

Having goals or having purpose?

Differential associations with age and quality of life in older adulthood

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ABSTRACT

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This study presents longitudinal (N = 155) analyses examining relations between goal purpose, health-related control strategies, goal adjustment capacities, and physical health in older adults. Participants were asked to report their 10 most important goals across three data collection waves and their levels of goal purpose were measured across time. In addition, participants were asked to indicate whether they experience any of 17 chronic health problems or different functional limitations over the 4-year span of the study. In support of my hypotheses, goal purpose had remained stable with age and across time, while the number of goals (i.e., approach goals) displayed a significant decline. Furthermore, this study has found that it is goal purpose, and not having goals, that predicted changes in physical health in this population. Finally, the study's results suggest that the different self-regulation processes (i.e., health-related control strategies and goal reengagement) were able to predict changes in physical health in older adulthood through their association with goal purpose. It also appears that goal purpose statistically mediated the association between self-regulation processes and physical health. These findings imply that goal purpose can play an adaptive role in later life such as preventing negative changes in physical health. The implications for the pursuit of purposeful goals in old age are discussed.

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Table of Contents

List of Figures.....	vi
List of Tables.....	vii
Introduction.....	1
The Life-span Development of Goals.....	1
The Importance of Purpose to Physical Health in Older Adulthood.....	8
Self-regulation Processes: Possible Routes to Purpose and Physical Health.....	14
Present Study.....	18
Method.....	19
Participants.....	19
Materials.....	20
Results.....	28
Cross-sectional and Longitudinal Trajectories of Goals and Purpose.....	29
Goals, Purpose, and Changes in Physical Health.....	31
Self-regulation Constructs as Predictors of Purpose, Goals, and Physical Health	38
Discussion.....	40
Limitations and Future Directions.....	48
References.....	51

List of Figures

- Figure 1.
Cross-Sectional Associations with Age of Number of Approach Goals, Number of Avoidance Goals, and Goal Purpose. The Outcome Variables were Averaged and Sample-Centered for Displaying Cross-Sectional Associations.....32
- Figure 2.
Longitudinal Trajectories of Number of Approach Goals, Number of Avoidance Goals, and Goal Purpose. The Outcome Variables were Person-Centered for Illustrating Longitudinal Trajectories.....33
- Figure 3.
Association Between T2 Number of Avoidance Goals (+- 1 SD) and Changes in Difficulties with Instrumental ADLs (Upper Panel) and Basic ADLs (Lower Panel) Over Time, Separately for Participants with a High versus Low T2 Levels of Goal Purpose (1 SD Above and Below the Mean).....37

List of Tables

Table 1.	Means and Standard Deviations of Approach Goal Domains.....	23
Table 2.	Means and Standard Deviations of Avoidance Goal Domains.....	24
Table 3.	Zero-Order Correlations Between Main Constructs Used in Study.....	27
Table 4.	Analyses of Variance Testing Cross-Sectional Associations with Age (and Other Sociodemographic Characteristics) and Longitudinal Changes for Number of Approach and Avoidance Goals and Levels of Purpose.....	30
Table 5.	Regression Analyses Predicting 2-Year Changes (T2-T3) in Chronic Health Problems and Difficulties in Instrumental and Basic Activities of Daily Living (ADLs) by T2 Levels of Approach Goals, Avoidance Goals, and Goal Purpose.....	35
Table 6.	Partial Correlations Between Self-Regulation Constructs (T1: Health-Related Control Strategies, Compensatory Secondary Control, Goal Disengagement, Goal Reengagement), Goals and Purpose (T2), and Changes in Physical Health (T2-T3: Chronic Health Problems, Difficulties in Instrumental ADLs and Basic ADLs), Controlling for Sociodemographic Characteristics (Age, Sex, SES, and Partnership Status).....	39

Introduction

Purpose in life (PIL), or the belief that one's life is meaningful and purposeful, has been thought to be a critical component of well-being, which may contribute to better physical health across the lifespan (Ryff & Singer, 2008).¹ Nevertheless, according to some measures, PIL displays a significant decline with increasing age (Boyle, Barnes, Buchman, & Bennett, 2009; Ryff & Keyes, 1995). This decline is surprising given that older adults are shown to exhibit equivalent, if not higher, levels of subjective well-being, compared to their younger counterparts (Diener, 1984; Diener & Suh, 1997). Given current research documenting the decline of PIL in later adulthood (Ryff & Keyes, 1995), and the impact of PIL on physical health, it is imperative to examine this contradiction. According to Ryff's measure (1989b), there are different core aspects to PIL; one being the possession of goals, and the other being the meaningfulness of the goals a person possesses. The present study investigates the different trajectories of these two components of PIL, as well as their independent effects on health. Moreover, the present study examines self-regulation processes that may predict PIL. The longitudinal assessment of PIL will allow for the study of change in this construct as people age. Furthermore, examining predictors of purpose in older adults may allow for a better understanding of the processes involved in successful aging.

The life-span development of personal goals

Self-regulation theories assert that human behaviour is composed of a continuous pursuit of goals, which includes a constant moving toward, or away from, desired goals

¹ The acronym PIL will be used throughout this paper to refer to purpose in life. This should not be confused with Carol Ryff's PIL measure (Ryff, 1989b).

across the life-span (Carver & Scheier, 1981; 1990; Klinger, 1998). People engage and persist in behaviours and activities that are believed to facilitate the attainment of sought-after goals, and are thus seen as active in their personal developmental course (Deci & Ryan, 2000; Heckhausen, 1997; Lerner & Busch-Rossnagel, 1981; Wrosch, Heckhausen, & Lachman, 2006). Goals push individuals towards engaging in adaptive behaviour, ultimately shaping their environments and determining who they will become by providing structure and direction in life (Ryff, 1989b; Segerstrom & Nes, 2006). Accordingly, one way to achieve high levels of well-being is by the harmonious achievement of a person's valued goals (Rowe & Kahn, 1987).

With advancing age, however, people experience increasing decline and loss in overall health and functioning. Given this age-related deterioration, older adults are expected to lose the capacity of pursuing some important life goals. This may be due to several reasons (Wrosch et al., 2008). First, many older adults suffer from health declines which can compromise their ability to pursue their desired goals. Cognitive losses may also render some goals no longer realistic for people. Finally, the notion that time becomes increasingly limited in old age can also influence the goals people choose to pursue (Carstensen, 1991). As a consequence, the reduction in the number of goals that can still be pursued could lead to a reduction in subjective well-being. Research, however, does not support this contention. Several studies conducted over the past twenty years have repeatedly failed to find an age-related decline in indicators of subjective well-being (Clarke, Marshall, & Ryff, 2000; Diener, 1984; Diener & Suh, 1997). In fact, one key finding in aging research is that negative affect tends to decrease with chronological age (Diener & Suh, 1997; Kunzmann, Little, & Smith, 2000; Mather &

Carstensen, 2005). These findings indicate a ‘paradox of happiness’; namely, that despite declines and losses in overall resources, physical health, and functioning, many older adults are still able to maintain high levels of subjective well-being (Baltes & Baltes, 1990; Brandtstädter & Greve, 1994; Heidrich & Ryff, 1993). This paradox may relate to the possibility that there are two different groups of older adults within the normative aging population, specifically the ‘usual’ and the ‘successful’ agers (Rowe & Kahn, 1987). In this regard, successful aging is thought to involve processes that adjust the person’s conception of the actual and potential courses of development in such a way that levels of well-being are maintained despite substantial and objective age-related loss (Brandtstädter & Greve, 1994). Several models of successful aging have been developed over the past two decades, in an attempt to elucidate the different processes involved in the maintenance of subjective well-being and successful patterns of life-long development. These models attribute the ability of older adults to maintain subjective well-being despite objective age-related losses to better goal adjustment processes and emotional regulation (Baltes & Baltes, 1990; Brandtstädter & Greve, 1994; Carstensen, 1991; Heckhausen, Wrosch, & Schulz, 2009; Schulz & Heckhausen, 1996). Taken together, these models can help account for the well-being and negative affect trends in the aging literature.

In 1990, Baltes and Baltes outlined the Selective Optimization with Compensation model (SOC model; Baltes & Baltes, 1990). The premise of this model is that older adults who experience age-related changes and loss adapt to their new circumstances by adjusting their behaviours involved in the pursuit of goals. In the process of ‘selection’, an older adult slowly restricts his or her domains of functioning

due to age-related loss. Goals that are no longer realistic to pursue, decrease in importance with advancing age and are not sought-after, in order to allow for a subjective feeling of control and satisfaction. In the process of 'optimization', older adults actively engage in behaviours that enhance and maximize their functional capacity. Finally, when the person's functional capacity is reduced below that which is required for optimal functioning given increasing loss, older adults use various compensation strategies (e.g., use of a walking cane) in order for them to continue pursuing the goals which they have chosen.

Similarly, according to the dual-process model of successful aging (Brandtstädter & Greve, 1994; Brandtstädter & Renner, 1990), the finding that well-being does not decrease despite age-related decline can be explained by the accommodation of the person to the constraints on his or her situation. Across the lifespan, people desire to exert control over their surrounding environment. People strive to alter their environments to better fit with their goals in a process termed 'assimilation'. In a situation where people experience constraints due to decline, such as in the case of aging, they change their focus from external to internal and attempt to adjust themselves to the environment by flexibly adjusting their goals. This process is termed 'accommodation'. When people fail at accomplishing their pursued goals, their level of competency may be undermined. Accommodation strategies are used in order to protect people from this outcome by maintaining and enhancing functioning. These strategies help increase perceived control and avoid decline by allowing people to rearrange the importance and value of their goals, given their current limitations. Thus, despite increasing constraints, psychological functioning in old age can be maintained or even enhanced.

