overall, these findings contribute to the understanding of successful regret regulation as well as the management of developmental goals across the lifespan. The results are discussed in relation to contributions to theory, clinical implications, and areas for future research.

# CONTRIBUTION OF AUTHORS

*Chapter 2 - Study 1:*

Farquhar, J. C., Wrosch, C., Pushkar, D., & Li, K. Z. H. (2013). The value of adaptive

      regret management in retirement. *International Journal of Aging and Human*

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I designed, conducted, and interpreted the statistical analyses and wrote and

edited all sections of the manuscript.  I, along with other graduate students and research

assistants, contributed to the collection of the data. Drs. Wrosch, Pushkar, and Li

provided helpful commentary on the manuscript and guided the direction of the research.

In addition, Dr. Pushkar is the principal investigator, and Drs. Wrosch and Li co-

investigators, of the study from which the current dataset is derived (i.e., *Concordia*

*Longitudinal Retirement Study)*.

      Study 1 expands upon my master's thesis (Farquhar, 2008). Study 1 is different

from the earlier thesis in several meaningful ways. First, Study 1 examined retirement

satisfaction, a dependent variable not examined in my Master's thesis. The earlier thesis

examined activity engagement (i.e., optional and maintenance activity) and emotion (i.e.,

positive and negative affect) as dependent variables whereas Study 1 examined activity

engagement (i.e., optional activity exclusively) and retirement satisfaction. Retirement

satisfaction is a meaningful construct when examining how regret may impact adjustment

to retirement.

      Furthermore, Study 1 examines a wave of data not available at the date of my

Master's thesis preparation. My Master's thesis involved baseline and 1-year follow-up

data when I defended my work in September 2008.  In contrast, Study 1 involves baseline

and 3-year follow-up data. The 3-year follow-up data was collected during 2008 and 2009. The availability of the 3-year data allowed me to report longitudinal patterns of findings not discussed in my Master's thesis. Specifically, high levels of engagement predicted increases in activity levels at three-year follow-up for retirees with high levels of opportunity. This pattern was only found in cross-sectional analyses of my Master's. In addition, I found that low levels of engagement (i.e., disengagement) protected retirees with low levels of opportunity from three-year declines in retirement satisfaction. This pattern was not present in my Master's thesis. Study 1 involves a discussion of these unique findings.

My Master's thesis can be found here:

http://spectrum.library.concordia.ca/976092/1/MR45462.pdf


*Chapter 3 – Study 2: Age and the Adjusted Regulation of Regret: A Quasi-Experimental Examination*

I, in collaboration with my supervisor Dr. Wrosch, conceptualized the experimental design and generated the hypotheses. I created the materials for the experimental manipulation. In addition, I played a major role in the data collection and preparation (e.g., transcription, etc.) process, with contribution from several research assistants. I designed, conducted, and interpreted the statistical analyses and wrote all sections of the manuscript.


*Chapter 4 – Study 3: The Outcome of Adjusted Regret-Regulation among Younger and Older Adults: The Role of Initial Regret Engagement*

I conceptualized the research question, generated the hypotheses, designed, conducted, and interpreted the statistical analyses, and wrote all sections of the manuscript.

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**CHAPTER 1:**

**GENERAL INTRODUCTION**

In the field of aviation, "press-on-it-is" is a dangerous mindset among pilots. This desire to reach one's destination, despite the awareness of unfavourable conditions such as an incoming storm, is a known contributor to pilot error and disaster (SKYbrary, 2010). Similarly, the pursuit of goals across the lifespan can also be impacted by "bad weather"; individuals cannot pursue all goals with uniform perseverance across the lifespan and expect to experience universal success.

Several factors, including biological and societal restrictions, may impact an individual's opportunity to reach personal developmental goals across the lifespan (Baltes, 1997; Heckhausen, Wrosch, & Schulz, 2010; Heckhausen, 1999). Accordingly, opportunity for goal attainment has been addressed in a variety of theories of personality and development (Brandtstadter & Renner, 1990; Carstensen, Isaacowitz, & Charles, 1999; Carver & Scheier, 1990, 1998; Heckhausen et al., 2010; Wrosch, Scheier, Carver, & Schulz, 2003). Based on the availability of opportunity for success regarding a specific goal, adjustments can be made to the behavioural and cognitive components of goal pursuit. Broadly, individuals can adjust from a position of goal engagement when opportunities are favourable to goal disengagement when opportunities decline and diminish.

Evidence regarding the adaptive management of goals across the lifespan comes from several lines of research (Dunne, Wrosch, & Miller, 2011; Hall, Chipperfield, Heckhausen, & Perry, 2010; Heckhausen, Wrosch, & Fleeson, 2001; Wrosch & Heckhausen, 1999). In general, the pattern of findings suggest the benefit of general or

domain-specific (e.g., health) engagement strategies when opportunities are favourable, but also the disadvantages of refusing to disengage (i.e., remaining engaged) when opportunity is unfavourable.

The study of life regret is one line of research that greatly contributed to the understanding of goal pursuit. Life regrets are common (Torges, Stewart, & Miner-Rubino, 2005) cognitive-emotional states associated with unsatisfactory life circumstances (Lecci, Okun, & Karoly, 1994). Similar to the aforementioned findings regarding goal management at-large, research on the management of regret across the lifespan consistently reports that possessing and pursing regrets in older adulthood is harmful to one's mental and physical health whereas regret disengagement in older adulthood is protective (e.g., Newall, Chipperfield, Daniels, Hladkyj, & Perry, 2009; Wrosch, Bauer, & Scheier, 2005).

Despite the consistent research findings, there remain several limitations in the area of goal-regulation as well as the management of regret experiences. First, researchers tend to use age as a proxy for objective levels of opportunity, and beyond a sparse collection of studies (e.g., Bauer & Wrosch, 2011), researchers seldom included measures of opportunity. In particular, few studies examined the range of opportunity that may exist in the later stages of life. Second, researchers tend to rely on correlational methods (e.g., Newall et al., 2009; Wrosch & Heckhausen, 2002). Consequently, there is a striking absence of experimental methods and evidence supporting the importance of congruence between available opportunity and regulatory strategy. Third, due to the absence of experimental methods, researchers do not yet understand how initial levels of engagement may impact the outcomes associated with manipulated regulatory processes.

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Overall, research addressing these limitations is critical to the understanding of both regret- and goal-regulation across the lifespan.

**Research Overview**

My dissertation includes three studies designed to address the aforementioned limitations and further advance our understanding of developmental goal adjustment. All three studies examine the regulation of life regrets. Studies 1 and 2 examines how opportunity impacts the relationship between regret-regulatory strategies (low versus high engagement) and well-being. As derived from theory (Heckhausen et al., 2010; Wrosch et al., 2003), I argue that high levels of regret engagement are not adaptive in themselves. Instead, high engagement to undo the negative consequences of regret is only adaptive in the context of available opportunity to address the regret. Conversely, low engagement (i.e., disengagement) is only adaptive in the context of poor or unfavourable opportunity. Using baseline cross-sectional and three-year longitudinal data, Study 1 examines whether the association between regret engagement and well-being is dependent upon perceived levels of available opportunity. Study 2 uses a quasi-experimental design with three-month follow-up data to investigate whether distinct regulatory strategies (i.e., regret engagement, regret disengagement, and control) deferentially impact individuals with relatively favourable (i.e., younger adults) versus unfavourable (i.e., older adults) objective opportunity. Study 3 examines how the impact of adjusting one's regulatory approach may also depend upon initial levels of engagement by examining a subset of participants from Study 2.

# LITERATURE REVIEW

## Developmental Goal Pursuit

On the road of life, we are likely to pursue of a variety of goals. Often, societal norms influence the types of goals we pursue (e.g., get married, secure employment; Heckhausen et al., 2010). Our goals may reflect intermediate steps toward a broad goal (e.g., find a partner prior to starting a family), and we may pursue goals that we wish to achieve in our current (e.g., middle age) or approaching (e.g., older adulthood) stage of development (Heckhausen et al.). However, if "life is a highway" (Cochrane, 1990) we may ultimately come to forks in the road, become caught in speed traps, and hit dead ends. What factors may impede our ability to pursue a particular goal? Also, what processes are involved in the pursuit of our life goals and in the management of the many challenges we may face in our quests?

**Opportunity.** There are several factors that may impact an individual's opportunity to successfully attain goals across the lifespan. One major factor is biological maturation (Baltes, 1997; Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Heckhasusen, 1999). Individuals undergo various physical changes as they age that may impact the pursuit of particular goals. Typically, cognitive and physical abilities increase during the early stages of development (childhood and adolescence), plateau in adulthood, and decline in later life. For instance, mobility (Daley & Spinks, 2000) and fertility (Dunson, Colombo, & Baird, 2002) may follow this pattern. Subsequently, the ability to walk the Great Wall of China or bear a child may, after initial increases with age, ultimately decline in older age.

Socially prescribed norms and stages also influence our opportunity to attain our personal goals (Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Heckhausen, 1999). In our various domains of life, we may seek a variety of sequential personal life goals. For instance, in the domains of education and career, we may share goals related to high school diplomas, post-secondary training, the attainment of employment, upward mobility, and retirement. In the domain of romance, we may pursue goals of dating, marriage, children, and family. Consequently, our current goals may reflect our particular stage of life (e.g., early adulthood). Furthermore we may adjust our goals based on the prescribed structure of our society's norms for that particular life stage (e.g., job attainment, marriage) rather than with another stage (e.g., retirement).

Our lifespan is finite. The average lifespan for individuals of developed countries is approximately 80 years (Statistics Canada, 2012). Therefore, this timeframe restricts the number of goals we can pursue (Wrosch et al., 2003). For instance, although it is not unusual to change one's career path (The New York Times, 2007), there may be a limit to the number of careers an individual can explore considering the years of training required for specific professions.

Based on the accumulation of biological and social obstacles, there may be an overarching inverted U-shaped curve in the opportunity to achieve our goals across the lifespan (Heckhausen et al., 2010; Heckhausen, 1999). That is, individuals may experience increased opportunity as they emerge out of early developmental phases such as childhood and adolescence prior to loss of opportunity post-adulthood into old-age. However, later-life declines in opportunity may only be part of the story. At the micro-level, there may be the same inverted U-shaped curve in opportunity for each life stage

and individual goal (Heckhausen et al., 2010) including goals held in the stage of older adulthood. In addition, opportunity may ebb and flow throughout various stages of life. Consequently, the inverted U-shaped curve in opportunity may be an overly simplistic understanding of opportunity. Consider opportunity related to the goal of traveling, where individuals are more likely to travel in periods of later-life (U.S. Travel Association, 2012) perhaps due to increased time and personal resources available in retirement. In addition, there may be individual differences in the availability of opportunity. Even in stages of later-life, some individuals may continue to possess favourable opportunities to address their particular life circumstances (Bauer, Wrosch, & Jobin, 2008; Hall et al., 2010).

**Self-regulatory processes in the pursuit of developmental goals**. The pursuit and successful attainment of developmental goals is important to our well-being. For instance, the pursuit of goals can add meaning and structure to our lives (e.g., Brunstein, 1993; Sheldon & Elliot, 1999). Since many factors may impede our ability to achieve our goals, individuals sometimes have to tailor their regulatory approach to their specific situation. Several theories of self- and goal-regulation address not only how we pursue our goals, but how we adjust our pursuits in the face of restricted opportunity (e.g., Baltes, 1997; Brandtstadter & Renner, 1990; Carstensen et al., 1999; Carver & Scheier, 1990, 1998; Hall et al., 2010; Heckhausen & Schulz, 1995; Wrosch et al., 2003).

First, the perceived availability of future opportunity may affect which goals we choose to pursue. Carstensen et al. (1999) distinguish between the pursuit of knowledge-based goals (e.g., attaining a career) and emotion-based goals (e.g., spending time with family). The researchers argue that the perception of available time influences which type

of goal we pursue. We tend to prioritize knowledge-based goals when time is available and emotion-based goals when time is limited. Consequently, older adults tend to prioritize emotion-based goals. At the same time, the researchers discuss that younger adults may also prioritize emotion-based goals when they perceive time as limited.

Individuals may have to employ specific strategies to help them achieve particular goals when they face restrictions. Baltes (1997) proposes that several processes help older adults continue to achieve their goals despite experiencing the increasing biological and cognitive restrictions of older adulthood. Baltes argues that successful aging involves individuals shaping their life in a way that favours goal attainment. This includes being selective in the type and number of goals to pursue (*selection*), actively pursuing the goal (e.g., time, effort) to improve the chance for goal attainment (*optimization)*, and seeking previously unused resources to account for any setbacks or losses that occur in the management of the goal (*compensation*).

When individuals possess a goal, a discrepancy exists between their current and desired state ("I despise renting; I want to own my own home"). There appears to be two distinct strategies in the management of this discrepancy. On the one hand, individuals can pursue their goals to reduce the discrepancy between their current and desired state ("I'm going to the bank to get a mortgage"). On the other hand, individuals alter their desired goal so that it is more inline with their current state ("On second thought, home ownership involves too many responsibilities"). Several theories have argued how we can adjust our regulatory approach to our goals in an effort to successfully attain goals when the opportunity is available, or disengage when opportunity is unavailable (e.g.,

Brandtstadter & Renner, 1990; Carver & Scheier, 1990, 1998; Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Wrosch et al., 2003).

Goal engagement is the adaptive approach to reduce the discrepancy between our current and ideal states when there is available opportunity (Brandtstädter & Renner, 1990; Carver & Scheier, 1998; Heckhausen et al., 2010; Wrosch et al., 2003). In regards to goal engagement, Brandtstädter and Renner (1990) argue that *assimilative coping* involves the adjustment of our circumstances to fit our goals (e.g., "If I run into problems, I will double my effort"). Similarly, Wrosch et al. (2003) discuss that engagement likely involves high levels of both effort and commitment. When an individual engages in attaining a goal, they increase their effort and remain committed to achieving their goal (Wrosch et al., 2003). Heckhausen and colleagues (e.g., Heckhausen & Schulz, 1995; Heckhausen et al., 2010) assert that several different strategies may be involved when pursuing our goals. These strategies include the investment of personal resources (e.g., time, effort; *selective primary control),* the use of external resources when required (e.g., assisting devices, other people; *compensatory primary control)*, and the use of our internal motivational (e.g., imagining yourself achieving your goal; *selective secondary control*).

In contrast to goal engagement, goal disengagement is the adaptive strategy to reduce the discrepancy between our current and ideal states when opportunity is low or unavailable (Heckhausen et al., 2010; Carver & Scheier, 1998; Wrosch et al., 2003). When the capacity to achieve a particular goal is impaired, goal disengagement processes assist individuals to let go of particular goals, so that efforts can be reinvested into alternative new or existing goals where goal engagement can be maintained and success

can be achieved (Heckhausen et al., 2010). In contrast to assimilative coping, Brandtstädter and Renner (1990) argue that *accommodative coping* involves the adjustment of our goals to fit our circumstances (e.g., "After a serious disappointment, I soon turn to new tasks"). Wrosch et al. (2003) discuss that, when individuals disengage from pursing a goal, they reduce their effort and withdraw commitment to the goal. Several theorists argue that internal psychological processes assist the individual to disengage and manage the experience of failure. For instance, individuals can downgrade the perceived value of the goal (Brandstätter, Herrmann, & Schüler, 2013; Wrosch et al., 2003), focus on the positive of a negative situation (Folkman, 1997; Wrosch, Heckhausen, & Lachman, 2000), or employ a variety of other internal processes involved in disengagement and self-protection (e.g., enhance the value of conflicting goals, blame others for the situation; *compensatory secondary control*; see Heckhausen et al., 2010*)*.

Neither goal engagement nor disengagement are adaptive in themselves. Instead, regulatory strategies are adaptive in the context of opportunity for successful goal attainment (Heckhausen et al., 2010). The ability to select specific control strategies that match one's specific opportunity and restrictions has been referred to as *optimization* (Heckhausen et al., 2010; Heckhausen & Schulz, 1993) or *meta-regulation* (Haase, Heckhausen, & Wrosch, 2013).

Assessing perceived opportunity helps individuals determine whether to engage or disengage in their goals. For instance, when we face difficulties attaining our goals, we often reconsider the expected outcome of our goal (Carver & Scheier, 1990; Wrosch et al., 2003). Following this reassessment, we choose to either persist toward our goal if we expect a favourable outcome, or disengage if we expect failure. However, there are

instances when we become caught between continuing to pursue a goal and disengaging, which Brandstätter et al. (2013) refer to as *action crisis*. When in this position, the aforementioned disengagement strategies (e.g., downgrading the importance of the goal) may assist an individual to disengage.

Changes in the use of either engagement or disengagement across the lifespan may reflect fluctuations in the level of opportunity to successfully attain goals in later life. The research is mixed regarding goal engagement, with some research supporting stable or increased engagement in older adulthood (e.g., Haase et al., 2013), and others suggesting decreases (Brandtstädter & Renner, 1990). However, in general, research supports that the use of goal disengagement increases with age (Brandtstädter & Renner, 1990; Brassen, Gamer, Peters, Gluth, & Büchel, 2012; Haase et al., 2013; Wrosch et al., 2003). In addition, individuals demonstrate better emotion regulation across the lifespan (Gross et al., 1997) and there is greater activation in neurological areas of emotional control in old age (Brassen et al., 2012), suggesting an increased use of disengagement strategies in later life.

In sum, several theories of personality and development highlight the importance of opportunity in self- and goal-regulation The next section discusses the interplay between regulatory strategies, opportunity, and well-being across a variety of life domains. Overall, a consistent pattern has emerged. When opportunity is available, goal engagement is adaptive, whereas when opportunity is unfavourable, goal disengagement is likely the adaptive response. Furthermore, selecting a self-regulatory process that does not correspond to the level of available opportunity is maladaptive and could result in

misdirected efforts and time, the maintenance of unsatisfactory life circumstances, and the emotional consequences of either outcome.

**Lines of Evidence Supporting the Importance of Opportunity**

Opportunity may play a substantial role in determining whether pursuing a specific goal is adaptive (Carver & Scheier, 1990; Heckhausen et al., 2010; Wrosch et al., 2003). Due to potential for declining levels of opportunity across the lifespan (Heckhausen & Schulz, 1995; Heckhausen et al., 2010; Baltes, 1997), older adults may have to make more use of disengagement-related strategies in order to let go of goals with unfavourable opportunities for success and adjust their attention toward more fruitful pursuits. This next section reviews the empirical support for the importance of opportunity, presented by area of research. As will be presented, younger adults or individuals with favourable opportunities show adaptive responses when engaged whereas older adults or individuals with unfavourable opportunities show adaptive responses when disengaged.

**Age as proxy for opportunity.** Researchers often consider age as proxy for opportunity, fuelling research that compares younger and older adults. As predicted, younger adults typically benefit from engagement whereas older adults benefit from disengagement. For example, Wrosch et al. (2000) found that younger adults who used primary control strategies, as measured by persistence toward a goal, reported better well-being. However, both younger and older adults who implemented secondary control strategies, as measured by positive reappraisals ("I find I usually learn something meaningful from a difficult situation"), reported higher well-being. The researchers also found that positive reappraisals had a significantly larger effect on well-being than

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persistence for middle-aged and older adults who experienced high, but not low, levels of stress (financial and health); this difference was not found among younger adults.

Other researchers also found that disengagement is particularly beneficial when examining samples of older adults exclusively. For instance, Hall et al. (2010) found that the oldest-old of their aging sample benefited when disengaging from, but suffered when engaging in, activity-related control strivings. Similarly, Dunne et al. (2011) found that baseline goal disengagement, but not reengagement, capacities predicted a reduction of depressive symptoms among older adults who experienced an onset of functional disability.

**Biological restrictions.** Proximity to a biological deadline can impact the opportunity available to address specific developmental goals, as well as the outcome of using particular regulatory strategies. For instance, Heckhausen et al. (2001) examined, across two studies, how one's ability to bear children impacts the formation of childbearing goals and explains the association between childbearing-related goal engagement and psychological outcomes. As predicted, the researchers found that women who had passed the childbearing age reported fewer childbearing goals than women who had met or were urgently approaching the childbearing deadline. This finding suggests that the women who had passed the childbearing age had let go of this goal now that the opportunity had passed. In addition, in a memory task, the researchers found the ability to recall sentences related to childrearing was associated with higher negative affect but only for women who had passed the childbearing age. This finding reflects the maladaptive consequences of having a mindset of particular developmental stage (motherhood) when you are in a later developmental stage. When the researchers

examined the use of childbearing-specific control strategies, two aggregated groups emerged: a before-deadline and a passed-deadline group. Reflecting their current level of opportunity, the before-deadline group endorsed the use of more engagement strategies associated with the pursuit of their goal (i.e., selective primary control, selective secondary control, compensatory primary control) than the passed-deadline group. In contrast, the passed-deadline group endorsed using more goal disengagement strategies (i.e., compensatory secondary control) than the before-deadline group. In addition, the researchers found that the use of selective primary control (invested time, effort) was associated with lower levels of depressive symptoms among before-deadline women because they tend to possess favourable opportunity, but higher levels of depressive symptoms among post-deadline women.

**Age-normative pursuits.** Support for the importance of opportunity in determining adaptive regulation also comes from research examining on- versus off-time, or age-normative versus non-normative, goal pursuits. For instance, Wrosch and Heckhausen (1999) examined romantic relationship pursuit among young- versus middle-aged divorcees, postulating that divorced middle-aged adults would have restricted opportunity to start a new relationship. As hypothesized, divorced middle-aged adults possessed fewer partner-related goals than their younger counterparts signifying that they had adjusted to their relatively-lower opportunity for success in the life domain of romance. In addition, middle-aged divorcees endorsed using fewer relationship-specific engagement processes (i.e., selective primary and secondary control) and more relationship disengagement processes (i.e., compensatory secondary control) than their younger counterparts. At 15-month follow-up, the researchers found that use of

relationship disengagement was maladaptive for young divorcees, but adaptive for middle-aged divorcees as measured by changes in positive affect. Similarly, Haase, Heckhausen, and Köller (2008) found that goal engagement related to career attainment was associated with higher positive affect for adolescents nearing the end of their education as this is an on-time event for this particular population. In addition, goal engagement was predictive of attaining an apprenticeship, but for female adolescents exclusively.

**Personal health issues.** Opportunity may impact the management of personal health issues. More specifically, it is adaptive to manage acute health problems with health engagement strategies (e.g., "If I have a health problem that gets worse, I put in even more effort to get better"; Wrosch, Schulz, & Heckhausen, 2002) and chronic conditions with disengagement strategies (e.g., self-protective positive reappraisals; "I look for a positive side to my struggles"; Hall et al., 2010).

Several studies show that the use of health-engagement strategies are protective for individuals with acute physical health problems.  Wrosch et al. (2002) found that older adults with acute health problems but low levels of health engagement had high levels of depressive symptoms. In contrast, older adults who were actively engaged in managing their health (as reflected by high health engagement) had low levels in depressive symptoms. Among older adults, high use of health engagement was also associated with reductions in depressive symptoms after one year, regardless of the health problems. Wrosch, Miller, Scheier, and de Pontet (2007) also found that physical health problems were associated with high levels of diurnal cortisol sections and depressive symptoms among older adults with low, but not among those with high, health

engagement. In a longitudinal examination, Wrosch and Schulz (2008) found that high levels of health engagement protected older adults with high levels of daily physical symptoms (e.g., chest pain, join pain) from two-year increases in health problems (e.g., heart disease, cancer) and difficulties in activities of daily living. In sum, when there is available opportunity to address one's health, such as is the case when managing acute conditions, it is protective to take action.

Researchers also investigated individuals with chronic health issues. Hall et al. (2010) examined regulatory strategies related to managing activity restrictions between two groups of older adults: those with a chronic health issues (e.g., heart disease) who have experienced an acute vascular event (e.g., heart attack) and those with chronic health issues who have not experienced such an event. The researchers argued that experiencing an acute event would provide opportunity for those with chronic issues to address their health. As expected, high use of engagement strategies was associated with increased survival among those who experienced the acute event, but low physical health among those who experienced chronic health problems. The researchers also found that two of three disengagement strategies were associated with health outcomes among their sample: seeing particular tasks as being less important than before (downgrading perceived importance), and looking for the positive side in the situation (positive reappraisal), but not telling yourself that others have worse problems than yourself (downward social comparison). As predicted, goal disengagement was associated with better physical health for those who experienced chronic health issues, but poorer physical health for those who also experience acute health issues. In a study of HIV-positive men, Thompson, Nanni, and Levine (1994) found that high levels of

disengagement in the form of acceptance of the chronic condition was associated with lower levels of depressive symptoms among those with low, but not high, perceptions of ability to control the outcome of their illness. Additionally, Dunne et al. (2011) found that high levels of functional disability predicted six-year increases in depressive symptoms only among older adults who had low general disengagement capacities whereas those with high general disengagement capacities were protected from such increases.

Researchers also found that the management of others' chronic health conditions requires disengagement capacities. Wrosch, Amir, and Miller (2011) found that goal disengagement capacities protected individuals involved in the care of a family member with mental illness. General goal disengagement capacities at baseline were associated with low depressive symptoms and caregiver burden. In addition, high levels of goal disengagement capacities protected individuals with high caregiver burden from experiencing increased depressive symptoms at 17-month follow-up. Goal reengagement showed an inconsistent pattern on the impact of care providers. In their study of parents of children with cancer, Wrosch, Scheier, Miller, Schulz, and Carver (2003) found that high levels of both general goal disengagement and reengagement were associated with low depressive symptoms; these association were not found among a comparison group of parents with healthy children.

In summary, there is a growing body of research supporting the importance of opportunity and how the outcome of using specific strategies is dependent on whether the individual possesses favourable or unfavourable opportunity to change their life circumstances. Another body of research, not yet discussed in my dissertation, is the study of life regrets.

**Life Regrets: An Introduction**

Although individuals tend to act in ways to prevent the experience of regret (Gilbert & Ebert, 2002), life regrets are common. In fact, approximately 50 to 90% of individuals report at least one life regret when prompted (Lecci et al., 1994; Newall et al., 2009; Torges et al., 2005). While an individual may experience regret on a day-to-day basis (e.g., "Why didn't I leave the house earlier in order to arrive at my appointment on time?"), life regrets are a unique phenomenon insofar as they are located in the personal past (e.g., "Why didn't I go to university?"), and are therefore distinguishable from a regretful reflection on a recent event (Torges et al., 2005; Västfjäll, Peters, & Bjälkebring, 2011). Due to limited resources, individuals must be selective in their life choices (Baltes, 1997; Heckhausen & Schulz, 1995) and sometimes choose developmental pathways that, upon later reflection (i.e., counterfactual thinking; (Kahneman, 1995), do not fulfill their current life-plan. If this reflection is constructed as an upward counterfactual thought (e.g., "I would be better-off if I had remained married to Julie" versus "I would be worse-off if I had remained married to Julie"; Kahneman, 1995) and involves an aspect of personal responsibility (e.g., "It was my fault that the relationship ended" versus "It was her fault that the relationship ended"; Gilovich & Medvec, 1995; Van Dijk, Van der Pligt, & Zeelenberg, 1999), the outcome is likely to be the experience of regret. While this reflection may be more likely to occur during periods of life review, which are often encountered in later life (Torges et al., 2005), life regrets can be experienced at any time throughout the lifespan (Landman, 1987) as the ability to understand and produce regret is established early in our development (Beck & Crilly, 2009).

Individuals construct regrets as either acts of omission or commission. Regrets of omission involve the failure to act ("Why didn't I marry Lisa?") whereas regrets of commission involve regrettable actions ("Why did I marry Julie?"). Some research suggests that regrets of commission and omission may be distinguished by associated emotions. For instance, regrets of omission have been found to be associated with higher levels of wistful (e.g., sentimental, nostalgic) and despair emotions (e.g., sorrow, helpless) whereas regrets of commissions are associated with hot emotions (e.g., angry, irritated; Gilovich, Medvec, & Kahneman, 1998). Longstanding regrets are more likely to be regrets of omission (Leach & Plaks, 2009) and to be high on wistful emotions (Wrosch & Heckhausen, 2002). At the same time, categorizing a regret as either omission or commission is difficult, as regrets can often be construed as both (Davis, Lehman, Wortman, Silver, & Thompson, 1995). In fact, some researchers suggest that regrets of omission and commission are largely indistinguishable (e.g., Wrosch et al., 2005).

Life regrets stem from a variety of major life domains (Roese & Summerville, 2005). Common life domains include: education ("I regret not continuing in university"), work ("I regret becoming a lawyer"), romantic relationships ("I regret marrying my partner"), family ("I regret not visiting my mother more often"), and self ("I regret not being more patient"). Research suggests that regret intensity may differ by life domain, with financial, family, and health regrets being more intense than education regrets (Choi & Jun, 2009). There are also sex differences in the frequency of regret domains. For example, men experience more regrets of omission than commission in the relationship domain (Roese, Pennington, Coleman, Janicki, Li, & Kenrick, 2006).

Theoretically, although regret can trigger rumination and depression (Wrosch et al., 2005; Wrosch, Bauer, Miller, & Lupien, 2007), regret may also motivate an individual to foster change in his or her environment (Boninger, Gleicher, & Strathman, 1994; Epstude & Roese, 2008). Consequently, regrets are evaluated as the most beneficial of all negative emotions (Saffrey, Summerville, & Roese, 2008). Regrets foster change through a variety of pathways (for a review, see Epstude & Roese, 2008). Life regrets may trigger certain goals and some researchers argue that regrets can be conceptualized as active goals held by an individual to undo the circumstances produced by the action or inaction of their personal past (Lecci et al., 1994). For example, the regret "I regret not seeing the Pyramids" may trigger a goal, or may in fact reflect a lingering goal, to travel to Egypt. Unfortunately, and as previously discussed, the opportunity to pursue our goals can decline due to the developmental considerations of age.

**Age and Life Regrets**

The experience of regret may change across the lifespan. For example, older adults tend to have more work and family regrets, but fewer relationship and leisure regrets, than younger adults (Jokisaari, 2003). Similar to the earlier review of goals, the opportunity to address life regrets may also decline as we age. Again, biological and societal factors impede on the ability to undo the negative consequences of regret (Baltes, 1997; Heckhausen & Schulz, 1995). For example, the opportunity for an older adult to address a regret regarding not attending law school may be impacted by cognitive functioning (i.e., biological factor) and the off-time event of entering university after the age of retirement (i.e., societal factor).

Generally, although not exclusively (Bauer et al., 2008; Bauer & Wrosch, 2011), older adults tend to experience a decline in opportunity to address their regrets. For example, older adults perceive their regrets as unchangeable and uncontrollable (Jokisaari, 2003) and perceive lower opportunity to undo both omission and commission life regrets than younger adults (Bauer et al., 2008; Wrosch et al., 2005). In addition, personal perceptions of opportunity are associated with objective (rater-coded) opportunity (Bauer et al., 2008). Due to the potential for changing levels of opportunity across the lifespan, and differences in opportunity between individuals, the phenomenon of life regret is a useful paradigm for examining the importance of opportunity and the use of regulatory strategies to address regret.

**Life Regrets and Empirical Support for the Importance of Opportunity**

Similar to the concepts of goal engagement and disengagement, we can consider regret engagement and disengagement. Several independent researchers have identified these contrasting strategies to address regret (e.g., behavioural versus psychological regret repair; Gilovich & Medvec, 1995; external versus internal regret processes; Torges et al., 2005; physical and mental acts; Landman, 1987). The following sections outline research exploring the consequences of theoretically adaptive and maladaptive regret regulation when influenced by opportunity to undo the regret.

**Possessing regrets post-deadline is harmful.** At some point for certain regrets, it may be simply too late to make external changes to one's environment and disengagement from, or deactivation of, the regret must be prioritized. This may be particularly true for older adults, as they face the aforementioned constraints on their

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opportunity to address their regrets, but may also be accurate for individuals regardless of age under specific circumstances.

Researchers found that possessing regrets after a relevant deadline has passed negatively impacts an individual's well-being. For instance, breast cancer patients who reported frequent regret-related thoughts about past behaviours that may have led to the diagnosis of cancer experienced higher psychological distress (Gilbar & Hevroni, 2007). Similarly, among parents and spouses of individuals who died in a car crash, those who reported recent regret-related thoughts (e.g., "I should not have let her play there") had higher distress than those who denied ever experiencing these thoughts, or those who reported only experiencing these thoughts in the past (Davis et al., 1995). In addition, among parents whose child died of sudden infant death syndrome, higher frequency of regret-related thoughts in the past week ("If I had done something different, my baby would still be alive") was associated with higher distress (Davis et al., 1995). Furthermore,  Holland, Thompson, Rozalski, and Lichtenthal (2013) examined the frequency of bereavement-related regrets among recent widows and widowers across a period of four years. Based on the trajectory of regret frequency, the researchers found that three groups of individuals emerged, and that the groups differed in their levels of grief. Specifically, individuals with high levels of regret that increased over time (approximately one-fifth of the sample) had higher levels of grief at four-year follow-up than individuals who with stable low-frequency regrets and individuals with stable high-frequency regrets. Therefore, those individuals who experienced increasing levels of regrets in the absence of opportunity to undo the regret, had the most difficulty adjusting

to the loss of a spouse. Overall, these findings highlight the importance of opportunity in adaptive regret management.

**Possessing regrets in old-age is harmful.** Researchers demonstrate that possessing regrets in older adulthood, a time typically associated with low opportunity (e.g., Wrosch et al., 2005), leads to negative mental and physical outcomes. Newall et al. (2009) found that older adults who reported more life regrets were more likely to experience a higher number of health problems and lower life satisfaction, even after controlling for socio-demographics and past levels of life satisfaction and physical health. In fact, older adults who identified at least one regret reported lower life satisfaction and physical health than those who denied having any regrets (Torges et al., 2005). Similarly, older adults who reported frequently experiencing regret at night were more likely to experience sleep disturbances beyond common contributors to sleep difficulties (e.g., depression, medications; Schmidt, Renaud, & Van, 2011).

In addition to the presence of regret, the intensity at which an older adult experiences regret impacts physical health. Wrosch et al. (2007) found that, among older adults, higher regret intensity was associated with increased cortisol dysreglation (i.e., overall volume of cortisol, steeper morning rise of cortisol) and more acute physical health problems (e.g., chest pain, headaches). Therefore, possessing a regret, and in particular an intense regret, is associated with maladaptive outcomes for older adults.

Several studies highlight the importance of age in the understanding of the association between regret and well-being. For instance, Lecci et al. (1994) showed that adults who reported an increased number of life regrets experienced more depressive symptoms; however, only older adults with a high number of regrets reported lower life

satisfaction. Similarly, Wrosch et al. (2005) found that intrusiveness of regret-related thoughts and negative affect predicted depressive symptoms and number of health problems primarily among older, but not younger, adults. An additional study by these researchers replicated the moderating effect of age when examining three distinct age groups (i.e., young-, middle-, and old-age adults). In congruence with previous findings, higher regret-related intrusive thoughts and negative affect were associated with lower life satisfaction among middle and older adults, but not younger adults (Wrosch et al., 2005).

      **Age and adaptive regret-regulation.** Compared to older adults, younger adults often encounter favourable opportunities to change their life circumstances (e.g., Wrosch et al., 2005), and therefore, may benefit from regret engagement. Wrosch and Heckhausen (2002) found that age moderated the association between internal control (i.e., perception of personal control over regret-inducing situation) and well-being. Specifically, high levels of internal control were associated with low levels of regret intensity for younger adults, but higher levels of regret intensity and intrusive thoughts among older adults. These findings are consistent with theories of goal management, insofar as high internal control may trigger younger adults to actively address their life circumstances. Further supporting this point, the researchers found that older adults reported lower internal control over their regrets than younger adults, signifying that one's strategies may change over time based on age-related challenges. Researchers also found that students with educational-regrets can benefit from regret engagement. Nasco and Marsh (1999) demonstrated that internal control and a sense of improved personal circumstances accounted for the relationship between regret-related thoughts about

personal performance on an initial academic exam and improved performance on an exam 30 days later.

Several researchers illustrate that it is adaptive for older adults who possess relatively lower levels of opportunity to disengage from trying to undo their regrets. To date, only one study used an experimental design to investigate the benefit of disengagement strategies in older adulthood. Wrosch et al. (2007) assigned older adults to one of two brief writing conditions (i.e., social-cognitive strategies and control) and monitored their regret intensity and physical health three-months post-manipulation. Regardless of the assigned condition, participants experienced reductions in hot emotions (i.e., angry, irritated, embarrassed) at follow-up. However, only those participants assigned to use social-cognitive strategies associated with disengagement (i.e., focusing on external factors responsible for the regret, comparing their regret to other people's regrets, and describing meaningful goals) experienced reductions in despair emotions (i.e., desperate, helpless, sorrow). In addition, being assigned to use social-cognitive strategies, compared to control, protected older adults with highly-intense regrets from increases in sleep-problems.

Conversely, older adults who fail to disengage from trying to undo their regrets, or younger adults who disengage from their regrets, do not tend to experience adaptive outcomes. For instance, although Wrosch et al. (2005) found that disengagement from regret was associated with lower intrusive regret-related thoughts and negative affect regardless of age, the association between disengagement and health was moderated by age. Specifically, disengagement from regrets of commission was associated with fewer depressive symptoms and physical health problems (e.g., digestion problems, migraines)

among older adults exclusively. Similarly, difficulties disengaging can place older adults in a position to take unbeneficial risks. Brassen et al. (2012) recorded behavioural and neurobiological indices of emotion regulation of participants engaged in a paradigm that induced regret. Following feedback regarding missed opportunity, non-depressed younger adults and depressed older adults (i.e., late-life depression) took more risk on subsequent tasks than non-depressed older adults. In a second study, the researchers compared the autonomic nervous response (i.e., skin conductance, heart rate) and intensity of regret for non-depressed and depressed older adults after each trial of the sequential decision task. Once again, depressed older adults took more risk after missed opportunities than non-depressed older adults. In addition, depressed older adults experienced reductions in autonomic nervous response after experiencing a missed opportunity whereas non-depressed older adults experienced increases. The researchers suggest that this differential pattern reflects that non-depressed older adults are engaging in adaptive cognitive disengagement strategies following a regret experience whereas depressed older adults are not.

Researchers have identified numerous strategies that could support disengagement. Downward social comparison (comparing yourself to others who you perceived to be worse-off than you) is one specific disengagement strategy that has proven to be beneficial for managing regrets, particularly in old age. Bauer et al. (2008) found that downward social comparisons regarding proximal targets (e.g., someone you know personally) were associated with reduced regret intensity for both younger and older adults, but that downward social comparisons to distant targets (people of your age group) were associated with reduced regret intensity among older adults exclusively.

Older adults also reported more downward social comparisons four-months after baseline, which explained reductions in regret intensity. Similarly, Bauer and Wrosch (2011) found that downward social comparisons were associated with increased positive affect, but not negative affect, among adults (younger and older) who perceived low opportunity to undo their regrets, and decreased cold symptoms among older adults with low opportunity.

Positively reframing regrets is another disengagement strategy for individuals with low opportunity. Torges et al. (2005) coded older adults' current relationship with their regrets as either 1) "having not come to terms", 2) "putting the best face on things", or 3) "come to terms", based on the individuals' description of their regrets. Individuals coded as not having come to terms with their regrets had lower life satisfaction and positive mood than the other two coded groups, and lower physical health than those coded as "putting the best face" on their regret. Similarly, Newall et al. (2009) found that the ability to see the positive in negative experiences (e.g., seeing the silver lining) predicted a lower frequency of regret, indicating that individuals who engage in this form of compensatory secondary control may "prevent or deactivate feelings of regret" (p. 280).

In summary, age plays an important role in the understanding of regret management. There is growing support suggesting that younger adults benefit from engaging in undoing their regrets whereas older adults benefit from disengaging from such efforts. Variance in the availability of opportunity to undo a life regret may account for these age-related differences.

