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# Goal Disengagement Capacities and Severity of Disease Across Older Adulthood: The Sample Case of the Common Cold

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Abstract

This study examined age-related associations between goal disengagement capacities, emotional distress, and disease severity across older adulthood. Given that an age-related increase in the experience of stressors might render important goals unattainable, we expected that goal disengagement capacities would predict a decrease in the severity of experienced illness (i.e., the common cold) by preventing emotional distress (i.e., depressive symptoms), particularly so among individuals in advanced (as compared to early) old age. This hypothesis was tested in a 6-year longitudinal study of 131 older adults (age range = 64 to 90). Regression analyses showed that goal disengagement capacities buffered 6-year increases in older adults' cold symptoms, and that this effect was significantly pronounced among older-old participants. Mediation analyses further indicated that changes in depressive symptoms exerted an indirect effect on the age-related association between goal disengagement and changes in cold symptoms. The study's findings suggest that goal disengagement capacities become increasingly important for protecting emotional well-being and physical health as older adults advance in age.

Key words: goal disengagement; depressive symptoms; physical disease; common cold; older adulthood; advanced old age.

# Introduction

Across older adulthood many individuals experience a sharp decline in different areas of function, leaving in particular older-old adults susceptible to the experience of disease (Baltes & Smith, 2003). Such physical health problems may occur, in part, because as older adults advance in age, they face an increasing number of age-related stressors that can render important goals unattainable and trigger health-compromising emotional distress (Cohen et al., 2007; Wrosch et al., 2006). A psychological construct that could protect older adults' physical health in the context of age-related stressors and unattainable goals relates to individual differences in goal disengagement capacities (Wrosch, Scheier, & Miller, 2013). However, little is known about potential changes in the adaptive value of these self-regulation capacities across older adulthood. Here, we address this possibility by examining age effects of goal disengagement capacities on severity of disease (by predicting the common cold) and emotional distress (by predicting depressive symptoms) in a sample of elderly individuals. Considering that stressors and goal constraints typically increase across older adulthood, we hypothesized that goal disengagement capacities would buffer against increases in cold symptoms particularly among individuals in advanced, as compared to early, old age. In addition, we expected that this age effect of goal disengagement capacities could be mediated by depressive symptomatology.

## *Age-Related Stressors and Severity of Disease Across Older Adulthood*

Older adulthood often consists of an accumulation of uncontrollable and at times inevitable challenges across different domains of life (e.g., functional limitations, loss of social roles, or bereavement; Baltes & Smith, 2003; Heckhausen, Wrosch, & Schulz, 2010). The occurrence of such age-related challenges, or stressors, may compromise older adults' psychological and physical health (Cohen et al., 2007). Older adults who face an increasing number of stressors may feel overwhelmed by their inability to achieve important life goals and

experience emotional distress (Wrosch et al., 2006). Emotional problems that result from the onset of age-related stressors may prompt health-compromising behaviors or disturb health-relevant biological processes (e.g., physical activity or immune function), which could increase the severity of experienced infectious diseases (e.g., the common cold; Cohen et al., 2007). This process could play a further role in the development of other age-related conditions (e.g., Alzheimer's disease, diabetes, or osteoporosis; El-Sahly et al., 2000; Graham et al., 2006). In this article, we focus on the severity of common cold symptoms because upper respiratory infections are quite common and remain a major cause of impairment in older adults (Castle, 2000; Graham, Christian & Kiecolt-Glaser, 2006; Patriarca, 1994).

The influence of age-related stressors on physical health may increase across older adulthood. To date, older adulthood can span more than 30 years of life (Oeppen & Vaupel, 2002) and the severity and controllability of stressors exert substantial changes across older adulthood. As compared to early old age, advanced old age is often characterized by the experience of multiple and often irreversible losses as well as increases in emotional distress (Baltes & Smith, 2003; Gerstorf et al., 2010; Smith et al., 2002; Sutin et al., 2013). In addition, older-old adults frequently experience declines in personal resources (e.g., cognitive function or social networks), which may further constrain their opportunities to overcome age-related stressors. Young-old adults, by contrast, are generally better able to adapt to age-related challenges and return to previous levels of functioning (Baltes & Smith, 2003). Thus, given that older-old adults are particularly likely to experience uncontrollable stressors and losses, they may also be at greatest risk of encountering emotional distress and experiencing symptoms of illness (cf. Cohen et al., 2007). This process may set in motion an adverse cascade, characterized by the occurrence of age-related stressors and subsequent psychological and physical health problems.