Another paradigm based on the maintenance of control across the life-span is the Optimization of Primary and Secondary Control model (OPS; Heckhausen, 1997). According to this model, in order for human behaviour to remain effective, even despite decline, it needs to be selective and be able to compensate for failure. Selectivity is important across the life-span, as people invest and gain expertise only in certain life domains and not others, but is even more crucial in old age, as the accumulation of loss creates increasing restrictions on what is still attainable for the individual. Both selectivity and compensation are accomplished by two sets of control strategies; namely, primary and secondary control (Heckhausen & Schulz, 1995). Primary control refers to active efforts of the individual to change his or her surrounding world in order to fit their needs. Secondary control refers to the individual's focus on internal processes in an effort to fit to the external world. Secondary control is used to maintain, minimize loss in, and enhance primary control, which is thought to have functional primacy in the individual. Secondary control becomes important when a person is confronted with age-related losses, which lead to unattainable goals, and helps buffer decline in self-esteem resulting from a reduction in control. A secondary control focus results in selection and pursuit of goals that expand levels of primary control (Brandstädter & Rothermund, 1994; Heckhausen, 1997; Wrosch, 2008). The increase in primary control potential, in turn, allows older adults to continue pursuing and achieving still attainable and important goals (Heckhausen, 1997). For this reason, coping with failure becomes more and more important with advancing age, and older adults are better off focusing on secondary, as opposed to primary, control processes (Heckhausen, 1997; Wrosch, 2008). Thus, the OPS model combines the idea of 'selection' and 'compensation' from the SOC paradigm and

the notion of external and internal focus of control from the dual-process model. These three models of successful aging speak to the fact that the process of aging can also be seen as a period of maintenance and advancement, and not only deterioration (Lupien & Wan, 2004).

The above three successful aging models describe and predict how people across the life-span adapt to changes in their functional capacities by the adjustment of their goals. They do not however, indicate which categories of goals will be favoured by older adults facing deterioration and loss. The Socioemotional Selectivity Theory (SST; Carstensen, 1991; Carstensen, Isaacowitz, & Charles, 1999) makes specific predictions pertaining to goals adopted in the social domains. This theory postulates that the selection of goals is based in a temporal context. According to this model, people tend to pursue different types of goals based on whether they perceive their remaining life time to be expansive or limited. When time is expansive, such as in young adulthood, people focus on future-oriented goals which involve gaining knowledge and expanding one's horizons. In contrast, as a person's remaining life time appears limited, such as in old age, he or she will change their focus to present-oriented goals, which have higher emotional meaning. These goals aim at optimizing emotional experience, increasing positive states, and reducing negative states. For example, while younger adults tend to seek out more new friendships that can be instrumental in achieving personal goals, older adults are more likely to focus on their emotionally meaningful relationships (Carstensen et al., 1999; Lang & Carstensen, 2002). Paying more attention to emotional goals leads to greater complexity in emotional experience and with it to a better regulation of day-to-day emotions. In support of these assumptions, Mather and Carstensen (2005) found that

while younger and older adults attended to negative information in similar ways, older adults appeared to dwell on negative information much less. Older adults were also more likely to remember positive information better, a process dubbed the 'positivity effect' (Mather & Carstensen, 2005; Carstensen & Mikels, 2005).

As indicated in the different models above, the aging process is marked by changes that affect the goals people can pursue, as many goals that were once reachable become unattainable. Older adults adjust to these circumstances by attempting to minimize losses and maximize gains (Baltes & Baltes, 1990). For this reason, goals in old age make a shift in orientation from approaching gain (i.e., approach goals), to avoiding loss (i.e., avoidance goals) (Baltes & Baltes, 1990; Heckhausen & Schulz, 1998). Studies have shown that having goals with an avoidance orientation predicted greater well-being in older adulthood (Ebner, Freund, & Baltes, 2006). In addition, older adults who endorsed more avoidance goals indicated more satisfaction with their goals. By preventing unwanted outcomes, avoidance goals lead people of any age to persist in continued striving for their goals (Förster, Higgins, & Idson, 1998; Lench & Levine, 2008). In accordance with the successful aging models described above, the benefits of avoidance goals in old age are twofold. First, goals that are aimed at maintaining the status quo help protect older adults from further loss. Second, as people experience more declines and challenges to their functional capacities, avoidance goals are helpful in that they allow older adults to disengage from approach goals that may no longer be realistic for them to pursue, thus serving to protect their self-esteem and self-concept. Therefore, the transition from achieving something new to maintaining what already exists and preventing further loss allows older adults to maintain high levels of well-being.

The Importance of Purpose to Physical Health in Older Adulthood

As previously stated, the pursuit of goals leads to adaptive behaviour and influences one's path by providing structure and direction in one's life (Ryff, 1989b; Segerstrom & Nes, 2006). PIL has been defined as a motivational construct associated with the presence of goals, aims, and a direction in life (Ryff, 1989b; Reker, Peacock, & Wong, 1987). These goals and aims contribute to the feeling of meaningfulness and integration of the various parts of the person's life, thereby predicting high levels of psychological well-being. Research indicates that the experience of PIL benefits quality of life in the short and long term (Carver & Scheier, 1990; King & Hicks, 2006; Low & Malzahn, 2007; Rasmussen, Wrosch, Scheier, & Carver, 2006; Ryff, 1989a, 1989b; Weise & Freund, 2005; Wrosch et al., 2006; Wrosch, Miller, Scheier, & Brun de Pontet, 2007; Wrosch & Scheier, 2003). In this vein, PIL has been shown to be positively associated with life satisfaction, optimism, and self-esteem, while exhibiting negative associations with perceived stress, depression, and hostile attitudes (Scheier et al., 2006). In addition, higher levels of PIL have been associated with greater left prefrontal hemisphere activation, linked to positive dispositional styles and a reduced likelihood of depression (Ryff & Singer, 1998). This may indicate that people who have an elevated sense of meaningfulness in life experience enduring positive mood and emotional reactivity and are thus, better able at generating positive affect even in the face of negative stressors. Finally, PIL has been shown to correlate with trait neuroticism, more so than with depression, suggesting that it may be a trait-like quality of the person (Boyle et al., 2009).

Psychological theories of physical health postulate that well-being contributes and may lead to effective functioning of multiple biological systems, such as the immune and endocrine systems (Ryff & Singer, 1998; Ryff, Singer, & Love, 2004). Effective bodily-system functioning, in turn, reduces the chance to suffer from disease and leads to an accelerated recovery (Ryff et al., 2004). Moreover, a high level of well-being often contributes to the maintenance of optimal functioning and reduced mortality. In this vein, these theories suggest that stress and negative mental states are related to higher incidences of illness, disability, and mortality, as well as a lower overall health status. Stress, for example, can influence disease outcomes, e.g. flu symptoms, through its effects on negative affect (Cohen, Tyrrell, & Smith, 1993). Moreover, in the extensive review by Pressman and Cohen (2005), negative affect has been shown to consistently relate to an increased risk of illness and mortality, and generally reduced health. Finally, individuals who are suffering from depression have been shown to display functional and structural changes in the brain that are thought to lead to physiological changes that are responsible for increased mortality, such as reduced heart rate variability and arrhythmia (Schulz, Martire, Beach, & Scheier, 2000). The findings concerning the effects of positive emotions and states on health, however, are mixed (Pressman & Cohen, 2005). The Broaden-and-build model (Fredrickson, 1998) postulates that the experience of positive emotions, such as contentment, broadens one's attention focus, cognition capacity, and action scope. People who experience frequent positive emotions are more likely to display a broad attentional focus, think more creatively, and participate in a larger array of activities. This broadening of an individual's experiences helps build his or her personal resources, for example by facilitating learning and social relationships.

According to this model, positive emotions can undo the effects of negative emotions, thereby protecting a person's physical health (Frederickson, 1998). These theories therefore posit that high levels of well-being are essential for maintaining a person's physical health.

Consequently, through its direct link to increased well-being, PIL is assumed to influence and predict different indicators of physical health. Indeed, several cross-sectional studies have shown that PIL is positively associated with lower weight, hip-waist ratio, total cholesterol, and better sleep quality, and correlates negatively with difficulties with basic and instrumental activities of daily living, HDL cholesterol, inflammatory markers, musculoskeletal symptoms, cardiovascular risk, and aortic calcification (Friedman, Hayney, Love, Singer, & Ryff, 2007; Pinquart, 2002; Ryff et al., 2006; Ryff & Singer, 2008; Ryff et al., 2004; Scheier et al., 2006; Steptoe, O'Donnell, Marmot, & Wardle, 2008). In fact, a new study by Boyle and colleagues (2009) assessing PIL across time was able to show that PIL was associated to a significantly reduced risk of death for a period of up to five years. Lower levels of PIL however, have been associated with maladaptive diurnal patterns of cortisol secretion, a biological process thought to link stressful events and physical health problems (Cohen, Kessler, & Gordon, 1995; Ryff et al., 2004; Wrosch, Scheier, Miller, & Carver, 2008).

Though PIL has exhibited significant associations with different well-being and health measures across different cross-sectional studies, results regarding the life span trajectories of PIL are mixed. While studies using the 'life purpose' subtest of the Life Attitude Profile (LP-LAP; Reker & Peacock, 1981) found that PIL peaks in older adulthood, studies using the 'purpose in life' subscale of Ryff's Scales of Psychological

Well-Being (PIL-RPWB; Ryff, 1989b) suggest that PIL is the individual characteristic that is most likely to decline significantly with advancing age. Moreover, a meta-analysis incorporating cross-sectional findings using different measures found that purpose declines throughout adulthood, with this decline increasing slightly in older adulthood (Pinquart, 2002). This mixed pattern of PIL trajectories across the life-span indicates that there is a need to investigate how PIL is measured.