**Opportunity accounts for age-related differences.** As there may be considerable variability in opportunity across the lifespan, including stages of later-life, researchers have explicitly examined how opportunity to undo regret impacts the association between regret experiences and measures of health. Many current theorists (e.g., Heckhausen et al., 2010) assert that it is not age, but opportunity, that explains the differences between the regret experiences of younger and older adults. Accordingly, when controlling for levels of opportunity, age-related differences in levels of regret disengagement and many of the moderating effects of age on the association between regret and physical and psychological health are rendered statistically non-significant (Wrosch et al., 2005; Bauer et al., 2008). Further emphasizing the importance of opportunity, Bauer and Wrosch (2011) found that individuals, regardless of age, who engaged in downward social comparisons related to their regrets experienced increases in positive affect if they also perceived low opportunity to undo their regrets. These findings highlight the importance of directly assessing opportunity, as opposed to assuming age-related differences in opportunity, when examining regrets.

**Summary of Literature Review**

Many theorists argue that regulatory strategies, such as engagement and disengagement, are not adaptive in themselves; rather, these strategies produce adaptive outcomes depending on the opportunity for goal success (Heckhausen et al., 2010; Carver & Scheier, 1990; Wrosch et al., 2003). Across a variety of research areas (e.g., personal health issues, biological restrictions, life regrets), an empirically supported pattern of adaptive regulation has emerged. Individuals who experience declines in opportunity to address their life circumstances, such as older adults, experience maladaptive outcomes

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when persisting to change their circumstances, but adaptive outcomes when disengaging from these particular issues. In contrast, individuals who experience favourable levels of opportunity to address life circumstances, such as younger adults, experience adaptive outcomes if they seek to make changes to their external environment. Further substantiating the role of opportunity in adaptive regulation, researchers who examined opportunity explicitly (e.g., Bauer & Wrosch, 2011) demonstrate that opportunity directly impacts the use of regulatory strategies. Despite the aforementioned empirical evidence, there are further questions and issues regarding developmental goal management that I aim to address with my research.

**Limitations in the Research Literature**

While much research has contributed and supported the contention that the impact of regulatory strategies on well-being is dependent upon opportunity, there are also important limitations yet to be addressed. First, there is a scarcity of research (e.g., Bauer et al., 2008; Bauer & Wrosch, 2011) that has examined opportunity explicitly. The majority of existing research suggests that older adult who possess regrets, and especially older adults who are engaged in undoing their regrets, are vulnerable to experiencing low levels of psychological and physical health (e.g., Newall et al., 2009; Torges et al., 2005; Wrosch et al., 2005, 2007). However, age serves only as a proxy for one's objective opportunity to address a specific regret and there may be instances in later life that provide increased opportunity to change life circumstances. For instance, certain stages of life may provide newfound opportunity to address certain regrets, such as in the period of retirement. In retirement, increased time and personal resources may be more readily available in the absence of workplace commitments. In addition, regrets are idiosyncratic

and certain individuals may possess favourable opportunity to address their specific regret regardless of their age (Bauer et al., 2008; Bauer & Wrosch, 2011). Examinations of how the association between regret regulatory strategies and adaptive outcomes is dependent upon individual levels of opportunity, as opposed to group differences in opportunity, would contribute to our understanding of the importance of opportunity in adaptive regulation. In addition, if examined among a sample of older adults, research on individual levels of opportunity among older adults may also highlight the variability of opportunity levels in older adulthood.

Second, most of the research examining the role of opportunity in regret management has relied on correlational research. Frequently, researchers use cross-sectional and longitudinal data to examine how chosen regulatory processes produce either adaptive or maladaptive outcomes (e.g., Newall et al., 2009; Wrosch & Heckhausen, 2002). To date, only one study has experimentally facilitated social-cognitive processes associated with regret disengagement exclusively in a sample of older adults (Wrosch et al., 2007) and no studies have experimentally facilitated and compared both regret disengagement and regret engagement among individuals with various levels of opportunity. Experimental designs would provide meaningful evidence highlighting the outcome of congruence between opportunity and regulatory strategy.

Third, and largely due to the absence of experimental designs, researchers do not yet understand how initial levels of engagement may impact the outcome of adjusting one's regulatory approach. Based on existing correlational findings (e.g., Wrosch & Heckhausen, 2002; Wrosch et al., 2005, 2007) individuals are most at risk of experiencing impaired psychological and physical health when their regulatory approach

does not correspond to the availability of opportunity to address their life circumstances. Therefore, it stands to reason that these at-risk individuals are likely to experience adaptive outcomes when being guided toward the a regulatory approach that reflects their respective level of opportunity. For instance, groups of individuals with relatively high levels of objective opportunity (e.g., younger adults) may demonstrate improved well-being when assigned to engage in their regrets in particular when they do not show signs of being initially engaged in undoing their regret. In contrast, groups of individuals with relatively low levels of objective opportunity (i.e., older adults) may demonstrate improved well-being when assigned to disengage in their regrets in particular when they do not show signs of being initially disengaged from their regrets. Research on the role of initial engagement would provide meaningful contributions toward not only theory, but the application of theory in practice.

**The Present Research**

My dissertation includes three studies designed to address the aforementioned limitations as well as expand upon our current understanding of regret management. All three studies examined and/or manipulated perceptions of opportunity and strategies association with the regulation of life regrets.

Study 1 addresses the limitation regarding the absence of research directly investigating individual differences in levels of opportunity. Study 1 examines data collected from a sample of recent retirees over a period of three years. Participants initially reported their most severe life regret and their baseline levels of engagement to undo the negative consequences of their regret and perceived level of opportunity to undo the regret. These measures serve as independent variables. In terms of dependent

variables, Study 1 investigates baseline levels and three-year change in two measures of well-being: 1) activity engagement (e.g., socializing, traveling), and 2) retirement satisfaction. Study 1 uses both a cross-section (predicting baseline levels) and longitudinal (predicting three-year change) design. The specific hypotheses of the study are:

*Hypothesis 1.1 (Cross-sectional analyses): The association between baseline regret engagement and well-being (i.e., activity engagement and retirement satisfaction) will be dependent upon baseline levels of perceived opportunity. When contrasting individuals with low versus high perceived opportunity, low levels of regret engagement (i.e., disengagement) will be associated with higher activity engagement and retirement satisfaction among retirees with low opportunity to undo their regrets (refer to solid line in Figure 1.1). In contrast, high levels of regret engagement will be associated with higher activity engagement and retirement satisfaction among retirees with high opportunity to undo their regrets (refer to dotted line in Figure 1.1).*

*Hypothesis 1.2 (Longitudinal analyses): The association between baseline regret engagement and three-year change in measures of well-being (i.e., activity engagement and retirement satisfaction) will be dependent upon baseline levels of perceived opportunity. Similar to baseline analyses, when contrasting individuals with low versus high perceived opportunity, low levels of regret engagement (i.e., disengagement) will be associated with larger increases in activity engagement and retirement satisfaction among retirees with low opportunity to undo their regrets (refer to solid line in Figure 1.1). In contrast, high levels of regret*

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*engagement will be associated with larger increases activity engagement and*
*retirement satisfaction among retirees with high opportunity to undo their regrets*
*(refer to dotted line in Figure 1.1).*

Study 2 addresses the limitation regarding the absence of experimental methods. Study 2 employs a quasi-experimental design to examine the impact of regret-regulatory strategies that are either adaptive or maladaptive depending upon the individual's developmental-level of opportunity to make changes to their life circumstances. In Study 2, younger and older adults are assigned to one of three writing conditions designed to manipulate the perception of opportunity (high opportunity, low opportunity, or control) and the associated regret-regulation strategies (regret engagement, regret disengagement, or control). Therefore, age and condition serve as independent variables. In terms of dependent variables, Study 2 includes two measures to assess the success of the manipulation (regret engagement and perceived opportunity). In addition, Study 2 includes several dependent variables to assess the outcome of the manipulation on well-being, including: regret intensity, specific regret emotions, regret closure, and sleep quality. These measures are assessed prior, immediately following, three-months post manipulation. The specific hypotheses of the study are:

> *Hypothesis 2.1: Regarding the success of the manipulation, participants assigned*
> *to the regret engagement condition will experience larger increases in regret*
> *engagement and perceived opportunity than participants assigned to the regret*
> *disengagement or control conditions, and participants assigned to the regret*
> *disengagement condition will experience larger decreases in regret engagement*

*and perceived opportunity than participants assigned to the control condition.*

*These differences will be present when assessing change in regret engagement*

*and perceived opportunity at both a) immediate and b) three-month follow-up.*

***Hypothesis 2.2****: Regarding well-being, younger adults assigned to the regret*

*engagement condition will show adaptive responses at three-month follow-up*

*(larger decreases in regret intensity and specific regret emotions, larger*

*increases in closure and sleep quality) when compared to younger adults*

*assigned to the regret disengagement or control conditions. By contrast, older*

*adults assigned to the regret disengagement condition will show adaptive*

*responses at three-month follow-up (larger decreases in regret intensity and*

*specific regret emotions, larger increases in closure and sleep quality) when*

*compared to older adults assigned to the regret engagement or control*

*conditions. This hypothesized pattern is presented in Figure 1.2.*

Study 3 addresses the limitation regarding whether the outcome of manipulated

regulatory processes depends upon initial levels of engagement. Study 3 uses a subset of

data from Study 2, focusing exclusively on participants assigned to the regret engagement

and regret disengagement conditions. The specific hypotheses of the study are:

***Hypothesis 3.1****: The association between age (younger versus older adults) and*

*condition assignment (regret engagement versus disengagement) on well-being at*

*three-month follow-up will further be dependent upon initial levels of*

*engagement. Specifically, among younger adults,  assignment to the regret*

*engagement condition (when compared to the disengagement condition) will be*

*associated with adaptive outcomes at three-month follow-up (larger decreases in*

*regret intensity and specific regret emotions, larger increases in closure and sleep*

*quality) in particular among participants with low initial levels of engagement*

*(see dotted line with circular endpoints in Figure 1.3). In contrast, among older*

*adults, assignment to the regret disengagement condition (when compared to the*

*engagement condition) will be associated with adaptive outcomes at three-month*

*follow-up (larger decreases in regret intensity and specific regret emotions,*

*larger increases in closure and sleep quality) in particular among participants*

*with high initial levels of engagement (see solid line with square endpoints in*
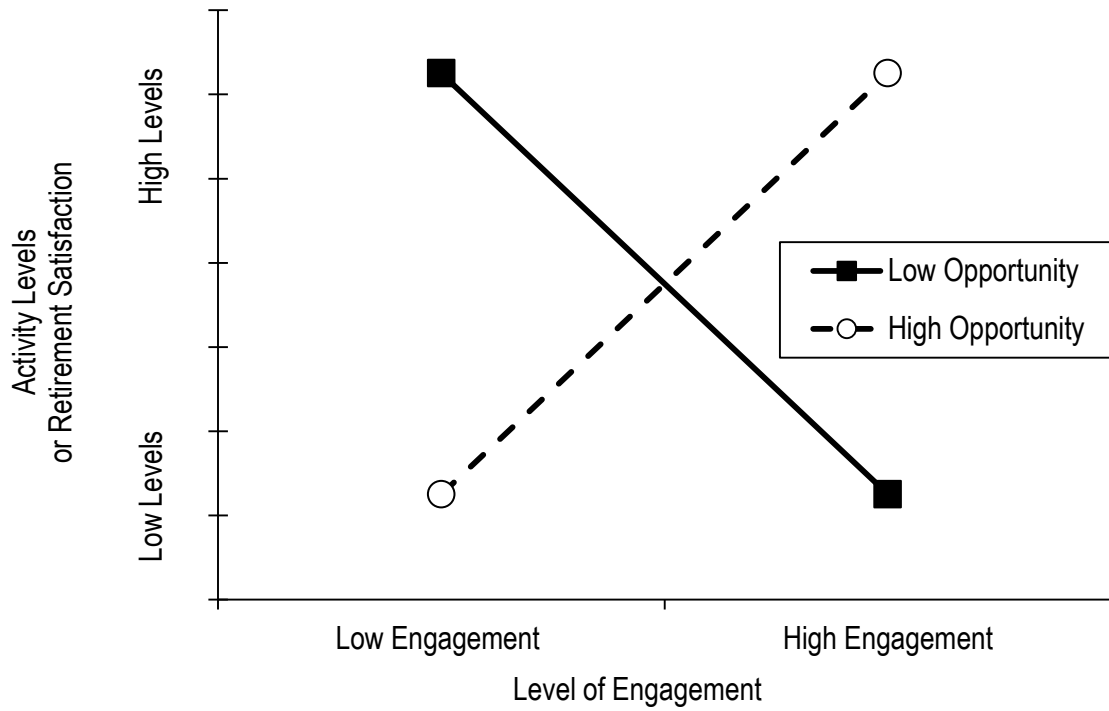
*Figure 1.3).*

*Figure 1.1.* Hypothesized (Study 1) association between level of regret engagement and activity engagement (or retirement satisfaction) plotted separately for individuals with low and high perceived opportunity to undo the negative consequences of their regret.
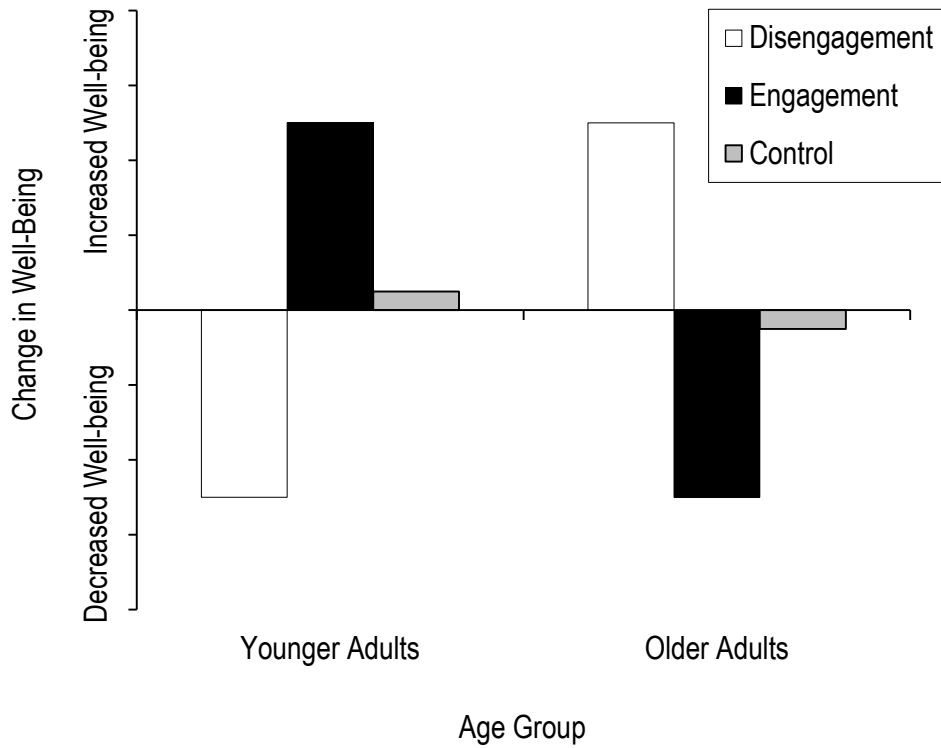
*Figure 1.2.* Hypothesized (Study 2) mean three-month change in well-being for each assigned condition within each age group condition.
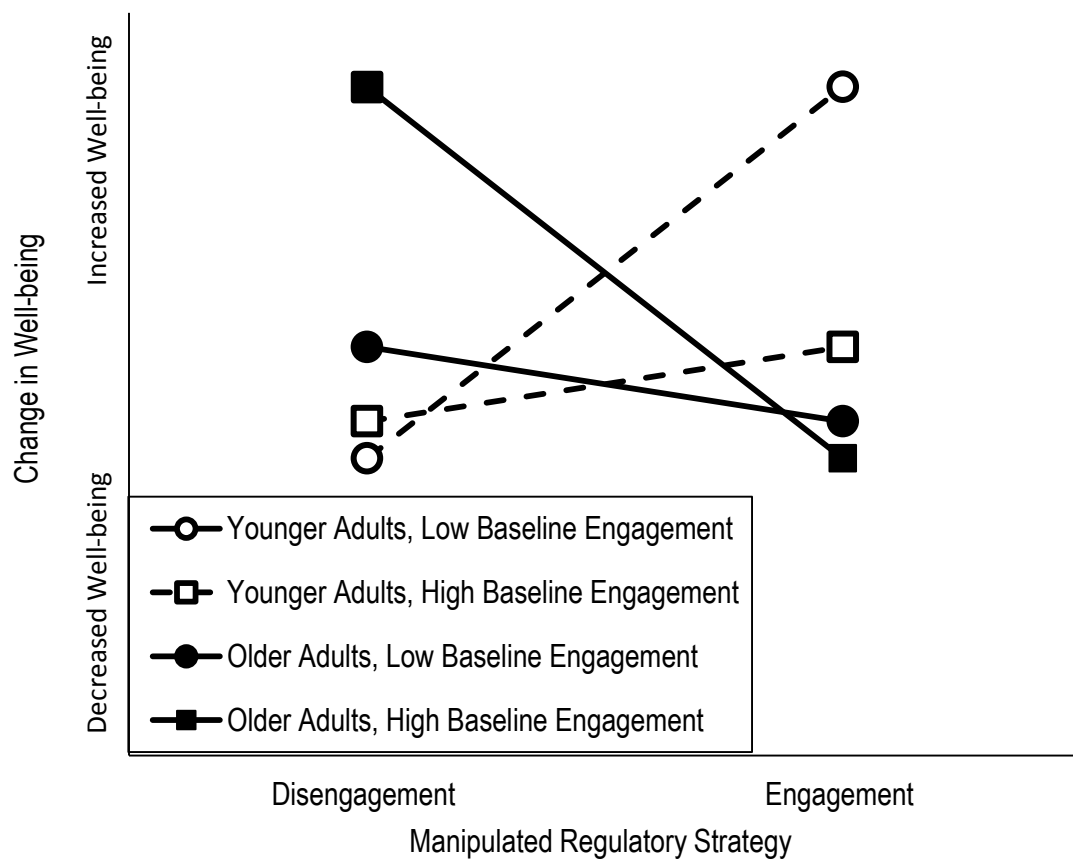
*Figure 1.3.* Hypothesized (Study 3) association between manipulated regulatory strategy and change in well-being dependent upon age group and baseline level of engagement.

**CHAPTER 2:**

**STUDY 1**

**The Value of Adaptive Regret Management in Retirement**

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**Abstract**

This three-year longitudinal study examined the associations between regret management, everyday activities, and retirement satisfaction among recent retirees. We hypothesized that the regulation of a severe life regret can facilitate activity engagement and retirement satisfaction, but only if retirees manage their regrets adaptively by either increasing effort and commitment when possessing favourable opportunities or disengaging when opportunity is unfavourable. Cross-sectional analyses demonstrated that the highest baseline levels of activity (e.g., volunteering, traveling) and retirement satisfaction were observed among participants who perceived favourable opportunities for addressing their life regrets and had high levels of engagement. Longitudinal analyses showed that this pattern was also associated with increases in activity engagement. In contrast, disengagement protected individuals with unfavourable opportunity from three-year declines in retirement satisfaction. These findings indicate that adaptive regulation of regrets can both contribute to gains and prevent losses in the early stages of retirement, which may have lasting consequences on retirees' quality of life.

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## Introduction

While current research suggests that the experience of life regrets can compromise older adults' subjective well-being (e.g., Wrosch et al., 2005), there may also be circumstances in which regretted events could promote older adults' goal regulation, activity level and well-being. To examine this possibility, we investigated in the present study whether certain regret experiences may lead to adaptive outcomes in older adulthood, particularly in the life stage of retirement. In this regard, we examined recent retirees' motivation to, and opportunity for, the resolution of a severe life regret to determine how the management of regret may contribute to activity engagement and satisfaction in retirement. Considering that retirement can provide individuals with newfound opportunity to actively overcome some of their life regrets, we hypothesized that the investment of high levels of effort and commitment in addressing regret would result in adaptive outcomes for retirees who perceive favourable opportunity to resolve their regret. By contrast, when the opportunity for regret resolution is unfavourable, low levels of regret-related effort and commitment (i.e., disengagement; Wrosch et al., 2003) could protect retirees' activity engagement and satisfaction.

### What are Life Regrets?

Life regrets are a common experience that involve negative emotions and are associated with a person's reflections on past decisions and behavior while considering alternative scenarios that might have resulted in better outcomes (Epstude & Roese, 2008; Gilovich et al., 1998; Kahneman, 1995; Landman, 1987; Wrosch et al., 2005). For example, some individuals may feel sad or embarrassed because they perceive that they would have been more satisfied with their life if they had chosen a different occupation

or had spent more time with family and friends. Such regret-related emotions and counterfactual scenarios are typically experienced in major life domains (e.g., work, education, or family; DeGenova, 1992; Roese & Summerville, 2005) and may be particularly likely to occur during periods of life review in later adulthood (Torges et al., 2005). Retirement, a stage marked by life review and substantial changes in existing roles and identities (Barnes & Parry, 2004), is therefore a time when regrets are salient and accessible.

Regret experiences can produce different outcomes. First, regrets may motivate adaptive behaviors aimed at changing undesired life conditions (Coricelli et al., 2005; Heckhausen, 1999; Roese, 1994; Wrosch & Heckhausen, 2002). Second, regrets can trigger general emotional distress by contributing to feelings of helplessness and depression and compromise a person's physical health (Wrosch et al., 2005; Wrosch et al., 2007). The specific outcome of regret may depend on the context of the regret as well as the regulatory strategies employed to manage the regret experience. More specifically, the outcome of regret may be determined by the level of opportunity available to address the regret and the level of effort and commitment put forward to overcome the regret.

**Regret Management: The Importance of Opportunity**

In older adulthood, research has suggested that the experience of regret can adversely affect psychological well-being and physical health (Lecci et al., 1994; Newall et al., 2009; Wrosch et al., 2005; Wrosch et al., 2007). These adverse effects of regret experiences on quality of life may be associated with age-related declines in the opportunity for undoing the negative consequences of regretted events (Baltes, 1997; Bauer et al., 2008; Heckhausen et al., 2010; Heckhausen, 1999; Wrosch, Dunne, Scheier,

& Schulz, 2006). Older adults who become psychologically occupied with regret-related circumstances without being able to reverse the consequences of their behaviors or decisions may be at risk of impaired psychological and physical health. Attempting to undo what cannot be undone is likely to contribute to psychological distress as well as associated biological and physical health problems (Wrosch et al. 2005, 2007).

The importance of opportunity has also been addressed in several broader theories of personality and development that examine the adaptive value of self-regulation, emotion-regulation, or control strategies (Baltes & Baltes, 1990; Brandtstadter & Renner, 1990; Carstensen et al., 1999; Carver & Scheier, 1998; Heckhausen et al., 2010; Wrosch et al., 2003). Many of these theories assume that the consequences of favourable versus unfavourable opportunities for attaining goals and overcoming problems depend on the use of specific self-regulatory processes (Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Wrosch et al., 2003; Wrosch, 2011). From this perspective, favourable opportunities for implementing desired life changes need to be matched by high levels of individuals' effort and commitment to produce adaptive outcomes (i.e., goal engagement, Heckhausen et al., 2010). For example, an upcoming family reunion may provide a favourable opportunity to reestablish family relations, but only if a person is motivated and prepared to improve such relationships. By contrast, poor, or the absence of, opportunities require a person to activate self-protective processes (e.g., positive reappraisals, Folkman, 1997; Wrosch, et al., 2000) and to withdraw effort and commitment from pursuing a goal or overcoming a problem (i.e., goal disengagement, Wrosch et al., 2003). For example, the death of a family member diminishes the opportunity to repair a fractured relationship and requires psychological disengagement

from goals related to the improvement of that relationship. Such an adaptive fit between opportunity and self-regulation increases the likelihood that individuals will make progress towards attainable goals or adjust internally to those goal-related problems that cannot be resolved (Heckhausen et al., 2010). It further suggests that neither opportunity nor self-regulatory processes are adaptive in themselves, but act together for producing beneficial developmental outcomes.

The discussed theories imply that it would be adaptive if individuals manage their regret experiences in an opportunity-sensitive way. When opportunity to undo a regret is not available, affect regulation and goal disengagement should be adaptive responses because they enable a person to reduce the intensity of regret-related distress and deactivate the regret. However, when opportunity is available, engagement in overcoming or undoing the regret (Landman, 1987), should be the adaptive response as it increases the likelihood of successfully implementing desired life changes (Epstude & Roese, 2008, Wrosch et al., 2005). In contrast, the continuous desire and attempt to overcome regrets that cannot be undone may trigger negative psychological and physical health outcomes, just as failure to engage in overcoming regrets that involve favourable opportunities can result in the maintenance of unsatisfactory life circumstances (Wrosch et al., 2006). In support of this argument, research has demonstrated that opportunity- and age-adjusted management of regret facilitates high levels of subjective well-being and physical health (Bauer et al., 2008; Bauer & Wrosch, 2011; Wrosch & Heckhausen, 2002; Wrosch et al., 2005, 2007).

**How Might the Management of Life Regrets Impact Retirement?**

While the previous discussion suggests that regrets in older adulthood often

involve relatively low opportunity and that the adaptive management of regrets often requires an older person to disengage, retirement may provide some older adults with the time and opportunity to address their regrets thereby leading to active regret-resolution activities. Such a process may be associated with a content-specific pathway, which represents a direct link between a specific regret and an associated activity (Epstude & Roese, 2008; Smallman & Roese, 2009). For example, a person who has a travel-related regret may reallocate time to make travelling possible and subsequently exhibit enhanced levels of travel activities. Further, it is also possible that the experience and management of a specific regret may create spillover effects to other activities (cf. Epstude & Roese, 2008). For example, managing a life domain related to a specific regret may draw attention to how individuals manage other life domains. In addition, addressing a particular regret could increase a person's confidence to overcome other regrets as well. Thus, a person who engages in a new regret-related activity could subsequently adopt other activities (e.g., making new friends during travel may increase social activities), or a person may simply transfer the benefits of using certain strategies to other areas of life (e.g., applying appropriate time-allocation to a variety of areas of life). Accordingly, regrets could motivate increased levels of activities in domains that are both related and unrelated to the original regret. Therefore, it seems important to assess a wide variety of activities when examining the impact of regret management as high levels of engagement in undoing regrets, when opportunity is available, could result in increased levels of activity engagement across a constellation of life domains over time. Alternatively, disengagement from regrets when opportunities are unfavourable may free personal resources that could in turn be directed toward the pursuit of a variety of more fruitful

goals.

We also argue that regret management may play a role in retirement satisfaction. There is considerable variability in the well-being of individuals as they adjust to retirement (Kim & Moen, 2001; Wang, 2007) and there may be a variety of factors that impact satisfaction with this new life stage (van Solinge & Henkens, 2008). As regret management has been associated with subjective well-being (Wrosch & Heckhausen, 2002; Wrosch et al., 2005, 2007), it may be one of the factors that impact satisfaction with retirement as well. If retirees possess favourable opportunity to address their regrets, active engagement in overcoming regrets may increase possible ways of gaining satisfaction in retirement. Alternatively, if retirees possess unfavourable opportunity, disengagement from addressing regrets may contribute to avoiding dissatisfaction due to the unnecessary expenditure of attention and resources on pursuing a fruitless goal.

We acknowledge that increases in activity engagement may be reciprocally associated with how retirees appreciate the circumstances of retirement. In retirement, life roles are being renegotiated and engagement in self-relevant activities can provide stability, purpose, and identity (Kim & Moen, 2001; Moen, 1996; Morrow-Howell, Hinterlong, Rozario, & Tang, 2003). Therefore, activity engagement may play a mediating role between regret management and retirement satisfaction. Specifically, retirees who are able to adaptively manage their regret experiences may feel more satisfied with retirement because of their increased engagement in meaningful activities. Alternatively, as positive states of subjective well-being have been found to impact behavior (Fredrickson, 1998; Pressman & Cohen, 2005), retirement satisfaction may also mediate the association between regret management and activity engagement. It is

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possible that if individuals feel satisfied about their retirement, they may elect to spend more of their time participating in activities of personal interest and investment.

## The Current Study

This three-year longitudinal study examined the associations between the management of life regrets, activity engagement, and retirement satisfaction in a sample of recent retirees. We reasoned that life regrets might become important predictors of everyday activity and satisfaction during the transitional life-stage of retirement when retirees are adjusting to the reformation of self-identifies and newfound leisure time. In predicting activity engagement and retirement satisfaction, we expected to identify two adaptive and context-dependent regret management strategies associated with the interaction between the engagement to undo regrets and the opportunity for undoing regrets. First, high levels of effort and commitment to resolve a regret should contribute to high levels and increases in activity and retirement satisfaction, but only for those retirees who perceive favourable opportunities to address their life regrets. Second, low levels of effort and commitment should contribute to high levels and increases in activity and retirement satisfaction, but only among retirees who perceive unfavourable opportunities to address their regrets. Finally, we examined in exploratory analyses whether activity mediated the relationship between regret management and retirement satisfaction, or whether retirement satisfaction mediated the relationship between regret management and activity.

## Method

### Participants and Procedure

This longitudinal study included a large and heterogeneous sample of recent

retirees from Montreal. The inclusion criteria were that participants had retired from at least 20 years of full-time employment, had no current employment over 10 hours a week, and were fluent in either English or French. Participants were recruited through letters sent to members of local retirement associations and advertisements placed in local newspapers. After contacting the laboratory, participants were invited to Concordia University for data collection. Participants received $50 for each session (see Appendix A).

The initial sample was collected in 2005 and included 433 retirees (see Pushkar et al., 2010). Of the initial sample, 353 retirees participated at three-year follow-up (retention rate = 82%). Because we were interested in studying the effects of regrets among relatively recently retired older adults, we included only participants who retired within the past three years ($n = 310$). Twenty-one participants were further excluded from the analyses because they did not provide data for the main study variables (19 participants did not have a regret, 1 participant did not complete the activity measure, and 1 participant did not complete the retirement satisfaction measure). The final sample used in the analyses thus included 289 participants, who were on average 58.94 years old at baseline ($SD = 4.94$; Range = 44 to 77). The age of our participants was comparable to the national median retirement age (i.e., 61 years) during the year of baseline data collection (Statistics Canada, 2006). Participants had 15.08 years of education ($SD = 2.43$), 55% of the sample was female ($n = 159$) and participants retired from work on average 1.30 years prior to baseline assessment ($SD = .73$). Participants who were included in the analyses did not significantly differ from excluded participants with respect to their baseline levels of activity, retirement satisfaction, regret engagement, or

age, $t$s < 1.52, $p$s > .05. However, excluded participants received somewhat lower education ($M = 14.28$, $SD = 2.52$), had been retired longer ($M = 3.42$, $SD = 2.73$), had higher perceived opportunity to undo their regret ($M = 2.86$, $SD = 1.52$), and were less likely to be female (43.75%) than participants who were included in the final sample, $t$s > 1.99, $p$s < .05.

**Materials**

The main study variables were embedded within a larger test battery designed to study the heterogeneous experience of retirement.[1] Our variables of interest included baseline and three-year follow-up measures of participants' activity levels and retirement satisfaction in addition to baseline measures of different aspects of their life regrets. Table 2.1 represents the means, standard deviations, and correlations of these variables. In addition, we assessed socio-demographic variables (i.e., sex, age, years of education, and years since retirement).

**Activity level** was measured using 18 items from the *Everyday Activities Questionnaire* (EAQ, Pushkar, Arbuckle, Conway, Chaikelson, & Maag, 1997). We were interested in the items identified as 'optional activities'. These are a collection of common non-obligatory activities that require social and cognitive effort for their pursuits (e.g., volunteering, entertaining, communicating, reading, traveling, physical activity, helping). Across assessments, we asked the participants to report how often they

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[1] While other aspects of this research program have been published (Bye & Pushkar, 2009; Pushkar et al., 2010), the associations between participants' life regrets, activities, and retirement satisfaction over time have not been addressed in previous publications from this study.

currently engage in each activity, using 5-point Likert-type scales (1 = not at all, 2 = less

than monthly, 3 = monthly, 4 = weekly, 5 = three times or more per week). We computed

sum scores for activity levels (see Table 1). Higher scores represent higher levels of

activity. For the entire sample, measures of activity were significantly correlated across

time (see Table 1), and did not significantly change from baseline to three-year follow-

up, $t(288) = .59$, $p = .55$.

**Retirement satisfaction** was measured using the 15-item current sources of

satisfaction subscale from the *Retirement Satisfaction Inventory* (Floyd et al., 1992), a

frequently used scale in the examination of retirement satisfaction (e.g., Fouquereau,

Fernandez, & Mullet, 2001; van Solinge & Henkens, 2008). This scale assessed the

importance of a variety of typical sources of retirement satisfaction (e.g., freedom to

pursue my own interests, less stress, more time for activities, more time to think) in

making retirement enjoyable, using 4-point Likert-type scales (endpoints: 1 =

unimportant, 4 = very important). Across assessments, we computed mean scores for

current levels of retirement satisfaction (see Table 1). Higher scores represent higher

levels of satisfaction. Measures of retirement satisfaction were significantly correlated

across time (see Table 1), and did not significantly change from baseline to three-year

follow-up, $t(288) = .51$, $p = .61$.

**Life regrets.** We asked participants at baseline to reflect on their lives and to

record their most severe life regret (see Appendix B; for assessment of life regrets, see

Wrosch et al., 2002, 2005, 2007). The majority of regrets were associated with omissions

($n = 215$; 74.39%) and, consistent with previous research, reflected regretted events in

major life domains (e.g., education = 20.07%, romance = 16.61%; career = 15.92%;

family = 13.94%; parenting = 11.07%; for meta-analytic findings regarding regret domains, see Roese & Summerville, 2005). The reported life regrets occurred on average 23.65 years ago ($SD = 12.78$).

**Engagement in undoing the regret** was measured with two items, representing core motivational constructs involved in the attainment of goals and resolution of problems (i.e., effort and commitment; see Heckhausen et al., 2010; Wrosch et al., 2003)[2]. Participants rated 1) how much effort they invest in undoing the negative consequences of their reported regret, and 2) how strongly they are committed to undoing the negative consequences of their reported regret. The two items were answered by using 5-point Likert-type scales (endpoints: 1 = no effort at all, 5 = a lot of effort), and were significantly correlated, $r(289) = .82$, $p < .01$, $\alpha = .90$. We computed a mean score of the two items. Higher scores represent higher levels of engagement in undoing regrets.

**Perceived opportunity to undo the regret** was also assessed with two items, using 5-point Likert-type scales (endpoints: 1 = very unlikely, 5 = very likely). Participants rated 1) how likely is it that the negative consequences of the regretted event *can* in fact be undone, and 2) how likely is it that the negative consequences of the regretted event *will* in fact be undone. The two items were significantly correlated, $r(289) = .78$, $p < .01$, $\alpha = .88$, and we computed a mean score of the two items. Higher scores represent higher levels of opportunity.

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[2] The measure of regret engagement is based on motivational constructs and assesses if someone is engaged in undoing their regret. It does not assess how someone plans to undo their regret (e.g., mental or physical acts; Landman, 1987).

**Socio-Demographics**

We collected socio-demographic information related to age, sex, highest level of education, and date of retirement using single-item questions.

**Statistical Procedure**

To test the hypothesis that the interaction of opportunity and regret engagement can predict activity levels and retirement satisfaction, we conducted four separate hierarchical regression analyses, predicting baseline levels and change in activity and retirement satisfaction. Prior to conducting these analyses, we computed change scores for the outcome variables in separate regression analyses for activity and retirement satisfaction, by predicting three-year levels while controlling for the baseline levels, and saving the standardized residuals for further analyses. In the first step of the hierarchical regression analyses, we entered the main effects of opportunity and regret engagement into the regression equation. In the second step, we tested the interaction term between opportunity and regret engagement for significance. The analyses used standardized predictor variables and statistically controlled for the socio-demographic variables (i.e., sex, years of education, years since retirement) that showed some association (i.e., $p <$ .10; see Table 1) with at least one of the dependent variables (Tabachnick & Fidell, 2007). To illustrate significant interaction effects, we plotted the association between baseline levels of regret engagement and the dependent variables separately for participants who perceived high versus low opportunities for undoing the negative consequences of their regrets (i.e., one standard deviation above and below the mean of the predictors; (Aiken & West, 1991). To interpret the shape of the interaction effects, we conducted analyses of simple slopes.

To explore whether levels and/or change in activity would mediate the relationship between regret engagement and levels and/or change in retirement satisfaction (or conversely, whether levels and/or change in retirement satisfaction would mediate the relationship between regret engagement and levels and/or change in activity), we conducted analyses of moderated-mediation to examine for conditional indirect effects at specific values of the moderator (Preacher, Rucker, & Hayes, 2007). Therefore, opportunity was set to one standard deviation below, at, and above the sample mean (low = 1.06, mean = 2.54, high = 4.02). Bootstrapping analyses were set at 5,000 resamples and we interpreted indirect (i.e., mediation) effects as significant if the 95% bias-corrected and accelerated confidence intervals did not contain zero (Preacher & Hayes, 2008).

## Results

The results section is divided into three sections. In the first section, we examined cross-sectional associations, and tested whether the interaction between baseline levels of perceived opportunity to undo the regret and engagement in undoing the regret is associated with baseline levels of participants' activity level and retirement satisfaction. In the second section, we investigated in longitudinal analyses whether the same interaction of baseline regret measures would also predict three-year changes in levels activity level and retirement satisfaction. In the third section, we tested if either activity level or retirement satisfaction plays a mediating role in the relationship between regret management and the alternate outcome.

### Cross-Sectional Analyses

The results of the analyses predicting baseline levels of activity engagement and

retirement satisfaction are reported in Table 2.2. Years of education, years of retirement, and sex, were not significantly associated with baseline levels of activity, $F$s(1, 285) < 3.51, $p$s > .05, $R^2$ < .02. In addition, years of education and years of retirement did not predict baseline levels of retirement satisfaction, $F$s(1, 285) < 2.71, $p$s > .05, $R^2$ < .02. Of the covariates, only sex was significantly associated with baseline levels of retirement satisfaction, $F$(1, 285) = 11.91, $p$ < .01, $R^2$ = .04, indicating that women reported higher baseline levels of retirement satisfaction than men. Table 2 further shows that the main effects of opportunity and regret engagement were not significantly associated with activity level or retirement satisfaction at baseline, $F$s(1, 283) < 1.83, $p$ > .18, $R^2$s < .01. In support of our hypotheses, however, the interaction between opportunity and regret engagement was significantly associated with baseline levels of activity, $F$(1, 282) = 13.73, $p$ < .01, $R^2$ = .05, and retirement satisfaction, $F$(1, 282) = 5.83, $p$ = .02, $R^2$ = .02.