*The Role of Goal Adjustment Capacities*

Given the adverse health effects of stressors and unattainable goals, it would be important to identify factors that could protect older adults' quality of life in such circumstances. From our perspective, this function could be served by adaptive self-regulation processes that enable older adults to maintain their emotional well-being and health by adjusting behavior in the face of age-related challenges and associated goal constraints (Brandtstädter, & Renner, 1990; Heckhausen et al., 2010).

Our approach is based on goal adjustment theory (Mens, Wrosch, & Scheier, in press; Wrosch et al., 2013). This theory proposes that goal adjustment capacities reflect individual difference variables that operate across different life domains and facilitate two self-regulation processes: goal disengagement and goal reengagement (Wrosch et al., 2013). *Goal disengagement capacities* correspond to an individual's tendency to withdraw behavioral efforts and psychological commitment from the pursuit of an unattainable goal. *Goal reengagement capacities* refer to the tendency to identify, commit to, and pursue other goals. The two goal adjustment capacities represent independent constructs that are only small to moderately associated with each other and exert different functions (Wrosch et al., 2013). In the context of unattainable goals, goal disengagement should prevent repeated failure and associated emotional distress. Goal reengagement, by contrast, is thought to provide new purpose in life and enhance positive emotional states. Since emotions play an important role in the development of disease (Cohen et al., 2007), both goal adjustment capacities may also be implicated in physical health.

Research suggests that goal disengagement and goal reengagement capacities can increase from adolescence to old age (Wrosch et al., 2013). These age-related improvements could enable some older adults to successfully manage the occurrence of age-related stressors. A substantial number of studies, including samples of older adults, support this assumption by

demonstrating that *goal disengagement capacities* ameliorate negative emotional states (e.g., depressive symptoms), biological dysregulation (e.g., diurnal cortisol or systemic inflammation), and physical health problems (e.g., eczema or constipation; Wrosch et al., 2003, 2007, 2013). Thus, goal disengagement capacities could also reduce older adults perceived symptoms of illness by buffering stressor-related emotional problems, particularly in advanced old age.

The role of goal reengagement in the adjustment to stress, however, appears to be more complex. Although goal reengagement capacities are often related to improved levels of positive emotional states, they rarely prevent distress or benefit biological and physical health (Wrosch et al, 2013).[1] In addition, goal reengagement can at times adversely affect subjective well-being (e.g., caregiving, Wrosch et al., 2011). Such detrimental effects may occur when individuals stretch their resources too thin by engaging in too many goals and become unable to effectively manage pressing life demands (Wrosch et al., 2013). As a consequence of these opposing effects, it seems rather unlikely that goal reengagement capacities directly protect older adults from experiencing symptoms of illness or underlying emotional distress.

In sum, the discussed literature suggests that in particular goal disengagement capacities could become increasingly important for protecting physical health as older adults advance in age. However, there is a paucity of age-comparative research on the adaptive value of these capacities across older adulthood. To address this gap in the literature, we examined the age-related effects of goal adjustment capacities on emotional distress and illness severity in an age-heterogeneous and longitudinal sample of older adults. As markers of emotional distress and illness severity, we assessed depressive symptoms and cold symptoms, respectively. We hypothesized that goal disengagement capacities would predict reduced levels of older adults' cold symptoms, and that this association would be pronounced among individuals in advanced (as compared to early) old age. In addition, we reasoned that the hypothesized age effect on

changes in cold symptoms could be mediated by depressive symptomatology. We did not expect the same effects to occur as a function of older adults' goal reengagement capacities, since goal reengagement has been shown to produce mixed effects in previous research (Wrosch et al., 2013). Nonetheless, we included goal reengagement capacities into our analysis to provide evidence for discriminant validity of different self-regulation capacities.

## Method

### *Participants*

This study was based on the *Montreal Aging and Health Study* (MAHS; Wrosch et al., 2007). Participants were recruited through newspaper advertisements targeted at older adults within the Montreal area. The only inclusion requirement was that participants should be over 60 years of age to facilitate the collection of a normative sample. A total of 215 older adult participants were recruited at baseline. They were visited in their homes or invited to the laboratory and were asked to respond to a self-report questionnaire among other measures. Follow-up data for this study were obtained every two years. Here, we report analyses using baseline and 6-year follow-up data of the MAHS ($M$ = 6.05, $SD$ = 0.18, *range* = 5.51 to 6.39 years; $n$ = 137).[2] Attrition over six years of study was associated with refusal to participate further ($n$ = 9), inability to locate participants ($n$ =19), presence of other personal problems ($n$ = 27), and death ($n$ = 23). Attrition was not associated with any baseline variable, except for age. Excluded participants were significantly older at baseline ($M$ = 73.65, $SD$ = 6.75) than those who remained in the study ($M$ = 71.94, $SD$ = 5.54; $t$[144.79] = 2.04, $p$ = 0.02). Six of the remaining 137 subjects were further excluded from the analyses because of missing data necessary to compute predictor or outcome variables. The final analytic sample consisted of 131 participants.