The LP-LAP measure seems to assess an overall sense of purpose in one's life irrespective of one's goals, aims, and activities, thus addressing the construct definition only partially (Reker et al., 1987). What's more, the wording of different items in this instrument may show significant content overlap with the satisfaction with life construct itself, for example: 'Basically, I am living the kind of life I want to live'. Indeed, the increased PIL scores in old age were compared to increased satisfaction with life scores in this age group, which makes it difficult to conclude whether it is purpose or life satisfaction that increased with age in these studies. Unlike the LP-LAP measure, Ryff's PIL-RPWB scale did address the sense of one's purpose as it pertains to his or her goals and direction in life. However, PIL according to this scale decreases significantly in older adulthood. Given this construct's strong link to well-being, this pattern of age-related PIL trajectory goes against the previously discussed 'paradox of happiness' and successful aging models (Baltes & Baltes, 1990; Brandtstädter & Greve, 1994; Carstensen, 1991; Heckhausen, Wrosch, & Schulz, 2009; Schulz & Heckhausen, 1996). Since PIL correlates positively with well-being, which is maintained in old age, the significant decline in PIL in older adulthood, as measured by Ryff's PIL subscale, is puzzling.

When analysing how PIL was assessed by Ryff (1989b) it should be considered that the items used to measure purpose could be divided into two separate constructs. The first construct includes items that assess the notion of having goals, such as: “I used to set goals for myself, but that now seems like a waste of time”. The second construct includes items that assess the purposefulness of the goals a person has, such as: “My daily activities often seem trivial and unimportant to me”. It appears that within this framework, the notion of having goals is intertwined with the notion of goal purpose, which makes it difficult to empirically distinguish both constructs. In other words, a person who has few goals will receive a low score on this measure and thus be assumed to have no meaning or direction in life. This process of scoring the PIL measure fails to take into account the possibility that a person may have few goals that actually fill his or her life with meaning, or conversely, that a person may have multiple goals that provide no meaning for him or her at all. This confound in the research brings forth a need to separately examine the two elements of PIL, having goals as opposed to goal purpose, respectively.

Carver and Scheier (1998) have proposed that it is the engagement in behaviour that sustains life. Two important elements in behaviour engagement are identifying goals which are attainable for the person, and are also valuable to the person (Scheier et al., 2006). This point is critical since valuable goals allow for continued engagement in behaviour and thus, help fill one’s life with purpose. Therefore, it is the attainability and value assigned to a goal that influence the person’s likelihood of selection and continued pursuit of that goal (Scheier et al., 2006; Vroom, 1964). For this reason, Scheier and colleagues (2006) have developed the Life Engagement Test (LET) which measures

purpose as the extent to which a person finds his or her activities to be meaningful. This scale attempts to measure the construct of goal purpose directly, thus eliminating confounds present in other measures of this construct, such as satisfaction with life and the notion of having goals.

Scheier and colleagues (2006) examined the psychometric properties and validity of the Life Engagement Test (LET) by correlating it with Ryff's PIL subscale as well as several well-being measures, e.g., positive affect, negative affect, and perceived stress. Not only did LET correlate with Ryff's instrument and all well-being measures, but when controlling for LET, Ryff's instrument was no longer significantly correlated with the well-being measures. By contrast, the associations between LET and several measures of well-being remained significant when statistically controlling for Ryff's instrument. This illustrates that LET is able to tap into the key ingredients of the construct of purpose, thus assessing purpose in one's life more directly than other measures available.

As described above, older adults change their goal focus from approaching gain to avoiding loss in order to maintain their overall subjective well-being, and with it their physical health (Baltes & Baltes, 1990; Heckhausen & Schulz, 1998). However, according to Carver and Scheier (1998), in order for one's goal pursuits to make a significant difference to their well-being or health, these goals need to hold personal value and meaning for the person. Goals which do not provide the person with a sense of purpose are less likely to help bring about adaptive behaviour. For example, when the goal of maintaining one's current level of functioning is highly meaningful to the person, he or she will be more likely to perform various activities in an attempt to achieve this goal, such as visit the doctor often, take medication on a regular basis, or maintain a

healthy lifestyle. If this goal is not important and meaningful for the person, however, he or she should be less likely to invest much effort in pursuing it. Instead, the person may prefer to eat unhealthy and avoid physical exercise. This implies that the more meaningful a goal is to the person, the more likely that person is to strive for that goal. As age-related loss and decline become more salient, adopting personally meaningful avoidance goals may actually become more important to older adults, increasing the chance that they will be pursued and lead to maintenance of their quality of life. Thus it may be concluded that those goals aimed at avoiding loss that are most meaningful and give most sense of purpose to the individual will be more likely to ultimately lead to better health and well-being, as compared to less meaningful avoidance goals.

Self-regulation Processes: Possible Routes to Purpose and Physical Health

Successful aging models state that older adults adjust their goal pursuits to manage the experience of age-related decline (Baltes & Baltes, 1990; Brandtstädter & Greve, 1994; Carstensen, 1991; Heckhausen, Wrosch, & Schulz, 2009; Schulz & Heckhausen, 1996). However, as illustrated by the variability within the aging population, not all older adults are able to adapt in the same way (Baltes & Baltes, 1990). In this regard, the successful adjustment to age-related decline may depend on inter-individual differences in older adults' goal regulation processes, which can affect the way people approach life situations (Wrosch & Scheier, 2003). This is especially evident in old age, a time when people encounter increased levels of decline and loss and are required to deal with these changes in a way that maintains their self-esteem and well-being. As older adults experience an increasing number of unattainable goals, several self-regulation processes can help maintain levels of purpose in this population.

The first process of self-regulation that older adults can use in order to adjust to age-related decline stems from the Optimization of Primary and Secondary Control model (OPS; Heckhausen, 1997) described earlier. As previously mentioned, this paradigm outlines different forms of primary and secondary control strategies. These control strategies are further divided into four specific control strategies, which can fulfill two underlying functions: goal engagement and goal disengagement. In terms of goal engagement, Selective Primary Control (SPC) refers to behaviours directly aimed at achieving goals. Compensatory Primary Control (CPC) relates to situations when external resources have to be relied on to achieve goals due to insufficient personal resources, such as asking others for advice. The third control strategy, Selective Secondary Control (SSC), involves increasing internal motivation and commitment toward a pursued goal. These three types of strategies aim at actively changing the environment to match an individual's needs. Finally, Compensatory Secondary Control (CSC) is activated when individuals experience failure and goals become unattainable, with the aim of reducing the negative effects of failure and facilitating goal disengagement. An example would be reducing the personal significance of an unattainable goal.

The experience of decline and deterioration is most evident in the health domain in older adulthood (Wrosch, Schulz, & Heckhausen, 2002). Thus, it stands to reason that health-related goals will pose great challenges to the aging population. Wrosch and colleagues (2002) created the Health-Related Control Strategies Scale, which incorporates all four control strategies as they relate specifically to health goals. In terms of goal engagement, health-related SPC, CPC, and SSC control strategies have been

labelled Health-Engagement Control Strategies (HECS) and have been shown to buffer the effects of physical symptoms on depressed mood (Wrosch, Schulz, & Heckhausen, 2002). Results also indicated that people who endorsed these control strategies showed reduced levels of depressive symptoms over time (Wrosch, Schulz, Miller, Lupien, & Dunne, 2007). Finally, it appears that the active use of these control strategies not only affect well-being by buffering the effects of physical problems, but also lead to more adaptive levels of diurnal cortisol secretion (Wrosch, Schulz et al., 2007).

Goals can give meaning to one's life if they are believed to be within one's control (Brandtstädter & Rothermund, 1994). Further, the successful pursuit of goals creates a sense of purpose in one's life (Carver & Scheier, 1990). However, increasing decline in later life limits the goals available for people to pursue, which hinders a person's sense of control, and with it his or her purpose in life (Brandtstädter & Rothermund, 1994). As previously discussed, HECS are executed with the aim of optimizing primary control across the life-span, helping to maintain a sense of control in the person despite changes and loss (Heckhausen, 1997). Therefore, individuals who use these control strategies may be better able to continue pursuing their purposeful goals, which could have a beneficial effect on their physical health.

As goals become unattainable, CSC is often used to prevent the impeding feelings of failure in the individual (Wrosch, 2008). Different techniques are used within this strategy, for example downward social comparisons. CSC has been shown to predict higher levels of well-being in older adults in the face of unattainable goals (Wrosch, 2008; Wrosch & Heckhausen, 1999). Two techniques that help compose CSC concern

the disengagement from unattainable goals and the reengagement in more realistic ones, given one's new life circumstances (Heckhausen & Schulz, 1995; Wrosch, 2008).

In addition, there are broader individual differences in participants' goal disengagement and goal reengagement capacities, relating to how people cope with unattainable goals across different circumstances (Wrosch & Scheier, 2003; Wrosch, Miller et al., 2007). From this perspective, goal disengagement involves the reduction of effort, as well as the reduction of the value and significance of the goal, thus lessening the commitment toward the unattainable goal (Wrosch & Scheier, 2003). This process has been shown to reduce psychological distress when experiencing unattainable goals (Wrosch, Miller et al., 2007). Goal reengagement involves the active identification, commitment, and pursuit of new attainable goals (Wrosch & Scheier, 2003). This process has been shown to buffer feelings of failure as well as maintain purpose in the individual, despite the experience of unattainable goals, and may serve as a protective factor especially as people age (Wrosch & Scheier, 2003). Working together, goal disengagement and goal reengagement help protect from the negative consequences of failure in the face of unattainable goals. In fact, according to the literature, older adults may benefit from goal disengagement only if they are able to reengage in new goals, otherwise they exhibit distress (Wrosch & Scheier, 2003; Wrosch, Miller et al., 2004). Not having a goal to engage in has been shown to lead to changes in endocrine and immunological systems, leading to susceptibility to disease, self-reported health problems, and overall reduced physical health (Rasmussen et al., 2006). Instead, the ability to let go of unattainable goals and to further channel resources to the pursuit of other attainable goals has been shown to relate with increased physical health (Wrosch &

Scheier, 2003). Therefore, it is expected that the health-related CSC, as well as individual differences in goal disengagement and reengagement capacities may predict high levels of purpose and thereby affect older adults' physical health.