To illustrate the significant interaction effect, we plotted the baseline associations between regret engagement and activity level (see left panel of Figure 2.1) and between regret engagement and retirement satisfaction (see right panel of Figure 2.1), separately for participants who perceived high versus low opportunities for undoing the negative consequences of their regrets. The obtained pattern of results showed that the highest baseline levels of activity and retirement satisfaction were found among retirees who perceived favourable opportunities to, and were engaged in, undoing their regrets. By contrast, participants who perceived favourable opportunities, but were not engaged in undoing their regrets reported considerably lower levels of activity and retirement satisfaction, similar to their counterparts who perceived unfavourable opportunities to undo their life regrets. The calculation of the simple slopes supported this interpretation

of the data by showing that regret engagement predicted baseline levels of activity and

retirement satisfaction for participants with favourable opportunities to undo their regrets

(activity: $\beta = .30$, $p < .01$, $R^2 = .04$; retirement satisfaction: $\beta = .22$, $p < .01$, $R^2 = .02$), but

not for their participants who perceived unfavourable opportunities (activity: $\beta = -.13$, $p =$

.13, $R^2 < .01$; retirement satisfaction: $\beta = -.06$, $p = .51$, $R^2 < .01$).[3]

**Longitudinal Analyses**

The results of the analyses predicting changes in activity and retirement

satisfaction are also reported in Table 2.2. Of the covariates, sex, years of education, and

years of retirement were not significantly associated with change in activity level, $F$s(1,

285) < 3.70, $p$s > .05, $R^2 < .02$, or change in retirement satisfaction, $F$s(1, 285) < 2.09, $p$s

>.15, $R^2$s < .01. Similar to the cross-sectional analyses, the main effects of regret

engagement and opportunity did not significantly predict changes in activity level or

retirement satisfaction, $F$s(1, 283) < 1.93, $p$s >.17, $R^2$s < .01. As hypothesized, and

replicating the cross-sectional results, we found significant interaction effects between

regret engagement and opportunity in predicting change in activity level, $F$(1, 282) =

6.34, $p = .01$, $R^2 = .02$, and retirement satisfaction, $F$(1, 282) = 4.90, $p = .03$, $R^2 = .02$.

To illustrate the significant interaction effect on three-year changes in activity

level and retirement satisfaction, we plotted in Figure 2.2 the association between regret

engagement and changes in activity level (left panel) and retirement satisfaction (right

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[3] Opportunity predicted baseline levels of activity for participants who were highly engaged in

undoing their regrets (Activity: $\beta = .25$, $p < .01$, $R^2 = .03$; Retirement Satisfaction: $\beta = .21$, $p = .02$, $R^2 =$

.02) as well as levels of activity among participants with low levels of engagement ($\beta = -.18$, $p = .03$, $R^2 =$

.02); however, this was not the case for retirement satisfaction ($\beta = -.08$, $p = .34$, $R^2 < .01$).

panel) separately for participants who perceived high versus low opportunities for

undoing the negative consequences of their regrets. The pattern of the longitudinal

findings for activity level was consistent with the cross-sectional findings. Specifically,

participants who perceived favourable opportunity for, and were engaged in, undoing

their regrets reported relatively large increase in activity over time. By contrast,

participants who perceived poor opportunities to address their regrets and participants

who were not engaged in overcoming their regrets but perceived favourable opportunity

did not experience such increases over time. Consistent with this interpretation, a

calculation of the simple slopes showed that regret engagement significantly predicted

three-year change in activity level among retirees with favourable opportunities to undo

their regrets, $\beta = .17$, $p = .05$, $R^2 = .01$, but not among their counterparts who perceived

unfavourable opportunities, $\beta = -.13$, $p = .13$, $R^2 < .01$. [4]

The pattern of longitudinal findings for retirement satisfaction, however, was not

identical with the cross-sectional findings. As illustrated in the right panel of Figure 2.2,

participants who perceived unfavourable opportunity, and yet were engaged in undoing

their regrets, experienced decreases in retirement satisfaction over time. By contrast,

participants who perceived unfavourable opportunities and were disengaged from

overcoming their regrets, as well as participants who generally perceived favourable

opportunities (independent of their levels of regret engagement), did not experience such

decreases over time. The calculation of simple slopes confirmed this interpretation by

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[4] Opportunity predicted three-year change in activity among participants who were highly

engaged in undoing their regrets ($\beta = .22$, $p = .01$, $R^2 = .02$), but not among participants with low levels of

regret engagement ($\beta = -.08$, $p = .35$, $R^2 < .01$).

showing that regret engagement significantly predicted three-year declines in retirement satisfaction for retirees with unfavourable opportunities to undo their regrets, $\beta = -.22$, $p = .01$, $R^2 = .02$, but not among those who perceived favourable opportunities, $\beta = .05$, $p = .59$, $R^2 < .01$.[5]

**Mediation Analyses**

We finally tested two potential mediation pathways. First, we examined whether activity plays a mediating role in the effect of the interaction of regret engagement and opportunity in predicting retirement satisfaction. For the cross-sectional findings, analyses of the conditional indirect effects showed that activity mediated the relationship between regret engagement and retirement satisfaction at high levels of opportunity (95% CI [.0044, .0377]), but not at average (95% CI [-.0009, .0164]) or low levels of opportunity (95% CI [-.0211, .0003]). For the longitudinal analyses, change in activity did not mediate the relationship between regret engagement and change in retirement satisfaction at high (95% CI [-.0014, .0144]), average (95% CI [-.0022, .0059]) or low levels of opportunity (95% CI [-.0110, .0010]).

Second, we also examined the alternative possibility in that retirement satisfaction plays a mediating role in the relationship between the interaction and activity. For the cross-sectional findings, analyses of the conditional indirect effects showed that retirement satisfaction mediated the relationship between regret engagement and activity

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[5] Opportunity predicted three-year change in retirement satisfaction among participants who were highly engaged in undoing their regrets ($\beta = .21$, $p = .02$, $R^2 = .02$), but not among participants with low levels of regret engagement ($\beta = -.05$, $p = .52$, $R^2 < .01$).

at high levels of opportunity (95% CI [.0430, .4386]), but not at average (95% CI [-.0134, .2312]) or low levels of opportunity (95% CI [-.2320, .0895]). For the longitudinal analyses, change in retirement satisfaction did not mediate the relationship between regret engagement and change in activity at high (95% CI [-.0248, .1037]), average (95% CI [-.1095, .0091]) or low levels of opportunity (95% CI [-.2074, .0183]).

**Discussion**

The results of this study showed that the management of life regrets can be associated with both activity engagement and retirement satisfaction among recently retired older adults. Specifically, we identified two adaptive regret management strategies. First, high levels of effort and commitment to undo regret produced adaptive outcomes when retirees perceived favourable opportunities to address their regret. Retirees who employed this strategy demonstrated high levels of baseline and three-year increases in activity (e.g., volunteering, travelling, physical activity), and high levels of baseline retirement satisfaction. Second, low levels of effort and commitment (i.e., disengagement) to undo regret produced adaptive outcomes when retirees perceived unfavourable opportunities to address their regret. Retirees who employed the latter type of strategy were protected from declines in retirement satisfaction over time. Finally, mediation analyses showed that the cross-sectional interaction effects of regret management and opportunity were correlated among individuals who perceived high levels of opportunity, indicating that those participants who actively engaged in addressing regrets that involved favourable opportunity experienced both high baseline levels of activity and retirement satisfaction.

This pattern of findings contributes to our understanding of the different roles of

regret in older adulthood. Earlier research among older adults has associated the presence of severe regret with low life satisfaction, elevated depressive symptoms, and biological and physical health problems (Lecci et al., 1994; Wrosch et al, 2005, 2007). However, our study demonstrates that regret management strategies can result in adaptive outcomes, including gains in activity engagement and retirement satisfaction, if they are matched with the availability of opportunity to address the regret. These gains are important in the earlier phases of retirement, which are typically associated with a renegotiation of roles and activities (Moen, 1996; Kim & Moen, 2001; Morrow-Howel et al., 2003). In this regard, the establishment of new activities in retirement is likely to produce subsequent long-term benefits for older adults' quality of life (Linville, 1987; Mullee, Coleman, Briggs, Stevenson, & Turnball, 2008; Pushkar et al., 2010).

In addition, our findings suggest that regret management can also play a protective role. In particular, disengagement from attempting to undo severe regrets protected individuals with low opportunity from experiencing a reduction in retirement satisfaction. This finding is consistent with a growing body of research suggesting that individuals with low levels of opportunity benefit emotionally if they disengage from unattainable goals (e.g., Bauer et al., 2008; Wrosch et al., 2003, 2006, 2007).

The reported findings further highlight the remarkable heterogeneity of the aging experience. Previous research examining regret experiences suggests that older adults have only few opportunities to address their regrets, and active engagement in overcoming such regrets is likely to result in failure and subsequent emotional problems (e.g., Bauer et al., 2008; Wrosch et al., 2006). Our data, however, suggest that this is only part of the story and that life regrets can result in adaptive outcomes in older adulthood,

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at least under some circumstances. In this regard, it is important to consider that life-span developmental theories do not describe older adulthood as a period of deterioration and loss only, but instead postulate that there are gains and losses in every period of life (e.g., Baltes, 1987). As a consequence, opportunity may not be as closely associated with age as one might expect (Bauer & Wrosch, 2011), and some retirees can pursue new goals when they experience an increase in opportunity afforded by the absence of work-related commitments.

While our findings showed that the interaction between regret engagement and opportunity was predictive of activity levels and retirement satisfaction, we note that the specific pattern of results were not identical for each longitudinal outcome. High levels of regret engagement predicted increased levels of activity engagement over time, but only for retirees with high levels of opportunity. In contrast, lower levels of regret engagement prevented a decline in retirement satisfaction, but only for those with low levels of opportunity. This pattern of results may be understood in relation to the distinction between behavior and affect regulation. Previous research has proposed that favourable opportunities require individuals to engage in behavioral strategies that lead to behavioral activation, whereas unfavourable opportunities may require them to use internal emotion-regulation strategies that can prevent emotional distress (Epstude & Roese, 2008; Heckhausen et al., 2010). Therefore, increases in activity engagement may be the behavioral consequences of behavior regulation, whereas maintenance of retirement satisfaction may be the affective consequences of psychologically "letting go" of regrets that cannot be undone. These distinct associations between regret management approaches and changes in behavioral and emotional outcomes may explain why

meditational pathways were not identified in our analyses involving the longitudinal outcomes.

Finally, the study's findings imply that neither opportunities nor self-regulation responses alone determine adaptive developmental outcomes. Instead, individuals need to match their behavioral and cognitive processes to different opportunities for addressing regret in order to experience the beneficial effects on their quality of life. These findings contribute to theories of self-regulation, emotion-regulation, and control (Baltes & Baltes, 1990; Brandtstaedter & Renner, 1990; Carstensen et al., 1999; Heckhausen et al., 2010; Wrosch et al., 2003). In this regard, a growing body of evidence has documented that individuals' self-regulation responses and their opportunities for producing desired life changes can interact in predicting developmental outcomes. In particular, goal engagement has been shown to benefit subjective well-being and physical health among individuals who have favourable opportunities to attain desired goals, while unfavourable opportunities for goal attainment require individuals to engage in self-protection and goal disengagement (for a review, see Heckhausen et al., 2010). Thus, our research extends this literature by providing empirical support for this assumption in a sample of recent retirees.

**Limitations and Future Directions**

Although this study demonstrated in cross-sectional and longitudinal analyses that regret experiences can be associated with older adults' activity engagement and retirement satisfaction, there are limitations that should be addressed in future research. First, our analyses were based on a measure of perceptions of opportunities and it could have been beneficial to also examine participants' objective opportunities. However, such

a measure is difficult to construct, given that objective opportunity may not only depend on the specific regret, but also on a person's capabilities and additional contextual factors. Moreover, we note that previous research has shown significant associations between objective and subjective opportunities (Bauer et al., 2008) and perceptions of opportunities may thus be an appropriate reflection of the extent to which individuals could address their life regrets. In addition, we think that in most cases objective opportunities need to be perceived by the individual in order to produce effects on behavior and outcomes, and that a subjective measure of opportunity may therefore be the more critical variable (for the importance of appraisals, see Lazarus & Folkman, 1984). Nonetheless, there may be differences between objective and subjective opportunities and future research should address this possibility by examining whether such differences could predict individuals' subsequent behaviors and quality of life.

Second, in our examination of the relation between regret management and activity engagement, we examined a variety of activity domains. This approach may have successfully captured the impact of regret management on behavior, given that regrets could impact a variety of behaviors through a number of pathways and mechanisms (c.f. Epstude & Roese, 2008). However, future research should extend our approach and examine how regret management might impact activities specific to the regret domain (e.g., how a parenting regret could facilitate reconciling family relations). Such links have been established in regret experiences related to task performance (e.g., school performance; Nasco & Marsh, 1999), but not in experiences of longstanding life regrets among older adults, and thus should be examined in future research.

Third, researchers could examine both how individuals strive to address their

regrets as well as the amount of progress they experience based on their efforts. In regard to how people strive to address their regrets, it has been argued that regrets may be resolved through physical or mental acts (Landman, 1987), or content-specific or content-neutral pathways (Epstude & Roese, 2008). It would be beneficial to understand not only if individuals are engaged in addressing their regrets, but also how they specifically plan to do it. In addition, tracking the associations between progress and specific regret management strategies would provide additional information regarding the outcomes of different resolution strategies and whether any regret can truly be resolved.

Fourth, researchers should examine the underlying individual difference variables that may predict how individuals manage their specific regrets. Our study assessed the levels of effort and commitment to manage a specific life regret and it is possible that trait-level factors may play a role in how individuals respond to the presence of regret. For example, the extent to which individuals generally perceive high levels of control or self-efficacy may be associated with active engagements in undoing the negative consequences of regret regardless of the available opportunity.

Finally, although our effect sizes were relatively small, we were able to identify regret management as a significant determinant of activity engagement and satisfaction in retirement. Consequently, we feel that our results may have implications for long-term developmental outcomes. For example, high levels of activity have been associated with retirement satisfaction, lower rates of health decline, and longevity (Linville, 1987; Morrow-Howel et al., 2003; Mullee et al., 2008; Pushkar et al., 2010). Thus, future research should examine how regret management, activity engagement, and retirement satisfaction predict indicators of older adults' long-term subjective well-being and

physical health to identify pathways to successful development.

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Table 2.1

*Means, Standard Deviations, and Zero-Order Correlations Between Main Study Variables*

| | M (SD) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | 58.94 (4.84) | - | | | | | | | | | | | | |
| 2. Sex[a] | - | -.03 | - | | | | | | | | | | | |
| 3. Years of Education | 15.08 (2.43) | .09 | -.08 | - | | | | | | | | | | |
| 4. Yeas of Retirement | 1.30 (.73) | -.04 | -.04 | -.07 | - | | | | | | | | | |
| 5. Years since regret event | 23.65 (12.78) | .31** | .00 | .05 | .03 | - | | | | | | | | |
| 6. Type of regret[b] | - | -.09 | -.02 | -.08 | .12* | -.11 | - | | | | | | | |
| 7. Regret Engagement | 2.80 (1.44) | -.14* | .01 | -.08 | -.12* | -.11 | -.03 | - | | | | | | |
| 8. Regret Opportunity | 2.54 (1.48) | -.20** | -.18** | -.09 | .03 | -.06 | .00 | .30** | - | | | | | |
| 9. Activity level (baseline) | 55.84 (6.93) | .01 | .06 | .10† | .10† | -.01 | -.07 | .07 | .02 | - | | | | |
| 10. Retirement satisfaction (baseline) | 2.92 (.48) | -.10† | .20** | -.07 | .09 | -.04 | .08 | .09 | .05 | .21** | - | | | |
| 11. Activity level (3-yr follow-up) | 55.62 (7.13) | -.01 | .13* | .10 | .00 | .03 | -.09 | .07 | .04 | .62** | .18** | - | | |
| 12. Retirement satisfaction (3-yr follow-up) | 2.90 (.49) | -.06 | .19** | -.01 | .03 | -.01 | .00 | .00 | .04 | .18** | .60** | .21** | - | |
| 13. Change in activity level[c] | .00 (1.00) | -.02 | .11† | .05 | -.07 | .04 | -.05 | .04 | .04 | .00 | .07 | .79** | .13† | - |
| 14. Change in retirement satisfaction[c] | .00 (1.00) | -.01 | .08 | .04 | -.03 | .02 | -.06 | -.07 | .02 | .07 | .00 | .13* | .80** | .11† |

*Note.* [a]Sex is coded, men = 1; women = 2; [b]Type of regret is coded, regret of commission = 1; regret of omission = 2; [c]Change in activity and change in retirement satisfaction are standardized residual scores; †$p \leq .10$; * $p \leq .05$; ** $p \leq .01$.

Table 2.2

*Summary of Hierarchical Regression Analyses Predicting Baseline Levels and Three-Year Change in Activity and Retirement Satisfaction by Participants' Perceived Opportunities For, and Engagement In, Undoing Their Regrets*

| | Baseline Levels | | | | | | Three-Year Change | | | | | |
| | Activity Level | | | Retirement Satisfaction | | | Activity Level | | | Retirement Satisfaction | | |
| | B | SE B | β | B | SE B | β | B | SE B | β | B | SE B | β |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Covariates[a]* | | | | | | | | | | | | |
| Sex[b] | .53 | .41 | .08 | .10 | .03 | .20** | .11 | .06 | .11† | .09 | .06 | .09 |
| Years of Education | .76 | .41 | .11† | -.02 | .03 | -.05 | .05 | .06 | .05 | .05 | .06 | .05 |
| Years of Retirement | .75 | .41 | .10† | .05 | .03 | .10† | -.06 | .06 | -.06 | -.02 | .06 | -.02 |
| *Main effects* | | | | | | | | | | | | |
| Regret engagement (RE) | .58 | .43 | .08 | .04 | .03 | .08 | .02 | .06 | .02 | -.09 | .06 | -.09 |
| Regret opportunity (RO) | .14 | .44 | .02 | .03 | .03 | .05 | .06 | .06 | .06 | .07 | .06 | .07 |
| *Interaction* | | | | | | | | | | | | |
| RE X RO | 1.48 | .40 | .21** | .07 | .03 | .14* | .15 | .06 | .15** | .13 | .06 | .13* |
| $R^2$ | | .08 | | | .08 | | | .05 | | | .04 | |

*Note.* [a] We statistically controlled the analyses for socio-demographic variables that showed some association (i.e., $p < .10$; see Table 1) with at least one of the dependent variables (Tabachnick & Fidell, 2001), [b]Sex is coded, men = 1; women = 2; †$p \leq .10$; * $p \leq .05$; ** $p \leq .01$
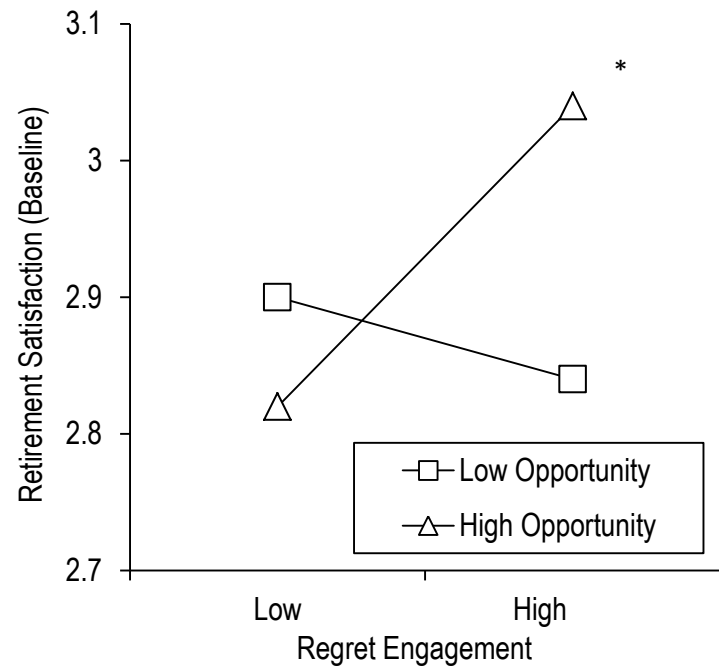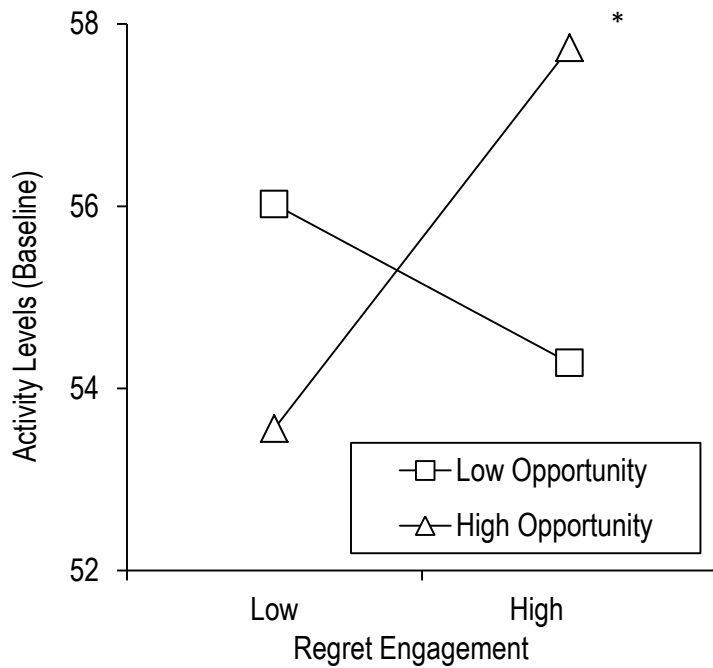
*Figure 2.1.* Association between baseline levels of regret engagement and baseline levels of activity (left panel) and retirement satisfaction (right panel) among retirees with high versus low baseline levels of perceived opportunities to undo their regret. Effects were plotted for one standard deviation above and below the sample means. (*) denotes that the slope significantly differs (p < .05) from zero.
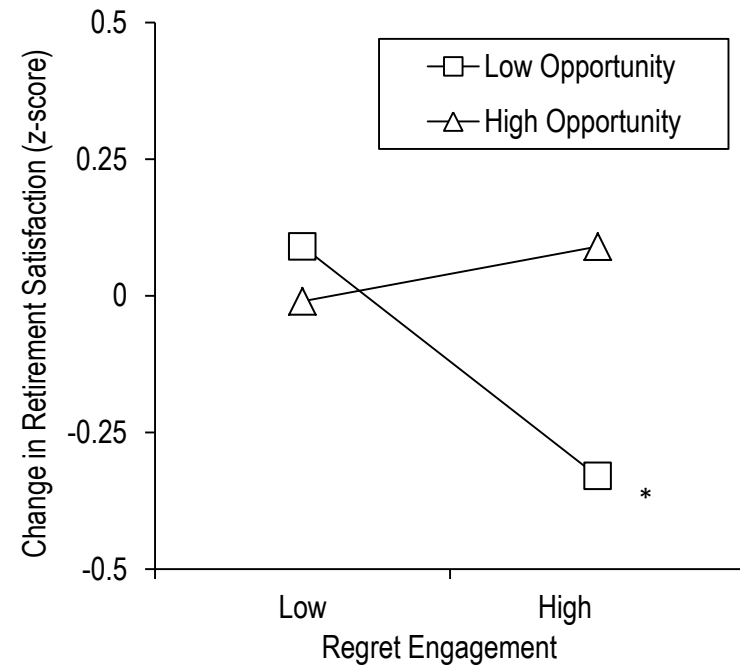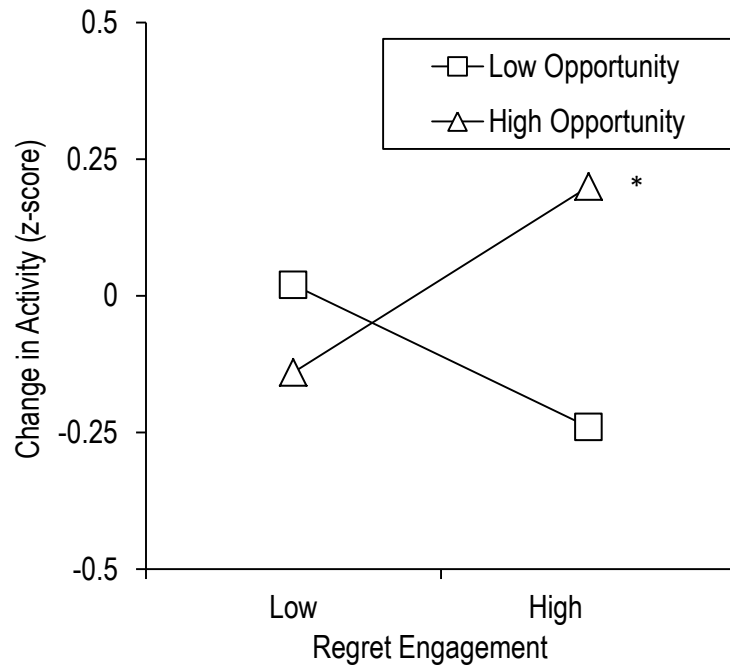
*Figure 2.2.* Association between baseline levels of regret engagement and 3-year changes in activity level (left panel) and retirement satisfaction (right panel) among retirees with high versus low baseline levels of perceived opportunities to undo their regret. Effects were plotted for one standard deviation above and below the sample means. (*) denotes that the slope significantly differs (p < .05) from zero.

**CHAPTER 3:**

**STUDY 2**

**Age and the Adjusted Regulation of Regrets: A Quasi-Experimental Examination**

**Abstract**

This quasi-experimental three-month longitudinal study compared the effects of different approaches to regulate the experience of regret. Two groups of participants, younger and older adults, completed one of three writing activities designed to alter how they address their most severe life regrets (engagement, disengagement, or control). We hypothesized that younger adults, who tend to possess relatively favourable objective opportunities to address their regrets, would experience larger three-month increases in well-being when assigned to engagement rather than disengagement or control. Accordingly, we found that younger adults experienced larger decreases in wistful emotions and larger increases in closure when assigned to engagement or control in comparison to disengagement, and larger decreases in regret intensity when assigned to engagement in comparison to disengagement. We hypothesized that older adults, who tend to possess relatively unfavourable objective opportunity, would experience larger three-month increases in well-being when assigned to disengagement rather than engagement or control. Indeed, older adults experienced larger increases in sleep quality when assigned to disengagement than the other two conditions. In addition, younger adults assigned to engagement had larger decreases in regret intensity and wistful emotions than older adults assigned to the same condition, whereas older adults assigned to disengagement had larger increases in regret closure than younger adults assigned to the same condition. These findings provide meaningful evidence highlighting the importance of opportunity when determining the response to a particular regulatory approach.

**Introduction**

Considering that individuals may face increasing restrictions (biological, societal) across the lifespan in the opportunity to attain personal goals (Baltes, 1997; Heckhausen, 1999; Heckhausen et al., 2010; Heckhausen & Schulz, 1995), current theories stress the importance of opportunity when considering how to approach our developmental goals (Carver & Scheier, 1998; Heckhausen et al., 2010; Wrosch et al., 2003). In particular, theorists argue that regulatory strategies (goal engagement, disengagement) are not adaptive in themselves, rather, these strategies are adaptive in the context of opportunity for goal attainment (Heckhausen et al., 2010). That is, the pursuit of goals is adaptive under circumstances of favourable opportunity, whereas disengagement is adaptive when opportunity is unfavourable. To date, evidence to support this pattern comes from correlational studies that are typically cross-sectional, but occasionally longitudinal, in nature (e.g., Wrosch et al., 2000; Hall et al., 2010; Wrosch & Heckhausen, 1999; Heckhausen et al., 2001). Consequently, there is an existing gap in the literature due to the absence of experimental methods highlighting the impact of opportunity on regulation.

The current study will fill this gap by examining the regulation of life regrets, a phenomenon that has been inspected in previous research on regulation (e.g., Newall et al., 2009; Wrosch & Heckhausen, 2002; Wrosch et al., 2005). In the current study, we manipulated the perception of opportunity to undo regret (high, low, or control) and the corresponding regret-regulatory approach (engagement, disengagement, or control) among a sample of individuals with relatively high (i.e., younger adults) or low (i.e., older adults) objective opportunity to undo the negative consequences of their severe life

regrets. Therefore, the current study employs a 3 (condition) X 2 (age group) design. We hypothesized that the impact of condition assignment on well-being would be dependent upon age group.   Specifically, we predicted that, among participants with relatively favourable objective opportunity (i.e., younger adults), assignment to engage in undoing their regrets would result in larger increases in well-being than assignment to either disengage from their regret or to control. In contrast, we predicted that, among participants with relatively low objective opportunity (i.e., older adults), assignment to disengage from their regrets would result in larger increases in well-being than assignment to either engage in undoing their regrets or control.

**Life Regrets, Regret-Regulation, and the Importance of Opportunity**

The experience of regret occurs when, upon reflection of our past behaviour or decisions, we consider alternative scenarios that may have produced more favourable outcomes (i.e., upward counterfactual thoughts; Kahneman, 1995) and experience of specific negative emotions (e.g., despair emotions, wistful emotions; Gilovich et al., 1998). Life regrets are common (Newall et al., 2009; Torges et al., 2005), can be experienced at any point in the lifespan (Landman, 1987), and involve a variety of life domains (e.g., romance, "I regret not marrying my first love; family, "I regret not having children"; career, "I regret becoming a teacher"; Roese & Summerville, 2005).

The experience of regret can be considered a double-edged sword. In some cases, regret produces corrective action and motivates individuals to address their unwanted life circumstances (Epstude & Roese, 2008; Boninger et al., 1994; Nasco & Marsh, 1999). In other cases, regret can produce negative emotional states and subsequently impair health (Wrosch et al., 2005, 2007). The outcome of regret depends upon whether individuals

choose to either engage in undoing the regret or disengage from the regret (Gilovich & Medvec, 1995; Torges et al., 2005; Landman, 1987; Wrosch et al., 2005). Theorists argue (Heckhausen et al., 2010) and research findings suggest (e.g., Wrosch et al., 2007; Wrosch et al., 2005; Wrosch & Heckhausen, 2002; Bauer et al., 2008; Bauer & Wrosch, 2011) that the outcome of employing a particular regret-regulatory strategy may be dependent upon the availability of opportunity to address one's particular life circumstances. Engagement may be adaptive in the context of available opportunity to address personal circumstances whereas disengagement may be adaptive in the context of unfavourable or low opportunity.

Unfortunately, the opportunity to attain our personal goals is not stable across the lifespan due to biological and societal factors that occur with age (Heckhausen, 1999; Baltes, 1997; Heckhausen et al., 2010). Similarly, in the context of life regrets, the opportunity to undo the negative consequences of regret may decline with age. Although there may be considerable variability in opportunity at any age (Bauer et al., 2008; Bauer & Wrosch, 2011; Farquhar, Wrosch, Pushkar, & Li, 2013), older adults tend to possess relatively lower objective opportunity to undo their regrets than younger adults (Wrosch et al., 2005; Bauer et al., 2008; Jokisaari, 2003).

Similar to research examining other life circumstances (e.g., health issues, fertility, romantic relationships; Hall et al., 2010; Heckhausen et al., 2001; Wrosch & Heckhausen, 1999), research on life regrets underscores the importance of addressing one's regret in a fashion that is considerate of the availability of opportunity (Wrosch et al., 2005; Wrosch et al., 2007; Nasco & Marsh, 1999; Bauer et al., 2008; Bauer & Wrosch, 2011; Torges et al., 2005; Newall et al., 2009). However, the existing research is

largely correlational in nature (e.g., Wrosch et al., 2005; Newall et al., 2009) and there is a striking absence of experimental methods. Experimental research would further substantiate the earlier correlational findings.

**Experimental Design and Adjusted Regulation**

Although there has been limited research on how regulatory strategies can be successfully manipulated (i.e., attributional retraining; e.g., Hall, Perry, Chipperfield, Clifton, & Haynes, 2006), one study to date conducted an experimental examination of the impact of regret-regulatory processes on quality of life. Wrosch et al. (2007) examined the use of social-cognitive strategies associated with disengagement among a sample of older adults. In their design, the researchers assigned older adults with a severe life regret to either use specific social-cognitive strategies or to a control condition. The researchers asked participants in both conditions to follow condition-specific writing instructions across three days, and all participants completed dependent measures prior to the manipulation and three-month post-manipulation. In the experimental condition, the researchers instructed participants to write diary-style entries using three strategies theoretically associated with disengagement: focusing on external factors responsible for the regret (external attributions), comparing their regret to other people's regrets (downward social comparisons), and describing meaningful goals (goal formation). In the control condition, participants were instructed to write about their daily activities. The results of the manipulation provided evidence for the benefit of disengagement strategies in this sample of older adults. Although both groups experienced reductions in regret-related hot emotions (e.g. anger), participants assigned to the disengagement condition benefitted from using the social-cognitive strategies and experienced reductions in

despair emotions (e.g., helpless). In addition, condition assignment explained the relationship between regret intensity and changes in sleep quality. Specifically, higher baseline regret intensity was associated with increased sleep problems at three-month follow-up, but only among participants assigned to the control condition. Therefore, the use of the social-cognitive strategies appeared to protect older adults with intense regrets from experiencing increased sleep difficulties.

While Wrosch et al. (2007) provides meaningful evidence that social-cognitive strategies associated with disengagement are beneficial for individuals (i.e., older adults) who tend to possess objective unfavourable opportunities to address their life circumstances (i.e., life regrets), there are several limitations to their experimental design and to the area of research at-large. First, researchers have not manipulated disengagement explicitly. In the aforementioned study, Wrosch et al. neither asked participants to let go of undoing their regrets (i.e., disengage) nor triggered disengagement by altering perceptions of opportunity (Brandstätter et al., 2013; Carver & Scheier, 1998; Wrosch et al., 2003). Instead, the researchers examined the impact of using social-cognitive strategies (e.g., downward social comparisons) associated with disengagement. Second, researchers have not yet compared the mental and physical outcomes of either engaging or disengaging from regrets. Third, researchers have not yet compared individuals with favourable versus unfavourable objective opportunities to address their regrets. For instance, Wrosch et al. (2007) examined a group of older adults without a comparison group of younger adults who may possess relatively higher objective levels of opportunity, and therefore may react differently to the use of certain regulatory approaches.

**The Current Study**

The current study uses a quasi-experimental design to investigate whether differences in objective opportunity influence the adaptability of a particular regulatory strategy. We addressed this question in the context of life regrets, a cognitive-emotional phenomenon (Gilovich et al., 1998; Kahneman, 1995; Landman, 1987). Based on theory and previous research (Bauer et al., 2008; Heckhausen, 1999; Heckhausen et al., 2010; Jokisaari, 2003; Wrosch et al., 2005), we reasoned that younger and older adults would possess high and low objective opportunity, respectively, to undo the negative consequences of their regret. Therefore, we recruited younger and older adults to participate in our study. We assigned participants from each age group to one of three conditions: 1) a regret engagement condition, where participants focused on how they possess favourable opportunities to address their regrets and considered how to undo their regrets; 2) a regret disengagement condition, where participants focused on how they possess unfavourable opportunity to address their regrets and considered how they might let go of their regrets; and 3) a control condition, where participants described their daily activities. Similar to previous studies (Hall et al., 2006; Moore & Brody, 2009; Wrosch et al., 2007), the current manipulation involves a writing task. Research evaluating writing tasks suggests that writing may facilitate change to internal mindsets (Park & Blumberg, 2002). Through the use of our writing task, individuals may internalize the assigned perception of opportunity and associated regulatory approach.

We designed the two experimental conditions to manipulate the perception of opportunity (high, low) and regulatory strategy (engagement, disengagement), since the perception of opportunity, or assessment of attainability, plays an important role in the

adjustment of our self-regulatory approach (Brandstätter et al., 2013; Carver & Scheier, 1990; Wrosch et al., 2003). To measure whether our manipulation impacted the intended motivational constructs, we assessed for differences in self-reported regret engagement (to undo the negative consequences of the regret) and perceived opportunity (to undo the regret) between the three conditions.

*Hypothesis 1.* *We predict significant differences between the conditions in immediate-change and three-month change in regret engagement and perceived opportunity.  Relative to the disengagement and control conditions, participants assigned to the engagement condition will have larger increases in regret engagement and perceived opportunity at immediate follow-up and three-month follow-up; and relative to the control condition, participants assigned to the disengagement condition will have larger decreases in regret engagement and perceived opportunity.*

We reasoned that the adaptive regulation of regret should reduce the psychological and physical consequences of regret. First, we argue that regret regulation will influence the emotional intensity of the regret experience. The experience of regret is associated with three clusters of specific emotions: hot (e.g., angry, irritated), despair (e.g., sorrow, helpless), and wistful emotions (e.g., sentimental, nostalgic; Gilovich et al. 1998). Based on previous findings (Wrosch et al., 2005, 2007; Wrosch & Heckhausen, 2002; Bauer et al., 2008), the adaptive regulation of regret is likely to produce a reduction in regret intensity via reduced specific emotions. In contrast, the maladaptive regulation of regret will likely increase or maintain the intensity of the regret. Second, we argue that regret regulation will impact how individuals perceive the current influence of their past decisions. Life regrets involve reflections of personal past decisions (e.g., dropping out of

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school) that contribute to current dissatisfaction (e.g., possessing an unsatisfactory career; Kahneman, 1995; Gilovich & Medvec, 1995; Van Dijk et al., 1999). If regret is addressed in a way that is congruent with the availability of opportunity, individuals are likely to develop a sense of closure over events of their personal past (Beike, Markman, & Karadogan, 2009; Beike & Wirth-Beaumont, 2005). In contrast, regrets are likely to be perceived as open and active if an individual uses a regulatory strategy that is incongruent with his or her availability of opportunity. Third, we argue that regret regulation will impact individuals' quality of sleep. Individuals tend to think about regret more frequently in the late-evening (prior to the onset of sleep) than at any other time of the day (Schmidt et al., 2011) and intense regrets are associated with increased sleep disturbances (Wrosch et al., 2007). Among individuals who tend to experience more frequent levels of regret, instructions to think about regrets before bed produces greater sleep disturbances than instructions to think about other emotional (e.g., pride) and non-emotional content (e.g., events of the working day; Schmidt & Van der Linden, 2013). If regret is managed using an opportunity-sensitive approach, individuals are likely to experience improved sleep quality. In contrast, the maladaptive regulation of regrets is likely to impair sleep quality.

Therefore, we hypothesized that the association between condition assignment and measures of well-being would be dependent upon available opportunity to undo the regret. Specifically, we hypothesized younger adults would show adaptive responses at three-month follow-up (i.e., larger decreases in regret intensity and regret-specific emotions, and larger increases in regret closure and sleep quality) when assigned to engage in undoing their regrets when compared to their counterparts assigned to regret

disengagement and control, whereas older adults would show adaptive responses when assigned to disengage from their regrets when compared to their counterparts assigned to regret engagement and control. In addition, we predicted that regret engagement would be more adaptive for younger adults than older adults, whereas regret disengagement would be more adaptive for older adults than younger adults (see Figure 3.1).

*Hypothesis 2. There will be a significant two-way interaction (between condition assignment and age group) when examining our dependent variables so that differences between conditions when examining three-month change in dependent variables is dependent upon age group. Subsequently, the following between-group differences will be found (see hypotheses 2a – 2d):*

*Hypothesis 2a. Among younger adults, assignment to regret engagement will result in adaptive outcomes when compared to assignment to regret disengagement or control. Therefore, relative to regret disengagement and control, younger adults assigned to regret engagement will have larger decreases in regret intensity and regret emotions and larger increases in regret closure and sleep quality.*

*Hypothesis 2b. Among older adults, assignment to regret disengagement will result in increased well-being when compared to assignment to regret engagement or control. Therefore, relative to regret engagement and control, older adults assigned to regret disengagement will have larger decreases in regret intensity and regret emotions and larger increases in regret closure and sleep quality.*

*Hypothesis 2c. Among all participants assigned to the disengagement condition, older adults will have increased well-being when compared to younger adults. Therefore, relative to younger adults, older adults assigned to regret disengagement will have larger*

*decreases in regret intensity and regret emotions and larger increases in regret closure and sleep quality.*

*Hypothesis 2d. Among all participants assigned to the engagement condition, younger adults will have increased well-being when compared to older adults. Therefore, relative to older adults, younger adults assigned to regret engagement will have larger decreases in regret intensity and regret emotions and larger increases in regret closure and sleep quality.*

To explore for possible mediation effects, we also tested whether 1) changes in measures associated with our manipulation (i.e., regret engagement, perceived opportunity) accounted for changes in our dependent variables, and 2) changes in the psychological features of regret (regret intensity, emotions, or closure) would mediate the association between condition assignment and the health outcome of sleep quality.