### *Materials*

*Cold symptoms* were assessed at baseline and 6-year follow-up, using an 8-symptom

checklist (e.g., *cough, runny nose, feeling under the weather*; Hamrick et al., 2002). Participants reported how severely they experienced the eight cold symptoms over the past two weeks on a 5-point Likert-type scale (0 = *none* to 4 = *very severe*). A measure of cold symptoms was obtained by calculating the average symptom severity at both assessments (αs > .71). To operationalize 6-year change in cold symptoms, a regression analysis was conducted, predicting follow-up cold symptoms by baseline cold symptoms, and saving the standardized residuals for future analysis.

*Depressive symptoms* were assessed at baseline and follow-up, using the 10-item Center for Epidemiological Studies Depression Scale (CES–D; Andresen et al., 1994). Participants were asked to rate how often each of the ten items applied to them during the previous week (e.g., *I felt depressed* or *I was bothered by things that usually don't bother me*). Responses were measured on a 4-point Likert-type scale (0 = *rarely or none of the time* to 3 = *most or almost all of the time*). Depressive symptoms were calculated by computing a sum score of the 10 items (αs > .71). A measure of 6-year changes in depressive symptoms was obtained in a regression analysis, predicting follow-up levels of depressive symptoms by baseline levels of depressive symptoms, and saving the standardized residual for future analysis.

*Goal adjustment capacities* were measured at baseline using the Goal Adjustment Scales (GAS, Wrosch et al., 2003). This self-report questionnaire assesses general tendencies to disengage from unattainable goals and to reengage in other goals when unattainable goals are encountered. Four items measured goal disengagement capacities (e.g., *It's easy for me to stop thinking about the goal and let it go*), and six items measured goal reengagement capacities (e.g., *I start working on other new goals to pursue*). Responses were measured on 5-point Likert-type scales, ranging from 1 = *strongly disagree*, to 5 = *strongly agree*. A principal component factor analysis confirmed that the goal disengagement (loadings = .64 to .79) and goal reengagement (loadings = .68 to .78) items loaded on two different factors, explaining 67% of the variance.

Accordingly, mean scores were computed for both goal disengagement (α = .57) and goal reengagement (α = .85) capacities.

*Sociodemographic variables* were included in the study as predictors or covariates. Age and sex were measured at baseline through self-report. Socioeconomic status (SES) was assessed using three variables at baseline: highest education completed (0 = *none* to 4= *graduate degree*), yearly family income (0 = *Less than $17,000* to 4 = *More than $68,000*), and perceived social status (visual ladder with 1 being the lowest rung and 10 being the highest; Adler et al., 2000). The three SES measures were postively correlated (*r*s > .40, *p*s < .001) and their standardized scores were averaged to obtain a reliable indicator of SES. The number of chronic illnesses was measured at baseline by asking participants to report whether they had experienced any of 17 different health problems over the past year (e.g., coronary heart disease, cancer, high blood pressure, or arthritis).

*Data Analyses*

Results are reported in three sections. First, we conducted preliminary analyses to describe the sample (by calculating means, standard deviations, and percentages), explore longitudinal changes in cold symptoms and depressive symptoms over time (by conducting ANOVAs), and report associations between the main variables (by computing zero-order correlations). Second, we conducted a hierarchical regression analysis, predicting changes in cold symptoms (residualized scores) by levels of goal disengagement and goal reengagement capacities, age, sex, SES, and chronic illness. In a second step, we tested the interaction terms of age and goal disengagement capacities (and goal reengagement capacities) separately for significance. Third, we examined whether depressive symptoms would mediate the age-related association between goal adjustment capacities and changes in cold symptoms by calculating indirect effects (95% BCI) in bootstrap analyses (using 5000 bootstraps; Preacher & Hayes,

2008). Since baseline levels and changes in depressive symptoms could equally qualify as potential mediators, both constructs were simultaneously included into the mediation analysis.

## Results

### *Preliminary Analyses*

Participants were on average 72 years old, approximately half of them were female, and they reported on average approximately 2 chronic health problems (see Table 1). The sample incoporated heterogeneous socioeconmic backgrounds with approximatedly 60% of participants receiving less than $34,000 in income per year, and 34% of sample obtained an undergraduate degree or higher. The perceived social status was slightly above the midrange of the scale. The socio-demographic and health characteristics for this sample were within the normative range of community-dwelling older adults (National Advisory Council on Aging, 2006).