Present Study

This longitudinal study was designed to investigate the associations between goals and goal purpose with indicators of physical health and self-regulation constructs in a sample of older adults. In this regard, this study attempted to accomplish three objectives. First, it investigated the two elements of PIL, namely having goals versus having goal purpose. These two different elements of PIL were expected to be independent of each other, thus displaying separate trajectories across the life-span. More specifically, the first hypothesis of this study was that the number of goals, especially the number of approach goals, will show a significant decline across time and with age, while levels of goal purpose will remain stable.

Second, the associations between goals and goal purpose with older adults' physical health were investigated. In this regard, the second hypothesis was that the number of goals and goal purpose will show different effects on older adults' physical health over time. Specifically, it was expected that goal purpose would prevent negative changes in health outcomes across time, whereas the number of approach and avoidance goals would not be related to significant changes in physical health over time. Furthermore, it was expected that avoidance goals may interact with goal purpose to prevent health declines across time. In particular, participants who reported a large

number of avoidance goals that are personally meaningful may show the most positive physical health outcomes.

Third, this study examined how different self-regulation processes (health-related control strategies and goal adjustment capacities), may be associated with participants' goals and goal purpose and thereby predict changes in physical health across time. In this respect, the third hypothesis stated that these self-regulation processes would predict high levels of goal purpose and beneficial longitudinal changes in physical health. In addition, it was expected that the effects of self-regulation processes on goal purpose would mediate the association between self-regulation processes and changes in physical health.

Method

Participants

The present study was based on three waves of longitudinal data from the Montreal Aging and Health Study (MAHS; Wrosch, Schulz et al., 2007). In 2004, a sample of 215 community-dwelling older adults was recruited through newspaper advertisement. The only inclusion criterion was that participants had to be at least 60 years old given that the purpose of the study was to follow a normative sample of older adults. Participants first contacted the laboratory and were then invited for an initial interview or had the interview conducted in their homes. During this meeting, participants were instructed to respond to a questionnaire. Participants received \$50 for their study participation.

The second wave (T2) and third wave (T3) of data collection were completed in 2006 and 2008, approximately two ($M = 1.89$ $SD = .08$) and four ($M = 3.78$ $SD = .24$)

years after the initial appointment, respectively. 184 individuals from the original sample took part in the second wave of data collection and 164 people participated in the third wave (retention rate = 72%). At baseline, participants' average age was 72.41 years ($SD = 5.91$), 111 were female (51.6%), and 66 participants (30.7%) had attained a bachelor's university degree or a higher education. Study attrition over 4 years was not associated with any of the variables used in the analyses, except for participants' age. Participants who dropped out of the study were significantly older ($M = 74.33$, $SD = 6.38$) than those who participated at T3 ($M = 71.67$, $SD = 5.56$), $t(213) = -2.84$, $p = .006$, $d = 0.44$. Of the 164 participants at T3, 7 participants did not participate at T2 and were excluded from the analyses. In addition, 2 participants were excluded because they did not complete the Life Engagement Test which assessed purpose on either T2 or T3, or did not report personal goals on at least two of the three study waves. In cases where participants reported personal goals in all but one study wave, the missing data points were replaced by the sample mean for that study wave. Following this exclusion, the final sample used in this study included 155 participants.

Materials

The main study variables included measures of participants' levels of purpose and goals (approach and avoidance goals), as well as measures of changes in physical health (chronic health problems and functional disability). While participants' goals were measured in all three waves, purpose was assessed only at T2 and T3 because this measure was not available at baseline. As a consequence, the outcome measures of physical health were selected to represent change from T2 to T3. In addition, baseline measures of sociodemographic characteristics (age, sex, socioeconomic status, and

partnership status) were incorporated into the study, and self-regulation constructs (health-related control strategies and goal adjustment capacities) were measured at baseline to explore associations with participants' goals, goal purpose, and physical health.

Sociodemographic characteristics were assessed at baseline and consisted of participants' age, sex, relationship status, and socioeconomic status (SES). Relationship status distinguished participants who were in an intimate relationship from those who were not, with a higher score representing participants who were not in a relationship. 84 participants (54.2%) reported being in a relationship. SES was measured using three variables: highest education level completed (0 = no education, 1 = high school, 2 = college, 3 = bachelor's degree, 4 = master's degree or doctorate; $M = 2.10$, $SD = 1.09$ at Time 3), yearly family income (0 = less than \$17,000, 1 = up to \$34,000, 2 = up to \$51,000, 3 = up to \$68,000, 4 = up to \$85,000, 5 = more than \$85,000; $M = 1.55$, $SD = 1.31$ at Time 3), and perceived SES (Adler, Epel, Castellazzo, & Ickovics, 2000; $M = 6.25$, $SD = 1.85$ at Time 3). Because the three SES measures were correlated ($r_s = .39$ to $.54$, $p_s < .001$), the standardized scores of the three single SES variables were averaged in order to obtain a global measure of SES, ($M = .04$, $SD = .85$, $\alpha = .72$).

Purpose was assessed at T2 and T3 by administering the Life Engagement Test (LET; Scheier et al., 2006). This instrument includes six items measured with 5- point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The LET was designed to measure the extent to which people engage in activities that are personally valued. Sample items include: "I value my activities a lot" or "Most of what I do seems trivial

and unimportant to me". Sum scores of the six items were computed separately for T2 and T3. The internal reliabilities of this test were .75 and .79 respectively.

Personal goals were assessed across all three assessments by asking participants to report up to ten of their most important goals. Across assessments, most of participants' goals were associated with the domains of relationship, family, health, finance, standard of living, and self-development. Relatively fewer goals were reported for the domains of work, leisure, civic pursuits, and religion. An 'other' category was created for goals that did not fit any of the aforementioned domains, which resulted in eleven domain categories².

Because goals can be related to approach or avoidance goals, all goals were further coded by applying criteria used in previous research (e.g., Heckhausen, 1997; Förster et al., 1998). In this regard, a goal was coded as an approach goal, if it expressed approaching gains; e.g., "I would like to learn a new language", and as an avoidance goal, if it was aimed at avoiding loss or maintaining a status-quo; e.g., "I want to stay healthy" and "I would like to maintain my financial status". Two independently performed codings of 10% of the goals suggested adequate reliability (Kappa = .73). Scores representing the number of approach goals and avoidance goals were computed for each assessment. At baseline, 80.56% of participants' goals were associated with approach goals (T2 = 79.31%, T3 = 78.51%) and 19.44% of participants' goals were associated with avoidance goals (T2 = 20.69%, T3 = 21.49%). Means and standard deviations of the different orientations and domains of goals are presented in Tables 1 and 2.

² The 'other' category consisted mostly of preparation for death.

Table 1

Means and Standard Deviations of Approach Goal Domains

Domain	Example	Baseline <i>M (SD)</i>	2-year follow-up <i>M (SD)</i>	4-year follow-up <i>M (SD)</i>
Approach Goals		4.44 (3.07)	4.03 (2.75)	3.82 (2.87)
Relationship	"Find a new friend"	.55 (.85)	.35 (.60)	.41 (.68)
Family	"Be a good mother"	.54 (.89)	.43 (.76)	.39 (.78)
Health	"Be healthy and live longer"	.63 (.90)	.57 (.92)	.75 (.95)
Finance	"Handle finances wisely"	.13 (.36)	.15 (.36)	.10 (.35)
Standard of living	"Buy new car"	.79 (1.15)	.79 (1.10)	.70 (1.13)
Work	"Find work in movies"	.06 (.26)	.05 (.30)	.05 (.24)
Self-development	"Do what is right"	.45 (.95)	.48 (.96)	.43 (.79)
Leisure	"Visit Western Canada"	1.05 (1.42)	.97 (1.31)	.79 (1.12)
Civic pursuits	"Volunteer"	.17 (.47)	.14 (.40)	.14 (.52)
Religion	"Attend church regularly"	.03 (.20)	.06 (.34)	.03 (.21)
Other	"To take care of my death"	.06 (.29)	.03 (.21)	.04 (.19)

Table 2

Means and Standard Deviations of Avoidance Goal Domains

Domain	Example	Baseline <i>M (SD)</i>	2-year follow-up <i>M (SD)</i>	4-year follow-up <i>M (SD)</i>
Avoidance Goals		1.07 (1.43)	1.05 (1.50)	1.05 (1.64)
Relationship	" <i>Maintain a relationship with woman I love</i> "	.16 (.42)	.11 (.35)	.12 (.38)
Family	" <i>Keep contact with children</i> "	.09 (.29)	.05 (.22)	.07 (.28)
Health	" <i>Maintain exercise regime</i> "	.47 (.71)	.52 (.78)	.43 (.70)
Finance	" <i>Maintain financial status</i> "	.05 (.21)	.02 (.14)	.03 (.18)
Standard of living	" <i>Be able to rearrange garden</i> "	.03 (.16)	.06 (.25)	.02 (.14)
Work	" <i>Continue to work part-time</i> "	.02 (.14)	.03 (.16)	.01 (.08)
Self-development	" <i>Continue to have goals</i> "	.08 (.30)	.05 (.24)	.09 (.42)
Leisure	" <i>Retain ability to play bridge</i> "	.12 (.38)	.14 (.43)	.19 (.61)
Civic pursuits	" <i>Continue community work</i> "	.04 (.19)	.07 (.26)	.05 (.27)
Religion	" <i>Continue spiritual program</i> "	.01 (.11)	.00 (.00)	.03 (.18)
Other	<i>Not Available</i>	.00 (.00)	.00 (.00)	.00 (.00)

Chronic health problems were assessed at T2 and T3 by asking participants to indicate whether they experienced any one of 17 different health problems (e.g., osteoarthritis and rheumatoid arthritis, cancer, coronary heart disease, kidney problems, serious problems with stomach or bowels). At T2, 9.7% of participants reported no chronic conditions, 27.7% indicated suffering from one problem, 37.4% mentioned two or three problems, and 25.1% indicated suffering from four or more chronic health problems. Sum scores representing the number of chronic health problems were computed separately for each wave. Over the two study waves, there was an overall non-significant increase in chronic health problems within this sample, $M_2 = 2.37$ ($SD = 1.74$) and $M_3 = 2.44$ ($SD = 1.91$), $t(154) = -.76$, $p > .05$. Change scores were computed by predicting in regression analysis subsequent levels of chronic health problems (T3) by previous levels of chronic health problems (T2) and saving the standardized residuals for further analysis.