**Method**

**Participants**

We recruited a heterogeneous community sample of younger (ages 18 – 30 years) and older (ages 60 years and older) adults from the Montreal metropolitan area through advertisements posted in public areas, newspapers, online communities (e.g., Craigslist), and referral lists from unrelated research projects. Interested parties were screened for eligibility, specifically: 1) the presence of three severe life regrets, 2) age within the specified parameters, and 3) proficiency in English. Initially, 226 participants enrolled in the study, and 175 participants (77.43% of enrolled participants) were included in the final sample (for participant flow chart, see Figure 3.2). Of the removed participants, 35 (15.49% of enrolled participants) did not return follow-up materials and 16 (7.08% of

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enrolled participants) had other issues (e.g., did not follow instructions, outside of age parameters). Removed participants did not differ from the final sample on baseline measures of regret closure, sleep quality, wistful emotions, and education level, $ts <$ 1.57, $ps > .05$, ds $< .26$, or sex, $\chi 2(1) = .51$, $p > .05$, $\psi = .05$, but removed participants did report higher baseline regret intensity ($M = 1.51$, $SD = .66$ versus $M = 1.23$, $SD = .61$), hot emotions ($M = 1.63$, $SD = .96$ versus $M = 1.24$, $SD = .81$), and despair emotions ($M = 1.35$, $SD = .79$ versus $M = 1.08$, $SD = .76$), than the participants of the final sample $ts > 2.86$, $p < .05$, ds $> .35$ and were more likely to be younger adults ($n = 34$ removed, 15.04% of enrolled participants) than older adults ($n = 11$ removed, 4.87% of enrolled participants), $\chi 2(1) = 9.66$, $p < .01$, $\psi = .21$  After removing participants, we replaced missing values among the remaining participants with the mean-value of the particular variable. Table 3.1 contains means, standard deviations, and zero-order correlations between baseline measures. The final sample included 87 younger adults and 88 older adults. Baseline measures of the final sample, comparing younger and older adults, are presented in Table 3.2.

**Procedure**

We invited participants to the laboratory to complete baseline questionnaires containing our dependent measures (Time 1; T1) and to be instructed on the writing intervention which they completed at home. We also asked participants to complete a follow-up questionnaire on the day immediately following the competition of the writing intervention to assess whether our manipulation was successful (i.e., immediate follow-up). Three months after baseline (Time 2; T2), we sent participants a follow-up questionnaire containing our dependent measures to be completed by mail. Participants

received $20 (T1 and immediate follow-up) and $10 (T2) remuneration (see Appendix C).

**Measures**

This study examines a subset of the dependent measures within this longitudinal study. With the exception of demographic information, we assessed the following measures at baseline (T1), immediate follow-up, and three-month follow-up (T2).

**Demographics.** We asked participants to report their age, sex, and highest level of education. We recoded the highest level of education using the following 5-point Likert-type scale (1 = did not complete high school, 2 = high school, 3 = collegial or trade school, 4 = bachelor's degree, 5 = master's or doctorate).

**Regrets.** We asked participants to report their three most severe regrets (see Appendix D) and to answer several questions about each regret (see Appendix E).

*Regret characteristics.* We asked participants to report (in years and months) how much *time has passed since the behaviour occurred that led to each regret*, and we aggregated these values to calculate an overall mean temporal value. Participants also reported whether the regret related to a behaviour that 'you have done' (i.e., commission) or that 'you have not done' (i.e., omission) and we calculated the *percentage of commission regrets* by dividing the total number of regrets classified as regrets of commission by the total number of regrets reported. Finally, participants used a list of ten common *regret domains* (see Roese & Summerville, 2005) to classify each regret. Comparisons between regret characteristics between younger and older adults is included in Table 3.3.

***Regret engagement and perceived opportunity.*** We assessed level of engagement in undoing each regret and level of perceived opportunity to undo each regret using the same items and method as described in Study 1. The 2-items used to compute regret engagement showed good internal consistency [T1: Mean $\alpha$ = .90 (range = .86 - .93); immediate follow-up: Mean $\alpha$ = .92 (range = .92 - .93); T2: $\alpha$ = .91(range = .88 - .93)] as did the 2-items used to compute perceived opportunity [T1: Mean $\alpha$ = .90 (range = .87 - .93); immediate follow-up: Mean $\alpha$ = .90 (range = .87 - .92); T2: $\alpha$ = .89 (range = .88 - .92)]. We then aggregated all three scores to calculate an overall mean level of regret engagement (T1: $M$ = 2.79, $SD$ = .97; immediate follow-up: $M$ = 2.94 , $SD$ = 1.01; T2: $M$ = 2.86, $SD$ = 1.00) and perceived opportunity at each time point (T1: $M$ = 2.32, $SD$ = .91; immediate follow-up: $M$ = 2.54, $SD$ = .95; T2: $M$ = 2.58, $SD$ = .97). Means and standard deviations of regret engagement and perceived opportunity are presented in Table 3.4.

***Regret intensity and regret emotions.*** We assessed the emotional intensity associated with each regret using 5-point Likert-type scales (endpoints: 0 = not at all, 4 = extremely). Participants rated, separately for each regret, the extent to which they have recently experienced nine regret-related emotions (e.g., helpless, angry, sentimental; Gilovich et al., 1998). The nine emotions showed good internal consistency [T1: Mean $\alpha$ = .77 (range = .74 to .80); T2: Mean $\alpha$ = .83 (range = .81 to .85)], and we calculated a mean intensity score for each regret. We then aggregated all three intensity scores to create an overall mean intensity score for each time point (T1: $M$ = 1.23, $SD$ = .61; T2: $M$ = 1.05, $SD$ = .66). Higher scores represent higher levels of regret intensity. Using the regret intensity ratings, we also assessed specific categories of regret-related emotions:

hot (i.e., angry, irritated, embarrassed), despair (i.e., sorrow, desperate, helpless), and wistful emotions (i.e., sentimental, nostalgic, contemplative). Each category showed acceptable internal consistency [(T1: Mean $\alpha$ = .69 (range = .62 to .72); T2: Mean $\alpha$ = .75 (range = .67 to .82)], and we calculated mean emotion scores for each of the three regrets. We aggregated the three scores for each specific emotion (Hot emotion, T1: $M$ = 1.24, $SD$ = .81; T2: $M$ = 1.04, $SD$ = .83; Despair emotion, T1: $M$ = 1.08, $SD$ = .76; T2: $M$ = .91, $SD$ = .74; Wistful emotions, T1: $M$ = 1.35, $SD$ = .76; T2: $M$ = 1.19, $SD$ = .80). Higher scores represent higher levels of the specific regret emotion. Means and standard deviations of regret intensity and specific regret emotions are presented in Table 3.4.

*Regret closure.* We assessed the amount of psychological closure associated with each regret by using two items with 5-point Likert-type scales (endpoints: 1 = strongly disagree, 5 = strongly agree). Participants rated 1) My regret feels like a 'closed book', and 2) My regret feels like 'unfinished business' (second item is reverse-coded; Beike & Wirth-Beaumont, 2005). The two items showed poor internal consistency [T1: Mean $\alpha$ = .45 (range = .22 to .62); T2: Mean $\alpha$ = .29 (range = .21 to .35)], so we examined each item separately. We aggregated the item ratings from each regret to create two mean closure scores ('Closed book', T1: $M$ = 3.17, $SD$ = .84;T2: $M$ = 3.13, $SD$ = .95; 'Unfinished business', T1: $M$ = 2.80, $SD$ = .86; T2: $M$ = 2.93, $SD$ = .99). Higher scores represent higher levels of regret closure. Means and standard deviations of regret closure are presented in Table 3.4.

**Sleep Quality.** A global measure of sleep quality was derived from items of the Brief Pittsburgh Sleep Quality Index (see Appendix F, Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Sleep quality was calculated using the following formula: sleep quality

= [(sleep time – sleep loss)/sleep time]. Sleep time was computed by asking participants to report the time they have usually (over the past month) got in and out of bed. Sleep loss was computed by adding together the amount of time it takes to fall asleep, time spent awake in the middle of the night, and time lost due to early awakening. The sleep quality calculation results in a score ranging from $0 – 1.00$ (T1: $M = .86$, $SD = .11$ ; T2: $M = .85$, $SD = .12$), and higher scores represent higher levels of sleep quality. Means and standard deviations of sleep quality are presented in Table 3.4.

**Experimental Manipulation**

Following the completion of the baseline questionnaire (T1), we randomly assigned participants to one of three writing conditions described as three-day 'writing interventions' to help participants 'overcome their regrets'. The conditions were designed to manipulate the participants' level of perceived opportunity to undo their regrets and the corresponding regret-regulatory strategy. In the 'regret disengagement' condition, participants (29 younger adults; 30 older adults) focused on unfavourable opportunities to undo their regrets and were consequently instructed to let go of their regret, whereas in the 'regret engagement' condition, participants (28 younger adults; 28 older adults) were asked to focus on their favourable opportunities and to increase their efforts to undo the regret. In the control condition, we instructed participants to write about their daily activities (30 younger adults; 30 older adults). We made efforts to ensure that participants were not aware of alternative instructions outside of their assigned condition (i.e., we tested participants individually; we did not test individuals living in the same household). The socio-demographic characteristics and baseline dependent measures did not differ

between individuals assigned to the three writing conditions for younger adults, $F$s(2, 84) < 1.94, $p$s > .05, $\eta^2_p$s ≤ .04, or older adults, $F$s(2, 85) < 2.09, $p$s > .05, $\eta^2_p$s < .05.

Participants completed the writing intervention on three consecutive days. To ensure compliance, participants received a daily reminder by telephone from a research assistant. Below, the procedure for the experimental conditions and the control condition are presented separately.

**Experimental conditions.**

We provided participants with a separate booklet of instructions for each day. Each booklet contained three parts: 1) general instructions, 2) two regret examples, and 3) instruction on how to proceed with the writing intervention (for regret engagement condition, see Appendix G; for regret disengagement condition, see Appendix H).

*General instructions.* On each day of the three-day writing intervention, participants read the following statement which was tailored to reflect their assigned condition (i.e., regret disengagement/ regret engagement):

Some aspects of our regrets can be undone, whereas other aspects cannot be undone. Unfortunately, sometimes people tend to (overestimate/underestimate) their ability to undo certain aspects of their regrets. This implies that even if you think you can undo the negative consequences of your regret, it may in fact be (unlikely or impossible/ likely or possible). Sometimes, we have to realize that it is time to (let go of/ undo) our regrets. This study is designed to help you (let go of/ undo) your regrets.

*Regret examples.* Participants were instructed to read two regret examples per day (six in total) related to common regret domains (i.e., family, finances, education, career,

romance, self-development; c.f. Roese & Summerville, 2005). The examples followed the writing procedure outlined below. Versions created to reflect the regret engagement condition were rated (on a Likert-type scale, 1 = impossible, 5 = possible) by 21 raters, blind to the purposes of the study, as possessing greater opportunity to undo the regret ($M = 4.41$, $SD = .67$) than versions created to reflect the regret disengagement condition ($M = 2.51$, $SD = .87$), $t(20) = 6.26$, $p < .01$, $d = 2.45$.

*Writing instructions.* Participants wrote about one of their three regrets on each of the three days (the order was randomized). When writing, participants were instructed to follow three distinct steps which we tailored to reflect their assigned condition (i.e., regret disengagement/ regret engagement). We asked participants to limit their writing time to a maximum of 20 minutes.

1) Please describe your regret in detail as well as the consequences of your regret,

2) Describe the conditions that might make it (unlikely or impossible/ likely or impossible) to undo your regret, and 3) What thoughts and/or actions would help you to (let go of/undo) your regret?

**Control condition.**

Similar to the experimental conditions, we provided participants with a separate booklet of instructions for each day. Each booklet contained three parts: 1) general instructions, 2) two activity examples, and 3) instruction on how to proceed with the writing intervention (see Appendix I).

*General instructions.* On each day of the three-day writing intervention, participants read the following statement:

Regrets can sometimes influence the types of activities we participate in. This study is designed to help you monitor your activities. Please consider the following examples.

*Activity examples.* Participants were instructed to read two activity monitoring examples. The examples followed the writing procedure outlined below.

*Writing instructions.* Participants were instructed to be neutral and objective, and not to mention their emotions, feelings or opinions when writing. We asked participants to limit their writing time to a maximum of 20 minutes, and to follow these three steps:

1) Please list what you have done today since you woke up this morning,

2) Describe in detail one of the activities that you have done today, and

3) Describe in detail another one of the activities that you have done today.

**Statistical Analyses**

**Calculation of dependent measures.** To obtain measures of immediate change, we calculated standardized residual change scores. We first conducted a regression analysis predicting the immediate level of a particular variable. We then entered, as the first and only step of the regression, the baseline level of the same variable. After running this analysis, we saved the residual for each participant. We next standardized all residual scores. To interpret change using this approach, scores above and below the value zero represent relative increases and decreases in the dependent variable, respectively. We truncated our measures (+/- 3 SD) to account for possible outliers (Tabachnick & Fidell, 2007). We repeated this process when calculating measures of three-month change.

**Testing of hypotheses.** To test if our experimental manipulation produced differences in regret engagement and perceived opportunity at immediate follow-up, we

conducted a series of 3 (condition) X 2 (age group) ANCOVAs. To unpack significant interactions, we conducted follow-up ANCOVAs examining for condition effects separately for each age group, and for age group effects separately for each condition. We included sex and level of education as covariates in all analyses. We also repeated these analyses when examining three-month change in regret engagement and perceived opportunity.

To test our main hypotheses, we conducted a series of 3 (condition) X 2 (age group) ANCOVAs. To unpack significant interactions, we conducted follow-up ANCOVAs examining for condition effects separately for each age group, and for age group effects separately for each condition. We included sex and level of education as covariates in all analyses.

Due to novelty of our paradigm, we also conducted follow-up analyses for marginal effects ($p < .10$), interpreting these effects with caution.

**Mediation analyses.** To probe as to whether changes in regret engagement or regret opportunity (at either immediate follow-up or three-month follow-up) mediated the relationship between condition assignment and three-month changes in our dependent variables, we conducted analyses of moderated mediation (see Figure 3.3; i.e., Process Model 7; Hayes, 2012) to test for conditional indirect effects at specific levels of the moderator (i.e., age groups). As there are three conditions, and bootstrapping methods cannot examine categorical information, we conducted separate bootstrapping analyses to contrast two conditions at a time (i.e., regret disengagement versus regret engagement; regret disengagement versus control; regret engagement versus control). Bootstrapping analyses were set at 5,000 resamples and we interpreted conditional indirect effects as

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significant if the 95% bias-corrected and accelerated confidence intervals did not contain zero (Hayes, 2013; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008).

We also completed bootstrapping analyses to probe as to whether changes in the psychological features of regret (i.e., regret intensity, specific regret emotions, regret closure) mediated the relationship between condition assignment and changes of sleep quality.

## Results

### Manipulation Check

Below, we present the analyses examining immediate change and three-month change in levels of regret engagement and perceived opportunity. As previous described, we conducted a series of 3 (condition) X 2 (age group) ANCOVAs, including sex and education level as covariates. To unpack significant interaction effects, we conducted follow-up ANCOVAs examining condition effects separately for each age group, and age group effects separately for each condition.

**Regret engagement.** We did not find significant covariate effects, $Fs(1, 167) < 1.23$, $ps > .27$, $\eta^2_ps < .01$, age group effect, $F(1, 167) < .01$, $p > .99$, $\eta^2_p < .01$, or condition effect, $F(2, 167) = .79$, $p = .46$, $\eta^2_p < .01$, when examining change in regret engagement at immediate follow-up. We did, however, find a marginally significant interaction effect, $F(2, 167) = 2.62$, $p = .08$, $\eta^2_p = .03$.

To unpack the interaction effect, we first examined the age groups separately. We did not find significant covariate effects for either younger, $F(1, 82) < 1.24$, $p > .27$, $\eta^2_p < .02$, or older adults, $F(1, 83) < .27$, $p > .61$, $\eta^2_p < .01$. There was also no significant

condition effect for younger, $F(2,82) = 1.97$, $p = .15$, $\eta^2_p = .05$, or older adults, $F(2,83) = 1.67$, $p = .20$, $\eta^2_p < .04$.

We next examined the conditions separately. We did not find a significant effect for education or age group for participants assigned to the regret disengagement condition, $Fs(1, 55) < 2.33$, $ps > .13$, $\eta^2_ps \leq .04$, however, we did find a marginally significant effect for sex, $F(1, 55) = 3.83$, $p < .06$, $\eta^2_p = .07$, with women having marginally larger increases in engagement ($M = .26$, $SD = .94$) than men ($M = -.29$, $SD = 1.07$). We did not find significant covariate or age effects for participants assigned to either the regret engagement condition, $Fs(1, 52) < .97$, $ps > .33$, $\eta^2_ps < .02$, or control condition, $Fs(1, 56) < .52$, $ps > .47$, $\eta^2_ps \leq .01$.

In regards to three-month change in regret engagement, we did not find significant covariate effects, $Fs(1, 167) < .63$, $ps > .43$, $\eta^2_ps < .01$, age group effect, $F(1, 167) < .01$, $p = .93$, $\eta^2_p < .01$, condition effect, $F(2, 167) = .38$, $p = .69$, $\eta^2_p < .01$, or interaction effect, $F(2, 167) = 1.44$, $p = .24$, $\eta^2_p = .02$.

**Perceived opportunity.** We did not find significant covariate effects, $Fs(1, 167) < 2.09$, $ps > .15$, $\eta^2_ps \leq .01$, age group effect, $F(1, 167) = 1.81$, $p = .18$, $\eta^2_p = .01$, or interaction effects, $F(2, 167) = 1.88$, $p = .16$, $\eta^2_p = .02$, when examining change in regret opportunity at immediate follow-up. We did, however, find a marginally significant condition effect, $F(2, 167) = 2.50$, $p = .09$, $\eta^2_p = .01$. Participants assigned to the regret engagement condition had significantly larger increases in perceived opportunity ($M = .24$, $SD = 1.02$) than participants assigned to the regret disengagement condition ($M = -.15$, $SD = 1.08$), $t(113) = -2.01$, $p < .05$, $d = .37$, and marginally larger increases than participants assigned to control ($M = -.08$, $SD = .87$), $t(114) = 1.84$, $p = .07$, $d = .34$.

Perceptions of regret opportunity did not differ between participants assigned to regret disengagement and control conditions, $t(117) = -.39$, $p = .70$, d $= .07$.

In regards to three-month change in regret opportunity, we did not find significant covariate effects, $F$s$(1, 167) < 1.93$, $p$s $> .17$, $\eta^2_p$s $= .01$, condition effect, $F(2, 167) = .84$, $p = .43$, $\eta^2_p = .01$, or interaction effect, $F(2, 167) = 1.35$, $p = .26$, $\eta^2_p = .02$. We did, however, find a significant age group effect, $F(1, 167) = 5.38$, $p = .02$, $\eta^2_p = .03$ with younger adults reporting larger increases in perceived opportunity ($M = .16$, $SD = .92$) than older adults ($M = -.16$, $SD = 1.06$).

**Three-Month Change to Dependent Measures**

Next, we present the analyses examining three-month change in our measures of well-being[6]. Similar to the aforementioned analyses, we conducted a series of 3 (condition) X 2 (age group) ANCOVAs, including sex and education level as covariates. To unpack significant interactions, we conducted follow-up ANCOVAs examining condition effects separately for each age group, and age group effects separately for each condition.

**Regret intensity.** We did not find significant covariate effects, $F$s$(1, 167) < 1.78$, $p$s $> .18$, $\eta^2_p$s $< .01$, age group effect, $F(1, 167) = 1.50$, $p = .22$, $\eta^2_p < .01$, or condition effect, $F(2, 167) = 1.11$, $p = .33$, $\eta^2_p = .01$, when examining three-month change in regret intensity. As predicted, we found a significant interaction effect, $F(2, 167) = 3.32$, $p =$

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[6] Some of the dependent measures were assessed at immediate follow-up (regret intensity, emotions, and closure, but not sleep quality). The analyses involving immediate change to these dependent variables are not included in an effort to reduce the number non-significant findings presented in text. Beyond a significant age effect for "closed book", $F(1, 167) = 11.03$, $p < .01$, $R^2 = .06$, with older adults having larger increases in closure ($M = .16$, $SD = .77$) than younger adults ($M = -.17$, $SD = .63$), there were no additional significant age, condition, or interaction effects ($p$s $> .10$) when examining immediate change to the dependent measures.

.04, $\eta^2_p = .04$. We graphed the mean change in regret intensity for each group in Figure 3.4.

To unpack the interaction effect, we first examined the age groups separately. We did not find significant covariate effects for either younger, $F(1, 82) < .98$, $p > .33$, $\eta^2_p \leq .01$, or older adults, $F(1, 83) < .81$, $p > .37$, $\eta^2_p \leq .01$. There was no significant condition effect for older adults, $F(2,83) = .35$, $p = .70$, $\eta^2_p < .01$, but there was a significant condition effect for younger adults, $F(2,82) = 4.01$, $p = .02$, $\eta^2_p = .09$. As predicted, younger adults assigned to the regret engagement condition had significantly larger decreases in regret intensity ($M = -.48$, $SD = .84$) than those assigned to the regret disengagement condition ($M = .26$, $SD = 1.18$), $F(1,53) = 7.42$, $p < .01$, $\eta^2_p = .12$, but did not differ from those assigned to the control condition ($M = -.09$, $SD = .91$), $F(1,54) = 2.50$, $p = .12$, $\eta^2_p = .04$. Younger adults assigned to the regret disengagement also did not differ from those assigned to control, $F(1,55) = 1.77$, $p = .19$, $\eta^2_p = .03$.

We next examined conditions separately. We did not find significant covariate or age group effects for participants assigned to the regret disengagement condition, $Fs(1, 55) < .59$, $ps > .45$, $\eta^2_p s \leq .01$, or the control condition, $Fs(1, 56) < .93$, $ps > .34$, $\eta^2_p s < .02$. For participants assigned to the regret engagement condition, there were no significant covariate effects, $Fs(1, 52) < 1.49$, $ps > .23$, $\eta^2_p s < .03$, but there was a significant age group effect, $F(1, 52) < 6.26$, $p = .02$, $\eta^2_p = .11$. As predicted, when assigned to the regret engagement condition, younger adults had significantly larger decreases in regret intensity ($M = -.48$, $SD = .85$) than older adults ($M = .22$, $SD = 1.10$).

**Regret emotions.** We did not find a significant covariate effects when examining any of the three regret emotions, $Fs(1, 167) < 1.25$, $ps > .27$, $\eta^2_p s < .01$. We did not find a

significant age effect for either hot or wistful emotions, $Fs(1, 167) < 1.90$, $ps > .17$, $\eta^2_p s \leq$ .01, but there was a significant age effect for three-month change in despair emotions, $F(1, 167) = 4.13$, $p = .04$, $\eta^2_p = .02$. Younger adults had larger decreases in despair emotions ($M = -.16$, $SD = .93$) than older adults ($M = .16$, $SD = 1.05$). We did not find a significant condition effect for either hot or despair emotions, $Fs(1, 167) < .12$, $ps > .89$, $\eta^2_p s < .01$, but there was a significant condition effect for three-month change in wistful emotions, $F(1, 167) = 3.45$, $p = .03$, $\eta^2_p = .04$. Participants assigned to the regret disengagement condition ($M = .24$, $SD = 1.00$) had larger increases in wistful emotions than participants assigned to the regret engagement condition ($M = -.25$, $SD = 1.87$), $F(1, 111) = 7.29$, $p < .01$, $\eta^2_p = .06$, but not participants assigned to the control condition ($M = .00$, $SD = .97$), $F(1, 115) = 1.48$, $p = .23$, $\eta^2_p = .01$. Participants assigned to the regret engagement condition did not differ from participants assigned to control, $F(1, 112) = 1.77$, $p = .19$, $\eta^2_p = .02$. Contrary to predictions, the interaction effect was not significant for either hot or despair emotions, $Fs(1, 167) < 1.93$, $ps > .15$, $\eta^2_p s \leq .02$, but, as predicted, there was a significant interaction effect for wistful emotions, $F(1, 167) < 3.55$, $p = .03$, $\eta^2_p = .04$. We graphed the mean change in wistful emotions for each group in Figure 3.5.

To unpack the significant interaction effect on three-month change in wistful emotions, we first examined the age groups separately. We did not find significant covariate effects for either younger, $F(1, 82) < .42$, $p > .51$, $\eta^2_p < .01$, or older adults, $F(1, 83) < 1.60$, $p > .21$, $\eta^2_p < .02$. There was no significant condition effect for older adults, $F(2,83) = .16$, $p = .85$, $\eta^2_p < .01$, but there was a significant condition effect for younger adults, $F(2,82) = 7.08$, $p < .001$, $\eta^2_p = .15$. As predicted, younger adults assigned to the

regret engagement condition had significantly greater decreases in wistful emotions ($M$ = -.55, $SD$ = .72) than those assigned to the regret disengagement condition ($M$ = .39, $SD$ = 1.07), $F(1,53) = 15.04$, $p < .001$, $\eta^2_p = .22$, but not the control condition ($M$ = -.18, $SD$ = 1.02), $F(1,54) = 2.23$, $p = .14$, $\eta^2_p = .04$. Younger adults assigned to regret disengagement had significantly greater increases in wistful emotions than those assigned to control, $F(1,55) = 4.23$, $p < .05$, $\eta^2_p = .07$.

We next examined the conditions separately. We did not find significant covariate or age group effects for participants assigned to regret disengagement condition, $F$s(1, 55) < 1.09, $p$s > .30, $\eta^2_p$s < .02, or the control condition, $F$s(1, 56) < 1.77, $p$s > .19, $\eta^2_p$s ≤ .03. For participants assigned to the regret engagement condition, there were no significant covariate effects, $F$s(1, 52) < 1.22, $p$s > .28, $\eta^2_p$s ≤ .02, but there was a significant age group effect, $F(1, 52) < 6.71$, $p = .01$, $\eta^2_p = .11$. As predicted, when assigned to the regret engagement condition, younger adults had significantly greater decreases in wistful emotions ($M$ = -.55, $SD$ = .72) than older adults ($M$ = .05, $SD$ = .93).

**Regret closure.** We did not find significant covariates effects for either 'closed book' or 'unfinished business' closure measures, $F$s(1, 167) < 2.56, $p$s > .11, $\eta^2_p$s < .02. We found a significant age group effect on three-month change for the 'closed book' closure measure, $F(1, 167) = 13.88$, $p < .001$, $\eta^2_p = .08$, but not the 'unfinished business' closure measure, $F(1, 167) = .03$, $p = .87$, $\eta^2_p < .01$. Older adults had greater increases in closure ('closed book'; $M$ = .26, $SD$ = .98) than younger adults ($M$ = -.27, $SD$ = .95). We did not find a significant condition effect for either closure measure, $F$s(2, 167) < .70, $p$s > .50, $\eta^2_p$s < .01. Contrary to predictions, we did not find a significant interaction effect for the 'unfinished business' measure, $F(2, 167) = .88$, $p = .42$, $\eta^2_p = .01$, but, as

predicted, we did find a marginally significant interaction effect for the 'closed book' measure, $F(2, 167) = 2.86$, $p = .06$, $\eta^2_p = .03$. We graphed the mean change in the 'closed book' closure measure for each group in Figure 3.6.

To unpack the significant interaction effect on three-month change in the 'closed book' closure measure, we first examined the age groups separately. We did not find significant covariate, $Fs(1, 83) < .04$, $ps > .84$, $\eta^2_ps < .01$, or condition effects for older adults, $F(2, 83) = .75$, $p = .48$, $\eta^2_ps = .02$. For younger adults, we did not find a significant sex effect, $F(1, 82) = .74$, $p = .39$, $\eta^2_p < .01$, but we did find a marginally significant effect for education, $F(1, 82) = 3.74$, $p = .06$, $\eta^2_p = .04$, with higher educated participants having greater decreases in closure ($r = -.23$). For younger adults, we found a significant effect for condition, $F(2, 82) = 3.17$, $p < .05$, $\eta^2_p = .07$. As predicted, younger adults assigned to the regret engagement condition had greater increases in closure ($M = -.11$, $SD = 1.18$) than those assigned to regret disengagement ($M = -.60$, $SD = .77$), $F(1, 53) = 4.15$, $p < .05$, $\eta^2_p = .07$, but did not differ from those assigned to control ($M = -.10$, $SD = .81$), $F(1, 54) = .04$, $p = .84$, $\eta^2_p < .01$. Younger adults assigned to regret disengagement had significantly greater decreases in closure than those assigned to control, $F(1, 55) = 6.22$, $p = .02$, $\eta^2_p = .10$.

We next examined the conditions separately. For participants assigned to the regret engagement condition, there were no education or age group effects, $Fs(1, 52) < 2.71$, $ps > .10$, $\eta^2_ps \leq .05$, but there was a sex effect, $F(1, 52) = 4.08$, $p < .05$, $\eta^2_p = .07$, with men ($M = .40$, $SD = 1.04$) having significantly larger increases in closure than women ($M = -.19$, $SD = 1.14$) . For participants assigned to the regret disengagement condition, there were no covariate effects, $Fs(1, 55) < .03$, $ps > .87$, $\eta^2_ps < .01$, but there

was a significant age group effect, $F(1, 55) < 20.77$, $p < .001$, $\eta^2_p = .27$. As predicted, older adults ($M = .39$, $SD = .81$) had significantly larger increases in closure than younger adults ($M = -.60$, $SD = .77$). For participants assigned to the control condition, there were no significant covariate effects, $F_s(1, 56) < 1.59$, $ps > .21$, $\eta^2_p s < .01$, but there was a marginal age group effect, $F(1, 56) < 2.88$, $p < .10$, $\eta^2_p = .05$. Again, older adults ($M = .31$, $SD = 1.02$) had larger increases in closure than younger adults ($M = -.10$, $SD = .81$).

**Sleep quality.** We did not find significant covariate effects, $F_s(1, 167) < 1.29$, $ps > .26$, $\eta^2_p s < .01$. We did not find a significant age group, $F(1, 167) = .21$, $p = .65$, $\eta^2_p < .01$, or condition effect, $F(2, 167) = .86$, $p = .43$, $\eta^2_p = .01$, on three-month change in sleep quality. As predicted, we found a significant interaction effect, $F(2, 167) = 3.25$, $p = .04$, $\eta^2_p = .04$. We graphed the mean change in sleep quality for each group in Figure 3.7.

To unpack the interaction effect, we first examined the age groups separately. We did not find significant covariate, $F_s(1, 82) < 2.15$, $ps > .15$, $\eta^2_p s < .03$, or condition effects, $F(2, 82) = 1.02$, $p = .37$, $\eta^2_p s = .02$, for younger adults. For older adults, we did not find significant covariate effects, $F_s(1, 82) < 2.59$, $ps > .11$, $\eta^2_p s \leq .03$, but the condition effect was significant, $F(2, 83) = 3.30$, $p = .04$, $\eta^2_p = .07$. As predicted, older adults assigned to the regret disengagement condition had significantly larger increases in sleep quality ($M = .33$, $SD = .76$) than those assigned to the regret engagement condition ($M = -.27$, $SD = 1.06$), $F(1, 54) = 6.33$, $p = .02$, $\eta^2_p = .11$, and control condition ($M = -.18$, $SD = 1.00$), $F(1, 56) = 4.63$, $p = .04$, $\eta^2_p = .08$. Older adults assigned to regret engagement did not significantly differ from those assigned to control, $F(1, 54) = .16$, $p = .69$, $\eta^2_p < .01$.

We next examined the conditions separately. We did not find covariate or age group effects for participants assigned to the regret disengagement, $Fs(1, 55) < 2.62$, $ps > .11$, $\eta^2_p s < .05$, regret engagement, $Fs(1, 52) < 1.58$, $ps > .21$, $\eta^2_p s \leq .03$, or control conditions, $Fs(1, 56) < 2.55$, $ps > .12$, $\eta^2_p s \leq .04$.

**Mediation Analyses**

We first examined whether changes in regret engagement or perceived opportunity mediated the relationship between condition assignment and change in our dependent variables, separately for younger and older adults. Accordingly, we used bootstrapping methods (Hayes, 2012; Hayes, 2013; Preacher et al., 2007) to test for conditional indirect effects at specific levels of the moderator (i.e., age groups; refer to Figure 3.3). As there are three conditions, and bootstrapping methods cannot examine categorical information, we conducted separate bootstrapping analyses to contrast two conditions at a time (i.e., regret disengagement versus regret engagement; regret disengagement versus control; regret engagement versus control).

The results of the analyses of conditional indirect effects are presented in Tables 3.5 – 3.8. As shown, neither immediate follow-up (see Table 3.5) nor three-month change in regret engagement (see Table 3.6) mediated the association between condition assignment and our dependent variables. However, immediate change in perceived opportunity mediated the association between condition assignment and three-month change in several dependent variables (see Table 3.7). First, assignment to regret engagement (versus regret disengagement or control) led to decreases in regret intensity and wistful emotions via increases in perceived opportunity, but only for young adults. In addition, assignment to regret engagement (versus control) led to increases in regret

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closure ('unfinished business') and sleep quality via increases in perceived opportunity, again only for younger adults. Three-month change in perceived opportunity also mediated the association between condition assignment and three-month change in several dependent variables (see Table 3.8). Assignment to the regret engagement condition (versus control) led to decreases in regret intensity and despair emotions, and increases in regret closure ('closed book') via increases in perceived opportunity, but only for younger adults.

We next examined whether the psychological features of regret mediated the relationship between condition assignment and sleep quality, separately for younger and older adults. We again tested for conditional indirect effects at specific levels of the moderator (i.e., age groups). The results of the analyses of conditional indirect effects are presented in Table 3.9. As shown, we found two significant conditional indirect effects among younger adults exclusively. First, assignment to regret engagement (versus disengagement) predicted increases in sleep quality via decreases in regret intensity. Second, assignment to regret disengagement (versus control) predicted decreases in sleep quality via increases in despair emotions.

**Discussion**

The current study used a quasi-experimental design to collect evidence that opportunity determines whether a particular regulatory strategy is adaptive. Individuals with relatively high objective opportunity to address their regrets (i.e., younger adults) and individuals with relatively low objective opportunity to address their regrets (i.e., older adults) were assigned to either 1) engage in undoing their regrets, 2) disengage

from undoing their regrets, or 3) complete a control task where they described their daily activities.

**Impact of Manipulation on Key Motivational Constructs**

As perceptions of opportunity may facilitate the use of particular regulatory approach (disengagement or engagement; Brandstätter et al., 2013; Carver & Scheier, 1990; Wrosch et al., 2003), we designed our experimental conditions to adjust both level of perceived opportunity (low or high) and the accompanying regulatory approach (disengagement or engagement). We hypothesized that participants' perception of opportunity and level of engagement to undo their regrets would differ depending on assigned condition (Hypothesis 1). There was mixed support for this hypothesis. As predicted, participants assigned to reflect on their favourable opportunity to undo their regrets and to list thoughts and behaviours that would assist them to undo their regrets (i.e., the engagement condition) had larger increases in perceived opportunity to undo their regrets than participants assigned to reflect on their unfavourable opportunity and subsequently let go of their regrets (i.e., the disengagement condition) as well as participants assigned to the control condition. However, we did not find these differences when examining long-term change in opportunity (i.e., three month follow-up), suggesting that the effects of the manipulation faded with time. In addition, participants assigned to the disengagement condition did not differ in perceived opportunity from the control condition when examining immediate and long-term change. In the case of changes in regret engagement, there were no differences between the conditions at any time-point.

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We found that changes in perceived opportunity impacted changes in well-being, but only among younger adults. Specifically, younger adults assigned to engage in undoing their regret (when compared to control, predominantly) experienced increases in perceived opportunity and subsequent larger increases in markers of well-being. We found this pathway among several measures of well-being (i.e., regret intensity, wistful emotions, despair emotions, regret closure, sleep quality) when examining both immediate and three-month change in perceived opportunity. This finding supports the contention that opportunity and engagement together can produce adaptive outcomes.

Although the manipulation did not produce differences in self-reported regret engagement, the writing process may have produced changes to implicit measures of engagement. For instance, previous researchers examined personal goals and the ability recall specific information as implicit signs of engagement level (Wrosch & Heckhauen, 1999; Heckhauen et al., 2001). Unfortunately, the current study did not include implicit measures of engagement and instead relied on participants to self-report their level of effort and commitment toward undoing the negative consequences of their particular regrets. Considering that we found differences in well-being between conditions, it is likely that our manipulation impacted engagement in some capacity and that our measures were not able to capture such differences.

In regards to differences in perceived opportunity, younger adults exhibited larger increases in perceived opportunity than older adults at long-term follow-up, regardless of condition assignment. It is possible that the process of focusing on their regrets increased participants' awareness of their respective objective opportunity to address their regrets.

**The Impact of Regulatory Strategy is Dependent Upon Age**

We hypothesized that well-being would differ between conditions, and that the pattern of findings would vary depending on the age group (Hypothesis 2). We reasoned that the pattern of change in well-being would differ between conditions depending on the age group due to the groups' relative objective differences in opportunity to address their regrets. As we age, we face restrictions that may impede on our ability to change our life circumstance, such as our ability to overcome particular regrets (Baltes, 1997; Heckhausen, 1999; Heckhausen et al., 2010). Consistent with previous research (e.g., Wrosch et al., 2005), we found that older adults reported lower baseline levels of opportunity to address their regrets than younger adults. This finding gives credence to our choice to compare these two groups. In addition, older adults reported lower baseline levels of regret engagement than younger adults, suggesting that individuals are able to accurately assess their circumstances.

We found partial support that younger adults experience more adaptive outcomes when assigned to engage in undoing their regrets than when assigned to disengage or control (Hypothesis 2a). For younger adults, engaging in undoing their regret was more adaptive than disengaging. Specifically, younger adults assigned to engage in undoing their regrets experienced larger increases in closure and larger decreases in regret intensity and wistful emotions than when assigned to disengage. Being asked to engage, however, was not more adaptive than being assigned to the control condition. Not surprisingly, disengaging was maladaptive when compared to control. Younger adults assigned to disengage from their regrets experienced larger increases in wistful emotions and larger decreases in closure than those assigned to control.

We found limited support that older adults experience more adaptive outcomes when assigned to disengage from their regrets than when assigned to engage or control (Hypothesis 2b). When asked to disengage from undoing their regrets, older adults reported larger improvements in sleep quality compared to older adults assigned to the other two conditions. This pattern did not emerge when examining changes in psychological measures of regret (e.g. regret intensity, closure).

Although we expected differences in well-being between younger and older adults to depend upon condition assignment, two separate patterns emerged. First, among younger adults, changes in psychological measures (i.e., regret intensity, specific emotions, closure) differed between conditions. In contrast, we did not find differences between condition when examining the psychological measures of older adults. Second, among older adults, changes in a physical health measure (i.e., sleep quality) differed between conditions. In contrast, we did not find differences between conditions when examining the sleep of younger adults. However, younger adults assigned to disengage from their regrets experienced decreases in sleep quality due to increases in regret intensity (when compared to younger adults assigned to engage in their regrets) and wistful emotions (when compared to younger adults assigned to control). Taken together, these findings suggest that the use of regulatory strategies directly affect the physical health of older adults, who may be particularly susceptible to sleep difficulties, whereas the use of regulatory strategies impact the physical health of younger adults indirectly through changes in psychological mechanisms.