Repeated-measurement ANOVAs showed no significant within-person effect (TIME) for participants' cold symptoms, $F(1, 130) = 2.43$, $p = .12$, indicating that levels of cold symptoms remained relatively stable in the entire sample. With respect to participants' depressive symptoms, however, a significant TIME effect was obtained, $F(1, 130) = 9.55$, $p = .002$, suggesting that levels of depressive symptoms increased over time (see Table 1).

Zero-order correlations showed that higher baseline levels of cold symptoms and depressive symptoms were associated with higher follow-up levels of these symptoms, indicating some stability in these variables (see Table 2). In addition, individuals with higher goal disengagement and goal reengagement capacities or higher SES had lower baseline and follow-up levels of depressive symptoms. Having a greater number of follow-up cold symptoms was positively associated with more depressive symptoms, and negatively associated with goal disengagement capacities. Women, as compared to men, were less likely to report cold symptoms at follow-up, experienced higher baseline levels of depressive symptoms, and reported

a lower SES. Finally, baseline levels of chronic illness were associated with higher baseline levels of cold symptoms and depressive symptoms.

*Age Effects of Goal Adjustment Capacities on Changes in Cold Symptoms*

Results from a hierarchical regression analysis showed that the included covariates, age, and the main effect of goal reengagement capacities were not significantly associated with changes in participants' cold symptoms, $|B\text{s}| < .14$, $|SE\text{s}| > .08$, $p\text{s} > .05$ (see Table 3). The main effect of goal disengagement capacities, however, significantly predicted changes in cold symptoms, $F(1, 124) = 13.23$, $p < .001$. Higher baseline levels of goal disengagement capacities were associated with fewer increases in cold symptoms, $B = -.32$, $SE = .09$, $p < .001$. The second step of the regression analysis confirmed a significant interaction effect between age and goal disengagement in predicting changes in cold symptoms, $F(1, 124) = 4.19$, $p = .04$. The interaction between age and goal reengagement capacities was not significant.[3]

Figure 1 illustrates the associations between age and changes in participants' cold symptoms one standard deviation above and below the mean of the goal disengagement scale. The obtained pattern suggests that increases in cold symptoms were observed particularly among older-old adults who reported low levels of goal disengagement capacities. By contrast, increases in cold symptoms were considerably lower among younger-old adults who reported low levels of goal disengagement capacities, and these changes were almost as low as the scores of their counterparts who were better able to disengage from unattainable goals (independent of age). Analyses of the simple slopes (Aiken & West, 1991) supported this interpretation by showing that age significantly predicted increases in cold symptoms among participants who reported low (-1 *SD*: $B = .29$, $SE = .13$, $p < .05$), but not high (+1 *SD*: $B = -.16$, $SE = .16$, $p > .05$), levels of goal disengagement capacities. Conversely, goal disengagement capacities significantly predicted fewer increases in cold symptoms among older-old adults (estimated for age 85: $B =$ -

.96, *SE* = .32, *p* = .004), but not among younger-old adults (estimated for age 65: *B* = -.09, *SE* = .15, *p* > .05).

*The Mediating Role of Depressive Symptomatology*

The mediation analysis showed that the significant direct effect of the interaction between age and goal disengagement capacities on changes in participants' cold symptoms was rendered non-significant when baseline levels and changes in depressive symptoms were controlled simultaneously for, *B* = -.19, *SE* = .11, *p* > .05 (see Figure 2). Bootstrap analysis clarified that changes in depressive symptoms (95% BCI [-.1664, -.0023]), but not baseline levels of depressive symptoms (95% BCI [-.0105, .0790]), exerted a significant indirect effect on the interaction effect between age and goal disengagement on changes in cold symptoms.

Figure 2 further shows that only increases in depressive symptoms (but not baseline levels of depressive symptoms, *B* = .04, *SE* = .02, *p* > .05), were positively associated with increases in cold symptoms, *B* = .19, *SE* = .09, *p* = .03. In addition, it demonstrates that the interaction between age and goal disengagement capacities also predicted changes in depressive symptoms, *F*(1, 124) = 6.21, *p* = .01 (but not baseline levels of depressive symptoms, *F*[1, 124] = .88, *p* > .05). Subsequently conducted simple slopes analyses confirmed that the pattern of interaction effect on changes in depressive symptoms was similar to the previously reported effect on changes in cold symptoms. That is, age was significantly associated with increases in depressive symptoms among participants with low (-1 *SD*: *B* = .25, *SE* = .13, *p* = .05), but not high (+1 *SD*: *B* = -.29, *SE* = .16, *p* > .05), levels of goal disengagement. Conversely, goal disengagement capacities were significantly associated with fewer increases in depressive symptoms among older-old adults (estimated for age 85: *B* = -1.15, *SE* = .32, *p* < .05), but not among younger-old adults (estimated for age 65: *B* = -.10, *SE* = .14, *p* > .05).