Difficulty with basic and instrumental activities of daily living were assessed at T2 and T3 by asking participants to indicate whether or not they had difficulty performing any of six basic ADLs (e.g., walk around the house, bath or shower, get in and out of a bed or chair) or any of six instrumental ADLs (IADLs; e.g., prepare meals, use the telephone, manage money). At T2, 89% and 77.4% of participants reported no difficulty in performing basic ADLs and IADLs, respectively. 7.1% and 14.8% of participants reported having one difficulty in performing basic and instrumental ADLs, respectively. Finally, 3.8% and 7.7% reported having two or more difficulties in performing basic or instrumental ADLs, respectively. Simple count variables representing the number of ADL and IADL problems were computed separately for T2 and T3. Over the two study

waves, there was an overall significant increase in difficulties in basic ADLs, from $M_{ADL2} = .18$ ($SD = .66$) to $M_{ADL3} = .40$ ($SD = .96$), $t_{ADL}(154) = -2.55$, $p = .01$, and a non-significant increase in difficulties in instrumental ADLs, from $M_{IADL2} = .36$ ($SD = .86$) to $M_{IADL3} = .41$ ($SD = .73$), $t_{IADL}(154) = -.62$, $p > .05$, respectively. Change scores were computed by predicting in regression analysis subsequent levels of basic and instrumental ADLs (T3) by previous levels of basic and instrumental ADLs (T2) and saving the standardized residuals for further analysis. Table 3 presents means and standard deviations and the zero-order correlations of the main constructs used in this study.

Self-regulation constructs were measured at baseline as health-related control strategies and goal adjustment capacities. Health-related control strategies were assessed by administering 12-items that were answered by using 5-point Likert-type scales (0 = *almost never true* to 4 = *almost always true*). Nine items measured health-engagement control strategies, which have been validated in previous research (Wrosch, et al., 2002; Wrosch, Schulz et al., 2007; Wrosch, Miller et al., 2008). Of these 9 items, three items measured investments of time and effort (e.g., If I have a health problem that gets worse, I put in even more effort to get better“), three items measured recruitment of external resources (e.g., If I develop a new health problem, I immediately get help from a health professional [e.g., doctor, nurse]), and three items measured commitment to health goals (e.g., When I decide to do something about a health problem, I am confident that I will achieve it). Mean scores of the items representing health-engagement control strategies were computed ($M = 3.14$, $SD = .68$, $\alpha = .88$).

In addition, the instrument included three items measuring CSC strategies. These items represented core aspects of secondary control, such as attributions or positive

Table 3

Zero-order Correlations Between Main Constructs Used in Study.

	M (SD)	1	2	3	4	5	6	7	8	9	10
1. Approach goals (T1)	4.44 (3.07)	-									
2. Approach goals (T2)	4.03 (2.75)	.49**	-								
3. Approach goals (T3)	3.82 (2.87)	.43**	.57**	-							
4. Avoidance goals (T1)	1.07 (1.43)	-.03	.03	.01	-						
5. Avoidance goals (T2)	1.05 (1.50)	.09	-.06	-.03	.43**	-					
6. Avoidance goals (T3)	1.05 (1.64)	.15	.06	-.05	.34**	.43**	-				
7. Goal purpose (T2)	24.01 (3.64)	.06	.11	-.02	.05	.12	.16*	-			
8. Goal purpose (T3)	24.10 (3.52)	.10	.07	.11	.05	.18	.29**	.63**	-		
9. Δ Chronic health problems (T2-T3)	2.37 (1.74)	.03	-.06	-.11	.07	.02	.04	-.17*	-.08	-	
10. Δ Instrumental ADLs (T2-T3)	.36 (.86)	.10	.03	.07	.02	-.08	-.01	-.29**	-.27**	.21*	-
11. Δ Basic ADLs (T2-T3)	.18 (.66)	.04	.08	.11	-.01	-.03	-.04	-.19*	-.13	.20*	.53**

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

reappraisals. The specific items were: “When I find it impossible to overcome a health problem, I try not to blame myself”, “Even if my health is in very difficult condition, I can find something positive in life” and “When I am faced with a bad health problem, I try to look at the bright side of things.” Mean scores of the items representing health-related CSC strategies were computed ($M = 3.10$, $SD = .80$, $\alpha = .71$).

In addition, to assess *goal disengagement and reengagement* the Goal Adjustment Scale was administered at baseline. This scale has been previously validated and assesses individuals’ general capacities to adjust to unattainable goals across different circumstances (Miller & Wrosch, 2007; Wrosch & Scheier, 2003; Wrosch, Miller et al., 2007). Participants were asked to indicate how they typically react if they have to stop pursuing an important goal. The scale consisted of four items measuring participants’ capacity to disengage from unattainable goals (e.g., “I stay committed to the goal for a long time; I can't let it go”) and six items assessing participants’ capacity to reengage in new goals (e.g., “I start working on other new goals”). Mean scores of the four goal disengagement items were computed ($M = 3.13$, $SD = .76$, $\alpha = .74$) and the six goal reengagement items ($M = 3.65$, $SD = .69$, $\alpha = .92$) respectively. Higher scores indicated that participants’ were better able to disengage from unattainable goals and to reengage in new goals.

Results

The results section is divided into three sections. In the first section, I used all available data to examine with repeated measurement analyses of variance (ANOVAs) whether participants’ goals and purpose exhibited cross-sectional associations with age (and other sociodemographic characteristics) and longitudinal changes over time. In the

second section, I present multiple regression analyses to test whether levels of goals and purpose (and the interactions between goals and purpose) would predict changes in physical health over time. Because purpose was not assessed at baseline, all predictor variables in these analyses were taken from the second wave of the study, and all outcome variables represented changes from T2 to T3. Finally, I explored in the third section whether baseline levels of self-regulation constructs (health-related control strategies and goal adjustment capacities) would be functionally associated with T2 levels of goals and goal purpose and T2-T3 changes in physical health.

Cross-Sectional and Longitudinal Trajectories of Goals and Goal Purpose

To examine whether participants' number of goals and goal purpose would exhibit different cross-sectional associations with age, and show different mean level changes over time, I conducted three repeated measurement ANOVAs, separately for approach goals, avoidance goals, and purpose. These analyses incorporated the within-subject factor Time, representing 4-yr changes of participants' number of goals and 2-yr changes of participants' goal purpose. In addition, age, sex, socioeconomic status, and partnership status were used as covariates in the analyses.

The results of the analyses are reported in Table 4. I obtained cross-sectional effects (averaged across assessments) of sex on the number of approach and avoidance goals, and of SES on the number of avoidance goals. Women reported a higher number of both approach and avoidance goals than men, $\beta = .18, p < .05$ and $\beta = .16, p < .05$. In addition, participants of a higher SES reported a higher number of avoidance goals than participants with a lower SES, $\beta = .31, p < .01$. In addition, the covariance effects demonstrated that participants' age was significantly associated with the number of

Table 4

Analyses of Variance Testing Cross-Sectional Associations with Age (and Other Sociodemographic Characteristics) and Longitudinal Changes for Number of Approach and Avoidance Goals and Levels of Purpose

	Approach goals			Avoidance goals			Purpose		
	<i>F</i>	η^2	β	<i>F</i>	η^2	β	<i>F</i>	η^2	β
<i>Covariates</i> ^a									
Age	6.88*	.04	-.21*	0.22	.00	.04	0.30	.00	.04
Sex ^b	5.12*	.03	.18*	4.19*	.03	.16*	0.83	.01	.08
SES	2.42	.02	.13	14.75**	.09	.31**	2.88	.02	.14
Partnership status	2.39	.02	.13	.46	.00	-.10	2.88	.02	-.15
Time	3.53*	.02		0.02	.00		0.11	.00	

Note. *Dfs* = 1,154. SES = socioeconomic status. ^a Covariate effects apply to the averaged measures across time, the β s of covariance effects were calculated in separate regression analyses.

^b Higher values represent females, as compared to males. * p < .05; ** p < .01.

approach goals, but not with the number of avoidance goals or levels of goal purpose. To illustrate the differential cross-sectional associations with age, I plotted in Figure 1 the association between age and sample-centered scores of approach goals, avoidance goals, and purpose. In support of my hypotheses, the obtained pattern of results demonstrates that while advancing age was associated with a significantly lower level of approach goals across assessments, $\beta = -.21, p < .05$, there was age-related stability in the number of avoidance goals and levels of purpose.

Table 4 also documents a longitudinal Time effect for the number of approach goals, but not for the number of avoidance goals or levels of goal purpose. I illustrated the differential longitudinal changes in Figure 2 by plotting the person-centered levels of approach goals and avoidance goals from T1 to T3, and of purpose from T2 to T3. In support of my hypothesis, the obtained pattern of findings almost replicated the previously presented cross-sectional associations with age, which suggests that the number of approach goals exerted a significant linear decline across time, but not the number of avoidance goals or levels of goal purpose.³

Goals, Purpose, and Changes in Physical Health

To examine the effects of goals and goal purpose on changes in physical health, I conducted three separate hierarchical multiple regression analyses, predicting changes from T2 to T3 in participants' chronic health problems, basic ADLs, and instrumental ADLs as the dependent variables. In the first step of the analyses, I entered the demographic characteristics (age, sex, SES, and partnership status) into the regression

³ It is noteworthy that follow-up analyses suggested that the obtained effects for participants' goals were not affected by the domain of goals (e.g., work or family) as there were no significant interactions between domain and age, or domain and Time.