In most instances, the experimental groups did not often differ from the control group at three-month follow-up. In order understand these findings, we can conceptualize

disengagement and engagement as separate endpoints on the same regulatory continuum (c.f. Brandstätter et al., 2013). Our manipulation may have pulled individuals away from their initial position on the continuum toward their assigned regulatory approach. Consequently, differences in psychological and physiological well-being were primarily observed between those assigned to either disengagement or engagement. However, individuals assigned to the control condition were not instructed to adopt a particular regulatory strategy, and likely remained in a relatively central position on the regulatory continuum. Consequently, no significant differences in well-being were found between individuals assigned to the control condition and individuals assigned to use the regulatory approaches located at either end of this continuum.

We found limited support that being assigned to disengage from regret was more adaptive for older adults than younger adults (Hypothesis 2c). Older adults reported larger increases in closure than younger adults but we did not find such differences when examining change in other indices of well-being. We also found limited supported that being assigned to engage in undoing regret was more adaptive for younger adults than older adults (Hypothesis 2d). Younger adults exhibited larger decreases in regret intensity and wistful emotions than older adults, but not despair emotions, hot emotions, closure, or sleep quality. The observed differences support the importance of using the appropriate regulatory approach under the appropriate circumstances; disengagement is adaptive when there is objectively low opportunity whereas engagement is adaptive when objective opportunity is available.

Although not all of our hypotheses regarding the relationship between age, regulatory approach, and well-being were supported, no pattern emerged that was

contrary to our predictions. The inability to detect significant differences in well-being between regulatory conditions and across ages may be the consequence of insufficient power due to sample size or manipulation strength. The number of participants in each group may not have been sufficiently large to detect differences in well-being between groups. Regarding manipulation strength, and as previously reported, condition assignment showed differencess in short-term change of perceived opportunity to undo regret, with no long-term changes in perceived opportunity or any change in level of engaging to undo regret. At the same time, this is the first manipulation of general regulatory strategies associated with regret. Therefore, further refinement of the manipulation may be warranted. Nevertheless, our manipulation successfully elicited differences in select measures of well-being.

Overall, these findings make a meaningful contribution to the understanding of regret regulation and to our knowledge of developmental goal pursuit. Specifically, these findings provide evidence that objective opportunity determines whether a regulatory strategy will produce adaptive or maladaptive outcomes. These findings substantiate the correlational research demonstrating that the association between regulatory strategy and well-being is dependent upon the availability of opportunity (e.g., Hall et al., 2010; Heckhausen et al., 2001; Wrosch & Heckhausen, 1999; Wrosch et al., 2005; Wrosch et al., 2007; Nasco & Marsh, 1999; Bauer et al., 2008; Bauer & Wrosch, 2011; Torges et al., 2005; Newall et al., 2009). In addition, this study builds substantially from the earlier experimental research in this area (i.e., Wrosch et al., 2007) by comparing regulatory approaches and different age groups.

**Limitations and Future Directions**

Although our study provided evidence that objective opportunity impacts an individual's psychological- and physical-health response to specific regulatory strategies, there are several limitations that should be addressed in future research. First, the study design did not manipulate objective levels of opportunity; rather, it recruited and examined two groups (i.e., young and older adults) who researchers argue possess different levels of objective opportunity. Consequently, the current study employed a quasi-experimental design. Future researchers may wish to study the impact of regulatory strategies after manipulating objective levels of opportunity. This may be challenging when using the paradigm of life regrets, which are located in the personal past. However, there may be other paradigms that may be better suited for opportunity manipulation. Manipulating objective opportunity and replicating the pattern of results found in this study would further substantiate the association between opportunity and regulatory strategies on measures of health and well-being.

Second, future researchers would benefit from examining the mechanisms associated with the successful manipulation of regulatory strategies. As we previously stated, our study was the first to successfully manipulate contrasting regulatory strategies. We did so by having participants focus on reasons why they possessed either low or high opportunity to address their regrets, and then asked participants to list thoughts and behaviours at-large that would help them to either disengage or engage in undoing their regrets. This manipulation was successful, insofar as it produced predicted differences between the groups for a variety of dependent variables. However, researchers may wish to examine whether focusing on opportunity as well as listing thoughts and behaviours

are both necessary components to manipulating regulatory strategies, or whether only one particular step is sufficient. In addition, there are a variety of specific strategies that can facilitate either disengagement or engagement. For instance, previous experimental research by Wrosch et al. (2007) guided participants to use specific social-cognitive strategies associated with disengagement. Future researchers may wish to facilitate the use of specific strategies associated with engagement or disengagement, which may be a more powerful manipulation of regret-regulation.

Third, the measure of regret closure exhibited unacceptable internal consistency. We were therefore unable to examine an aggregated measure of regret closure and instead examined each measure of regret closure independently. Consequently, analyses involving the regret closure were interpreted with caution, and the predicted pattern of results, while present, was not significant for both individual measures. Future researchers should be mindful of the psychometric properties of measures of closure and may benefit from examining the full-scale measure (Beike & Wirth-Beaumont, 2005), which was not included in our dataset.

Fourth, future researchers should investigate how regulatory strategies impact specific regrets within an individual. In our design, we asked participants to complete a writing task regarding three of their regrets and assessed all three regret separately prior to creating an overall average to use in our analyses. However, just as individuals differ in their level of opportunity to undo their regrets (Wrosch et al., 2005; Bauer et al., 2008; Bauer & Wrosch, 2011; Farquhar et al., 2013), we expect individuals to experience different levels of opportunity for each specific regrets. For instance, an individual may have favourable opportunity to undo one of their regrets, but not another. Therefore, we

predict that, similar to our findings, engagement strategies would result in adaptive outcomes for specific regrets with favourable opportunity, but disengagement would be beneficial for low-opportunity regrets. In addition, we expect this pattern regardless of age if opportunity is examined explicitly.

Finally, researchers may wish to examine the impact of other key motivational factors, beyond opportunity, on the relationship between regulatory approach and well-being. Previous research suggests that the individuals who are most at risk of experiencing impaired psychological and physical health are those who report using a level of regret engagement that is incongruent with their respective levels of objective opportunity (e.g., Wrosch & Heckhausen, 2002; Wrosch et al., 2005; Wrosch et al., 2007). However, there is considerable variability in reported engagement levels (Farquhar et al., 2013; Bauer et al., 2008), and we suspect that an individual's initial level of engagement is likely to influence how well he or she adopts any particular manipulated regulatory approach. Consistent with previous research, our findings indicate that the use of certain regulatory approaches is either adaptive or maladaptive depending on age (and objective opportunity). However, this association may also be dependent upon baseline levels of engagement. Furthermore, individuals who are most "at risk" of experiencing maladaptive outcomes due to the use of an opportunity-incongruent approach may experience substantial benefits when guided toward a regulatory approach that reflects their specific level of available objective opportunity.

Despite these identified limitations, the findings of the current study provide meaningful evidence that the outcome of using any particular regulatory strategy is

dependent upon the availability of opportunity, thus substantiating our knowledge of

adaptive regulation.

Table 3.1

*Means, Standard Deviations, and Zero-order Correlations between Baseline Variables.*

| | M (SD) | Range | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age (years) | 45.33 (22.06) | - | - | - | | | | | | | | | | | |
| 2. Sex[a] | - | - | .02 | - | | | | | | | | | | | |
| 3. Education level | 3.32 (1.16) | 1 - 5 | .14† | .01 | - | | | | | | | | | | |
| 4. Years since regret | 17.43 (14.46) | - | .80** | .05 | .07 | - | | | | | | | | | |
| 5. Regrets of Commission (%) | .55 (37) | 0 - 1 | .26** | .09 | .16* | .21** | - | | | | | | | | |
| 6. Regret Engagement | 2.80 (.97) | 1 - 5 | -.29** | ,01 | -.04 | -.27** | -.14† | - | | | | | | | |
| 7. Perceived Opportunity | 2.32 (.91) | 1 - 5 | -.31** | .01 | -.09 | -.29** | .03 | .49** | - | | | | | | |
| 8. Regret Intensity | 1.23 (.61) | 1 - 5 | -.24** | -.01 | -.10 | -.18* | -.15* | .20** | -.07 | - | | | | | |
| 9. Hot Emotions | 1.24 (.81) | 1 - 5 | -.33** | .07 | -.15* | -.27** | -.25** | .28** | .04 | .82** | - | | | | |
| 10. Despair Emotions | 1.08 (.76) | 1 - 5 | -.15* | .07 | -.09 | -.12 | -.10 | .18* | -.05 | .86** | .67** | - | | | |
| 11. Wistful Emotions | 1.35 (.76) | 1 - 5 | -.08 | -.15* | .01 | -.04 | .03 | -.01 | -.15* | .67** | .23** | .36** | - | | |
| 12. Closure (item 1) | 3.17 (.84) | 1 - 5 | .33** | .04 | .01 | .28** | .02 | -.43** | -.42** | -.02 | -.12 | .08 | .01 | - | |
| 13. Closure (item 2) | 2.80 (.86) | 1 - 5 | .05 | -.02 | -.02 | -.01 | -.07 | -.21** | -.12 | -.37** | -.28** | -.34** | -.24** | .23** | - |
| 14. Sleep Quality | .86 (.11) | 0 - 1 | -.03 | -.09 | .18* | -.04 | .10 | -.06 | -.08 | -.30** | -.23** | -.24** | -.23** | -.07 | .23** |

*Note.* Range = Possible range for each scale; Closure (item 1) = "closed book"; Closure (item 2) = "unfinished business"; [a]Sex is coded as men = 1, women = 2; †$p < .10$, *$p < .05$, **$p < .01$.

Table 3.2

*Comparison of Means and Standard Deviations for Baseline Socio-demographic and Dependent Variables between Younger and Older Adults.*

| | Younger Adults M (SD) | Older Adults M (SD) | df[a] | *t*-value | Cohen's *d* |
|---|---|---|---|---|---|
| Age (years) | 23.72 (3.09) | 66.68 (5.98) | 131 | -59.57*** | 9.03 |
| Female (%)[b] | 65.52 | 69.32 | 1 | .29 | .04 |
| Education Level | 3.19 (.90) | 3.44 (1.36) | 151 | -1.45 | -.22 |
| Regret Intensity | 1.38 (.65) | 1.07 (.52) | 173 | 3.43*** | .53 |
|    Hot Emotions | 1.51 (.85) | .97 (.67) | 164 | 4.65*** | .71 |
|    Despair Emotions | 1.20 (.82) | .96 (.69) | 168 | 2.07* | .32 |
|    Wistful Emotions | 1.43 (.77) | 1.28 (.74) | 173 | .81 | .20 |
| Regret Closure | | | | | |
|    "Closed Book" | 2.87 (.74) | 3.46 (.84) | 173 | -4.89*** | .75 |
|    "Unfinished Business" | 2.73 (.76) | 2.86 (.95) | 165 | -1.00 | -.15 |
| Sleep Quality | .86 (.12) | .86 (.11) | 173 | .47 | .00 |

*Note.* [a]When Levene's test indicated unequal variances, we adjusted the degrees of freedom. [b]We compared sex differences using chi-square non-parametric analyses, and calculated phi to report the corresponding effect size. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3.3

*Comparisons of Means and Standard Deviations for Baseline Regret Characteristics between Younger and Older Adults*

| | Younger Adults | Older Adults | | | |
| --- | --- | --- | --- | --- | --- |
| | *M (SD)* | *M (SD)* | df[a] | *t*-value | Cohen's *d* |
| Years since regret | 6.13 (3.86) | 28.58 (12.24) | 104 | -16.33*** | 2.47 |
| Commission(%) | .46 (.38) | .64 (.35) | 173 | -3.33*** | -.49 |
| Regret Engagement | 3.05 (.88) | 2.54 (1.00) | 173 | 3.59*** | .54 |
| Perceived Opportunity | 2.58 (.87) | 2.06 (.88) | 173 | 3.92*** | .59 |
| Domain (%) | | | | | |
| Work | .08 (.15) | .10 (.15) | 173 | -1.11 | -.13 |
| Education | .22 (.20) | .11 (.16) | 165 | 3.89*** | .61 |
| Romance | .17 (.19) | .10 (.17) | 170 | 2.73** | .39 |
| Family | .15 (.21) | .33 (.27) | 173 | -4.71*** | .74 |
| Friends | .10 (.18) | .03 (.12) | 150 | 3.19** | .46 |
| Health | .07 (.15) | .05 (.15) | 173 | .88 | .13 |
| Leisure | .02 (.08) | .03 (.10) | 173 | -.84 | -.11 |
| Self-development | .11 (.18) | .11 (.20) | 173 | -.09 | .00 |
| Spirituality | .01 (.05) | .01 (.06) | 173 | -.44 | .00 |

*Note.* [a]When Levene's test indicated unequal variances, we adjusted the degrees of freedom. *p < .05, **p < .01, ***p < .001.

Table 3.4

*Comparison of Means and Standard Deviations for Dependent Variables at Baseline, Immediate Follow-up, and Three-Month Follow-up*

| Variable | Baseline<br>*M (SD)* | Immediate<br>Follow-up<br>*M (SD)* | Three-Month<br>Follow-up<br>*M (SD)* | *F* | $R^2$ |
|---|---|---|---|---|---|
| Regret Engagement | 2.79 (.97)[a] | 2.94 (1.01)[b] | 2.86 (1.00) | 3.00* | .02 |
| Perceived Opportunity | 2.32 (.91)[a] | 2.54 (.95)[b] | 2.58 (.97)[b] | 10.94** | .06 |
| Regret Intensity | 1.23 (.61)[a] | 1.16 (.70)[b] | 1.05 (.66)[c] | 14.14** | .08 |
|    Hot Emotions | 1.24 (.81)[a] | 1.13 (.88)[b] | 1.04 (.83)[c] | 11.02** | .06 |
|    Despair Emotions | 1.08 (.76)[a] | 1.05 (.84)[a] | .91 (.74) | 10.74** | .06 |
|    Wistful Emotions | 1.35 (.76)[a] | 1.30 (.84)[a] | 1.19 (.80)[b] | 6.46** | .04 |
| Regret Closure | | | | | |
|    "Closed book" | 3.17 (84) | 3.05 (.95) | 3.13 (.95) | 1.95 | .01 |
|    "Unfinished business" | 2.80 (.86) | 2.73 (.91)[a] | 2.93 (.99)[b] | 4.25* | .02 |
| Sleep Quality | .86 (.11) | - | .85 (.12) | 1.69 | .01 |

*Note.* Different superscripts represent significantly different means. *$p < .05$, **$p < .01$

Table 3.5

*Summary of Indirect Effects of Immediate Change in Regret Engagement, Conditional upon Age Group, on the Association between Condition Assignment and Three-Month Change in Various Measures of Well-being*

| | | Compared Conditions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Disengage vs. Engagement | | Disengagement vs. Control | | Engagement vs. Control | |
| Dependent Variable | Age | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] |
| Regret Intensity | YA | -.06 (.06) | [-.2534, .0062] | .01 (.03) | [-.0197, .0964] | .04 (.05) | [-.0088, .2011] |
| | OA | .06 (.08) | [-.0196, .3241] | -.05 (.06) | [-.2458, .0207] | .02 (.06) | [-.0677, .1844] |
| Hot Emotions | YA | -.04 (.05) | [-.2090, .0153] | .02 (.03) | [-.0331, .1099] | .03 (.04) | [-.0110, .1693] |
| | OA | .05 (.07) | [-.0235, .2865] | -.08 (.06) | [-.2724, .0013] | .01 (.05) | [-.0493, .1531] |
| Despair Emotions | YA | -.06 (.05) | [-.2360, .0061] | .00 (.02) | [-.0185, .0838] | .05 (.05) | [-.0074, .1906] |
| | OA | .06 (.08) | [-.0196, .3005] | -.02 (.06) | [-.1939, .0533] | .02 (.06) | [-.0688, .1990] |
| Wistful Emotions | YA | -.04 (.05) | [-.1914, .0111] | .01 (.02) | [-.0169, .1028] | .03 (.04) | [-.0151, .1509] |
| | OA | .04 (.07) | [-.0151, .2689] | -.03 (.06) | [-.2057, .0515] | .01 (.05) | [-.0436, .1594] |
| Regret Closure "Closed book" | YA | -.03 (.05) | [-.1806, .0321] | .00 (.02) | [-.0703, .0355] | .04 (.05) | [-.0141, .1975] |
| | OA | .04 (.06) | [-.0358, .2369] | .01 (.06) | [-.1245, .1370] | .02 (.06) | [-.0571, .2383] |
| "Unfinished business" | YA | -.03 (.05) | [-.0294, .1806] | .00 (.03) | [-.0931, .0325] | -.03 (.04) | [-.1434, .0175] |
| | OA | -.04 (.07) | [-.2577, .0359] | .01 (.07) | [-.1042, .1772] | -.01 (.05) | [-.1800, .0451] |
| Sleep Quality | YA | .02 (.04) | [-.0536, .1259] | .01 (.03) | [-.0238, .1147] | -.01 (.03) | [-.0908, .0517] |
| | OA | -.02 (.06) | [-.1962, .0534] | -.07 (.07) | [-.2716, .0075] | .00 (.04) | [-.1073, .0570] |

*Note.* YA = younger adults; OA = older adults; ab(SE) = conditional indirect effect and standard effort of the effect; LLCI and ULCI = lower limit and upper limit of 95% bias-corrected and accelerated confidence intervals; **$p < .05$.

Table 3.6

*Summary of Indirect Effects of Three-Month Change in Regret Engagement, Conditional upon Age Group, on the Association between Condition Assignment and Three-Month Change in Various Measures of Well-being*

| Dependent Variable | Age | Disengage vs. Engagement | | Disengagement vs. Control | | Engagement vs. Control | |
|---|---|---|---|---|---|---|---|
| | | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] |
| Regret Intensity | YA | .00 (.03) | [-.0277, .1009] | .06 (.06) | [-.2294, .0102] | -.02 (.05) | [-.1526, .0464] |
| | OA | .01 (.04) | [-.0342, .1545] | -.06 (.05) | [-.0367, 2549] | .01 (.03) | [-.0408, .1225] |
| Hot Emotions | YA | .01 (.03) | [-.0358, .1158] | -.06 (.05) | [-.1992, .0113] | .00 (.04) | [-.0761, .1023] |
| | OA | .02 (.05) | [-.0366, .1906] | .05 (.06) | [-.0367, .2232] | .00 (.03) | [-.0742, .0500] |
| Despair Emotions | YA | .00 (.03) | [-.0294, .0917] | -.04 (.05) | [-.2008, .0106] | .00 (.05) | [-.1056, .0902] |
| | OA | .01 (.04) | [-.0392, .1494] | .04 (.06) | [-.0249, .2260] | .00 (.03) | [-.0599, .0772] |
| Wistful Emotions | YA | .00 (.02) | [-.0360, .0477] | -.06 (.06) | [-.2105, .0112] | -.04 (.04) | [-.1833, .0096] |
| | OA | .01 (.04) | [-.0577, .0679] | .05 (.07) | [-.0314, .2366] | .01 (.04) | [-.0506, .1448] |
| Regret Closure "Closed book" | YA | -.02 (.05) | [-.1547, .0725] | .04 (.05) | [-.0150, .1880] | .06 (.06) | [-.0128, .2452] |
| | OA | -.04 (.08) | [-.0424, .0867] | -.03 (.06) | [-.2316, .0200] | -.01 (.05) | [-.1803, .0605] |
| "Unfinished business" | YA | .00 (.03) | [-.0424, .0867] | .05 (.06) | [-.0179, .2356] | -.01 (.05) | [-.1226, .0911] |
| | OA | .00 (.04) | [-.0526, .1272] | -.05 (.07) | [-.2837, .0311] | .00 (.03) | [-.0518, .0996] |
| Sleep Quality | YA | -.01 (.03) | [-.0965, .0259] | .01 (.03) | [-.0307, .1057] | .04 (.04) | [-.0116, .1458] |
| | OA | -.01 (.04) | [-.1549, .0250] | -.01 (.04) | [-.1339, .0267] | -.01 (.04) | [-.1262, .0409] |

*Note.* YA = younger adults; OA = older adults; ab(SE) = conditional indirect effect and standard effort of the effect; LLCI and ULCI = lower limit and upper limit of 95% bias-corrected and accelerated confidence intervals; **$p < .05$.

Table 3.7

*Summary of Indirect Effects of Immediate Change in Perceived Opportunity, Conditional upon Age Group, on the Association between Condition Assignment and Three-Month Change in Various Measures of Well-being*

| Dependent Variable | Age | Disengage vs. Engagement | | Disengagement vs. Control | | Engagement vs. Control | |
|---|---|---|---|---|---|---|---|
| | | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] |
| Regret Intensity | YA | -.11 (.08) | [-.3252, -.0061]** | -.03 (.04) | [-.1554, .0207] | .10 (.07) | [.0068, .2902]** |
| | OA | -.01 (.05) | [-.1380, .0885] | .01 (.04) | [-.0264, .1360] | .05 (.07) | [-.0611, .2403] |
| Hot Emotions | YA | -.05 (.06) | [-.2000, .0557] | .00 (.03) | [-.0715, .0616] | .06 (.06) | [-.0092, .2218] |
| | OA | .00 (.03) | [-.0940, .0478] | .00 (.03) | [-.0582, .0594] | .03 (.05) | [-.0331, .1893] |
| Despair Emotions | YA | -.03 (.08) | [-.2135, .1077] | .00 (.04) | [-.0528, .1180] | .07 (.06) | [-.0058, .2345] |
| | OA | .00 (.03) | [-.1979, .0501] | .00 (.03) | [-.0964, .0406] | .04 (.06) | [-.0400, .2018] |
| Wistful Emotions | YA | -.17 (.08) | [-.3789, -.0509]** | -.06 (.06) | [-.2471, .0184] | .12 (.07) | [.0129, .3046]** |
| | OA | -.01 (.07) | [-.1460, .1342] | -.03 (.06) | [-.0549, .2080] | .06 (.08) | [-.0736, .2646] |
| Regret Closure "Closed book" | YA | -.04 (.08) | [-.2137, .1158] | .00 (.04) | [-.0914, .0790] | .02 (.06) | [-.0963, .1614] |
| | OA | .00 (.08) | [-.0958, .0484] | .00 (.03) | [-.0673, .2080] | .01 (.08) | [-.0736, .2646] |
| "Unfinished business" | YA | .01 (.08) | [-.1344, .1927] | .02 (.04) | [-.0323, .1621] | -.10 (.07) | [-.3117, -.0058]** |
| | OA | .00 (.03) | [-.0557, .0761] | -.01 (.04) | [-.1661, .0312] | -.05 (.07) | [-.2498, .0493] |
| Sleep Quality | YA | .04 (.07) | [-.0822, .2221] | .04 (.05) | [-.0116, .2131] | -.12 (.08) | [-.3280, -.0074]** |
| | OA | .00 (.03) | [-.0474, .1004] | -.02 (.05) | [-.1993, .0311] | -.06 (.08) | [-.2721, .0732] |

*Note.* YA = younger adults; OA = older adults; ab(SE) = conditional indirect effect and standard effort of the effect; LLCI and ULCI = lower limit and upper limit of 95% bias-corrected and accelerated confidence intervals; **$p < .05$.

Table 3.8

*Summary of Indirect Effects of Three-Month Change in Perceived Opportunity, Conditional upon Age Group, on the Association between Condition Assignment and Three-Month Change in Various Measures of Well-being*

| | | Compared Conditions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Disengage vs. Engagement | | Disengagement vs. Control | | Engagement vs. Control | |
| Dependent Variable | Age | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] |
| Regret Intensity | YA | -.06 (.06) | [-.2269, .0061] | .00 (.03) | [-.0361, .1110] | .09 (.06) | [.0029, .2556]** |
| | OA | -.01 (.06) | [-.1682, .0708] | -.02 (.05) | [-.1872, .0301] | -.03 (.07) | [-.2021, .0772] |
| Hot Emotions | YA | -.03 (.05) | [-.1993, .0186] | .00 (.03) | [-.0331, .0877] | .06 (.05) | [-.0108, .2044] |
| | OA | -.01 (.04) | [-.1408, .0373] | -.01 (.04) | [-.1589, .0305] | -.02 (.05) | [-.1589, .0423] |
| Despair Emotions | YA | -.04 (.05) | [-.2135, .0111] | .00 (.03) | [-.0352, .1091] | .10 (.07) | [.0103, .2760]** |
| | OA | -.01 (.04) | [-.1469, .0498] | -.02 (.04) | [-.1724, .0292] | -.04 (.07) | [-.1958, .0890] |
| Wistful Emotions | YA | -.07 (.06) | [-.2353, .0102] | .01 (.03) | [-.0401, .1066] | .07 (.05) | [-.0026, .2287] |
| | OA | -.02 (.06) | [-.1475, .0958] | -.02 (.05) | [-.1832, .0286] | -.02 (.05) | [-.1817, .0519] |
| Regret Closure "Closed book" | YA | -.11 (.08) | [-.3172, .0016] | .01 (.07) | [-.1133, .1563] | .11 (.07) | [.0095, .2884]** |
| | OA | -.02 (.09) | [-.2765, .0960] | -.07 (.08) | [-.2833, .0481] | -.04 (.07) | [.2279, .0885] |
| "Unfinished business" | YA | .00 (.05) | [-.0825, .1277] | .00 (.03) | [-.0593, .0654] | -.06 (.06) | [-.2537, .0150] |
| | OA | .00 (.03) | [-.0596, .0872] | .00 (.04) | [-.1030, .0762] | .02 (.05) | [-.0465,.1698] |
| Sleep Quality | YA | .02 (.05) | [-.0465, .1657] | .00 (.02) | [-.0475, .0528] | -.03 (.05) | [-.1879, .0455] |
| | OA | .00 (.03) | [-.0377, .1153] | .00 (.04) | [-.1020, .0591] | .01 (.04) | [-.0285, .1722] |

*Note.* YA = younger adults; OA = older adults; ab(SE) = conditional indirect effect and standard effort of the effect; LLCI and ULCI = lower limit and upper limit of 95% bias-corrected and accelerated confidence intervals; **$p$ < .05.

Table 3.9

*Summary of Indirect Effects of Three-Month Change in Various Psychological Measures of Well-being, Conditional upon Age Group, on the Association between Condition Assignment and Three-Month Change in Sleep Quality*

| | | Compared Conditions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Disengage vs. Engagement | | Disengagement vs. Control | | Engagement vs. Control | |
| Mediator | Age | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] | ab (SE) | [LLCI, ULCI] |
| Regret Intensity | YA | .13 (.07) | [.0181, .3180]** | .11 (.09) | [-.0464, .2927] | -.08 (.06) | [-.2307, .0024] |
| | OA | -.04 (.06) | [-.2059, .0426] | -.01 (.07) | [-.1659, .1103] | .03 (.06) | [-.0640, .1922] |
| Hot Emotions | YA | .06 (.05) | [-.0186, .2133] | .03 (.07) | [-.0942, .1749] | -.02 (.04) | [-.1592, .0250] |
| | OA | -.04 (.06) | [-.2169, .0240] | .01 (.05) | [-.0968, .1079] | .02 (.04) | [-.0188, .1556] |
| Despair Emotions | YA | .08 (.06) | [-.0066, .2211] | .02 (.07) | [-.1354, .1642] | -.06 (.05) | [-.1856, .0037] |
| | OA | -.05 (.06) | [-.2085, .0328] | .00 (.07) | [-.1624, .1104] | .04 (.05) | [-.0406, .1905] |
| Wistful Emotions | YA | .12 (.10) | [-.0722, .3511] | .15 (.09) | [.0178, .3550]** | -.09 (.07) | [-.2708, .0110] |
| | OA | .00 (.04) | [-.0728, .1079] | -.03 (.07) | [-.2114, .0878] | -.03 (.07) | [-.2057, .0813] |
| Regret Closure | | | | | | | |
| "Closed book" | YA | .09 (.08) | [-.0011, .3166] | .04 (.05) | [-.0268, .1855] | .00 (.03) | [-.0450, .0689] |
| | OA | -.06 (.06) | [-.2289, .0147] | -.01 (.03) | [-.1225, .0328] | .00 (.04) | [-.0524, .1029] |
| "Unfinished business" | YA | .08 (.08) | [-.0122, .3010] | .02 (.05) | [-.0413, .1573] | -.05 (.07) | [-.2407, .0502] |
| | OA | .02 (.06) | [-.1829, .0810] | -.03 (.05) | [-.1955, .0282] | -.03 (.07) | [-.2120, .0759] |

*Note.* YA = younger adults; OA = older adults; ab(SE) = conditional indirect effect and standard effort of the effect; LLCI and ULCI = lower limit and upper limit of 95% bias-corrected and accelerated confidence intervals; **$p$ < .05.
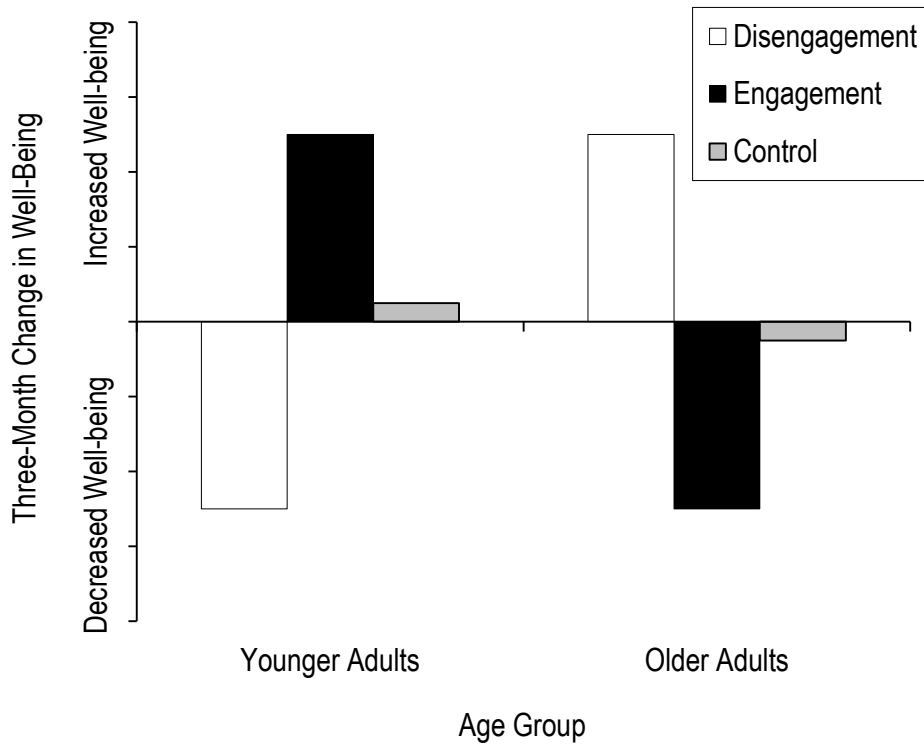
*Figure 3.1.* Hypothesized mean three-month change in well-being for each condition within each age group.

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                           ┌─────────────────────────────────┐
                           │     Invited to participate       │
                           │ following telephone screening    │
                           │ (N = 226; (n = 124 YA; n = 102 OA))│
                           └─────────────────────────────────┘
                                          │
                           ┌─────────────────────────────────┐
                           │   Baseline Assessment (T1)       │
                           └─────────────────────────────────┘
                                          │
                           ┌─────────────────────────────────┐
                           │        Randomization             │
                           │  (to 3-day writing activity)     │
                           └─────────────────────────────────┘
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|  | Assigned to the disengagement condition (n = 40 YA; n = 32 OA) | Assigned to the engagement condition (n = 44 YA; n = 34 OA) | Assigned to the control condition (n = 40 YA; n = 36 OA) |
|---|---|---|---|
| **Manipulation** | Withdrew (n = 0 YA; n = 0 OA) | Withdrew (n = 0 YA; n = 1 OA) | Withdrew (n = 0 YA; n = 3 OA) |
| **Follow-up Assessments (Immediate & T2)** | Lost to follow-up: Did not return written materials and immediate follow-up (n = 6 YA; n = 0 OA); 3-month follow-up (T2): (n = 4 YA; n = 1 OA) | Lost to follow-up: Did not return written materials and immediate follow-up (n = 11 YA; n = 3 OA); 3-month follow-up (T2): (n = 4 YA; n = 0 OA) | Lost to follow-up: Did not return written materials and immediate follow-up (n = 6 YA; n = 1 OA); 3-month follow-up (T2): (n = 3 YA; n = 1 OA) |
| **Analysis** | Excluded from analyses: Outside age parameters or experimenter error (n = 0 YA; n = 1 OA)  Included in analyses (n = 30 YA; n = 30 OA) | Excluded from analyses: Outside age parameters or experimenter error (n = 2 YA; n = 2 OA)  Included in analyses (n = 27 YA; n = 28 OA) | Excluded from analyses: Outside age parameters or experimenter error (n = 1 YA; n = 1 OA)  Included in analyses (n = 30 YA; n = 30 OA) |

*Figure 3.2.* Participant flow chart. YA = younger adults, OA = older adults.
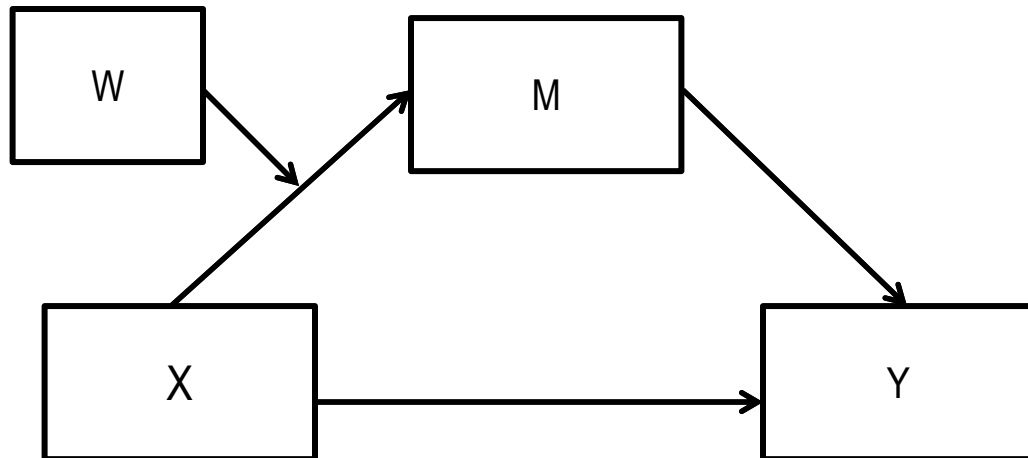
*Figure 3.3.* Conceptual model of conditional indirect effects (Process Model 7, adapted from Hayes, 2012). X = independent variable, Y = dependent variable, M = mediating variable, W = moderating variable.
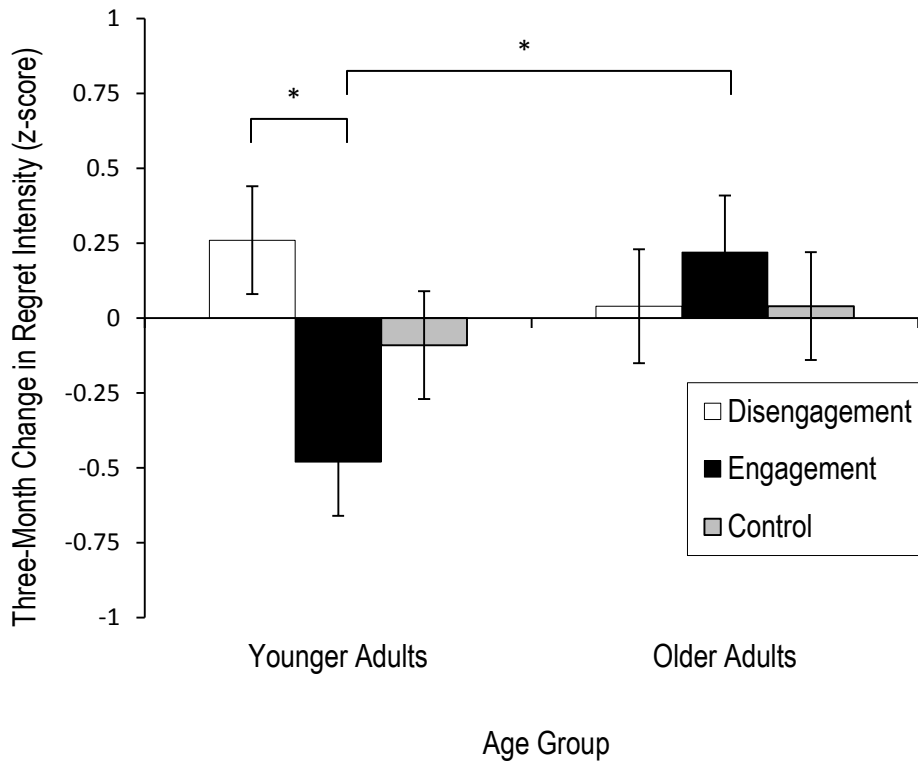
*Figure 3.4.* Mean three-month change in regret intensity for each condition within each age group. Three-month change (y-axis) was calculated by regressing baseline levels of regret intensity on three-month levels of regret intensity and saving and standardizing (z-score) the residuals; Scores above and below the value zero represent relative increases and decreases in the regret intensity, respectively. Error bars represent standard error of the mean and an asterisk (*) denotes when two groups significantly differ (p < .05).
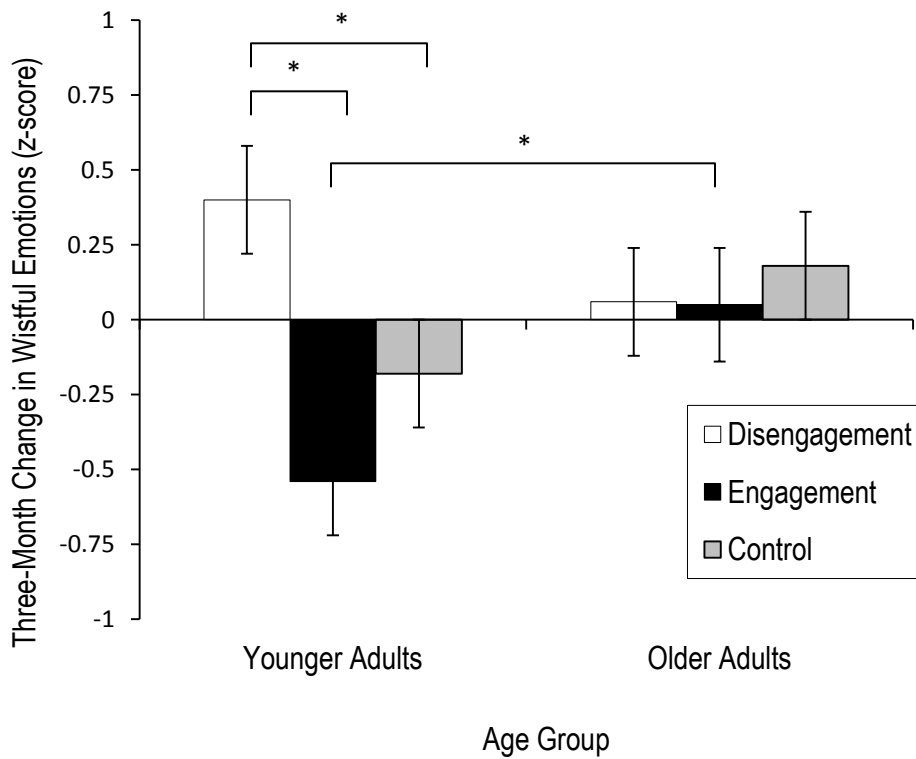
*Figure 3.5.* Mean three-month change in wistful emotions for each age group in each assigned condition. Three-month change (y-axis) was calculated by regressing baseline levels of wistful emotions on three-month levels of wistful emotions and saving and standardizing (z-score) the residuals; scores above and below the value zero represent relative increases and decreases in wistful emotions, respectively. Error bars represent standard error of the mean and an asterisk (*) denotes when two groups significantly differ ($p < .05$).
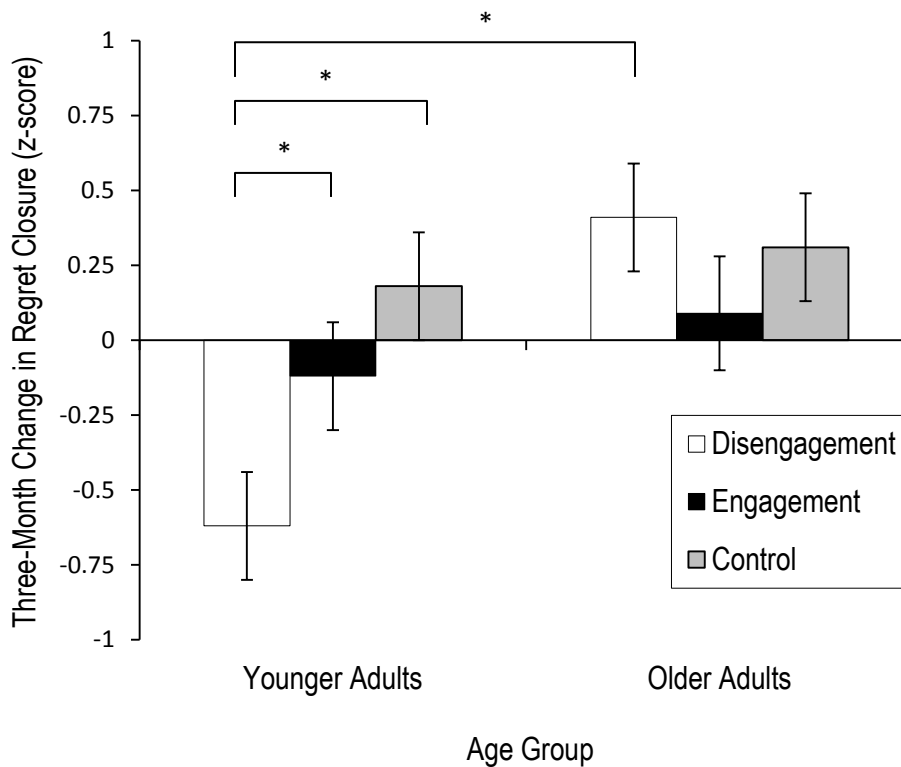
*Figure 3.6.* Mean three-month change in regret closure ("closed book") for each age group in each assigned condition. Three-month change (y-axis) was calculated by regressing baseline levels of regret closure on three-month levels of regret closure and saving and standardizing (z-score) the residuals; scores above and below the value zero represent relative increases and decreases in the regret closure, respectively. Error bars represent standard error of the mean and an asterisk (*) denotes when two groups significantly differ ($p < .05$).
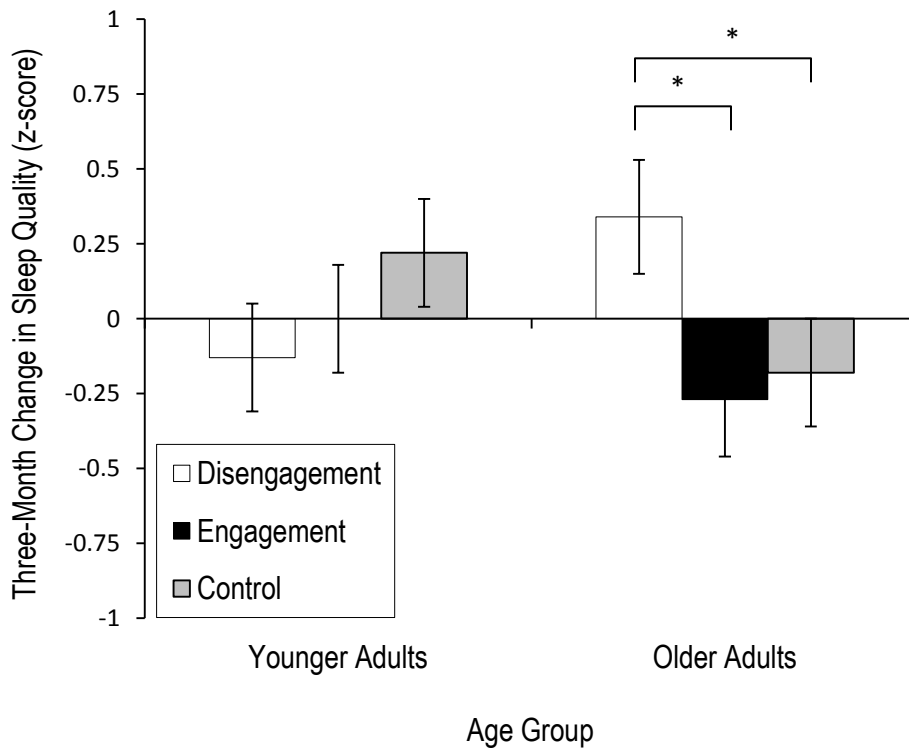
*Figure 3.7.* Mean three-month change in sleep quality for each age group in each assigned condition. Three-month change (y-axis) was calculated by regressing baseline levels of sleep quality on three-month levels of sleep quality and saving and standardizing (z-score) the residuals; scores above and below the value zero represent relative increases and decreases in the sleep quality respectively. Error bars represent standard error of the mean and an asterisk (*) denotes when two groups significantly differ ($p < .05$).