## Discussion

This longitudinal study of community-dwelling older adults showed that goal disengagement capacities buffered against 6-year increases in participants' cold symptoms. In addition, it demonstrated that this protective effect was enhanced among individuals in advanced, as compared to early, old age. Finally, the age-related association between goal disengagment capacities and changes in cold symptoms was statistically mediated by a reduction of depressive symptoms. These effects were independent of sociodemongraphic variation and chronic illness.

The obtained association between individuals' capacity to disengage from unattainable goals and fewer longitudinal increases in cold symptoms is consistent with research, documenting the physical health benefits of goal disengagement capacities (Wrosch et al., 2007). Such a process may occur because goal disengagement can prevent repeated failure experiences and reduce associated emotional distress, which may ameliorate experience of physical disease (Cohen et al., 2007; Wrosch et al., 2013). These observed health benefits were specific to participants' goal disengagement capacities and did not emerge as a function of their goal reengagement capacities. The frequent absence of longitudinal health effects of goal reengagement capacities has been discussed previously by addressing that goal reengagement rarely reduces psychological distress and at times can even forecast emotional problems (e.g., if individuals deplete their resources, Wrosch et al., 2011, 2013)

Of importance, the buffering effect of goal disengagement capacities on changes in cold symptoms became paramount among individuals in advanced, as compared to early, old age. Further, our analyses suggest that this age effect of goal disengagement capacities on the severity of cold symptoms developed over an extended period time and became evident in our study after four and six years of study (see follow-up analyses in Footnote #3). This implies that goal disengagement is particularly important for reducing severity of disease as older adults advance

in age. We think that such an age-related increase in the adaptive value of goal disengagement capacities occurs because individuals in advanced old age are particularly likely to experience multiple and often uncontrollable stressors and losses, while simultaneously encountering a reduction in resources needed for overcoming these problems (Baltes & Smith, 2003; Heckhausen et al., 2010). Individuals in early old age, by contrast, typically have more resources and opportunities available to overcome stressors and goal-related problems, which may make goal disengagement a less needed behavioural response.

The obtained age effects of goal disengagement capacities are likely to be explained by the onset of specific age-related stressors (e.g., functional disability) that are managed using stressor-specific goal regulation strategies. Although our study did not include such stressor-specific strategies, previous work would be consistent with this possibility by showing that specific coping strategies can mediate the beneficial effects of goal disengagement capacities in the context of severe stressors (Wrosch, Amir, & Miller, 2011). In addition, previous work has demonstrated that beneficial emotional effects of goal disengagement capacities in response to specific stressors are comparable to the age-effects reported in our study. For instance, goal disengagement has been found to protect older adults from experiencing increases in emotional distress (i.e., depressive symptoms, mental health problems) if they develop, over time, specific functional disabilities (Dunne, Wrosch, & Miller, 2011; see also Boerner, 2004). Thus, age may act as a proxy for specific age-related stressors that occur as a result of the physical, cognitive and social declines in older adulthood.

As an extension of previous research, the study's results further demonstrated that fewer increases in depressive symptomatology statistically mediated the age effect of goal disengagement capacities on reduced levels of cold symptoms. In particular among participants in advanced old age, goal disengagement capacities were associated with a reduction of

depressive symptoms, which exerted an indirect effect on the age-related association between goal disengagement and reduced levels of cold symptoms. This mediation effect documents a psychological process that links adaptive goal disengagement with beneficial health outcomes.

Numerous pathways could explain the observed mediation effect of depressive symptoms on participants' cold symptom. First, depressive symptoms may exert a direct impact on immune system function or disturb hormonal processes that can alter individuals' immune responses (for goal disengagement and systemic inflammation, see Wrosch et al., 2013). Second, depressive symptoms could influence the severity of cold symptoms through behavioural mechanisms or utilization of health-related strategies. For instance, individuals with high levels of depressive symptoms may engage in unhealthy behaviour practices that may promote illness (i.e., insufficient physical activity, smoking or alcohol consumption; Saint-Onge, Krueger, & Rogers, 2014). Furthermore, older adults who feel depressed may fail to utilize over-the-counter medications to prevent or alleviate cold symptoms (Stoller, Forster, & Portugal, 1993). Given these considerations, we feel that it is likely that one of these factors, or a combination of different biological and behavioural mechanisms, may explain the observed mediation effect of depressive symptomatology on the severity of cold symptoms in advanced old age (Saint-Onge, Krueger, & Rogers, 2014).

