Depressive Symptoms Can Be Useful: Self-Regulatory and Emotional Benefits of Dysphoric Mood in Adolescence

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Propositions derived from evolutionary biology and personality psychology suggest that depressive symptoms may serve adaptive functions by enabling people to adjust to unattainable goals, which in turn promotes quality of life. The authors tested this hypothesis in a longitudinal study of adolescent girls involving 4 waves of data collected over approximately 19 months. The authors expected that high baseline levels of depressive symptoms would facilitate the development of adolescents' goal adjustment capacities (i.e., goal disengagement capacities and goal reengagement capacities). In addition, the authors expected that improvements in goal adjustment capacities over time would presage lower levels of subsequent depressive symptoms. Data from the first 3 waves produced results demonstrating that baseline levels of depressive symptoms predicted an increase in goal disengagement capacities over time but not in goal reengagement capacities. Moreover, increases in goal disengagement capacities predicted a reduction in subsequent depressive symptoms. The findings suggest that depressive symptomatology may serve adaptive functions by facilitating the development of goal disengagement capacities in adolescence.

Keywords: depressive symptoms, self-regulation, goal disengagement

Depressive symptomatology can manifest in the form of low mood or a pathological syndrome and is often accompanied by a state of helplessness that can adversely affect a person's motivation and behaviors (Bruce, 2000; Seligman, 1975; Wrosch, Schulz, & Heckhausen, 2002).[1] Depressive symptoms can also contribute to dysregulation of biological systems and to problems with physical health (e.g., enhanced cortisol secretion, systemic inflammation, morbidity and mortality from heart disease, and other conditions; Miller & Blackwell, 2006; Parker, Schatzberg, & Lyons, 2003; Schulz et al., 2000). Although there is a strong consensus among practitioners and scientists that depressive symptomatology typically compromises quality of life, scientists from different disciplines have raised the possibility that depressive symptoms may, at times, serve adaptive functions in the self-regulation of behavior. In particular, it has been suggested that depressive mood may facilitate the abandonment of unattainable goals and thereby could promote quality of life (e.g., Klinger, 1975; Nesse, 2000).

Here, we test this hypothesis in a multiwave study of adolescent girls. We expected that higher baseline levels of depressive symptoms would enable participants to more easily disengage from unattainable goals and reengage in other meaningful goals over the subsequent year (for processes involved in goal adjustment, see Wrosch, Scheier, Miller, Schulz, & Carver, 2003). In turn, we expected these improved goal adjustment capacities to forecast a reduction of depressed mood over time.

Depressive Symptoms and Adjustment of Unattainable Goals

Theory derived from evolutionary biology suggests that depressive symptomatology, like other human characteristics, has evolved in phylogenesis as a defense to cope with situations in which a person's behavior is likely to result in wasted efforts, danger, loss, or damage to the body (Keller & Nesse, 2006; Nesse, 2000). In particular, it has been argued that depressive symptoms may facilitate disengagement from unattainable goals and lead to the conservation of resources (Beck, 2002; Klinger, 1975). Fur-

[1] In this article, we use the term *depressive symptomatology* to refer to high levels of dysphoric symptoms or the low mood state that can emerge from the experience of ordinary events. Though these symptoms form part of the clinical syndrome of depression, our focus here is not on that condition.

ther, such resources could be used when aversive situational circumstances change or enable the organism to employ different strategies or redirect effort and time toward other activities that have a higher likelihood of payoff (Klinger, 1975; Nesse, 2000; Thierry, Steru, Chermat, & Simon, 1984).

In fact, several different theoretical frameworks converge upon the idea that depressive symptomatology enables people to adaptively manage the experience of unattainable goals. One framework highlights the idea that abandoning a desired goal is a difficult task (Wrosch, Scheier, Carver & Schulz, 2003) because (a) goal attainment processes are central in organizing human behavior (for evolutionary primacy and benefits of goal attainment processes, see Heckhausen & Schulz, 1995) and (b) people need to adjust their behavioral responses to complex situational demands. Thus, certain emotions may have evolved to help the organism respond behaviorally to unfavorable environmental contingencies (Heckhausen, 2000). Depressive mood, in particular, is associated with more realistic perceptions of the environment (Dykman, Abramson, Alloy, & Hartlage, 1989), and it therefore should be conducive to the selection of appropriate life goals (Taylor & Gollwitzer, 1995). Thus, depressive symptomatology may have evolved to facilitate the withdrawal of effort and commitment from pursuing an unattainable goal, thereby guiding the selection of adaptive human behavior.