Figure 1. Cross-Sectional Associations with Age of Number of Approach Goals, Number of Avoidance Goals, and Goal Purpose. The Outcome Variables were Averaged and Sample-Centered for Displaying Cross-Sectional Associations.

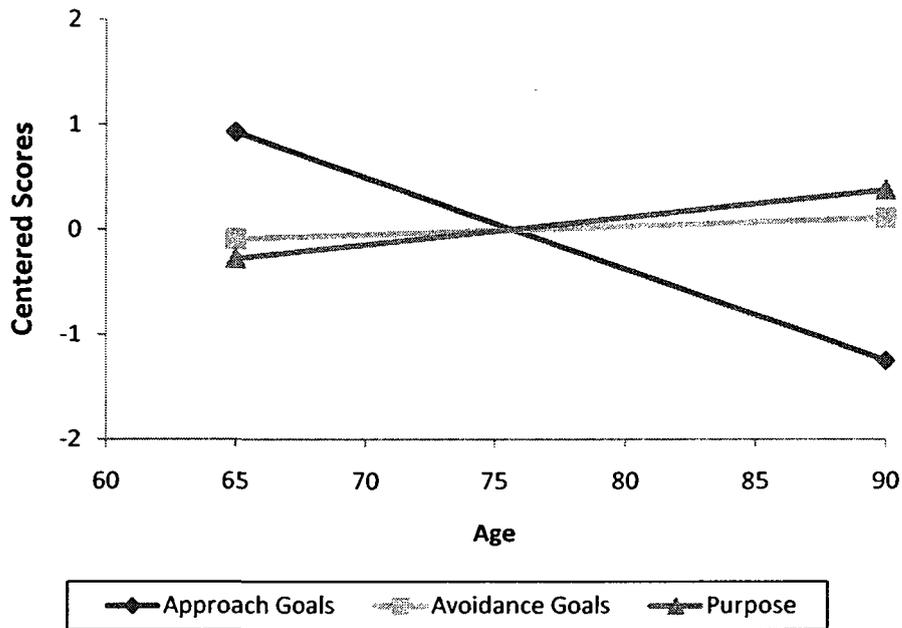
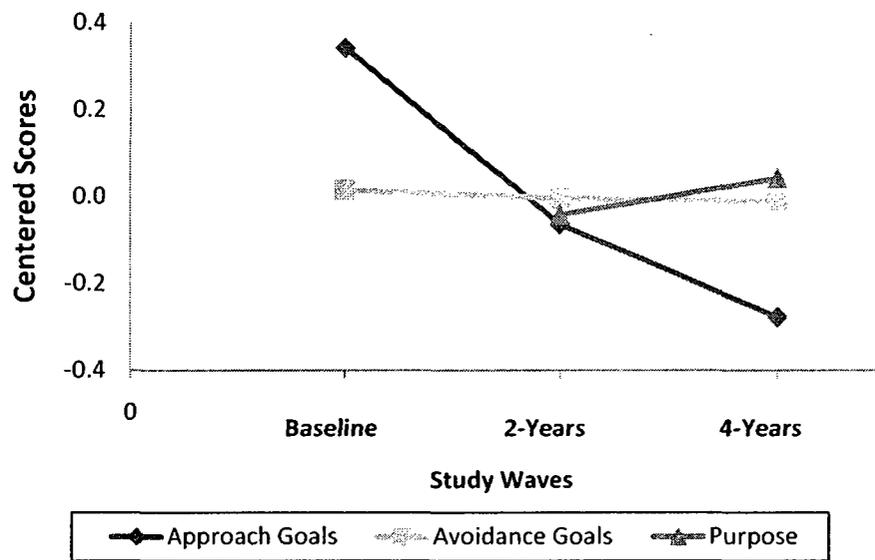


Figure 2. Longitudinal Trajectories of Number of Approach Goals, Number of Avoidance Goals, and Goal Purpose. The Outcome Variables were Person-Centered for Illustrating Longitudinal Trajectories.



equations. The second step tested the main effects of T2 levels of approach goals, avoidance goals, and goal purpose for significance. Finally, in the third step of the analyses, I have entered the two-way interaction between approach goals and goal purpose, and between avoidance goals and goal purpose, into the regression equations. All predictors were centered prior to conducting the analysis. Table 5 displays the results of this analysis. The first step of the analysis showed that sociodemographic characteristics were not significantly associated with any of the indicators of physical health, $F_s(1,154) < 3.59$, $R^2_s < .02$, $p_s > .06$. The inclusion of the main effects in the second step of the analyses did not reveal significant effects of either the number of approach goals or the number of avoidance goals on changes on the outcome measures, all $F_s(1,154) < 1.83$, all $R^2_s < .01$, all $p_s > .18$. However, levels of purpose significantly predicted longitudinal changes in chronic health problems, $F(1,154) = 4.61$, $R^2 = .03$, difficulties with instrumental ADLs, $F(1,154) = 12.93$, $R^2 = .08$, and difficulties with basic ADLs, $F(1,154) = 7.06$, $R^2 = .04$. In support of my hypotheses, these results demonstrate that, as compared to their counterparts who reported low levels of goal purpose at T2, participants who reported high levels of goal purpose subsequently experienced fewer increases in chronic health problems, $\beta = -.18$, $p < .05$, difficulties with instrumental ADLs, $\beta = -.31$, $p < .001$, and difficulties with basic ADLs, $\beta = -.22$, $p < .01$.

The final step of the analyses demonstrated a significant interaction between purpose and avoidance goals in predicting changes in difficulties with instrumental ADLs, $F(1,154) = 5.32$, $p = .02$, $R^2 = .03$, and basic ADLs, $F(1,154) = 9.27$, $p < .01$, $R^2 = .06$. The interaction between purpose and avoidance goals did not predict changes in

Table 5

Regression Analyses Predicting 2-Year Changes (T2-T3) in Chronic Health Problems and Difficulties in Instrumental and Basic Activities of Daily Living (ADLs) by T2 Levels of Approach Goals, Avoidance Goals, and Goal Purpose.

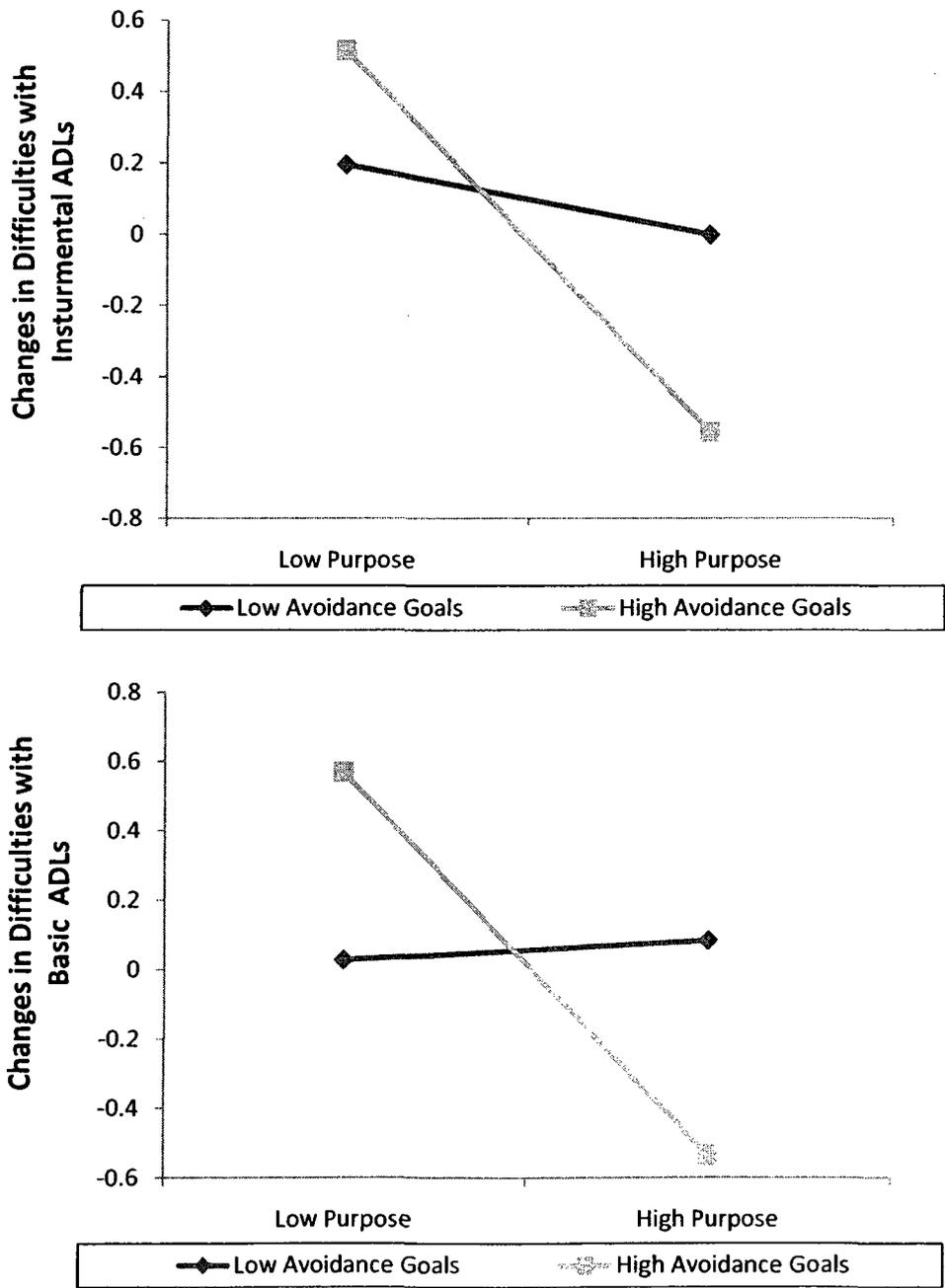
	Δ Chronic health problems		Δ Difficulties with Instrumental ADLs		Δ Difficulties with basic ADLs	
	R ² Change	β	R ² Change	β	R ² Change	β
<i>Main Effects</i>	.03		.08**		.05*	
Approach goals (APG)	.00	-.04	.00	.08	.01	.11
Avoidance goals (AVG)	.00	.02	.00	-.03	.00	-.02
Goal purpose (LET)	.03*	-.18*	.08**	-.31**	.04**	-.22**
<i>Interactions</i>						
LET x APG	.02	-.14	.02	-.14	.01	-.07
LET x AVG	.01	-.07	.03*	-.18*	.06**	-.24**