Overall, the reported findings have important implications for lifespan developmental research and theory. While advanced old age has been described as a widely understudied area (Baltes, 1998), more recent research has documented significant declines in older-old adults' emotional, psychological, and physical functioning (e.g., Baltes & Smith, 2003; Gerstorf et al., 2010; Sutin et al., 2013). The psychological processes that accelerate, or delay, psychological and physical decline in advanced old age, however, are not well understood. To this end, our results suggest that some of these declines may be prevented if individuals are capable of

disengaging from unattainable goals. The identification of this process may curb an adverse cascade in advanced old age, in which age-related challenges trigger emotional distress and subsequent physical health problems.

In addition, the findings lend support to theories of adaptive self-regulation. Although a substantial body of research has documented that disengagement can benefit well-being and health if individuals encounter unattainable goals (Brandtstädter & Renner, 1990; Heckhausen, et al., 2010; Wrosch et al., 2013), extant work did not examine age-differences in the influence of these self-regulation processes across older adulthood. In this regard, our study demonstrates that goal disengagement processes become paramount when older individuals enter a life phase that is characterized by an increasing number of challenges and a reduction of opportunities for overcoming problems (Baltes & Smith, 2003). The reported study thus supports the theoretical claim that it is especially in such low opportunity circumstances that individuals need to abandon unfeasible goals to protect their quality of life (Heckhausen et al., 2010).

Finally, this study may contribute to health research by documenting a psychological mechanism that could protect older adults' physical health. Our findings suggest that the stress-related experience of infectious disease, such as the common cold, may be triggered by emotional distress if older-old adults are unable to disengage from unattainable goals. Given that severity of infectious disease (and a potentially underlying dysregulation of behavioral and biological processes) could contribute to subsequent and serious health conditions (e.g., Alzheimer's disease, diabetes, or osteoporosis, El-Sahly et al., 2000; Graham et al., 2006), the identification of goal disengagement capacities as a protective process may be important to a variety of researchers who work with the elderly population. Note, however, that our findings also showed that levels of goal disengagement capacities were not correlated with participants' age at baseline (see Table 2), potentially leaving individuals who enter old age with a low

capacity for goal disengagement most vulnerable to the experience of emotional distress and physical health problems. An implication of the latter argument would be that older adults with poor goal disengagement capacities could be targeted early to receive interventions on how to manage specific goal constraints which could improve their quality of life.

*Limitations and Future Directions*

This research is not without limitations. First, the reported results are based on a small longitudinal sample, and future research should examine their generalizability by replicating them in larger and representative samples of older adults.

Second, participants' cold symptoms were assessed via self-reports, which could be affected by a number of biases or individual difference variables (e.g., neuroticism). Although our analysis predicted changes in cold symptoms, which is likely to reduce biases as a function of other individual difference variables, future studies should incorporate measures of physician-verified cold symptoms.

Third, changes in depressive and cold symptoms were both measured over the same 6-year time interval, which makes it possible that reversed associations between variables are possible too. Note, however, that our hypotheses were based on experimental research, demonstrating that distress can cause the incidence of the common cold if participants were infected with the cold virus (Cohen, 1996). Nonetheless, future research should conduct fine-grained studies to further explore directional associations between distress and cold symptoms. In addition, such research should seek to disentangle the various pathways that potentially link depressive symptoms and the experience of physical illness.

Fourth, the reliability of the goal disengagement scale was only modest in this study. Although reliability has not been a problem in much of the research using this scale (Mens et al., in press), it may at times be observed for instruments incorporating only few items (i.e., four).

Given that factor analysis confirmed that the items of the two subscales of the GAS (disengagement and reengagement) loaded on two separate factors (see Methods), we feel that this issue does not seriously compromise the interpretation of our findings.

Finally, our theoretical model would suggest that the observed process could be associated with the prospective development of severe health problems in participants' future. We therefore suggest that subsequent waves of our study should address this possibility by assessing changes in a variety of chronic health conditions. Research along these lines may further illuminate how elderly individuals can manage the occurrence of stressors across older adulthood and protect their psychological and physical health.

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Footnotes

[1] Goal reengagement capacities may benefit physical health, however, if they directly trigger salubrious behaviors (e.g., exercise, Wrosch et al., 2013).