The idea that negative emotions can serve adaptive functions has also been addressed by a number of personality theories that examine how people regulate their behavior. These theories assume that negative affect often emerges in circumstances that involve difficulty with goal pursuits (for associations between life events, goal failure, and negative affect, see Carver & Scheier, 1990, 1998; Higgins, 1987; Taylor, 1991; Watson, Clark, & Tellegen, 1988). Personality theories further predict that the negative affect arising from problems with goal attainment may motivate adaptive behaviors. For example, Klinger (1975) has argued that people try to overcome obstacles that they experience in the pursuit of personal goals. However, when they are unable to overcome the obstacle and fail in attaining the goal, negative mood arises and facilitates disengagement from the incentive (Klinger, 1975). Consistent with this line of arguing, Frijda (1988) noted that failure experiences are particularly strong predictors of persistent negative affect, which can serve as a signal for necessary behavioral responses. Moreover, Carver and Scheier (1990, 1998) have suggested that goal failure not only elicits negative affect but also interrupts self-regulation activities. In such circumstances, people disengage from a goal if they have doubts about attaining the goal in the future (Carver & Scheier, 1990, 1998).

In support of these theoretical propositions, recent empirical studies have demonstrated that abandoning a desired goal can be adaptive if the goal is no longer attainable (e.g., Wrosch, Scheier, Miller, et al., 2003). From this perspective, goal adjustment involves two separate processes: People need to disengage from the unattainable goal, and they need to reengage in other meaningful activities (Carver & Scheier, 1990, 1998; Wrosch, Scheier, Carver, & Schulz, 2003). Goal disengagement requires a person to withdraw effort and commitment from the pursuit of a goal, while goal reengagement entails the identification of, commitment to, and pursuit of new goals when a desired goal can no longer be attained (Wrosch, Scheier, Carver, & Schulz, 2003; Wrosch, Scheier, Miller, et al., 2003).

Research from this line of work further suggests that people differ in their general capacities to disengage from unattainable goals and to reengage in other new goals, across different circumstances (Wrosch, Scheier, Miller, et al., 2003). In addition, it demonstrates that individuals with better goal disengagement capacities are higher in subjective well-being, have lower cortisol output and less systemic inflammation, and report fewer symptoms of illness (Miller & Wrosch, 2007; Wrosch, Miller, Scheier, & Brun de Pontet, 2007; Wrosch, Scheier, Miller, et al., 2003). In a similar vein, goal reengagement capacities have been shown to predict high levels of subjective well-being (e.g., life satisfaction, low depression, or fewer suicidal thoughts; R. C. O'Connor & Forgan, 2007; Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). In most cases, these effects were documented prospectively, such that goal adjustment capacities forecast improvements in outcomes over time (for other experimental and longitudinal studies demonstrating beneficial effects of goal adjustment processes, see also Duke, Leventhal, Brownlee, & Leventhal, 2002; Kuhl, 1981; Wrosch, Bauer, Miller, & Lupien, 2007; Wrosch & Heckhausen, 1999).

While the previous discussion of the role played by negative mood in the adjustment of unattainable goals focused on single episodes of depressive symptoms that result from the failure to attain a specific goal, we note that research also documents moderate stability in people's depressive symptomatology over time (T. G. O'Connor, Neiderhiser, Reiss, Hetherington, & Plomin, 1998). This implies that there is reliable variation between individuals in their tendencies to experience depressive symptoms. From our perspective, such stability in depressive mood may, in part, reflect that some people encounter goal failure more frequently than do other people.[2] In addition, this raises the possibility that depressive mood not only triggers the adjustment to a specific unattainable goal but also may contribute to a person's general goal adjustment capacities over a considerable period of time. In particular, the frequent experience of specific unattainable goals and the associated depressive symptoms could trigger repeated cycles of successful goal adjustment. Over time, such cycles of adjustments to specific unattainable goals may bring about improvements in a person's general capacities to cope with a broader range of unattainable goals in the future.