**CHAPTER 4:**

**STUDY 3**

**The Outcome of Adjusted Regret-Regulation Among Younger and Older Adults:**

**The Role of Initial Regret Engagement**

**Abstract**

This quasi-experimental three-month longitudinal study examined how the outcome of adjusting one's approach to regulate regret experiences may depend upon initial level of regret engagement. Two groups of participants, younger and older adults, completed one of two writing activities designed to alter their regulatory approach (engagement or disengagement). By assessing the proportion of verb tense produced by participants in the writing activity, we computed implicit measures of regret engagement. Among younger adults, being assigned to engage in, rather than disengage from, undoing their regrets produced larger decreases in regret intensity, hot emotions, and despair emotions and larger increases in closure. However, we found these relative benefits of engaging only for younger adults who initially had low, but not high, levels of regret engagement. In contrast, among older adults, being assigned to disengage from, rather than engage in, undoing their regrets produced larger decreases in regret intensity, hot emotions, and despair emotions and larger increases in regret closure and sleep quality. However, we found these relative benefits of disengaging only for older adults initially disengaged from their regrets (i.e., low levels of engagement). The implications of the findings in relation to outcomes of adjusted regulation are discussed.

**Introduction**

The experience of life regrets may produce negative outcomes if not appropriately addressed (Wrosch & Heckhausen, 2002; Wrosch et al., 2005, 2007; Torges et al., 2005; Bauer et al., 2008; Bauer & Wrosch, 2011). The adaptive regulatory approach to managing regret may depend on the availability of opportunity to undo the negative consequences of the regret (Heckhausen et al., 2010; Wrosch et al., 2003; Carver & Scheier, 1990). When opportunity is favourable, being engaged in undoing the regret produces adaptive changes (Farquhar et al., 2013; Nasco & Marsh, 1999) whereas disengaging from regret when opportunity is low prevents negative psychological and physical health outcomes (Wrosch et al., 2005, 2007)

Individuals who employ a regulatory approach that is incongruent with their respective level of opportunity are the most at-risk of experiencing negative outcomes associated with regret. For instance, due to their relatively high levels of opportunity (Wrosch et al., 2005; Jokisaari, 2003), younger adults who are disengaged may maintain unsatisfactory life conditions (Epstude & Roese, 2008; Nasco & March, 1999). In contrast, due to their relatively low levels of opportunity (Wrosch et al., 2005; Jokisaari, 2003), older adults who remain engaged in undoing their regrets may be at increased risk for depression and impaired health (Wrosch et al., 2005, 2007).

We hypothesized the impact of adjusted regret-regulation on well-being among younger and older adults will depend upon initial levels of engagement. We argue that individuals who demonstrate signs of using a regulatory approach that is incongruent with their respective level of opportunity will benefit most when instructed to use opportunity-congruent regulation compared to opportunity-incongruent regulation. That

is, we predicted that younger adult who show signs of low engagement will experience larger increases in well-being when assigned to engage in their regrets than disengage. In contrast, we predicted that older adults who show signs of high engagement will experience larger increases in well-being when assigned to disengage in their regrets than engage.

**Life Regrets and the Adaptive Regulation of Regrets**

Life regrets are a common cognitive-emotional experience (Lecci et al., 1994; Newall et al., 2009; Torges et al., 2005). Regret may occur when we reflect on how selecting alternative decisions and behaviours in our past may have produced more favourable outcomes and we subsequently experience negative emotions (e.g., "I am disappointed that I didn't attend law school. I could be earning a larger salary!"; Kahneman, 1995; Landman, 1987). Regrets tend to reflect common domains of life (e.g., family, career, romance; Roese & Summerville, 2005) and can be experienced at any point throughout the lifespan (Beck & Crilly, 2009; Torges et al., 2005).

The experience of regret can produce one of two outcomes. First, regrets can motivate individuals to change their life circumstances ("I'm leaving my job and going to law school!"; Epstude & Roese, 2008; Boninger et al., 1994; Nasco & Marsh, 1999). Alternatively, regrets can impair our mental and physical health (Wrosch et al., 2005, 2007). How we choose to manage our regrets as well as the availability of opportunity we possess to change the circumstances related to the regret influence which of these two possible outcomes occur.

The availability of opportunity varies depending on our life circumstances. Several researchers found that there is considerable variability in opportunity across the

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lifespan with some individuals experiencing low, and others high, levels of opportunity (Bauer et al., 2008; Bauer & Wrosch, 2011). Certain stages of life may provide newfound opportunity to change particular life circumstances (e.g., retirement; Farquhar 2013). At the same time, opportunity may decline across the lifespan due to biological and societal restrictions (Baltes, 1997; Heckhausen et al., 2010). Accordingly, younger adults report higher levels of opportunity to address their regrets than older adults (Bauer et al., 2008; Wrosch et al., 2005; Jokisaari, 2003).

Several theories highlight the importance of opportunity when discussing specific regulatory processes (Heckhausen et al., 2010; Wrosch et al., 2003; Carver & Scheier, 1990). In regards to regret, we may be able to manage our experience of regret by either actively engaging in undoing the negative circumstances of the regret or by disengaging from the regret (Gilovich & Medvec, 1995; Torges et al., 2005; Landman, 1987; Wrosch et al., 2005). However, the outcome of either strategy depends on the context of our regret. Specifically, regret engagement may be adaptive in the context of favourable objective opportunity to undo the regret whereas regret disengagement may be adaptive in the context of objectively low opportunity.

Unfortunately, when individuals employ a regulatory approach that is not sensitive to the availability of opportunity, they are likely to experience maladaptive outcomes. Remaining engaged in undo the regret despite the absence of opportunity is associated with impaired psychological and physical health (Wrosch et al., 2005, 2007) whereas disengaging from addressing the regret when there is favourable opportunity is likely to maintain unsatisfactory life circumstances (Nasco & Marsh, 1999; Epstude & Roese, 2008).

In summary, the individuals who are most at risk of experiencing the downfalls of regret are those who employ a regulatory approach that is incongruent with their respective opportunity to address their regret. In the context of age, younger adults who disengage from their regrets and older adult remain actively engaged in undoing their regrets may be most at risk.

**How Do We Assess Engagement?**

Engagement involves both effort and commitment (Wrosch et al., 2003; Carver & Scheier, 1990; Heckhausen et al., 2010). When an individual engages in attaining a goal, they increase their effort and remain committed to achieving their goal (Wrosch et al., 2003). By contrast, when an individual disengages from pursing a goal, they reduce their effort and withdraw commitment to the goal (Wrosch et al., 2003). Accordingly, researchers examining life regrets often assess level of engagement by asking participants to report their current level of effort and commitment to undo the negative circumstances of their regret (Wrosch & Heckhausen, 2002; Wrosch et al., 2005, 2007; Farquhar et al., 2013). When using this method, researchers find that, among individuals with high levels of opportunity, high levels of self-reported engagement is associated with favourable outcomes (e.g., Farquhar et al., 2013). In contrast, among individuals with low levels of opportunity, high levels of self-reported engagement is associated with unfavourable outcomes (e.g., Wrosch & Heckhausen, 2002).

Beyond self-reported engagement, researchers developed methods to assess implicit levels of engagement. For instance, a greater number of personal goals in a particular life domain (e.g., relationship, parenthood) reflects how engaged an individual is to make changes in that domain of life (Wrosch & Heckhausen, 1999; Heckhausen et

al., 2001). In addition, the recall of more positive than negative attributes related to a domain of life (Wrosch & Heckhausen, 1999) and the recall or more goal-relevant than irrelevant phrases (Heckhausen et al., 2001) may reflect higher levels of engagement.

Another method to implicitly measure level of engagement may be to examine language use. According to Pennebaker, Mehl, and Niederhoffer (2003), assessing the production of language may allow researchers to tap into the internal states of individuals. Therefore, examining language use is ideal for the study of internal processes associated with self-regulation. Thankfully, recent technology (e.g., Linguistic Inquiry and Word Count (LIWC); Pennebaker, Booth, & Francis, 2007) makes linguistic analyses increasingly accessible to researchers.

Although there is a scarcity of linguistic research on verb use (Moore & Brody, 2009), the existing research suggests that the use of particular verb tenses is a meaningful predictor of well-being among people who have faced adverse circumstances. Overall, the limited research suggests that writing about difficult life events (e.g., trauma) using past tense is associated with beneficial outcomes, whereas low levels of past tense, or high levels of alternative tenses (i.e., present, future), is detrimental to our psychological health (Hughes, Ultmann, & Pennebaker, 1994; Pennebaker, Mayne, & Francis, 1997; O'Kearney & Perrott, 2006; Hellawell & Brewin, 2004; Manne, 2002; Pasupathi, 2007). The association between verb tense and well-being may suggest that the use of past tense verbs when describing personal circumstances, events, or goals implies that the writer has created a sense of temporal distance from the subject of discussion (Pennebaker, Mehl, & Niederhoffer, 2003) and is consequently more disengaged. In contrast, the use of present

or future tense may imply that the subject of discussion (e.g., trauma) continues to be proximal and active for the writer.

Consider an individual discussing the goal of attending college. The use of past-tense verbs ("I <u>wanted</u> to go to college; it <u>was</u> very important to me") appears to suggest the individual is more disengaged from the goal than if they were to use present-tense verbs ("I really <u>want</u> to go to college; it <u>is</u> very important to me") or future-tense verbs ("I <u>will</u> go to college"). In the context of regret, the use of verb tense when discussing the consequences of regret may also reflect the level of engagement an individuals has to address the regret. For instance, consider an individual who possesses the regret of not visiting her terminally sick parent.  The use of past-tense verbs ("I <u>regretted</u> it deeply. The consequence <u>was</u> that I <u>felt</u> a loss that I <u>was</u> not able to retrieve.") suggests that the regret is less active than the use of present ("I <u>regret</u> it deeply. The consequence <u>is</u> that I <u>feel</u> a loss that I <u>cannot</u> <u>retrieve.</u>") or future-tense verbs (I <u>will</u> always regret it. I feel a loss that I <u>will</u> never retrieve.").

**The Current Study**

The current study builds upon previous quasi-experimental research (Study 2) to examine whether the association between adjusted regret-regulation and well-being is dependent upon initial levels of engagement.

We examined younger and older adults assigned to participate in a writing task designed to either 1) facilitate engagement in undoing regret, or 2) facilitate disengagement from regret. We assessed baseline levels of regret engagement by examining the levels of verb tenses used by participants when describing their regrets. Based on previous research regarding engagement and language use, we reasoned that

particular levels of verb tense would reflect a sense of being either disengaged (i.e., high past, low present, and low future verb tense use) or actively engaged (i.e., low past, high present, and high future verb tense use) in trying to undo the consequences of the regret. All participants completed measures of well-being at baseline and three-month follow-up.

As previously stated, individuals who approach their regret with a level of engagement that does not reflect their respective level of opportunity are most vulnerable to compromised psychological and physical health (Wrosch et al., 2005, 2007). We reasoned that these individuals would benefit when instructed to use an opportunity-congruent approach to regulate their regrets. The specific hypotheses are as follows:

*Hypothesis 1: We hypothesize that the association between age (younger versus older adults) and condition assignment (regret engagement versus disengagement) on measures of three-month change in well-being will be dependent upon initial levels of engagement (as measured by the use of verb tense when describing regret). Specifically, we predict that participants who demonstrate signs of using a regulatory approach that is incongruent with their respective level of opportunity will show larger increases in well-being when assigned to an opportunity-congruent condition than an opportunity-incongruent condition (see Figure 4.1). We predict that the following patterns will be found (see Hypotheses 1a-1b):*

*Hypothesis 1a: Younger adult who show signs of low engagement (high past, low present, and/or low future tense use) will experience larger increases in well-being when assigned to the regret engagement condition than the regret disengagement condition (refer to dotted line with round endpoints in Figure 4.1).*

*Hypothesis 1b:* In contrast, older adults who show signs of high engagement (low past, high present, and/or high future tense use) will experience larger increases in well-being when assigned to the regret disengagement condition than the regret engagement condition (refer to solid line with square endpoints in Figure 4.1).

**Method**

**Participants**

The current sample included the 115 participants assigned to the experimental conditions of Study 2. Specifically, we examined the 59 participants assigned to the disengagement condition (29 younger; 30 older adults) and 56 participants assigned to the engagement condition (28 younger; 28 older adults).

**Procedure**

As previously described (Study 2), participants completed a three-day writing activity. As per the instructions for both of the experimental conditions, we asked participants to: "Please describe your regret in detail as well as the consequences of your regret" (i.e., step 1). Participants completed this writing task for each of three reported regrets, addressing one regret per day on three sequential days. For each participant, we transcribed the handwritten text into a computerized text file. The description and consequences written for each regret were combined into one aggregative text file per participant to prepare for linguistic analysis. Text files were edited as per analytic guidelines (Pennebaker et al., 2007). We did not include the text written by participants assigned to the control condition, as we did not ask these participants to describe their regrets or the consequences of their regrets.

**Measures**

**Independent variables.** Condition (regret engagement, regret disengagement), age group (younger adults, older adults), and implicit regret engagement (see below), served as our independent variables.

*Implicit regret engagement.* We assessed initial levels of engagement by calculating levels of verb tense use. Using a linguistic software program (Linguistic Inquiry and Word Count (LIWC); Pennebaker et al., 2007) designed to calculate the proportion of text that reflects particular linguistic categories, we first calculated the total number of words used by each participant ($M = 326.32$, $SD = 106.21$). We then calculated the proportion of *past* ($M = 7.51$, $SD = 2.22$), *present* ($M = 5.07$, $SD = 2.30$), and *future* tense verbs ($M = .78$, $SD = .63$) used by each participant. Participants' verb use significantly differed by verb tense, $F(2, 222) = 884.79$, $p < .001$, $\eta^2_p = .89$. Participants used significantly more past than present tense, $t(114) = 6.73$, $p < .001$, $d = 1.08$, and future tense, $t(114) = 30.19$, $p < .001$, $d = 4.12$. Participants also used significantly more present than future tense, $t(114) = 20.23$, $p < .001$, $d = 2.54$ . Verb tense use did not significantly interact by age group or experimental condition, $F$s(2, 222) $< 1.57$, $p$s $> .21$, $\eta^2_p$s $< .02$. Lower use of past tense, and higher use of present and future tense represent higher levels of engagement.  For samples of participants' writing, see Appendix J.

**Dependent measures.**  We included all descriptive measures (socio-demographic and regret-specific) and three-month change measures [*regret intensity*, *hot emotions*, *despair emotions*, *wistful emotions*, *regret closure ("closed book"; "unfinished business"), sleep quality*] described in Study 2.

The zero-order correlations between linguistic variables and main study variables are presented in Table 4.1.

**Statistical Analyses**

Prior to conducting our analyses, we truncated verb tense measures (+/- 3 SD) to account for possible outliers (Tabachnick & Fidell, 2001).

To examine our hypotheses, we conducted a series of hierarchical regressions. In the first step of the analyses, we entered the socio-demographic control variables (i.e., sex, level of education). In the second step, we entered the main effects of age group, experimental condition, and past tense verb use. In the third step, we entered all two-way interactions between our main predictor variables (age group, experimental condition, and past-tense verb use) and in the final step, we entered the three-way interaction term for these variables. We standardized all variables prior to calculating interaction terms. We then repeated the analyses and reported results involving present-tense and future-tense verbs.

These analyses build upon the previously reported findings (Study 2) by examining the moderating effects of verb tense use on the previously reported interactions between condition and age group. Therefore, when discussing our findings, we emphasize the second-order interaction (i.e., the 3-way interaction between age condition, condition, and verb tense). In the event the second-order interaction is not significantly associated with our dependent variables, we discuss any significant first-order interactions (i.e., 2-way interactions). In the event that none of the interactions are significant, we discuss any significant the main effects.

To interpret 3-way interaction effects, we plotted the associations between condition assignment (regret engagement condition versus regret disengagement condition) and the various dependent variables separately for younger adults and older adults and those who used high and low levels (+/- 1 SD) of verb use. We used an online plotting resource when creating these figures (Dawson, *nd*). We then conducted analysis of simple slopes to test if the plotted slope differed significantly from zero (Aiken & West, 1991). This has been identified as a common approach to interpreting 3-way interaction effects (Dawson & Richter, 2006).

## Results

### Preliminary Analyses

**Verb use by condition and age group.** We first examined if condition assignment produced differences in proportion of verbs used by participants. We did this to rule out possible condition effects on language production.

We found that verb use did not differ by age group, $F$s(1, 109) < 2.40, $p$s > .10, $R^2$s < .03, or condition, $F$s(1, 109) < .28, $p$s > .59, $R^2$s < .01, and the interaction between age group and condition was not significant when examining the use of past and present tense verbs, $F$s(1, 109) < 2.09, $p$s > .15, $R^2$s < .02, but the interaction effect was marginally significant when examining the use of future tense verbs, $F(1, 109) = 3.43$, $p = .07$, $R^2 = .03$. To interpret this interaction, we first examined the conditions separately. We did not find a significant age effect when examining the engagement condition, $F(1, 52) = .04$, $p = .84$, $R^2 < .01$, but we did find a significant effect when examining the disengagement condition, $F(1, 55) = 4.65$, $p = .04$, $R^2 = .08$. Older adults assigned to the disengagement condition used significantly more future tense verbs ($M = .99$, $SD = .75$)

than younger adults assigned to the same condition ($M = .60$, $SD = .57$). We next examined the age groups separately, and did not find a significant condition effect for either younger, $F(1, 53) = 1.37$, $p = .25$, $R^2 = .03$, or older adults, $F(1, 54) = 1.91$, $p = .17$, $R^2 = .03$.

**Verb association with baseline and change in self-reported regret engagement.** We next examined if verb use, our measure of implicit regret engagement, was associated with baseline levels, immediate- or three-month change in self-reported regret engagement. As shown in Table 4.1, the level of verb use (regardless of verb tense) was not significantly correlated with baseline levels of self-reported regret engagement. We presented the analyses predicting immediate change in regret engagement in Table 4.2, and the analyses predicting three-month change in Table 4.3. We found a marginally significant main effect for present tense on immediate change in self-reported regret engagement, $F(1, 109) = 3.52$, $p = .06$, $R^2 = .03$, $\beta = .18$, and a significant main effect for present tense on three-month change in self-reported regret engagement, $F(1, 109) = 3.87$, $p = .05$, $R^2 = .03$, $\beta = .21$. Participants who produced higher levels of present tense verbs reported larger increases in regret engagement at both immediate and three-month follow-up.

## Main Analyses

As previously described, we tested our hypotheses by completing a series of hierarchical regressions. The final step of the regression examined the 3-way interaction between age group, condition, and verb use (past, present, or future verb use). To interpret 3-way interaction effects, we plotted the associations between condition assignment (regret engagement condition versus regret disengagement condition) and the

various dependent variables separately for younger adults and older adults and those who used high and low levels (+/- 1 SD) of verb use.

**Regret intensity.** We presented the analyses predicting regret intensity in Table 4.4. As predicted, we found a marginally significant 3-way interaction effect when including past tense, $F(1, 105) = 3.06$, $p = .08$, $R^2 = .03$, and present tense, $F(1, 105) = 2.90$, $p = .09$, $R^2 = .02$. The 3-way interaction effect was not significant when including future tense, $F(1, 105) = .81$, $p = .37$, $R^2 < .01$.

We plotted the 3-way interaction effect involving past tense in Figure 4.2 (left panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment had a marginally significant effect on regret intensity for participants who used either low, $F(1, 51) = 3.69$, $p = .06$, $R^2 = .06$, $\beta = -.34$, or high levels of past tense verbs, $F(1, 51) = 3.84$, $p < .06$, $R^2 = .07$, $\beta = -.36$. Therefore, younger adults assigned to the engagement condition had larger decreases in regret intensity than those assigned to the disengagement condition regardless of their use of past tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment was not significant association with regret intensity for participants who used low levels of past tense, $F(1, 52) = 1.41$, $p = .24$, $R^2 = .02$, $\beta = -.24$, but was significantly associated for participants who use high levels of past tense, $F(1, 52) = 4.00$, $p = .05$, $R^2 = .07$, $\beta = .41$. Therefore, older adults assigned to the disengagement condition had larger decreases in regret intensity than those assigned to the engagement condition but only when they used high levels of past tense verbs.

We plotted the 3-way interaction effect involving present tense in Figure 4.2 (right panel). In regards to younger adults, the calculation of simple slopes showed that

condition assignment was significantly associated with regret intensity for participants who used low, $F(1, 51) = 7.27$, $p < .01$, $R^2 = .12$, $\beta = -.51$, but not high levels of present tense, $F(1, 51) = 1.50$, $p = .23$, $R^2 = .03$, $\beta = -.21$. Therefore, younger adults assigned to the engagement condition had larger decreases in regret intensity than those assigned to the disengagement condition, but only when they used low levels of present tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment was not associated with regret intensity for participants assigned who used either low, $F(1, 52) = 2.42$, $p = .13$, $R^2 = .04$, $\beta = .30$, or high levels of present tense verbs, $F(1, 52) = .09$, $p = .76$, $R^2 < .01$, $\beta = -.07$. Therefore, older adults assigned to the disengagement condition did not differ from those assigned to the engagement condition, regardless of their use of present tense verbs.

**Regret emotions.**

*Hot emotions.* We presented the analyses predicting hot emotions in Table 4.5. As predicted, we found a significant 3-way interaction effect when including past tense, $F(1, 105) = 3.87$, $p = .05$, $R^2 = .03$, and present tense, $F(1, 105) = 8.22$, $p < .01$, $R^2 = .07$. The 3-way interaction effect was not significant when including future tense, $F(1, 105) = .64$, $p = .42$, $R^2 < .01$.

We plotted the 3-way interaction effect involving past tense in Figure 4.3 (left panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was not significantly related to hot emotions for participants who used either low, $F(1, 51) = .24$, $p = .63$, $R^2 < .01$, $\beta = -.09$, or high levels of past tense verbs, $F(1, 51) = 1.67$, $p = .20$, $R^2 = .03$, $\beta = -.25$. Therefore, younger adults assigned to the engagement condition did not differ from those assigned to the disengagement

condition regardless of their use of past tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment was not significantly associated with hot emotions when participants used low levels of past tense, $F(1, 52) = 1.07$, $p = .31$, $R^2 = .02$, $\beta = -.21$, but was significantly associated for participants who used high levels of past tense, $F(1, 52) = 4.33$, $p = .04$, $R^2 = .07$, $\beta = .42$. Therefore, older adults assigned to the disengagement condition had larger decreases in hot emotions than those assigned to the engagement condition but only when they used high levels of past tense verbs.

We plotted the 3-way interaction effect involving past tense in Figure 4.3 (right panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was significantly associated with hot emotions for participants who used low, $F(1, 51) = 4.78$, $p = .03$, $R^2 = .08$, $\beta = -.43$, but not high levels of present tense, $F(1, 51) = .08$, $p = .78$, $R^2 < .01$, $\beta = .05$. Therefore, younger adults assigned to the engagement condition had larger decreases in hot emotions than those assigned to the disengagement condition but only when they used low levels of present tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment had a significant association with hot emotions for participants who used low, $F(1, 52) = 5.72$, $p = .02$, $R^2 = .10$, $\beta = .45$, but not high levels of present tense, $F(1, 52) = 1.09$, $p = .30$, $R^2 = .02$, $\beta = -.24$. Therefore, older adults assigned to the disengagement condition had larger decreases in hot emotions than those assigned to the engagement condition but only when they used low levels of present tense verbs.

***Despair emotions.*** We presented the analyses predicting despair emotions in Table 4.6. As predicted, we found a significant 3-way interaction effect when including

past tense, $F(1, 105) = 5.23$, $p = .02$, $R^2 = .04$, and present tense, $F(1, 105) = 4.30$, $p = .04$, $R^2 = .04$. The 3-way interaction effect was not significant when including future tense, $F(1, 105) = .13$, $p = .72$, $R^2 < .01$.

We plotted the 3-way interaction effect involving past tense in Figure 4.4 (left panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was not significantly related to despair emotions for participants who used either low, $F(1, 51) = .77$, $p = .39$, $R^2 = .01$, $\beta = -.16$, or high levels of past tense, $F(1, 51) = 1.99$, $p = .17$, $R^2 = .04$, $\beta = -.27$. Therefore, younger adults assigned to the engagement condition did not differ in despair emotions from those assigned to the disengagement condition regardless of their use of past tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment was not significantly associated with despair emotions for participants who used low levels of past tense, $F(1, 52) = 1.60$, $p = .21$, $R^2 = .03$, $\beta = -.25$, but was significantly associated for participants who use high levels of past tense, $F(1, 52) = 5.04$, $p = .03$, $R^2 = .09$, $\beta = .45$. Therefore, older adults assigned to the disengagement condition had larger decreases in despair emotions compared to those assigned to the engagement condition but only when they used high levels of past tense verbs.

We plotted the 3-way interaction effect involving present tense in Figure 4.4 (right panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was significantly related with despair emotions when participants used low, $F(1, 51) = 6.17$, $p = .02$, $R^2 = .10$, $\beta = -.47$, but not high levels of present tense, $F(1, 51) < .01$, $p = .97$, $R^2 < .01$, $\beta = .01$. Therefore, young adults assigned to the engagement condition had larger decreases in despair emotions than those assigned to

disengagement condition but only when they used low levels of present tense. In regards to older adults, the calculation of simple slopes showed that condition assignment was not significantly associated with despair emotions when participants used either low, $F(1, 52)$ = 2.51, $p$ = .12, $R^2$ = .04, $\beta$ = .30, or high levels of present tense, $F(1, 52)$ = .01, $p$ = .92, $R^2 < .01$, $\beta$ = -.02.

*Wistful emotions.* We presented the analyses predicting despair emotions in Table 4.7. Contrary to our prediction, the 3-way interaction effect was not significant when including past tense, $F(1, 105)$ = .03, $p$ = .87, $R^2 < .01$, present tense, $F(1, 105)$ = .04, $p$ = .85, $R^2 < .01$, or future tense, $F(1, 105)$ = 1.57, $p$ = .21, $R^2$ = .01.

**Regret closure.**

*"Closed book".* We presented the analyses predicting regret closure ("closed booked") in Table 4.8. As predicted, we found a marginally significant 3-way interaction effect when including past tense, $F(1, 105)$ = 3.02, $p$ = .09, $R^2$ = .02. The 3-way interaction effect was not significant when including present tense, $F(1, 105)$ = 1.14, $p$ = .29, $R^2 < .01$, or future tense, $F(1, 105)$ = .01, $p$ = .91, $R^2 < .01$.

We plotted the 3-way interaction effect involving past tense in Figure 4.5 (right panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was not significantly related to regret closure for participants who used low levels of past tense, $F(1, 51)$ = 1.42, $p$ = .24, $R^2$ = .02, $\beta$ = .21, but was marginally associated for participants who used high levels of past tense, $F(1, 51)$ = 2.98, $p$ = .09, $R^2$ = .05, $\beta$ = .32. Therefore, younger adults assigned to the engagement condition had larger increases in regret closure than those assigned to the disengagement condition but only when they used high levels of past tense verbs. In regards to older

adults, the calculation of simple slopes showed that condition assignment was not significantly associated with regret closure for participants who used low levels of past tense, $F(1, 52) = .35$, $p = .62$, $R^2 < .01$, $\beta = .10$, but was significantly associated for participants who use high levels of past tense, $F(1, 52) = 4.15$, $p < .05$, $R^2 = .07$, $\beta = -.42$. Therefore, older adults assigned to the disengagement condition had larger increases in regret closure than those assigned to the engagement condition but only when they used high levels of past tense verbs.

Although we found that the 3-way interaction effect involving present tense verbs was not significant, we plotted the slopes in Figure 4.5 (right panel) to visually compare the pattern to the slopes involving past tense.

**"Unfinished business".** We presented the analyses predicting regret closure ("unfinished business") in Table 4.9. As predicted, we found a significant 3-way interaction effect when including past tense, $F(1, 105) = 6.57$, $p = .01$, $R^2 = .06$, and present tense, $F(1, 105) = 4.85$, $p = .03$, $R^2 = .04$. The 3-way interaction effect was not significant when involving future tense, $F(1, 105) = .62$, $p = .43$, $R^2 < .01$.

We plotted the 3-way interaction effect involving past tense in Figure 4.6 (left panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was not significantly related to regret closure participants who used either low, $F(1, 51) = .87$, $p = .36$, $R^2 < .02$, $\beta = .17$, or high levels of past tense, $F(1, 51) = 1.62$, $p = .21$, $R^2 = .03$, $\beta = .24$. Therefore, younger adults assigned to the engagement condition did not differ in regret closure from those assigned to the disengagement condition regardless of their use of past tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment had a significant

association with regret closure for participants who used either low, $F(1, 52) = 4.03$, $p =$ .05, $R^2 = .06$, $\beta = .39$, or high levels of past tense, $F(1, 52) = 4.84$, $p = .03$, $R^2 = .08$, $\beta = -$ .43. Therefore, older adults assigned to the disengagement condition had larger increases in regret closure than those assigned to the engagement condition when they used high levels of past tense verbs, and older adults assigned to the engagement condition had larger increases in regret closure than those assigned to the disengagement condition when they used low levels of past tense verbs.

We plotted the 3-way interaction effect involving present tense in Figure 4.6 (right panel). In regards to younger adults, the calculation of simple slopes showed that condition assignment was significantly related with regret closure for participants who used low, $F(1, 51) = 4.59$, $p = .04$, $R^2 = .08$, $\beta = .41$, but not high levels of present tense, $F(1, 51) = .03$, $p = .85$, $R^2 < .01$, $\beta = .03$. Therefore, younger adults assigned to the engagement condition had larger increases in regret closure than those assigned to the disengagement condition but only when they used low levels of present tense verbs. In regards to older adults, the calculation of simple slopes showed that condition assignment was not significantly associated with regret closure for participants who used either low, $F(1, 52) = 2.31$, $p = .13$, $R^2 = .04$, $\beta = -.28$, or high levels of present tense, $F(1, 52) = .56$, $p = .46$, $R^2 < .01$, $\beta = .17$. Therefore, older adults assigned to the disengagement condition did not differ in regret closure from those assigned to the engagement condition regardless of their use of present tense verbs.

**Sleep quality.** We presented the analyses predicting sleep quality in Table 4.10. As predicted, we found a marginally significant 3-way interaction effect when including present tense, $F(1, 105) = 3.34$, $p = .07$, $R^2 = .03$. The 3-way interaction effect was not

significant when including past tense, $F(1, 105) = 1.52$, $p = .22$, $R^2 = .01$, or future tense, $F(1, 105) = .35$, $p = .56$, $R^2 < .01$.

We plotted the 3-way interaction effect involving present tense in Figure 4.7. In regards to younger adults, the calculation of simple slopes showed that condition assignment was not significantly related to regret closure for participants who used either low, $F(1, 51) = 1.22$, $p = .28$, $R^2 = .02$, $\beta = .22$, or high levels of past tense, $F(1, 51) = .14$, $p = .71$, $R^2 < .01$, $\beta = -.07$. Therefore, younger adults assigned to the engagement condition did not differ on sleep quality from those assigned to the disengagement condition regardless of their level of present tense verb use. In regards to older adults, the calculation of simple slopes showed that condition assignment had a significant association with sleep quality for participants who used low, $F(1, 52) = 7.89$, $p < .01$, $R^2 = .12$, $\beta = -.50$, but not high levels of past tense, $F(1, 52) = .10$, $p = .75$, $R^2 < .01$, $\beta = -.07$. Therefore, older adults assigned to the disengagement condition had larger increases in sleep quality than those assigned to the engagement condition but only when they used low levels of present tense verbs.

Although we found that the 3-way interaction effect involving past tense verbs was not significant, we plotted the slopes in Figure 4.7 (left panel) to visually compare the pattern of the past tense slopes to the present tense slopes (right panel).

**Discussion**

The current study investigated whether the outcome of being instructed to adjust one's approach to regulate the experience of regret is dependent upon baseline levels of engagement. We randomly assigned individuals who possessed relatively high (i.e., younger adults) or low (i.e., older adults) levels of objective opportunity to complete

writing activities designed to facilitate one of two approaches to the management of regret (i.e., engagement or disengagement). We assessed participants' baseline level of engagement by examining the use of particular verb tenses when describing their regrets. We reasoned that the low use of past tense, or the high use of present or future tense, reflects high levels of engagement whereas the high use of past tense, or the low use of present or future tense, reflects low levels of engagement (i.e., disengagement).

**Summary of Findings**

Two patterns of findings emerged. The first pattern supported our hypothesis (see Hypothesis 1a). As predicted, younger adults who showed signs of being disengaged from their regrets at baseline fared better when assigned to engage in, rather than disengage from, their regrets. That is, we found that younger adults who used high past tense and/or low present tense when describing their regrets experienced larger three-month decreases in regret intensity, hot emotions and despair emotions, and larger increase in regret closure, when instructed to engage in rather than disengage from their regrets. In contrast, younger adults who were already engaged in undoing their regrets at baseline (i.e., low past tense and/or high present tense) did not differ in well-being when assigned to either engage in, or disengage from, their regrets. Younger adults who are disengaged from their regrets are at risk of maintaining unsatisfactory life circumstances (Epstude & Roese, 2008; Nasco & Marsh, 1999). Therefore, these findings suggest that individuals who are most at risk experience adaptive outcomes when instructed to adopt the regulatory approach (i.e., engaging in undoing the regret) that accurately reflects their age-related favourable levels of opportunity.

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The second pattern was contrary to our hypothesis (Hypothesis 1b). We initially expected that older adults who were most at risk of impaired well-being (i.e., older adults who were engaged in overcoming their regrets;  Wrosch et al., 2005, 2007) would benefit from being instructed to disengage versus engage in their regrets; however, this hypothesis was not supported. Instead, older adults who were engaged in their regrets at baseline (i.e., low past tense and/or high present tense) did not significantly differ in well-being when assigned to either regulatory condition. However, older adults who showed signs of already being disengaged from their regrets fared better when assigned to disengage from, compared to engage in, undoing their regrets. That is, older adults who used high past tense and/or low present tense when describing their regrets experienced larger three-month decreases in regret intensity, hot emotions and despair emotions, and larger increase in regret closure and sleep quality, when instructed to engage in, rather than disengage from, their regrets.