[2] Note that data from the MAHS have been reported in previous research, including results on goal adjustment capacities or depressive symptoms (e.g., Dunne et al., 2011). However, none of these studies examined age-effects of goal adjustment capacities across older adulthood or predicted participants' cold symptoms.

[3] We also conducted analyses on earlier levels of cold symptoms, which showed that age interacted with goal disengagement to predict 4-year changes [$F(1, 123) = 5.33$, $B = -.27$, $SE = .12$, $p = .02$, $R^2 = .04$], but not 2-year changes [$F(1, 123) = .31$, $B = -.07$, $SE = .12$, $p = .58$, $R^2 = .00$], in cold symptoms. Note that the direction of the significant interaction effect for predicting 4-year changes in cold symptoms was identical with the above reported effect on 6-year changes in cold symptoms.

Table 1

*Means, Standard Deviations and Frequencies of Main Study Variables (N = 131)*

| Constructs | Mean (SD) or Percentage [a] | Range |
|---|---|---|
| Cold symptoms | | |
| Baseline | 1.34 (0.34) | 1.00- 3.00 |
| 6-year | 1.41 (0.48) | 1.00 - 4.38 |
| Depressive symptoms | | |
| Baseline | 5.91 (4.31) | 0.00 - 18.00 |
| 6-year | 7.15 (5.37) | 0.00 – 26.20 |
| Goal disengagement capacities | 3.06 (0.70) | 1.00 – 4.75 |
| Goal reengagement capacities | 3.70 (0.60) | 1.83 – 5.00 |
| Age | 72 (5.19) | 64 - 90 |
| Female (%) | 54% | |
| Chronic illness | 2.19 (1.52) | 0 - 8 |
| Education (%) | | |
| None | 4.0% | |
| High school | 29.4% | |
| College/trade | 28.6% | |
| Bachelor | 26.2% | |
| Masters/PhD | 11.9% | |
| Income | | |
| Less than $17,000 | 23% | |
| $17,001 – $34,000 | 36.9% | |
| $34,001 – $51,000 | 18% | |
| $51,001 – $68,000 | 15.6% | |
| > $68,000 | 6.6% | |
| Subjective social status | 6.23 (1.87) | 0 -10 |

*Note.*[a] Mean (SD) are presented for continuous variables.

Table 2

*Zero-Order Correlations of Main Study Variables (N = 131)*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Baseline cold symptoms | | | | | | | | | |
| 2. 6-year cold symptoms | .18* | | | | | | | | |
| 3. Baseline depressive symptoms | .14 | .12 | | | | | | | |
| 4. 6-year depressive symptoms | .07 | .32** | .57** | | | | | | |
| 5. Goal disengagement capacities | -.01 | -.34** | -.16* | -.39** | | | | | |
| 6. Goal reengagement capacities | .09 | -.07 | -.31** | -.29** | .12 | | | | |
| 7. Age | -.13 | .10 | .06 | .11 | -.16 | -.04 | | | |
| 8. Sex [a] | -.02 | -.19* | .17* | .11 | .08 | .06 | .07 | | |
| 9. Chronic illness | .36** | .16 | .17* | .12 | -.12 | -.18* | -.05 | -.17 | |
| 10. Socioeconomic status | -.01 | .06 | -.43** | -.21* | .08 | .10 | -.14 | -.21* | -.07 |

*Note*. [a] Higher values represent female participants.

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

Table 3

*Regression Analysis Examining Age Effects of Goal Adjustment Capacities on 6-year Changes in Cold Symptoms (N = 131)*

| | 6-year changes in cold symptoms | | |
|---|---|---|---|
| | $R^2$ | *B* | *SE* |
| *Main Effects* | | | |
| Goal disengagement capacities (GD) | .09** | -.32** | .09 |
| Goal reengagement capacities (GR) | .00 | -.04 | .09 |
| Age | .01 | .11 | .10 |
| Sex [a] | .02 | -.14 | .09 |
| Socioeconomic status | .01 | .08 | .08 |
| Chronic illness | .00 | .05 | .09 |
| *Interaction Effects* | | | |
| Age X GD | .03* | -.23* | .11 |
| Age X GR | .00 | .06 | .12 |

*Note.* [a] Higher values represent female participants.