To further explore this possibility, we reasoned that effects of depressive mood on improvements in a person's general goal adjustment capacities are particularly likely to occur in adolescence because this is a life phase when individuals are actively engaged in forming their identities (Markus & Nurius, 1986), which often entails pursuing goals that later prove to be unrealizable (Reynolds, Steward, MacDonald, & Sischo, 2006). This makes it possible that adolescents who tend to experience elevated levels of depressive symptoms improve their general goal adjustment capacities over time, given that they are more likely to encounter frequent cycles of successful adjustments to specific unattainable goals. Further, given the documented benefits of high levels of goal adjustment capacities (Miller & Wrosch, 2007;

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[2] We note that there are also other factors that could contribute to stability in depressive symptoms—factors such as family dysfunction, affect regulation, and biological and genetic factors (cf. Garber, Keiley, & Martin, 2002).

Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003), adolescents who exhibit improvements in their goal adjustment capacities may subsequently experience a reduction of their depressive symptomatology.

The Present Study

The previous discussion suggests that depressive symptomatology may make it easier to adjust to unattainable goals and thereby fosters adaptive outcomes. However, to the best of our knowledge, there is no empirical research that has rigorously tested this proposed process model. To address this gap in the literature, we examined the associations between depressive symptomatology (with the Beck Depression Inventory [BDI]; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and goal adjustment capacities (i.e., goal disengagement and goal reengagement; Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003) in four waves of data from a 19-month longitudinal study of adolescent girls who were at high risk for experiencing depressive symptoms.

We were interested in testing two hypotheses. The first hypothesis predicted that high baseline levels of depressive symptomatology would forecast an increase in participants' general goal adjustment capacities over time. The second hypothesis assumed that such increases in participants' goal adjustment capacities would be associated with reduced levels of subsequent depressive symptoms. Given the four waves of data available in the present study, we examined whether baseline levels of depressive symptoms at Time 1 (T1) would predict an increase in participants' goal adjustment capacities over the 1st year of study (T1 to T3). In addition, we tested whether increased levels of goal adjustment capacities over the 1st year of study (from T1 to T3) would predict a reduction of subsequent levels of depressive symptomatology. The second hypothesis was tested by examining whether a reduction of depressive symptoms over 19 months as well as T4 levels of depression (controlling for previous levels of depressive symptoms) could be predicted by an improvement of goal adjustment capacities over the 1st year of study.

Method

Participants and Procedures

This study is part of a larger project on depression among adolescent women at high risk for affective disorders. Participants were recruited from Vancouver, British Columbia, through advertisements in local media. Eligibility criteria were as follows: (a) 15–19 years old, (b) fluent in English, (c) free of acute and chronic medical conditions, (d) without a lifetime history of psychiatric disorders, and (e) at high risk for developing an initial episode of depression. *High risk* was defined as having a first-degree relative with a history of depression or as scoring in the top quartile of the population distribution on one of two indexes of cognitive vulnerability: the Dysfunctional Attitudes Scale (Alloy et al., 2006) or the Adolescent Cognitive Style Questionnaire (Hankin & Abramson, 2002).[3]

This study enrolled 122 participants at baseline (T1). The mean age of the sample was 17.16 years ($SD = 1.33$). Forty-four percent were Caucasians, 38% were East Asians, and 18% were of East Indian, African, Aboriginal, or other origin. Participants came from homes where parents averaged 14.94 years of education ($SD = 2.99$). The project was approved by the University of British Columbia Research Ethics Board, and written consent was obtained from all participants. For those who were younger than 18, a parent or guardian also provided consent.

Subsequent waves of data were collected at approximately 7 months (T2: $M = 6.71$, $SD = 1.21$), 13 months (T3: $M = 13.01$, $SD = 1.66$), and 19 months (T4: $M = 19.00$, $SD = 2.22$) after the initial interview. Of the initial 122 participants, 17 discontinued their participation over time, and key data from 8 additional participants could not be used due to missing data at baseline or technical problems with data collection software. We excluded these participants from the analyses. The final sample included 97 participants, and these participants did not significantly differ from excluded participants with respect to baseline levels of depressive symptoms, goal adjustment capacities, and age, all ts $< .92$, all ps $> .10$.