Why did the predicted pattern emerge for younger but not older adults? Some researchers consider that level of engagement appears on a continuum, with high engagement and low engagement (i.e., disengagement) settling at opposing ends (Brandstätter et al., 2013). Increasing from a position of low to high engagement may be easier to initiate than decreasing one's level of engagement. Consider an automobile driver sitting at a green light. The opportunity to proceed to his destination appears favourable, as indicated by the traffic signal. In order to continue toward the destination, the driver must accelerate his speed. This process may be akin to the process of switching from low to high engagement. In contrast, it is possible that additional processes must occur in order to switch from a mindset of high engagement to disengagement. Taking

his foot off the accelerator or hitting the break may prevent a crash, but this does not equate with letting go of his destination. In order to disengage from continuing to his destination, the driver has to somehow let go of the desire to reach his destination. For instance, downgrading or devaluing the goal may be a necessary component in the facilitation of disengagement (Brandstätter et al., 2013; Wrosch et al., 2003). Although our writing task involved a manipulation of perceived opportunity in an effort to trigger the congruent regulatory approach (Carver & Scheier, 1990, 1998; Wrosch et al., 2003), our task did not attempt to directly manipulate the value of undoing the regret. In addition, our task did not involve the use of social-cognitive strategies that may facilitate disengagement (focusing on external factors responsible for the regret, comparing the regret to other people's regret, describing meaningful goals; Wrosch et al., 2007). Therefore, older adults who were initially engaged in undoing their regrets could not adjust to a position of disengagement. Consequentially, the only group of older adults who benefited from being instructed to disengage were those who were already in a mindset of disengagement.

An unexpected association also emerged among older adults who were highly engaged in their regrets at baseline. Contrary to our hypothesis, older adults who were initially engaged (i.e., used low levels of past tense verbs) experienced larger increases in regret closure when assigned to engage, rather than disengage, in undoing their regrets. Regardless of their initial level if engagement, we did not expect older adults to benefit from being assigned to engage in undoing their regrets, because of their relatively low levels of opportunity to change circumstances related to their regret (Wrosch et al., 2005; Bauer et al., 2008; Jokisaari, 2003). However, there is considerable variability in levels of

opportunity across the lifespan, including stages of later adulthood (Bauer et al., 2008; Bauer et al., 2011; Farquhar et al., 2013). Therefore, this unexpected effect may be driven by some older adult who possess favourable levels of opportunity regardless of their age. If these older adults possessed favourable opportunity, then being initially engaged and being instructed to engage in undoing their regrets who in fact produce adaptive outcomes.

We assessed levels of regret engagement using an implicit measure of engagement. We calculated the proportion of verb tense (past, present, and future) used by participants when describing their regrets and the consequences of their regrets. Although we suspected that low levels of past tense and high levels of present and future tense verbs would reflect high levels of regret engagement, we did not find an association between verb tense and baseline levels of self-reported regret engagement. However, when examining changes in regret engagement, we found that high levels of present tense verbs were associated with immediate and three-month increases in self-reported regret engagement. This findings suggests that there is validity to our approach to measure regret engagement via the use of verb tense.

In summary, when assigned to either engage or disengage, well-being is dependent upon baseline levels of engagement. Among younger adults, being instructed to engage in overcoming their regrets produced larger increases in well-being than being assigned to disengage from their regrets, but only for younger adults who had low baseline levels of engagement. In contrast, among older adults, being instructed to disengage from their regrets produced larger increases in well-being than being assigned

to engage in their regrets, but only for older adults who showed initial signs of already being disengaged from their regrets.

**Limitations and Future Directions**

Although this study provides evidence that initial level of engagement plays a role in determining the outcome of adjusted regret-regulation, there are several limitations that should be addressed in future research. First, measuring regret engagement by assessing the use of verb tense requires further clarification and consideration. We argue that the use of certain verb tenses when describing the regret reflects one's level of engagement to address regret. That is, the low use of past tense verbs (and high use of present and future tense verbs) reflects high levels of regret engagement, whereas high use of past tense verbs (and low use of present and future tense verbs) reflects disengagement. While the use of verb tense was not related to self-reported regret engagement, the use of present tense verbs was associated with larger increases in self-reported regret engagement at immediate and three-month follow-up. Therefore, initial regret engagement (as reflect in high levels of present tense) predicted self-reported increases in effort and commitment to undoing regret. Researchers may wish to further explore how the use of particular verb tenses reflects components of regret engagement.

There is sparse research on the use of verb tense in general (Moore & Brody, 2009), and this study is the first to examine verb use as an implicit measure of regret engagement. As such, we examined the impact of each type of verb tense (past, present, future) separately in our analytical approach. Not only did we find that the high use of past tense verbs was associated with the low use of present tense, we also found correlated effects when examining the role of implicit regret engagement using either past

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or present tense. For example, older adults experienced larger decreases in despair emotions when assigned to disengage in, but not engage from, their regrets if they had high use of past tense verbs or low use of present tense verbs. Due to the strong association between past and present tense verbs, future researchers could calculate a composite score or focus on one particular verb tense as opposed to both. The use of future tense, which was associated with the use of present but not past tense, was rarely produced by participants when describing their regrets. Subsequently, we did not find that baseline engagement, as measured by the use of future tense, impacted the association between regulatory approach and change in well-being. In addition, we focused exclusively on the use of verb tense as a linguistic marker of regret engagement. Future researchers may wish to examine other linguistic categories and the association between these categories and regret-regulation. For instance, other researchers suggest that the use of third-person pronouns (e.g., we), as opposed to first-person pronouns (e.g., "I"), reduces the intensity of certain types of regrets, but increases the intensity of other regrets (Valenti, Libby, & Eibach, 2011).

How can researchers most effectively assess level of regret engagement via language production? This question remains unanswered. We analyzed language in the written material produced by participants completing the first step of the guided-writing activity. This process involved instructions to both describe the regret in detail and to describe the consequences of the regret. Future researchers could examine these two components separately. We predict that the use of verb tense would be most likely to reflect levels of engagement when individuals are discussing the consequences of the regret. If the consequences are located in the personal past, there may be a greater

likelihood that individuals experiences a sense of temporal distance (Pennebaker et al., 2003) and are less engaged in addressing the regret.

Future researchers could measure implicit change in regret engagement by assessing verb tense use. In the current study, we interpreted verb use when describing regret (and the consequences of regret) as an implicit measure of baseline regret engagement. Although the participants wrote about their regrets after being assigned to their respective conditions, but not necessarily prior to completing the manipulation, the proportions of verb tense did not differ by assigned regulatory approach. However, in future designs, researchers could assess language use following the manipulation to determine  implicit effects on regret engagement. Language use could also be examined longitudinally. We predict that, when describing one's regret, an increase in the use of present or future tense verbs across time would reflect increased regret engagement. In contrast, an increase in the use of past tense verbs across time would reflect disengagement or regret deactivation.

Finally, our findings may have important implications for successful aging and mental health. Future research is required to understand these implications. First, older adults face several restrictions that can impede upon their ability to attain personal goals (c.f. Heckhausen et al., 2010). Consequently, older adults who remain engaged in attaining particular unattainable goals may require special consideration. Based on our findings, the process of adjusting to disengagement, in contrast to engagement, may not produce successful outcomes based solely on instructing older adults to focus on their unfavourable opportunities and consider letting go of their goal. We speculate, based on earlier theory and research (Brandstätter et al., 2013; Wrosch et al., 2003; Hall et al.,

2010; Wrosch et al., 2007), that the use of additional social and/or cognitive strategies (e.g., downgrading the value of the problematic thought or behaviour) may be necessary. Similarly, the treatment of some mental health issues require patients to adjust their regulatory approach to either engage in, or disengage from, particular thoughts or behaviours. Consider individuals who are diagnosed with an eating disorder. The primarily cognitive feature maintaining an eating disorder is the high level of value the individual places on her weight and shape (American Psychiatric Association, 2013). Successful treatment of the eating disorder may require the individual to disengage from how she values her weight and shape, but strategies associated with downgrading the value may be required for the individuals to successful let go of her appearance-based preoccupation.

Overall, in spite of these limitations, our findings make a unique contribution to the understanding of adjusted regulation by highlighting the importance of initial levels of engagement. Individuals with favourable opportunity to address their life circumstances benefit from adjusting their regulatory approach to engagement if they were initially disengaged. However, individuals with unfavourable opportunity to address their life circumstances  benefit from adjusting to disengagement only when they already show signs of disengagement.

Table 4.1

*Zero-Order Correlations Between Linguistic and Baseline Study Variables*

| | Past Tense | Present Tense | Future Tense | Word Count |
|---|---|---|---|---|
| Past Tense (%) | - | | | |
| Present Tense (%) | -.48** | - | | |
| Future Tense (%) | -.14 | .18* | - | |
| Total Word Count | .11 | -.04 | .09 | - |
| Age (years) | .07 | -.11 | .15 | .13 |
| Sex | .04 | .16† | .04 | .08 |
| Education Level | .04 | -.01 | .01 | .02 |
| Years since regret | .07 | -.07 | .17† | .07 |
| Commission (%) | -.07 | .29** | .06 | -.03 |
| Regret Engagement | -.06 | -.05 | -.08 | .15 |
| Perceived Opportunity | -.11 | .12 | .01 | .05 |
| Regret Intensity | -.08 | .10 | -.14 | .17† |
| Hot Emotions | -.12 | .09 | -.14 | .19* |
| Despair Emotions | -.06 | .18† | -.16† | .22* |
| Wistful Emotions | -.02 | -.04 | -.03 | -.03 |
| "Closed book" | .16† | .05 | .10 | .00 |
| "Unfinished business" | .13 | -.24** | .01 | -.10 |
| Sleep Quality | .14 | -.09 | -.10 | -.02 |

*Note.* Sex is coded: men = 1 , women = 2. †*p* < .10, *p* < .05, **p* < .01.

Table 4.2

*Summary of Hierarchical Regression Analyses Predicting Immediate Change in Regret Engagement by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | .14 | .10 | .13 | .02 | .14 | .10 | .13 | .02 | .14 | .10 | .13 | .02 |
| Education Level | .04 | .10 | .04 | .00 | .04 | .10 | .04 | .00 | .04 | .10 | .04 | .00 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.13 | .10 | -.12 | .01 | .19 | .10 | .18 | .03† | .11 | .10 | .10 | .01 |
| Exp condition (EC) | -.02 | .10 | -.01 | .00 | .00 | .10 | .00 | .00 | -.01 | .10 | -.01 | .00 |
| Age group (AG) | .04 | .10 | .04 | .00 | .07 | .10 | .06 | .00 | .02 | .10 | .02 | .00 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | -.03 | .10 | -.03 | .00 | -.14 | .10 | -.13 | .02 | -.09 | .11 | -.08 | .01 |
| T X AG | -.05 | .11 | -.05 | .00 | .05 | .11 | .04 | .00 | -.10 | .11 | -.10 | .01 |
| EG X AG | -.21 | .10 | -.19 | .04* | -.19 | .10 | -.18 | .03† | -.18 | .10 | -.17 | .03† |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | -.05 | .11 | -.05 | .00 | -.14 | .11 | -.13 | .01 | .07 | .11 | .06 | .00 |
| Total $R^2$ | | | | .07 | | | | .11 | | | | .07 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, *\*p* < .05, *\*\*p* < .01.

Table 4.3

*Summary of Hierarchical Regression Analyses Predicting Three-Month Change in Regret Engagement by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | .05 | .10 | .04 | .00 | .05 | .10 | .04 | .00 | .05 | .10 | .04 | .00 |
| Education Level | .01 | .10 | .01 | .00 | .01 | .10 | .01 | .00 | .01 | .10 | .01 | .00 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.13 | .10 | -.12 | .02 | .20 | .10 | .19 | .03* | .03 | .10 | .02 | .00 |
| Exp condition (EC) | .06 | .10 | .06 | .00 | .08 | .10 | .07 | .01 | .07 | .10 | .07 | .00 |
| Age group (AG) | -.09 | .10 | -.08 | .01 | -.06 | .10 | -.06 | .00 | -.10 | .10 | -.09 | .01 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .00 | .10 | .00 | .00 | -.15 | .10 | -.14 | .02 | -.05 | .11 | -.05 | .00 |
| T X AG | .03 | .11 | .02 | .00 | .03 | .11 | .03 | .00 | .05 | .11 | .05 | .00 |
| EG X AG | .02 | .10 | .02 | .00 | .04 | .10 | .04 | .00 | .04 | .10 | .04 | .00 |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | .00 | .11 | .00 | .00 | -.10 | .11 | -.10 | .01 | -.02 | .11 | -.02 | .00 |
| Total $R^2$ | | | | .03 | | | | .08 | | | | .02 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, *p* < .05, **p* < .01.

Table 4.4

*Summary of Hierarchical Regression Analyses Predicting Three-Month Change in Regret Intensity by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | $\beta$ | $\Delta R^2$ | B | SE(B) | $\beta$ | $\Delta R^2$ | B | SE(B) | $\beta$ | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | .02 | .09 | .02 | .00 | .02 | .09 | .02 | .00 | .02 | .09 | .02 | .00 |
| Education Level | .10 | .09 | .10 | .01 | .10 | .09 | .10 | .01 | .10 | .09 | .10 | .01 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.06 | .09 | -.06 | .00 | .03 | .10 | .03 | .00 | .00 | .10 | .00 | .00 |
| Exp condition (EC) | -.13 | .09 | .10 | .02 | -.13 | .09 | -.13 | .02 | -.13 | .09 | -.13 | .02 |
| Age group (AG) | .10 | .10 | .10 | .01 | .10 | .10 | .10 | .01 | .10 | .10 | .10 | .01 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .12 | .10 | .12 | .01 | .02 | .10 | .02 | .00 | -.08 | .10 | -.08 | .01 |
| T X AG | -.04 | .10 | -.04 | .00 | .17 | .10 | .16 | .02† | -.15 | .10 | -.15 | .02 |
| EG X AG | .22 | .09 | .22 | .05* | .25 | .09 | .25 | .06** | .24 | .09 | .24 | .06** |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | .17 | .10 | .17 | .03† | -.17 | .10 | -.17 | .02† | .09 | .10 | .09 | .01 |
| Total $R^2$ | | | | .13 | | | | .14 | | | | .12 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †$p < .10$, *$p < .05$, **$p < .01$.

Table 4.5

*Summary of Hierarchical Regression Analyses Predicting Three-Month Change in Hot Emotions by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | -.02 | .09 | -.02 | .00 | -.02 | .09 | -.02 | .00 | -.02 | .09 | -.02 | .00 |
| Education Level | .08 | .09 | .08 | .01 | .08 | .09 | .08 | .01 | .08 | .09 | .08 | .01 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.04 | .10 | -.04 | .00 | .04 | .10 | .04 | .00 | -.05 | .10 | -.05 | .00 |
| Exp condition (EC) | -.03 | .10 | -.03 | .00 | -.02 | .10 | -.02 | .00 | -.03 | .10 | -.03 | .00 |
| Age group (AG) | .01 | .10 | .01 | .00 | .01 | .10 | .01 | .00 | .01 | .10 | .01 | .00 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .08 | .10 | .08 | .01 | .01 | .10 | .01 | .00 | .02 | .10 | .02 | .00 |
| T X AG | -.09 | .10 | -.09 | .01 | .12 | .10 | .12 | .01 | -.13 | .10 | -.13 | .02 |
| EG X AG | .14 | .10 | .14 | .02 | .17 | .10 | .17 | .03† | .14 | .10 | .14 | .02 |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | .20 | .10 | .19 | .03* | -.29 | .10 | -.29 | .07** | .08 | .10 | .08 | .01 |
| Total $R^2$ | | | | .08 | | | | .12 | | | | .05 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, **p* < .05, ***p* < .01.

Table 4.6

*Summary of Hierarchical Regression Analyses Predicting Three-Month Change in Despair Emotions by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | .07 | .09 | .07 | .01 | .07 | .09 | .07 | .01 | .07 | .09 | .07 | .01 |
| Education Level | .09 | .09 | .09 | .01 | .09 | .09 | .09 | .01 | .09 | .09 | .09 | .01 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.07 | .09 | -.07 | .00 | .10 | .10 | .10 | .01 | .07 | .10 | .07 | .01 |
| Exp condition (EC) | -.04 | .09 | -.04 | .00 | -.03 | .09 | -.03 | .00 | -.04 | .09 | -.04 | .00 |
| Age group (AG) | .18 | .10 | .18 | .03† | .19 | .10 | .19 | .03* | .16 | .10 | .16 | .03† |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .13 | .10 | .13 | .02 | .06 | .10 | .06 | .00 | -.09 | .10 | -.09 | .01 |
| T X AG | .02 | .10 | .02 | .00 | .18 | .10 | .18 | .03† | -.14 | .10 | -.14 | .02 |
| EG X AG | .15 | .10 | .15 | .02 | .20 | .10 | .19 | .04* | .19 | .10 | .19 | .03* |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | .22 | .10 | .22 | .04* | -.21 | .10 | .20 | .04* | .04 | .10 | .04 | .00 |
| Total $R^2$ | | | | .13 | | | | .15 | | | | .10 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, **p* < .05, ***p* < .01.

Table 4.7

*Summary of Hierarchical Regression Analyses Predicting Three-Month Change in Wistful Emotions by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Covariates* | | | | | | | | | | | | |
| Sex | -.02 | .10 | -.02 | .00 | -.02 | .10 | -.02 | .00 | -.02 | .10 | -.02 | .00 |
| Education Level | .05 | .10 | .05 | .00 | .05 | .10 | .05 | .00 | .05 | .10 | .05 | .00 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.04 | .09 | -.04 | .00 | -.04 | .10 | -.04 | .00 | -.02 | .09 | -.02 | .00 |
| Exp condition (EC) | -.25 | .09 | -.25 | .06** | -.25 | .10 | -.25 | .06** | -.25 | .09 | -.25 | .06** |
| Age group (AG) | .07 | .09 | .07 | .00 | .06 | .09 | .06 | .00 | .07 | .10 | .07 | .00 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .13 | .09 | .13 | .02 | -.02 | .10 | -.02 | .00 | -.14 | .10 | -.14 | .02 |
| T X AG | .00 | .10 | .00 | .00 | .16 | .10 | .15 | .02 | -.12 | .10 | -.12 | .01 |
| EG X AG | .23 | .09 | .23 | .05** | .24 | .09 | .24 | .06** | .26 | .09 | .26 | .06** |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | .02 | .10 | .02 | .00 | .02 | .10 | .02 | .00 | .12 | .10 | .12 | .01 |
| Total $R^2$ | | | | .14 | | | | .15 | | | | .16 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, *\*p* < .05, *\*\*p* < .01.

Table 4.8

*Summary of Hierarchical Regression Analyses Predicting Three-Month in Closure ("Closed Book") by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | -.12 | .09 | -.12 | .01 | -.12 | .09 | -.12 | .01 | -.12 | .09 | -.12 | .01 |
| Education Level | -.07 | .09 | -.07 | .01 | -.07 | .09 | -.07 | .01 | -.07 | .09 | -.07 | .01 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | .00 | .09 | .00 | .00 | -.07 | .09 | -.07 | .00 | .02 | .09 | .02 | .00 |
| Exp condition (EC) | .04 | .09 | .04 | .00 | .04 | .09 | .04 | .00 | .04 | .09 | .04 | .00 |
| Age group (AG) | .32 | .09 | .32 | .10** | .31 | .09 | .31 | .09** | .32 | .09 | .32 | .10** |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | -.07 | .09 | -.07 | .01 | .00 | .09 | .00 | .00 | .01 | .10 | .01 | .00 |
| T X AG | .05 | .10 | .05 | .00 | .09 | .10 | .09 | .01 | .13 | .09 | .12 | .01 |
| EG X AG | -.20 | .09 | -.20 | .04* | -.21 | .09 | -.21 | .04* | -.21 | .09 | -.21 | .04* |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | -.16 | .09 | -.16 | .02† | .10 | .10 | .10 | .01 | -.01 | .10 | -.01 | .00 |
| Total $R^2$ | | | | .19 | | | | .18 | | | | .18 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, **p* < .05, ***p* < .01.

Table 4.9

*Summary of Hierarchical Regression Analyses Predicting Three-Month in Closure ("Unfinished Business") by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | -.10 | .09 | -.10 | .01 | -.10 | .09 | -.10 | .01 | -.10 | .09 | -.10 | .01 |
| Education Level | .01 | .09 | .01 | .00 | .01 | .09 | .01 | .00 | .01 | .09 | .01 | .00 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | .04 | .10 | .04 | .00 | -.11 | .10 | -.11 | .01 | .01 | .10 | .01 | .00 |
| Exp condition (EC) | .07 | .10 | .07 | .01 | .06 | .10 | .06 | .00 | .07 | .10 | .07 | .01 |
| Age group (AG) | .04 | .10 | .04 | .00 | .03 | .10 | .03 | .00 | .04 | .10 | .04 | .00 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | -.15 | .10 | -.15 | .02 | -.01 | .10 | -.01 | .00 | -.06 | .10 | -.06 | .00 |
| T X AG | .12 | .10 | .12 | .01 | -.14 | .10 | -.14 | .02 | .15 | .10 | .15 | .02 |
| EG X AG | -.11 | .09 | -.11 | .01 | -.15 | .10 | -.15 | .02 | -.12 | .10 | -.12 | .01 |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | -.25 | .10 | -.24 | .06** | .23 | .10 | .22 | .04* | .08 | .10 | .08 | .01 |
| Total $R^2$ | | | | .13 | | | | .11 | | | | .06 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †$p < .10$, *$p < .05$, **$p < .01$.

Table 4.10

*Summary of Hierarchical Regression Analyses Predicting Three-Month in Sleep Quality by Participants' Assigned Condition, Age Group, and Verb-Tense Use*

| | Verb Tense | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Past Tense | | | | Present Tense | | | | Future Tense | | | |
| Variable | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ | B | SE(B) | β | $\Delta R^2$ |
| *Covariates* | | | | | | | | | | | | |
| Sex | .18 | .09 | .18 | .03* | .18 | .09 | .18 | .03* | .18 | .09 | .18 | .03* |
| Education Level | .03 | .09 | .03 | .00 | .03 | .09 | .03 | .00 | .03 | .09 | .03 | .00 |
| *Main effects* | | | | | | | | | | | | |
| Tense (T) | -.05 | .09 | -.05 | .00 | .01 | .10 | .01 | .00 | .03 | .09 | .03 | .00 |
| Exp condition (EC) | -.12 | .09 | -.12 | .02 | -.12 | .09 | -.12 | .01 | -.12 | .09 | -.12 | .01 |
| Age group (AG) | .04 | .10 | .04 | .00 | .04 | .10 | .04 | .00 | .03 | .10 | .03 | .00 |
| *2-way interactions* | | | | | | | | | | | | |
| T X EC | .11 | .10 | .11 | .01 | -.01 | .10 | -.01 | .00 | -.17 | .10 | -.17 | .03 |
| T X AG | .02 | .10 | .02 | .00 | -.02 | .10 | -.02 | .00 | -.05 | .10 | -.05 | .00 |
| EG X AG | -.18 | .09 | -.18 | .03* | -.18 | .10 | -.18 | .03† | -.16 | .09 | -.16 | .02† |
| *3-way interaction* | | | | | | | | | | | | |
| T X EC X AG | -.12 | .10 | -.12 | .01 | .19 | .10 | .18 | .03† | -.06 | .10 | -.06 | .00 |
| Total $R^2$ | | | | .11 | | | | .11 | | | | .11 |

*Note.* Sex is coded: men = 1, women = 2; Exp condition is coded: regret disengagement = 1, regret engagement = 2; Age group is coded: younger adults = 1, older adults = 2. †*p* < .10, **p* < .05, ***p* < .01.
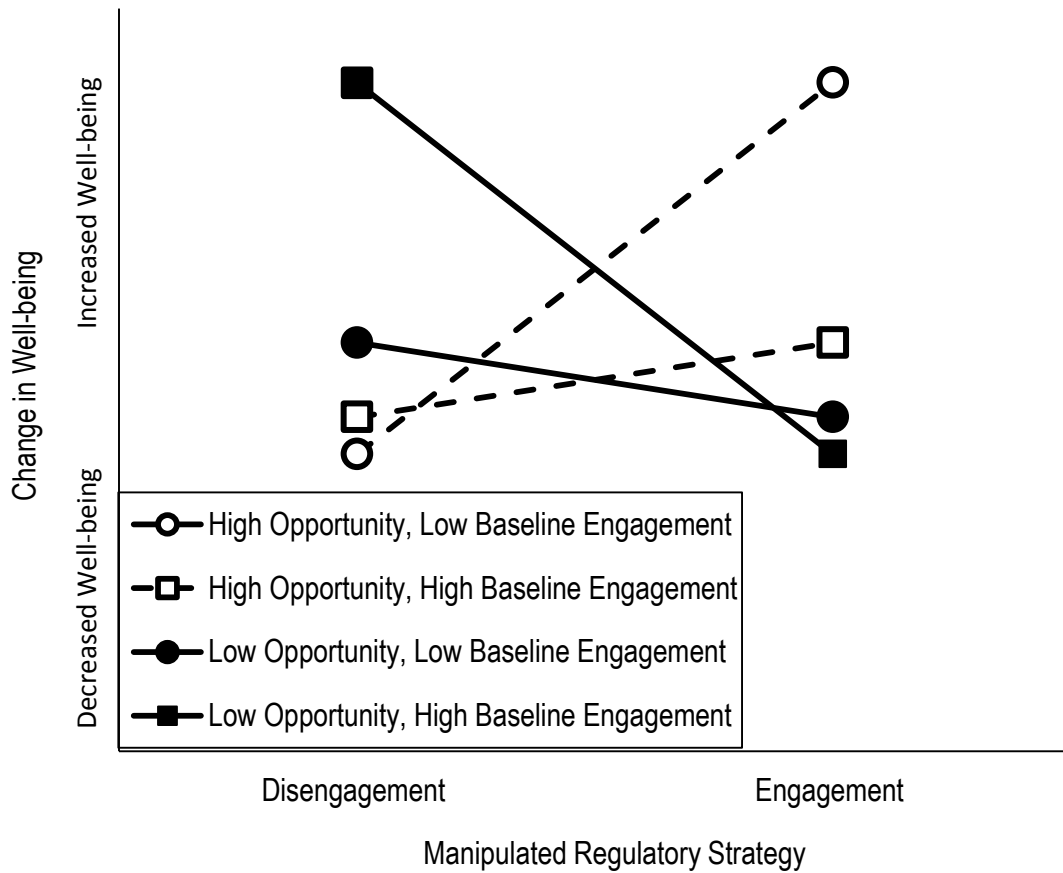
*Figure 4.1.* Hypothesized association between manipulated regulatory strategy and change in well-being conditional upon level of opportunity and baseline level of engagement.
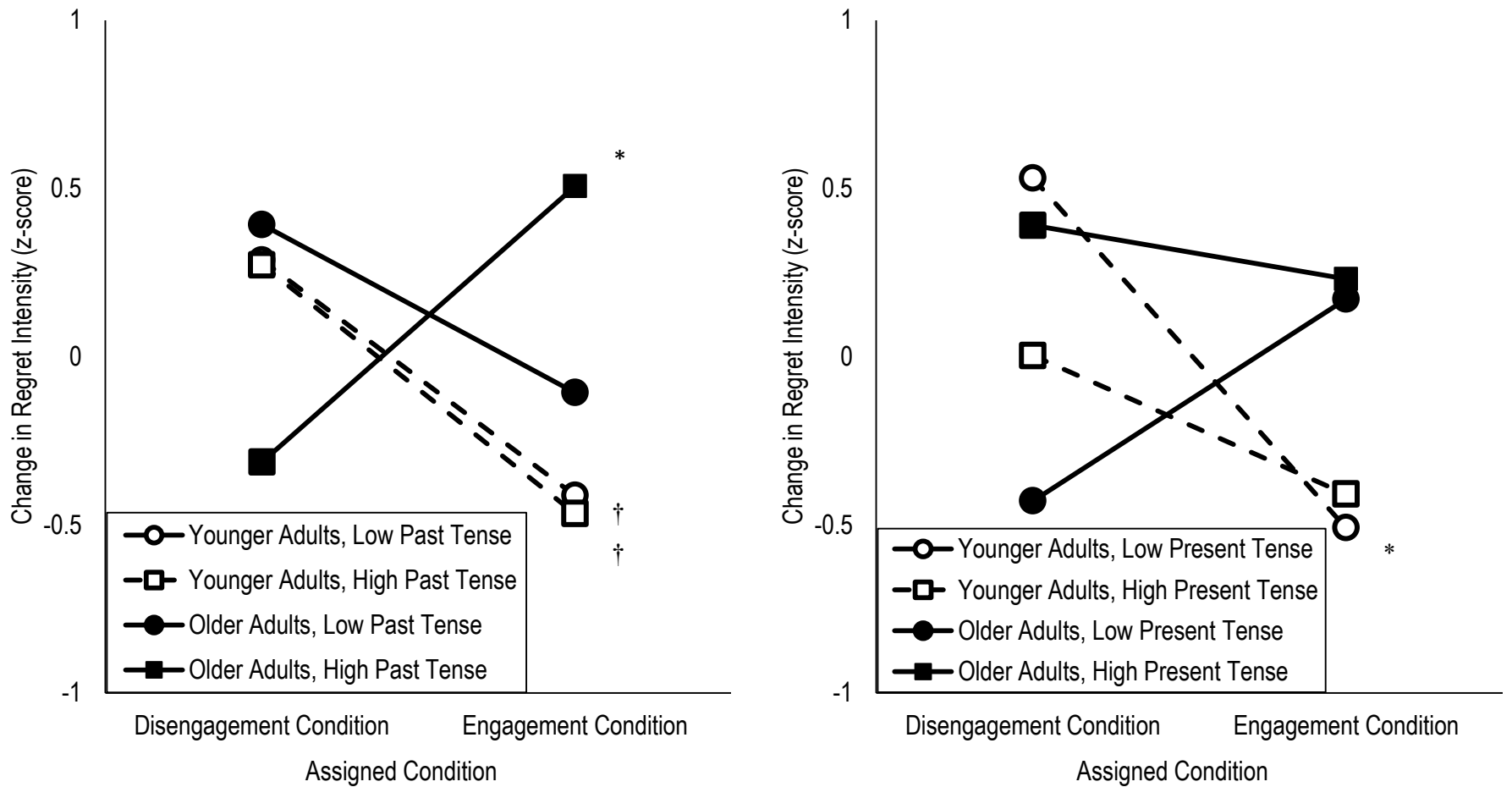
*Figure 4.2.* Association between condition assignment and three-month change in regret intensity plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); low past tense or high present tense represents high baseline regret engagement; (†) denotes that the slope marginally differs (p < .10) from zero; (*) denotes that the slope significantly differs (p < .05) from zero.
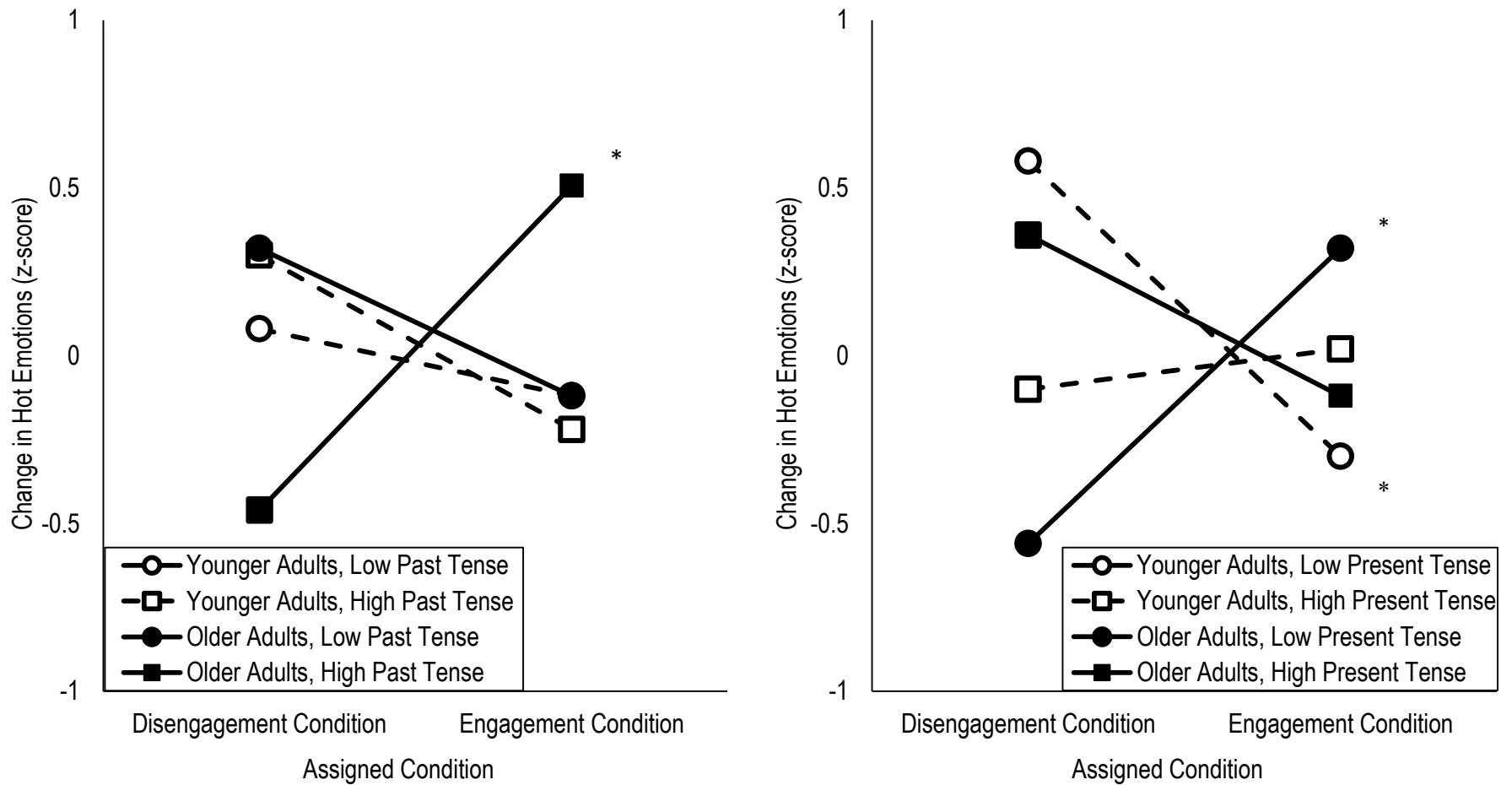
*Figure 4.3.* Association between condition assignment and three-month change in hot emotions plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); low past tense or high present tense represents high baseline regret engagement; (*) denotes that the slope significantly differs (p < .05) from zero.
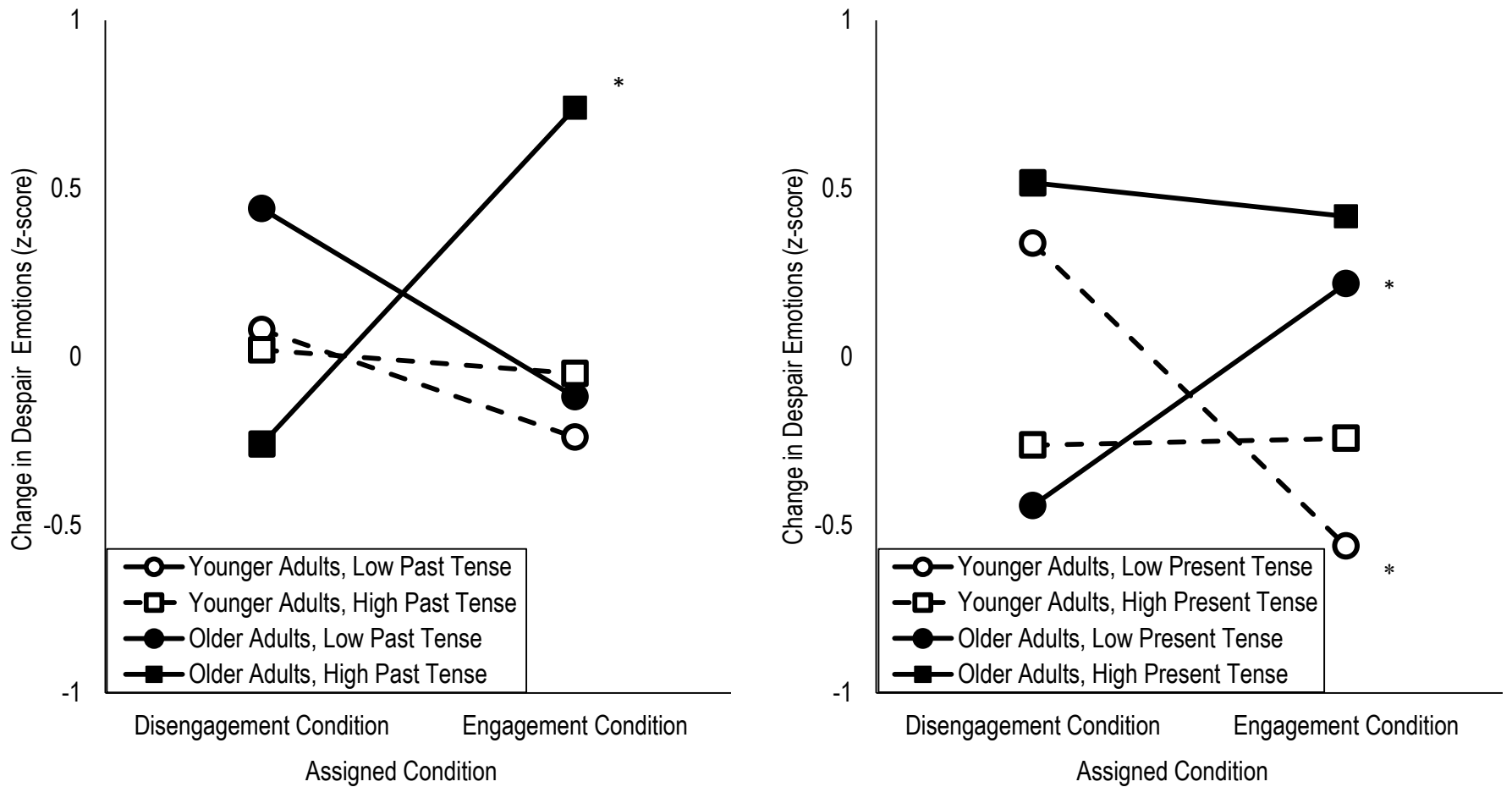
*Figure 4.4.* Association between condition assignment and three-month change in despair emotions plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); low past tense or high present tense represents high baseline regret engagement; (*) denotes that the slope significantly differs (p < .05) from zero.
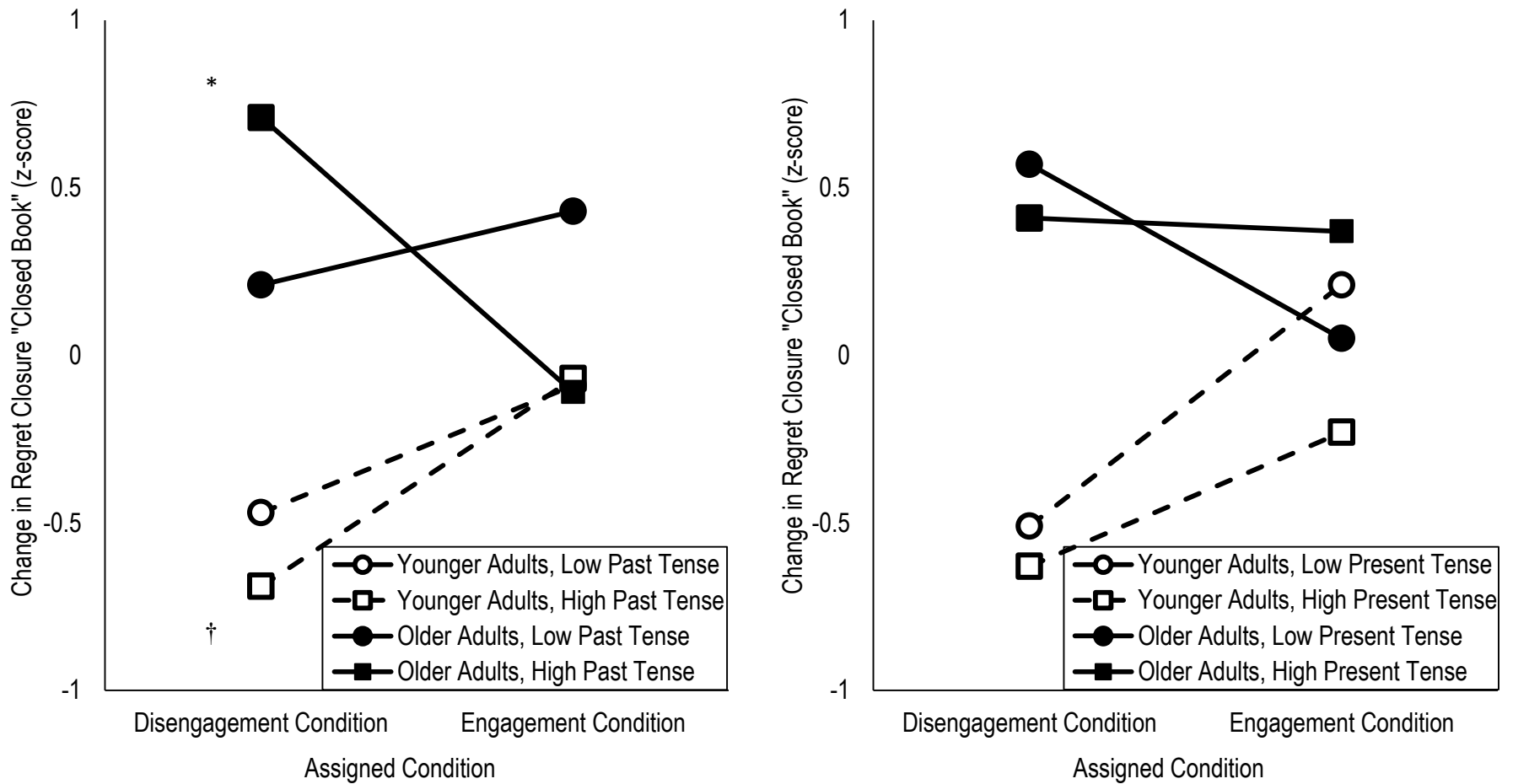
*Figure 4.5.* Association between condition assignment and three-month change in regret closure ("closed book") plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); (†) denotes that the slope marginally differs (p < .10) from zero; (*) denotes that the slope significantly differs (p < .05) from zero.