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

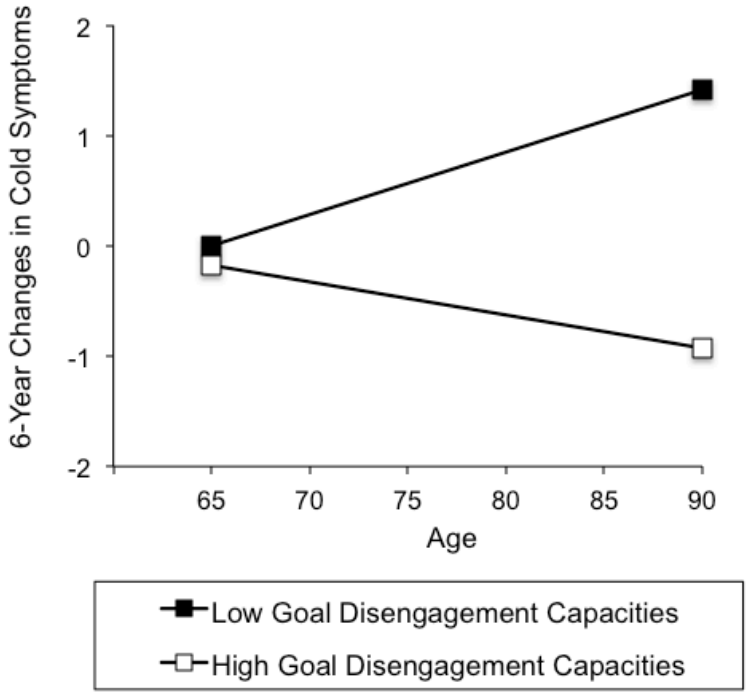


Figure 1. Associations between age and 6-year changes in cold symptoms among participants with low (-1 *SD*) and high (+1 *SD*) baseline levels of goal disengagement capacities.

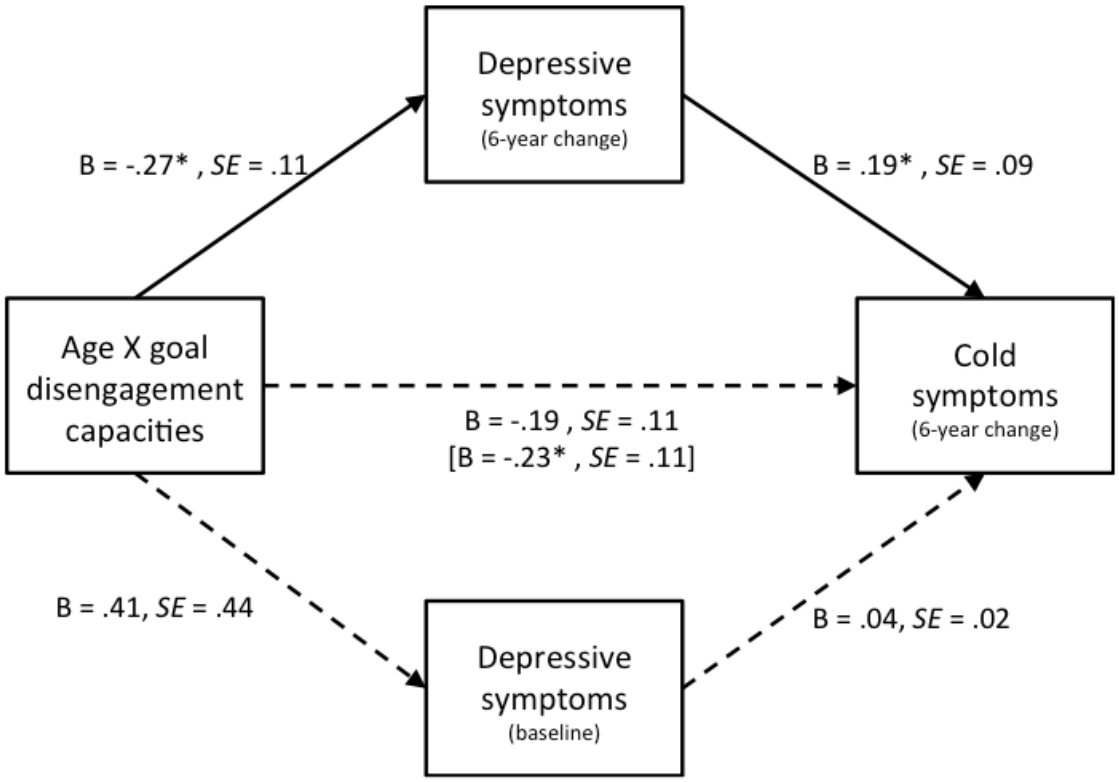


Figure 2. Mediation model testing the indirect effects of baseline levels and changes in depressive symptoms on the age-related association between goal disengagement capacities and changes in cold symptoms.