Note. ^a The analyses were controlled for age, sex, socioeconomic status, partnership status, and Time 2 scores for each dependent variable assessed. The β s of interaction effects were calculated in separate regression analyses. * $p < .05$; ** $p < .01$.

chronic health problems, $F(1,154) = .74, p = .39, R^2 = .01$, and the interaction between purpose and approach goals did not predict changes in chronic health problems or in difficulties with instrumental and basic ADLs, all $F_s(1,154) < 3.39$, all R^2 's $< .02$, all p s $> .07$.

To illustrate the significant interaction effects between purpose and avoidance goals on changes in instrumental ADLs and basic ADLs, I plotted in Figure 3 the association between purpose (1 SD above and below the scale mean) and changes in instrumental ADLs (Upper Panel) and basic ADLs (Lower Panel), separately for participants who scored 1 SD below and above the mean number of avoidance goals (see Aiken & West, 1991). The shape of the interactions suggest that the fewest increases in both basic and instrumental ADLs were obtained among participants who reported high goal purpose and had adopted a large number of avoidance goals. By contrast, larger increases in basic and instrumental ADLs were obtained among participants who reported only few avoidance goals (independent of purpose) and participants who reported low levels of purpose and many avoidance goals. Subsequently conducted analyses of the simple slopes supported this interpretation of the data. Purpose predicted fewer increases in difficulties with instrumental and basic ADLs among older adults who reported a high number of avoidance goals (instrumental ADLs: $\beta = -.56, p < .001$, basic ADLs: $\beta = -.55, p < .001$), but not among those who reported a low number of avoidance goals (instrumental ADLs: $\beta = -.08, p = .44$, basic ADLs: $\beta = .05, p = .68$). In addition, a high number of avoidance goals was significantly associated with fewer increases in instrumental and basic ADL among older adults who reported high levels of purpose (instrumental ADLs: $\beta = -.29, p = .02$, basic ADLs: $\beta = -.33, p < .01$). Among participants

Figure 3. Association Between T2 Number of Avoidance Goals (+/- 1 SD) and Changes in Difficulties with Instrumental ADLs (Upper Panel) and Basic ADLs (Lower Panel) Over Time, Separately for Participants with a High versus Low T2 Levels of Goal Purpose (1 SD Above and Below the Mean).



who reported low levels of purpose, the number of avoidance goals was not associated with increases in difficulties with instrumental ADLs, $\beta = .18, p = .14$, but significantly predicted an increase in difficulties with basic ADLs, $\beta = .27, p = .03$.

Self-regulation Constructs as Predictors of Purpose, Goals, and Physical Health

To examine whether adaptive self-regulation constructs can be associated with participants' levels of goal purpose and the number of goals, and thereby may explain effects on physical health, I conducted a set of partial correlations. In the first step, I have computed correlations (controlling for sociodemographic characteristics) between baseline measures of health-engagement control strategies, health-related compensatory secondary control, goal disengagement capacities, and goal reengagement capacities with T2 levels of goal purpose, approach goals, and avoidance goals, and T2-T3 changes in chronic health problems, instrumental ADLs, and basic ADLs.

The results of these analyses are displayed in Table 6 and indicate that higher baseline levels of health-engagement control strategies, compensatory secondary control, and goal reengagement capacities were significantly associated with higher levels of goal purpose at Time 2 and lower increases in instrumental ADLs from T2 to T3. However, goal disengagement capacities were not significantly associated with levels of purpose or changes in instrumental ADLs, and none of the self-regulation constructs predicted T2 levels of approach or avoidance goals, or were significantly associated with T2-T3 changes in chronic health problems or basic ADLs.

To finally examine whether the obtained effects of self-regulation constructs on changes in instrumental ADLs were mediated by levels of purpose, I repeated the previous analyses and additionally controlled the associations between self-regulation

Table 6

Partial Correlations Between Self-Regulation Constructs (T1: Health-Related Control Strategies, Compensatory Secondary Control, Goal Disengagement, Goal Reengagement), Goals and Purpose (T2), and Changes in Physical Health (T2-T3: Chronic Health Problems, Difficulties in Instrumental ADLs and Basic ADLs), Controlling for Sociodemographic Characteristics (Age, Sex, SES, and Partnership Status).

	Purpose	Approach goals	Avoidance goals	Δ Chronic health problems	Δ Instrumental ADLs	Δ Basic ADLs
Self-regulation constructs (T1)	(T2)	(T2)	(T2)	(T2-T3)	(T2-T3)	(T2-T3)
Health-engagement control strategies	.42**	.07	-.08	.01	-.20*	-.04
Compensatory secondary control	.42**	.12	-.05	-.02	-.20*	-.03
Goal disengagement	.13	.05	-.06	-.08	-.10	-.02
Goal reengagement	.36**	.11	-.08	-.12	-.18*	-.08

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

constructs and changes in instrumental ADLs for T2 levels of purpose. In these analyses, the effects of health-engagement control strategies ($r = -.09, p = .28$), compensatory secondary control ($r = -.09, p = .29$), and goal reengagement capacities ($r = -.08, p = .36$) on changes in instrumental ADLs were no longer significant. Sobel tests indicated that goal purpose exerted a significant indirect effect in the association between health-engagement control strategies ($Z = -2.96, p < .01$), compensatory secondary control ($Z = -2.97, p < .01$), and goal reengagement ($Z = -2.84, p < .01$) on change in difficulties with instrumental ADLs. By contrast, the association between purpose and changes in instrumental ADLs remained significant if the analysis was additionally controlled for baseline levels of health-engagement control strategies ($r = -.23, p < .01$), compensatory secondary control ($r = -.23, p < .01$), or goal reengagement capacities ($r = -.25, p < .01$). These results are consistent with the idea that adaptive self-regulation constructs can forecast fewer increases in difficulties with instrumental ADLs through their beneficial effects on individuals' goal purpose.

Discussion

The present study investigated the associations between older adults' goals and goal purpose with longitudinal changes in physical health and baseline levels of self-regulation constructs. This study had three aims. First, it examined the cross-sectional and longitudinal trajectories of goal purpose, approach goals, and avoidance goals. The second goal was to investigate the effects of goal purpose and goal orientation on changes in physical health across time. Finally, the effects of self-regulation processes, namely health-related control strategies and goal adjustment capacities, on goal purpose and changes in health were assessed.

The first goal of the study was to examine the different trajectories of goal purpose and goal orientation in older adults. This analysis was important given the contradicting findings surrounding PIL, including that it may significantly decline in older adulthood, yet is correlated with high levels of well-being and health which typically remain stable across the adult lifespan (Brim, Ryff, & Kessler, 2004; Clarke et al., 2000; Diener, 1984; Diener & Suh, 1997). In addition, no studies to date have focused on longitudinal changes in goal purpose, further stressing the importance of assessing changes in purpose across time in this age group (Boyle et al., 2009). By separating the two different elements included in the measurement of PIL, having goals and goal purpose, this study found that the number of approach goals declines significantly with age and across time, while the number of avoidance goals and levels of goal purpose remained stable, both in cross-sectional and longitudinal analyses. These findings indicate that older adults pursue fewer goals aimed at gain over time, while maintaining stable levels of goals aimed at prevention of loss. This is in accord with trends in the scientific literature (Baltes & Baltes, 1990; Ebner et al., 2006; Heckhausen & Schulz, 1995). In addition, these findings indicate that goal purpose does not necessarily decline in older adulthood. This may explain some of the contradictions reported in the literature. If both aspects of purpose, namely having goals and goal purpose, are used as one scale, it appears as though a person's level of purpose exhibits a decline in older adulthood. However, by separating these two aspects of purpose and assessing their trajectories individually, it becomes clear that despite the reduction in overall number of goals, specifically approach goals, levels of goal purpose can still be maintained as the person ages.

Furthermore, the results showed that older adults of higher SES reported more avoidance goals, as compared to older adults of lower SES. This could be due to two reasons. First, older adults of higher SES may have achieved more resources in life and thus, may also have more to lose. This may lead to greater focus on the maintenance of resources accumulated throughout life and the prevention of loss. In addition, it is also possible that given their higher education, older adults of higher SES may have higher self-resolution skills and may be more aware of the benefits associated with the avoidance of loss in old age. Moreover, the results showed that females tended to report more approach and avoidance goals, as compared to males. In this regard, it is possible that men and women in this sample espouse more traditional gender roles; namely, men were expected to work and provide for their families, as opposed to women. Following retirement, men will have ultimately had to let go of many work- and career-related goals leading to fewer remaining goals to be pursued in this group. Women, who traditionally were responsible for maintaining family ties, for example, may show greater continuity of goals post-retirement, leading to the finding that in this age group, women appear to have more goals overall. Finally, when assessing specific domains of approach goals it became clear that the decline in approach goals was prevalent across goal domains and was not limited to any specified domain. This indicates that older adults in this sample tended to pursue fewer approach goals from all different domains.