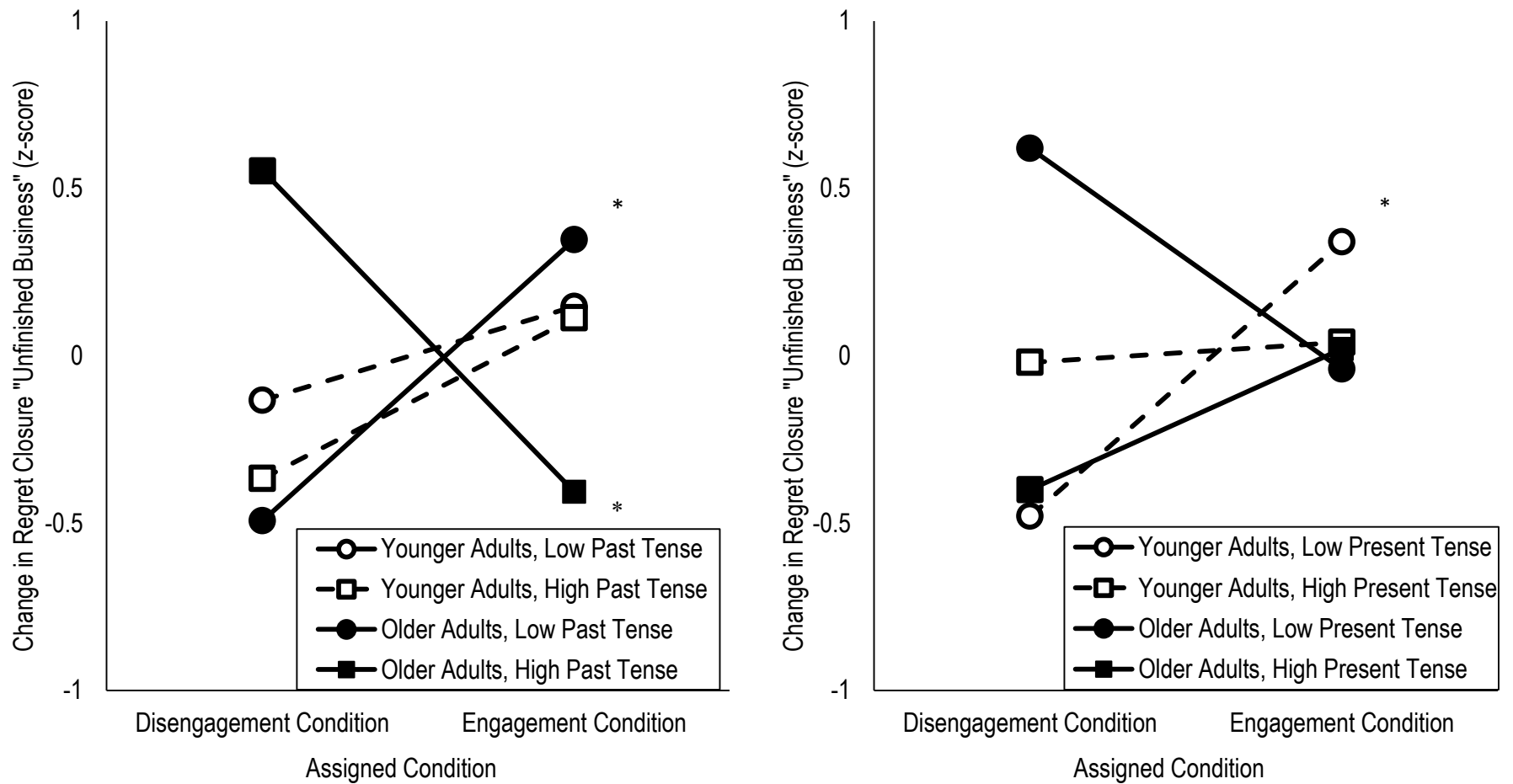*Figure 4.6.* Association between condition assignment and three-month change in regret closure ("unfinished business") plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); low past tense or high present tense represents high baseline regret engagement; (*) denotes that the slope significantly differs (p < .05) from zero.
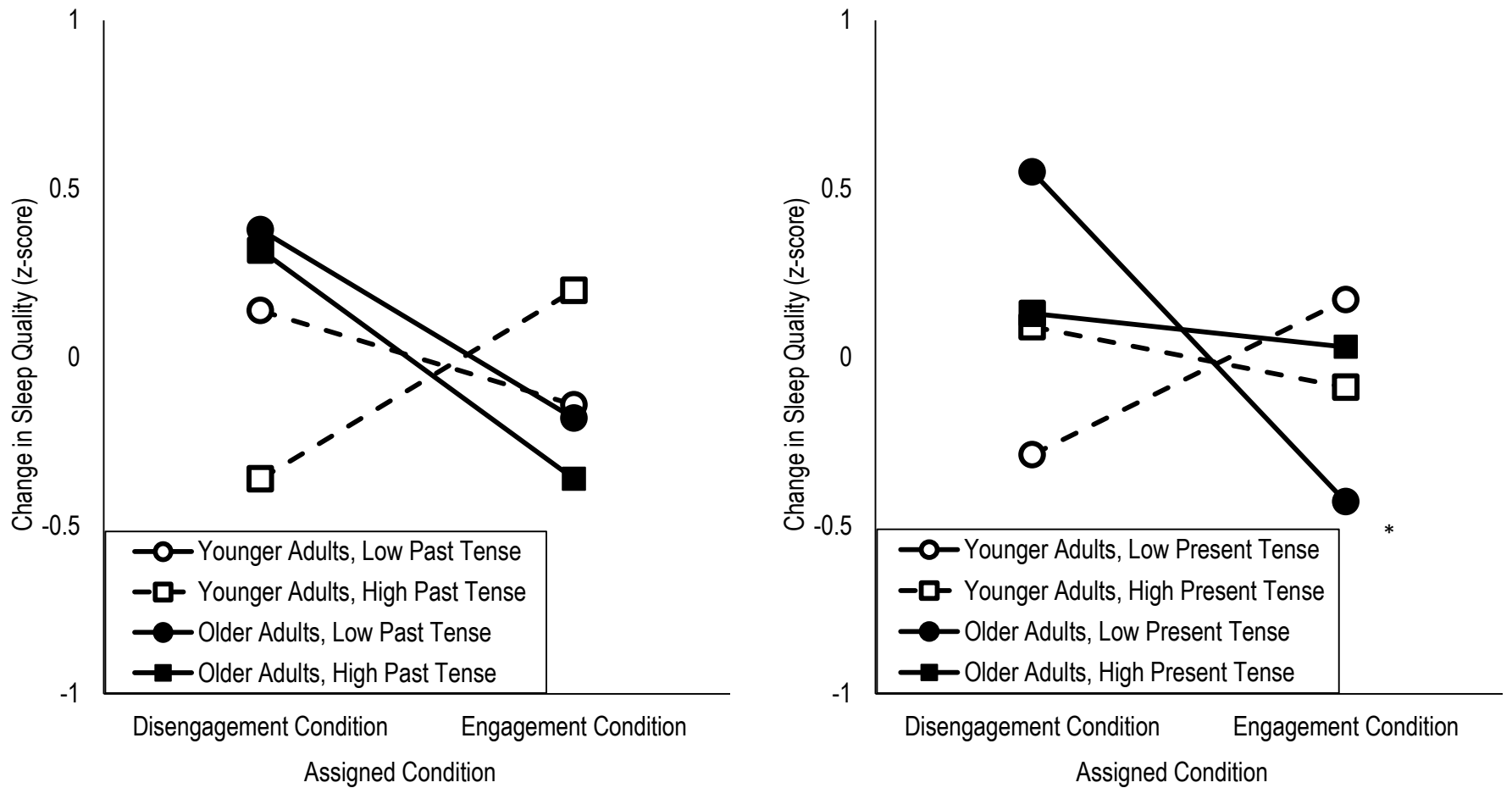
*Figure 4.7.* Association between condition assignment and three-month change in sleep quality plotted separately for participants from each age group who used either high or low past (left panel) or present tense verbs (right panel); low past tense or high present tense represents high baseline regret engagement; (*) denotes that the slope significantly differs (p < .05) from zero.

**CHAPTER 5:**

**GENERAL DISCUSSION**

**Contributions to Theory and Research**

Due to various constraints (e.g., biological, societal; Baltes, 1997; Heckhausen, 1999; Heckhausen et al., 2010), the availability of opportunity to attain developmental goals declines with age. Depending on the availability of opportunity for goal attainment, individuals can adjust how they choose to approach their goals. In broad terms, individuals can adjust from a position of goal engagement and pursuit when opportunity is available to a position of disengagement and goal deactivation when opportunities are unavailable. Theory suggests, and research supports, that congruence between regulatory approach and the availability of opportunity is necessary to promote and protect psychological and physical health (e.g., Brandtstädter & Renner, 1990; Hall et al., 2010; Heckhausen et al., 2001; Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Wrosch & Heckhausen, 1999; Wrosch et al., 2003). Similarly, the availability of opportunity to undo the negative consequences produced by life regrets declines with age (Wrosch et al., 2005). Previous research documents that engaging in undoing the regret is adaptive in the context of available opportunity whereas disengagement from the regret is adaptive when opportunity is unavailable (Torges et al., 2005; Newall et al., 2009; Bauer et al., 2008; Bauer & Wrosch, 2011; Wrosch & Heckhasuen, 2002; Wrosch et al., 2005, 2007).

My research examined how the association between regulatory approach and well-being depends upon the availability of opportunity. In three studies, I examined and/or manipulated the regulatory approach used by individuals to manage their

experience of regret. I designed my research to address limitations in the existing research on the regulation of developmental goals (at-large) and regrets (specifically).

Study 1 addressed the absence of research directly investigating individual differences in the availability of opportunity to change life circumstances. Researchers tend to use age as a proxy for the availability of opportunity (e.g., Wrosch et al., 2000; Wrosch & Heckhausen, 2002) and only a handful of published studies assessed levels of opportunity explicitly (Bauer et al., 2008; Bauer & Wrosch, 2011). Despite differences in the opportunity to address regret experiences (Wrosch et al., 2005), age-related declines in opportunity are likely only part of the story as certain circumstances, including life stages, may provide newfound opportunity even in older adulthood. Study 1 determined, among individuals in the life stage of retirement, that the regulation of regret can either lead to gains or prevent loses, if managed with an approach that accounts for the availability of opportunity. Among retirees with favourable opportunity, high levels of regret engagement produced high levels of activity engagement (e.g., volunteering, socializing) and retirement satisfaction. In addition, these retirees experienced increases in activity engagement at three-year follow-up. Among retirees with unfavourable opportunity, low levels of engagement (i.e., disengagement) prevented a reduction in retirement satisfaction at three-year follow-up. By directly assessing for the availability of opportunity, Study 1 provided empirical support that opportunity, and not age, determines the adaptiveness of a regulatory approach. Thus, Study 1 substantiates current theory on adaptive regulation (e.g., Brandtstädter & Renner, 1990; Wrosch et al., 2003; Heckhausen et al., 2010).

Study 2 addressed the absence of experimental methods to examining the outcome of adjusted regulatory approach. Most research examining the outcome of regulatory processes rely on cross-sectional and longitudinal correlational research (e.g., Hall et al., 2010; Wrosch & Heckhausen, 2002; Heckhausen et al., 2001; Newall et al., 2009) and there is limited experimental research examining the impact of adjusted regulation (i.e., Wrosch et al., 2007). No previously published studies compared the outcome of engagement, disengagement and control, nor examined how these approaches differentially impact individuals with low (e.g., younger adults) versus high (e.g., older adults) levels of objective opportunity. Study 2 determined that younger adults assigned to engage in undoing their regrets experienced larger increases in well-being (i.e., decreased regret intensity and wistful emotions, increased closure) when compared to their counterparts assigned to disengage, but not their counterparts assigned to control. In comparison, older adults assigned to disengage from their regrets experienced larger improvements in sleep quality when compared to their counterparts assigned to engage or control. In addition, younger adults experienced larger decreases in regret intensity and wistful emotions than older adults when assigned to engage in undoing their regrets. In contrast, older adults experienced larger increases in closure than younger adults when assigned to disengage. Overall, Study 2 builds upon early experimental research and provides support for earlier correlational findings by documenting that the impact of using a particular regulatory approach depends upon the availability of opportunity.

In the absence of experimental methods, the role of initial engagement in the outcome of adjusted regulation remained unexamined. By building upon Study 2, Study 3 determined that the outcome of manipulated regulatory processes depends upon initial

levels of engagement. Among younger adults, being assigned to engage in, versus disengage from, undoing regret produced larger increases in well-being (i.e., decreased regret intensity, hot emotions, and despair emotions, and increased closure), but only for younger adults initially disengaged from their regrets. In comparison, among older adults, being assigned to disengage from, versus engage in, undoing regret produced larger increases in well-being (i.e., decreased regret intensity, hot emotions, and despair emotions, and increased closure and sleep quality), but only for those older adults already disengaged from their regrets. Therefore, being instructed to disengage, when disengagement is the theoretically adaptive approach, only produces adaptive outcomes if the individual is already disengaged. This finding appears to suggest that additional disengagement strategies (e.g., downgrading the perceived value of undoing the regret) are necessary to facilitate adaptive disengagement among individuals who remain actively engaged (cf. Brandstätter et al., 2013; Carver & Scheier, 1998; Heckhausen et al., 2010; Wrosch et al., 2003).

There are many strengths to my research. For instance, the design and analyses of my studies reflect considerable novelty and creativity. Study 1 was novel insofar as it measured opportunity explicitly and examined the moderating effects of opportunity. Unlike earlier research, Study 1 examined the variability in regret management among a sample of older adults who were undergoing a major life transition. I explored recent retirees, a group likely to experience a surge in opportunity to address unfavourable life circumstances in the absence of workplace commitments. The quasi-experimental approach of Study 2 was innovative as most research relies on correlational studies (e.g., Wrosch et al., 2005; Hall et al., 2010). As well, Study 2 was the first to manipulate

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individual's general regulatory strategy across multiple regrets. In contrast to early experimental work that asked participants to list one regret and subsequently complete tasks related to that particular regret (Wrosch et al., 2007), my design required participants to report three severe regrets, and then to complete the same regulatory task for each regret across multiple sequential days. This may have impacted the participants' general approach to regret-regulation at-large, rather than the regulation of a specific regret. Finally, Study 3 was novel not only because it examined the impact of baseline regret engagement on the outcome of adjusted regulation, but also because it assessed implicit signs of regret engagement. I achieved this by examining the types of verbs produced by participants when they discussed their regrets and the consequences of their regrets. Research on language is a growing field, especially since the advent of computer-based linguistic software (Pennebaker et al., 2007). Language use is an unobtrusive method of examining internal states (Pennebaker et al., 2003), which makes it an exciting method to examine processes associated with internal regulatory processes. Outside of the field of developmental regulation, my approach of examining verb tense is novel as there has been limited examinations of verbs (Moore & Brody, 2009). Overall, I hope that my innovated approach to examining constructs related to developmental regulation may fuel future research in this field.

In addition, my research employed a multipronged approach to address my research questions. First, Study 1 had a correlational design, whereas Studies 2 and 3 used a quasi-experimental design. Second, Studies 2 and 3 examined opportunity categorically by comparing younger and older adults, whereas Study 1 included a continuous measure of perceived opportunity. Third, all studies involved longitudinal

analyses, with Studies 2 and 3 examining short-term follow-up (i.e., three months), whereas Study 1 involved long-term follow-up (i.e., three year). Fourth, Study 3 built upon Study 2 by examining levels of engagement thus broadening our understanding of how adaptive engagement and disengagement can be facilitated. Overall, the inclusion of my three studies provides a holistic research program that makes meaningful contributions to theory.

**Clinical Implications**

Several clinical implications can be drawn from the research findings. First, changing the regulatory approach, in particular adjustment from engagement to disengagement, is advisable for individuals who face goal restrictions. This may be particularly important among older adults as they tend to experience age-related barriers to goal success (Baltes, 1997; Heckhausen & Schulz, 1995; Heckhausen et al., 2010). As the population is aging (Statistics Canada, 2012), there may be a growing proportion of individuals who are at risk of experiencing psychological and physical problems if they cannot successfully disengage from unmanageable life circumstances (e.g., Hall et al., 2010). Beyond the implications for healthy aging, disengagement may be particularly important among clinical populations who experience a disorder that is maintained by unrealistic goals or an inability to redirect attentional resources away from negative mind-states. For example, disengagement capacities may be helpful for individuals suffering from eating disorders who maintain unrealistic and problematic weight-loss goals (Fairburn, 2008) or individuals experiencing persistent complex bereavement disorder who may be overwhelmed by a difficult loss that cannot be undone (American Psychiatric Association, 2013). In sum, disengagement is an adaptive approach when

individuals face constraints, obstacles, or negative consequences associated with their goal pursuits.

However, I do not recommend the widespread use of disengagement, in particular among older adults. Rather, I suggest that disengagement strategies be employed under circumstances of low or unfavourable opportunity. It would be ill-advised to recommend disengagement if opportunity was favourable because continued effort and commitment would likely provide improvements to one's personal circumstances. For instance, older adults who face acute medical conditions who engage in addressing these issues experience health gains (Hall et al., 2010). Indeed, switching to disengagement when opportunity remains available may result in the maintenance of unsatisfactory life circumstances. In regards to psychiatric disorders, engagement capacities may be particularly important for individuals suffering from disorders of anxiety (e.g., specific phobias, social anxiety disorder). Avoidance is a central feature of anxiety disorders, and anxiety may be reduced by facilitating engagement strategies that address the particular target of avoidance (Turk, Heimberg, & Magee, 2008).

Third, the assessment of opportunity is an important component when determining the direction of psychological treatments. However, assessing opportunity may be a difficult task, particularly among clinical populations. In my research, I asked participants to report their perceived level of opportunity to address their regrets. Earlier research found that perceptions of opportunity were associated with objective ratings of opportunity (Bauer et al., 2008); however, this research was conducted with community samples. Among clinical populations, there is greater likelihood of individuals to engage in thinking errors known as cognitive distortions (Leahy, 2003). One particular cognitive

distortion common among individuals experiencing major depressive disorder is black-and-white thinking (Greenberger & Padesky, 1995). Individuals who tend to fall victim to this particular cognitive distortion may either overestimate or underestimate the likelihood that they can produce change on their environment. Therefore, deriving clinical interventions involving a particular regulatory approach may be ill-informed if the clinician relies on the client's perception of opportunity. At the same time, clinicians may not be aware of all relevant information to produce an objective evaluation of the client's opportunity, nor would such an approach necessarily foster the therapeutic alliance. I encourage clinical researchers to pursue research addressing how the measurement of opportunity to achieve relevant life changes can be determined in the context of clinical treatments.

Fourth, the findings of Study 3 suggest that asking an individual to consider their unfavourable opportunities to change their life circumstances and consequently disengage from their pursuits may not be sufficient to facilitate adaptive disengagement. It is likely that additional processes may be required, such as downgrading the value of the particular pursuit (cf. Brandstätter et al., 2013; Carver & Scheier, 1998; Heckhausen et al., 2010; Wrosch et al., 2003). Researchers have previously identified several strategies associated with adaptive disengagement that may inform therapeutic interventions, including: focusing on the positive of a negative situation, blaming others for the situation, and acceptance (e.g., Torges et al., 2005; Wrosch et al., 2007; Hall et al., 2010; Bauer et al., 2008; Bauer & Wrosch, 2011; Thompson et al., 1994). Some of these strategies have already been incorporated into clinical interventions. For example, in the treatment of borderline personality disorder, telling yourself that others have it worse

than you (i.e., downward social comparisons) is a strategy encouraged during moments of emotional distress, and "letting go" is a strategy encouraged to help individuals stay grounded in the moment (Lineham, 1993). My findings further substantiate empirical support for treatments that involve these strategies (i.e., dialectical behaviour therapy; McMain et al., 2009) and highlight the importance of these specific therapeutic components.

**Limitations and Future Directions**

There are several limitations in my research that should be addressed in future research. First, researchers may wish to examine paradigms that do not involve life regrets. All three of my studies involved the paradigm of life regrets. This was a prosperous approach, and one that has been used by other researchers to contribute to the understanding of adaptive regulatory strategies (e.g., Wrosch & Heckhausen, 2002; Wrosch et al., 2007). However, researchers also examine successful regulation using other goal-related paradigms (e.g., child bearing; Heckhausen et al., 2001). I encourage researchers to replicate my findings by examining other paradigms. In particular, future researchers may wish to replicate my quasi-experimental findings by examining paradigms regarding the pursuit of specific goals.

Second, future researchers should prioritize longitudinal, experimental, and longitudinal-experimental designs. The abundance of research examines developmental goal pursuit using cross-sectional correlational designs (e.g., Wrosch & Heckhausen, 1999; Heckhausen et al., 2001). However, in many cases, particular associations may not become apparent until time has passed and the effects of either adaptive or maladaptive regulation arise. Consider the three-year longitudinal findings involving retirement

satisfaction in Study 1. By including the three-year follow-up data, I was able to demonstrate how low levels of engagement protected retirees with low levels of opportunity from three-year decreases in retirement satisfaction and this pattern that was not present when examining baseline cross-sectional data. In addition, experimental research, such as Study 2, can provide meaningful evidence supporting the theoretical contentions or can verify correlational findings. Experimental designs would also be beneficial, especially when considering the clinical implications, if the design involved long-term follow-up documenting sustained effects of regulatory manipulations.

Third, future researchers may wish to study the strategies that may facilitate adaptive engagement and disengagement. Study 3 demonstrated that focusing on unfavourable opportunities and contemplating letting go of the regret did not produce increased well-being among individuals hypothesized to benefit most from disengaging (i.e., older adults with high levels of regret engagement). Future researchers could build upon earlier findings (e.g., Wrosch et al., 2007) to determine if additional disengagement strategies are required to facilitate adaptive disengagement.  In addition, as both engagement and disengagement theoretically involve internal psychological components (selective secondary control, compensatory secondary control; Heckhauen et al., 2010) there is likely to be a variety of cognitive strategies associated with either form of regulation. Future researchers may wish to continue examining the specific cognitive strategies associated with adaptive regulation. Such an approach would further illustrate pathways to the successful management of life circumstances.

Despite the aforementioned limitations, my research remains a substantial contribution to theory. I have broadened and clarified understanding in the study of regret

regulation as well as developmental goal regulation by addressing the impact of

opportunity on specific regulatory approaches. I hope that my findings promote further

research in this area of study.

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**APPEDICES**

This is to state that I, _____, agree to participate in the study on retirement 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 anytime 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 study is a longitudinal study, I may be contacted again for an annual interview in 2006, 2007 and 2008. Each annual interview will last approximately four hours. I will receive $50 for each annual interview in which I will take part.

6.     I will receive a copy of the general results as they become available if I have indicated my name and address on the previous page.

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

8.     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 _____

*If at any time you have questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424, extension 7481 or by email at areid@alcor.concordia.ca.*

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 behaviours. In addition, they often want the negative consequences of their behaviours to be undone.

Life regrets might result from things that people <u>have done</u> (e.g., having pursued a fruitless goal) and from things that people <u>have not done</u> (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.**

_____

_____

_____

_____

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

   1. Does the regret that you have noted relate to a behaviour:
      ___ that you have done
      ___ that you have *not* done

   2. When did the behaviour 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

3.  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

4.  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

5.  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

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

    **No effort at all**                                                    **A lot of effort**
    ☐              ☐              ☐              ☐              ☐
    1              2              3              4              5

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 adults.

**B. PROCEDURES**
For the first phase of this study, I will be invited to the laboratory to complete a series of questionnaires. The questionnaires will focus on self-reports of life regrets, well-being, and health. Following the questionnaires, I will complete the first of three writing intervention tasks. At this time, I will receive $20 for my participation. At home, over the next three consecutive days, I will be instructed to complete the following two writing intervention tasks as well as an additional series of questionnaires.

Three-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 that will be sent to me by mail. For each follow-up session, I will receive an 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 and the writing sessions.

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 D: General Instructions, Study 2**

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.

Regrets might result from things that people <u>have done</u> (e.g., having pursued a fruitless goal) and from things that people <u>have not done</u> (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 <u>your life</u>. Is there anything in your life that <u>you regret</u> having done or not having done?

We will be asking you to record your <u>three most severe regrets</u>, and to answer some questions about these regrets.

*Please Note:* If your regret concerns illegal activity or an event that would easily identify you (e.g., being the runner-up in a well-known national competition), please choose a different regret.

In the space provided below, please record the <u>first</u> of your three severe life regrets.

_____

_____

In the space provided below, please record the <u>second</u> of your three severe life regrets.

_____

_____

In the space provided below, please record the <u>third</u> of your three severe life regrets.

_____

_____

**Regret Type (Commission, Omission)**

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

**Years Since Regret**

When did the behaviour 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

**Opportunity to undo regret** (Likert-type scale, 1: Very Unlikely, 5: Very Likely)

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

**Regret Closure**

Please indicate your level of agreement with each of the following statements (Likert-type scale, 1: Strongly Disagree, 5: Strongly Agree):

1. My regret feels like a 'closed book'.
2. My regret feels like 'unfinished business'. (R)

**Regret Domain**

Please classify **your regret** into the appropriate life domain reported below. Please circle the appropriate domain.  If a regret belongs to more than one life domain, please select the **ONE** life domain that best describes the regret.

1. Work
2. Education
3. Romance
4. Family
5. Friends
6. Finances

7. Health
8. Leisure
9. Self-development/personal growth
10. Spirituality
11. Other (specify):
_____

**Regret Intensity/Regret Emotions**

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 **recently** when or if you thought about **your regret**.

|  | 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 |  |  |  |  |  |

# APPENDIX F: Sleep Measure, Study 2

The following questions relate to your usual sleep habits. Your answers should indicate the most accurate reply for the majority of days and nights of the **past month**.

1. What time have you usually laid down to go to sleep at night? _____ am/pm

2. What time have you usually gotten out of bed in the morning? _____ am/pm

3. How long has it taken you to fall asleep after you have laid down to go to sleep at night?

    _____ minutes

4. How many minutes of sleep have you lost because you woke up in the middle of the night?

    _____ minutes

5. How many minutes of sleep have you lost because you woke up earlier than your usual time to get up?

    _____ minutes

# APPENDIX G: Instructions: Regret Engagement, Study 2

Some aspects of our regrets can be undone, whereas other aspects cannot be undone. Unfortunately, sometimes people tend to *underestimate* their ability to undo certain aspects of their regrets. This implies that even if you think you cannot undo the negative consequences of your regret, it may in fact be *likely* or *possible*. Sometimes, we have to realize that it is time to *undo* our regrets. This study is designed to help you *undo* your regrets. Please consider the following examples….

Example 1: *Sarah L.*

**Step 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.**

<u>I regret that I do not have a good relationship with my sister. She and I had a good relationship until the time of our parents' divorce. She took my mother's side whereas I took my father's. Since then, our lives have grown apart. We rarely talk, and I feel like I don't even know what is going on in her life. The last time I saw her was at a family reunion….</u>

**Step 2: Describe the conditions that might make it <u>likely</u> or <u>possible</u> to undo your regret.**

<u>She lives close by; it would be easy to visit her. She has told me that she is interested in having a relationship with me…</u>

**Step 3: What thoughts and/or actions would help you to <u>undo</u> your regret?**

<u>If I want the relationship to improve I need to make an effort, like calling her or sending her letters. I could tell her that our relationship is important to me and that I want to try again…..</u>

Example 2: *Mark M.*

**Step 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.**

I regret taking out a loan. I decided to arrange for a financial loan so that I could accomplish some of the goals I was striving for. Currently, I am only making small payments on the loan and I am concerned about the time it will take to pay off my debt. This is disappointing, because the debt interferes with my future plans…

**Step 2: Describe the conditions that might make it <u>likely</u> or <u>possible</u> to undo your regret.**

My family and friends have offered to help me with the financial situation. My financial advisor says that it would only take a short period to pay off my debt if I restricted my spending habits…

**Step 3: What thoughts and/or actions would help you to <u>undo</u> your regret?**

I could ask my family and friends for help so that I can pay back the loan sooner. I could take another job to help with the loan payments. I could cut back on my daily expenses so that I can make larger payments on my loan…

# INSTRUCTIONS

Like Sarah L. & Mark M., we ask that you explore your regret in 3 steps:

STEP 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.

STEP 2: Describe the conditions that might make it <u>likely</u> or <u>possible</u> to undo your regret.

STEP 3: What thoughts and/or actions would help you to <u>undo</u> your regret?

Please complete the 3 steps, by hand, on the following pages.

Today, we will be focusing on the regret that is attached to the following page.

Please record the <u>time at which you *begin*</u> writing and the <u>time at which you *stop*</u> in the appropriate space.

In addition, please take a moment at the end to complete our 2 follow-up questions.

**PLEASE LIMIT YOUR WRITING TIME TO A MAXIMUM OF 20 MINUTES.**

**APPENDIX H: Instructions: Regret Disengagement, Study 2**

Some aspects of our regrets can be undone, whereas other aspects cannot be undone. Unfortunately, sometimes people tend to *overestimate* their ability to undo certain aspects of their regrets. This implies that even if you think you can undo the negative consequences of your regret, it may in fact be *unlikely* or *impossible*. Sometimes, we have to realize that it is time to *let go* of our regrets. This study is designed to help you *let go* of your regrets. Please consider the following examples….

Example 1: *Sarah L.*

**Step 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.**

<u>I regret that I do not have a good relationship with my sister. She and I had a good relationship until the time of our parents' divorce. She took my mother's side whereas I took my father's. Since then, our lives have grown apart. We rarely talk, and I feel like I don't even know what is going on in her life. The last time I saw her was at a family reunion…</u>

**Step 2: Describe the conditions that might make it <u>unlikely</u> or <u>impossible</u> to undo your regret.**

<u>My sister lives far away in a different province; it would be difficult to visit her. She has told me that she is not interested in having a relationship with me…</u>

**Step 3: What thoughts and/or actions would help you to <u>let go</u> of your regret?**

<u>I could accept things the way they are. I could tell myself that our relationship was not very good if it couldn't get through our parents' divorce. I could focus on the other important relationships that I have in my life, and I could focus on things where I would be more successful…</u>

Example 2: *Mark M.*

**Step 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.**

I regret taking out a loan. I decided to arrange for a financial loan so that I could accomplish some of the goals I was striving for. Currently, I am only making small payments on the loan and I am concerned about the time it will take to pay off my debt. This is disappointing, because the debt interferes with my future plans…

**Step 2: Describe the conditions that might make it <u>unlikely</u> or <u>impossible</u> to undo your regret.**

I am too proud to seek out the help of my family and friends. It seems like it will take a long time to pay off the loan…

**Step 3: What thoughts and/or actions would help you to <u>let go</u> of your regret?**

I should accept that the financial loan was something that was necessary at the time. It helped me accomplish goals that were important to me. I could focus on what the loan has allowed me to do, rather than focus on how long it will take to pay off the loan…

# INSTRUCTIONS

Like Sarah L. & Mark M., we ask that you explore your regret in 3 steps:

STEP 1: Please describe your regret <u>in detail</u> as well as the <u>consequences</u> of your regret.

STEP 2: Describe the conditions that might make it <u>unlikely</u> or <u>impossible</u> to undo your regret.

STEP 3: What thoughts and/or actions would help you to <u>let go</u> of your regret?

Please complete the 3 steps, by hand, on the following pages.

Today, we will be focusing on the regret that is attached to the following page.

Please record the <u>time at which you *begin*</u> writing and the <u>time at which you *stop*</u> in the appropriate space.

In addition, please take a moment at the end to complete our 2 follow-up questions.

**PLEASE LIMIT YOUR WRITING TIME TO A MAXIMUM OF 20 MINUTES.**

## APPENDIX I: Instructions: Control Condition, Study 2

Regrets can sometimes influence the types of activities we participate in. This study is designed to help you monitor your activities. Please consider the following examples….

Example 1: *Sarah L.*

**Step 1: Please list what you have done today since you woke up this morning.**

I woke up at 8h00 and made some coffee. Then I let the dog out into the backyard. I got the paper from outside and read it while I drank my coffee. Then I prepared breakfast and ate it. I took a quick shower and then got dressed. I took the dog out for a walk for about half an hour. When I came home, I checked my messages and saw that my sister had called. I called her back and we chatted for almost an hour.  After that, I got prepared for a friend of mine to arrive for lunch. When she arrived, she set the table while I prepared the lunch. After lunch, I left with her to do some shopping….

**Step 2: Describe <u>in detail</u> one of the activities that you have done today.**

I took my dog for a walk at 9h00. I called his name and got his leash and we were ready to go. As I was walking down my block I saw one of my neighbors. She waved and I stopped to chat with her for a few minutes. We talked about…

**Step 3: Describe <u>in detail</u> *another* one of the activities that you have done today.**

I called my sister around 9h30. She wanted to know how my evening was last night. I told her that she should have joined me last night, but she insisted that she was not feeling well at the time. I asked her about a mutual friend who was recently in the hospital…

Example 2: *Mark M.*

**Step 1: Please list what you have done today since you woke up this morning.**

I woke up and took a shower. When I got out of the shower, I got dressed. I went downstairs to eat breakfast. I had a toasted bagel and a glass of orange juice. After breakfast, I sat down to watch some television. A friend of mine called around noon to ask me to meet him for lunch. I drove and picked him up on the way to the restaurant. After we ate, we headed to Canadian Tire to buy some supplies. While we were there, I remembered that I was supposed to go over to a friend's house to help him with a project….

**Step 2: Describe <u>in detail</u> one of the activities that you have done today.**

My friend and I went to a local restaurant for lunch. I ordered a burger platter and he ordered a sandwich. I asked him how work was going, and he said things were fine. We talked about the hockey game from last night….

**Step 3: Describe <u>in detail</u> *another* one of the activities that you have done today.**

We arrived at Canadian Tire at 13h00. I needed to pick up a new set of pliers and my friend needed some light bulbs. The store was very busy. I ran into a friend who I hadn't seen in awhile. He asked about my family, and I told him that….

# INSTRUCTIONS

Like Sarah L. & Mark M., we ask that you please write, by hand, about what you have done today in three steps:

STEP 1: Please list what you have done today since you woke up this morning.

STEP 2: Describe in detail one of the activities that you have done today.

STEP 3: Describe in detail *another* one of the activities that you have done today.

It is important that you describe things exactly as they occurred. Do not mention your emotions, feelings or opinions regarding the events that have occurred during the day. Your description should be as neutral and objective as possible.

Do not worry about making your stories interesting. We are interested in hearing about your activities as they occurred during the day.

Please record the time at which you *begin* writing and the time at which you *stop* in the appropriate space.

**PLEASE LIMIT YOUR WRITING TIME TO A MAXIMUM OF 20 MINUTES.**

# APPENDIX J: Writing Samples, Study 3

### Sample 1:

**Participant (older adult) with *low* level of implicit regret engagement (z-scores for level of verb use: past tense = 1.54 , present tense = -.98 , future tense = -.13)**

I regret that I missed the entire childhood of my daughter. I also regret what that decision did to me emotionally. I have always felt that something was missing (like an amputation). I also felt guilt and shame, which have lingered. I found my daughter a year and a half ago. We have met, but we are strangers. She is more like me than my other three children. This fact increases my regret at not having raised her and having had the closeness that might have been possible.

I regret becoming sexually involved and moving in with a woman who helped me (rescued me) when I was leading a 16 year abusive marriage. She was also married. We both had children. Her children accepted me and so did her ex-husband. That was partly because I left my job, my province, and my family (extended) and my friends to move in with her. She kept her life intact. I had no idea that I would find losing everything so hard to bear.

I believed that, since I had married a man who was a married father when we became involved. I had to work when our first child was born. I wanted to stay home and said so. He convinced me that "I knew what I was getting into" and that we needed my income to offset the alimony and child support he sent his first wife. I regret not insisting on staying home. It set a pattern that held with our second child, even though by then we could have afforded for me to stay home. As a result, I never fully bonded with my children. I never fulfilled my strong maternal instincts.

<u>**Sample 2:**</u>

**Participant (older adult) with *high* level of implicit regret engagement (z-scores for level of verb use: past tense = -.74, present tense = 1.07, future tense = .75)**

Since I had not married this man at 24 I got into a marriage later at 38 with another man. Therefore my offspring today is only 24 years old. I don't know whether I'll live to be a grandma. The second consequence is that I had gone through hell with my marriage. So had I married the first man that I fell in love I would have not suffered that much. Maybe today I would have been living together with the first man and not live on my own. Or maybe enjoying my golden years with my grandchildren! Ha ha!

I regret that I did not continue with my second degree in mechanical engineering. Instead I chose to be a stay at home mom. Today I'm left without a professional job while my friends are holding managerial posts and retiring well. I wish I have had a profession that I can fall back on in my old age.

My daughter was approached by a certain university to join a group of above-average kids to start university life at 12. I didn't want it as my husband was not supportive. We then moved to another country so that she could appreciate another culture. Today she just finished a Bachelor's degree and is not motivated to do a Masters. I wish that she had continued her education until she reached PhD. Unfortunately, she rather works then to go to school.