Materials

The main variables presented in this study included participants' goal adjustment capacities, measured three times across the 1st year of study, and participants' depressive symptoms, measured four times across 19 months. Table 1 presents the means of and associations between these constructs.

The Goal Adjustment Scale (Wrosch, Scheier, Miller, et al., 2003)—a self-report questionnaire administered at T1, T2, and T3—measured participants' general goal disengagement and goal reengagement capacities. This instrument has been validated in a number of studies documenting independent factors of goal disengagement and goal reengagement, satisfactory internal consistencies, and associations with adaptive outcomes including indicators of subjective well-being, biological functioning, and physical health (Miller & Wrosch, 2007; Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003).

Participants responded to 10 items—measuring how they usually react if they have to stop pursuing an important goal—on 5-point Likert-type scales ranging from 1 (*almost never true*) to 5 (*almost always true*). Four items measured a person's capacity to disengage from unattainable goals (e.g., "It's easy for me to reduce my effort towards the goal" or "I stay committed to the goal for a long time; I can't let it go"), and six items measured a person's capacity to reengage with new goals (e.g., "I seek other meaningful goals" or "I start working on other new goals"). For each measurement point, we computed sum scores of the goal disengagement items (αs $= .71$ to $.80$) and the goal reengagement items

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[3] Participants who had a family history of depression ($n = 39$) did not significantly differ from participants who were recruited only on the basis of cognitive vulnerability or dysfunctional attitudes ($n = 78$) with respect to baseline measures of depressive symptomatology, goal adjustment capacities, and age. In addition, we included five control participants into the sample who had a low risk for depression. In fact, these participants reported lower baseline scores of depressive symptomatology but did not differ from other participants with respect to goal adjustment capacities or age. Given that our theoretical framework would also apply to low-risk participants, and all reported effects remained significant if low-risk participants were excluded from the analyses, we kept these participants in the analyses.

Table 1
Means (SDs) and Zero-Order Correlations of Main Constructs

Main construct	M (SD)	1	2	3	4	5	6	7	8	9
1. Depressive symptoms (T1)	7.50 (6.33)	—								
2. Depressive symptoms (T2)	6.95 (6.07)	.67**	—							
3. Depressive symptoms (T3)	6.47 (5.66)	.53**	.49**	—						
4. Depressive symptoms (T4)	5.61 (4.60)	.50**	.63**	.58**	—					
5. Goal disengagement (T1)	9.80 (2.90)	.09	−.02	.06	.02	—				
6. Goal disengagement (T2)	10.47 (2.64)	.13	.08	.24*	−.03	.35**	—			
7. Goal disengagement (T3)	10.83 (2.81)	.33**	.20*	.12	−.02	.34**	.51**	—		
8. Goal reengagement (T1)	22.37 (3.15)	−.08	−.12	−.12	−.03	.22*	−.14	−.13	—	
9. Goal reengagement (T2)	23.40 (3.06)	−.21*	−.21*	−.12	−.23*	−.04	.16	−.02	.58**	—
10. Goal reengagement (T3)	23.77 (2.89)	−.09	−.13	−.15	−.02	−.15	−.02	.02	.36**	.50**

Note. T in T1–T4 = time.
* $p < .05$. ** $p < .01$.

(αs = .79 to .80).[4] As reported in Table 1, the goal disengagement and goal reengagement scales were only modestly correlated with each other and were significantly correlated across measurements.

We also computed change scores of goal disengagement capacities and goal reengagement capacities to examine whether increased levels of goal adjustment capacities predict subsequent levels of depressive symptoms. To this end, we calculated the within-person regression coefficients across the 1st year of study (predicting goal adjustment capacities by year since study entry for T1, T2, and T3 with a linear regression model using Excel) for both goal disengagement capacities ($M = .08$, $SD = .26$) and goal reengagement capacities ($M = .10$, $SD = .26$).