The second goal of this study was to test the effects of goal purpose and number of goals on changes in physical health across time. The results of the analyses showed that goal purpose predicted beneficial changes in all health outcomes. Older adults who reported having higher levels of goal purpose exhibited fewer increases in chronic health

problems, as well as less difficulty with basic and instrumental ADLs across time. The number of approach or avoidance goals, however, did not predict any changes in physical health outcomes across time. These findings add another important aspect to understanding the functions of purpose in older adulthood, in particular if they are considered in combination with the differing longitudinal trajectories of goal purpose and number of goals. Past research indicated that though purpose exhibits strong correlations with indicators of subjective well-being and physical health outcomes, it displayed a significant decline in older adulthood (Boyle, et al., 2009; Ryff & Keyes, 1995). These findings could imply that with a decline in purpose, well-being and physical health may also decline with age. However, as indicated by these findings, there are two independent elements to PIL that exhibit differing patterns across older adulthood, having goals and goal purpose. As noted previously, it is only the number of (approach) goals that declines with age. Goal purpose, by contrast, remains stable throughout older adulthood. Furthermore, it is only the goal purpose component that prevents declines in older adults' physical health. Given that this component maintains stability with age and across time, it stands to reason that aging is not a process of ultimate decline and loss, but rather can also be associated with maintenance of health and happiness. These two findings, taken as a whole, elucidate the importance of having purposeful goals, especially in old age, as well as how health can be maintained during this developmental stage.

In addition, the reported results indicate that older adults who reported more avoidance goals that were highly purposeful to them, exhibited less increases in functional disability associated with performing activities of daily living. This may mean that functional declines can be delayed or prevented, when older adults espouse many

goals aimed at loss prevention and consider these goals to be highly meaningful to them. These goals, if seen as important to the person, can influence health for the better by instilling beneficial habits that can make a positive difference in older adulthood. For example, if the goal of maintaining one's current level of functioning is meaningful to the person and fills his or her life with purpose, he or she may be more likely to incorporate certain lifestyle habits such as exercise, a healthy diet, or frequent visits to the doctor. With advancing age, decline and loss become more and more probable, perhaps making avoidance goals more meaningful and important to older adults (Baltes & Baltes, 1990; Ebner et al., 2006; Förster et al., 1998; Heckhausen & Schulz, 1998; Lench & Levine, 2008). This could explain the interaction found between avoidance goals with goal purpose in predicting a prevention of increases with ADL difficulties. These findings help illustrate the 'paradox of happiness' described in the literature, namely how older adults are able to maintain their morale, subjective well-being, and physical health in the face of functional and health declines (Baltes & Baltes, 1990; Bradtstädter & Greve, 1994; Kunzmann et al., 2000).

Finally, the third goal of this study was to assess the effects of self-regulation processes on goal purpose and changes in health across time, and whether purpose mediated the association between self-regulation processes and changes in physical health. In this regard, the study's results showed that health-related control strategies, namely HECS, relating to the attainment of health-related goals, and CSC, relating to dealing with failure in achieving unattainable health goals, both significantly predicted goal purpose levels two years later. In addition, both control strategy constructs predicted less increases in difficulties with instrumental ADLs across time. Finally, when

accounting for goal purpose, HECS and CSC no longer predict changes in instrumental ADLs, indicating that purpose statistically mediated this relation.

Moreover, broader goal reengagement capacities were also shown to predict prospective levels of purpose as well as changes in difficulties with instrumental ADLs. Similar to the finding regarding health-specific control strategies, when controlling for the effects of purpose, goal reengagement was no longer able to predict these changes, indicating that purpose statistically mediated this relation as well. This elucidates how health-related control strategies and goal reengagement are able to prevent negative changes in health, through their affects on goal purpose.

Interestingly, goal disengagement did not predict future levels of goal purpose or changes in health. According to Wrosch and colleagues (2007), goal disengagement and goal reengagement can indeed predict different outcomes. While goal reengagement tends to predict positive aspects of well-being, such as purpose, goal disengagement is more closely related to negative aspects of well-being, for example negative affect (Wrosch, Miller et al., 2007). In addition, research has found that without the opportunity and ability to reengage in new attainable goals, goal disengagement may not lead to beneficial health consequences for older adults (Wrosch & Scheier, 2003; Wrosch et al., 2004). The finding that goal disengagement does not predict goal purpose or changes in health outcomes follows in line with this body of literature. Goal reengagement, on the other hand, influences positive changes in well-being and health, thus affecting both goal purpose and health outcome measures in this study. Thus, it can be concluded that goal reengagement capacities are stronger predictors of purpose in life than goal disengagement capacities. However, future research should explore whether goal

disengagement and goal reengagement must work together in order to accomplish two ends; first, the prevention of pitfalls and risks of failure in pursuing goals and experiencing unattainable goals. Second, it should be investigated whether these two self-regulation processes, when working together, can lead to positive change in goal purpose, well-being, and health.

It is important to note that significant effects of self-regulation processes were only obtained with respect to preventing an increase of difficulties with instrumental ADLs. None of the self-regulation constructs was able to predict changes in chronic health problems or difficulties with basic ADLs. One potential explanation of this pattern of results may be found in the model of disability proposed by Verbrugge and Jette (1994). This model defines disability as the effects of chronic health problems on a person's ability to engage in ADLs. As such, this model postulates that chronic health problems precede and give rise to difficulties with ADLs via bodily impairments. This could mean that by the time functional disabilities are evident, chronic health problems are already well established and therefore harder to change, resulting in significant declines in the former but not the latter, following the increased use of self-regulation processes. In addition, the participants in this sample reported more difficulties with instrumental, rather than basic, ADLs. This may indicate that instrumental ADLs precede basic ADLs. Given that this study included a relatively healthy sample of older adults, it is possible that functional impairment in basic ADLs will become evident only in later stages of physical decline. It will therefore be beneficial to test the relations between self-regulation processes and changes physical health measures in future longitudinal studies to help explain these results.

Overall, this study has revealed several important findings regarding the psychological processes involved in the maintenance of older adults' physical health. First, it demonstrated that the two major elements of PIL exhibit different trajectories across time and with age, in older adulthood. While the number of goals decreases significantly over time, in particular approach goals, the older adults' goal purpose remains stable across age and time. Second, goal purpose also prevents negative changes in different health outcomes, such as chronic health problems, and basic and instrumental ADLs, while the notion of having goals is not significantly related to changes in physical health. This illustrates the importance of finding purposeful goals to pursue in older adulthood, as opposed to attempting to pursue as many goals as possible. Moreover, avoidance goals appear to be important for this population, and can also prevent or delay negative changes in health if they are also purposeful. Finally, health-related control strategies defined by the OPS model (Heckhausen, 1997), as well as the process of goal reengagement, appear to act as predictors of goal purpose, stressing their importance in older adulthood.

These findings have important clinical implications for older adults. While a common occurrence in old age, age-related health declines can possibly be delayed or prevented in older adulthood. Pursuing highly meaningful goals may represent a psychological mechanism that can prevent older adults from entering into a downward spiral, characterized by physical problems and functional declines. In this regard, it may be possible to address a person's sense of goal purpose thus supporting the maintenance of physical health, and with it well-being.

Identifying the processes that lead to the experience of purposeful goals can further assist the elderly population as a whole. Within the next 25 years, the population of adults aged 65 and older will double (SAHA, 2007). In addition, while people living in high longevity countries continue to add to their life-span, many suffer from chronic health problems and functional decline for longer periods of time (Oeppen & Vaupel, 2002). Given these demographic trends, illuminating pathways to purpose in life in older adults is important because by understanding these processes we can help maintain a high level of physical functioning, thus increasing quality of life and longevity in old age. As the older adult population continues to grow at a faster rate than any other age group, this research will prove invaluable in understanding the challenges that older adults face, while at the same time allowing us to identify how this population may be able to maintain their physical health, thus increasing their quality of life.

Limitations and Future Directions

There are limitations to this study that should be addressed in future investigations. First, the measure of goal purpose used in this study (LET) did not exist until the second wave of the study (Scheier et al., 2006). For this reason, I was only able to assess goal purpose during two of the three data collection waves of this study and thus, I did not have goal purpose ratings at baseline. Therefore, the multiple regression analyses predicting goal purpose at Time 2 from baseline measures of health-related control strategies need to be interpreted with caution, as I was unable to control for baseline levels of goal purpose.

Second, in this study I assessed overall goal purpose, yet did not ask participants to rate each goal reported according to its purpose or meaningfulness. Future studies should address this limitation by asking participants to indicate how purposeful they find each specific goal they outline. This will allow for a thorough follow-up of ways in which the blockage of goals of differing levels of meaningfulness affects physical health in older adulthood.

A third limitation of this study relates to the older adult sample used. By including only the elderly who reside in the community, I was focusing my analyses on individuals who are relatively healthier and exhibited fewer health problems and functional declines than some of their peers, allowing them to live independently. The question remains whether the finding that self-regulation processes and goal purpose lead to decreased difficulties with instrumental ADLs will remain significant in older adults who exhibit more severe functional difficulty. It is possible that goal purpose and usage of control strategies and goal reengagement can only benefit physical health during the early stages of age-related health declines, implying that once functional declines have reached a certain level, goal purpose and self-regulation processes may not produce beneficial change. This question should be addressed in future studies.

Finally, future studies should address the evident positive effects of goal purpose and self-regulation processes by creating intervention programs for older adults. Such programs could teach this population to focus on goals that have most purpose to them, in the hopes that by investing resources in these goals, older adults' physical health may be maintained with advancing age. Such programs could also instruct on the benefits of adopting avoidance goals that have most meaning. Additionally, such intervention

programs could instruct older adults on using different control strategies and on strengthening their goal adjustment capacities, which may help them in actively pursuing and achieving their goals. In this regard, future research along these lines may assist older adults in maintaining their physical health for many years to come.

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