Depressive symptoms were assessed with the Beck Depression Inventory (BDI; Beck et al., 1961). Participants were asked to report the severity of 22 depression symptoms over the past 2 weeks on Likert-type scales ranging from 0 to 3 (e.g., sadness: 0 = "I do not feel sad"; 3 = "I am so sad or unhappy that I can't stand it"). We computed sum scores of the 22 items at T1 for all four measurements (αs = .80 to .87). Depressive symptoms were significantly correlated across assessments (see Table 1) and declined from study onset to T4, $t(96) = 3.27$, $p < .01$.[5]

Results

We examined whether high baseline levels of depressive symptoms would predict increases in participants' goal adjustment capacities over time by estimating two sets of growth curve models, utilizing hierarchical linear modeling (HLM) 6.0 (Raudenbush, Bryk, Cheong, & Congdon, 2004). In the Level 1 models, we estimated within-person variability in participants' goal disengagement capacities and goal reengagement capacities (using data from T1, T2, and T3) as a function of months since study entry (β_1 values) and a residual term. In the Level 2 models, we then tested our hypothesis by estimating between-person variation in participants' goal disengagement slopes and goal reengagement slopes (β_1 values) as a function of standardized baseline scores of depressive symptomatology (γ_{11} values) and a random residual term. The Level 2 models also controlled for age (γ_{12} values). In addition, Level 1 and Level 2 models were estimated to predict the intercepts of participants' goal adjustment capacities (β_0 values, which reflect participants' scores at study entry, and γ_{01} and γ_{02}

values, which represent the effects of depressive symptoms and age on the Level 1 intercept).

Table 2 summarizes the results of the analyses. The Level 1 models demonstrated significant effects for the intercepts of goal disengagement and goal reengagement capacities, indicating that baseline scores of these constructs were significantly different from 0. In addition, the Level 2 models showed that neither baseline levels of depressive symptomatology nor age exerted significant effects on the intercept (baseline levels) of goal disengagement capacities or goal reengagement capacities.

Table 2 also shows that the Level 1 models revealed significant slope effects, indicating that time since study entry significantly predicted variability in participants' goal disengagement and goal reengagement capacities. Levels of goal disengagement capacities and goal reengagement capacities exhibited a significant linear increase over the 1st year of study. Time since study entry explained 16.9% of the variability in participants' goal disengagement capacities and 24.2% of the variability in participants' goal reengagement capacities. In addition, there was significant variability around the average within-person slopes of goal disengagement capacities and goal reengagement capacities (χ^2s > 126, dfs = 96, $N = 97$, ps < .05), suggesting the presence of reliable between-person differences in these slopes.

Of importance, the results of the Level 2 models further demonstrated a significant effect of baseline levels of depressive symptomatology on participants' goal disengagement slope (see Table 2). These findings support our hypothesis by indicating that higher baseline levels of depressive symptoms forecasted greater goal disengagement capacities over the 1st year of the study. Depressive symptoms explained 21.0% of the between-person variance in disengagement slope over time (as compared with a Level 2 model that included only age). However, baseline levels of depressive

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[4] Two participants did not report data on goal adjustment capacities at T2 (but had data at T1 and T3), and 8 participants did not report data on goal adjustment capacities at T3 (but had data at T1 and T2). We replaced these missing data with the sample means.

[5] Two participants did not report scores for depressive symptoms at T2, and 9 participants did not report scores for depressive symptoms at T3 (but had scores for depressive symptoms at T1 and T4). These missing data were replaced with the sample means.

Table 2

Results of HLM Analyses Predicting Individual Differences in Within-Person Changes in Goal Disengagement and Goal Reengagement Capacities (From T1 to T3) by Baseline Levels of Depressive Symptomatology (T1) and by Age

	Goal disengagement capacities		Goal reengagement capacities	
Variable	Coefficient (SE)	T ratio	Coefficient (SE)	T ratio
Level 1				
Intercept (β_0)[a]	9.861 (0.271)	36.40**	22.482 (0.317)	70.96**
Level 2 predictors of Level 1 intercept				
T1 depressive symptoms (γ_{01})	0.143 (0.274)	0.52	−0.432 (0.316)	−1.36
Age (γ_{02})	0.289 (0.274)	1.05	0.493 (0.317)	1.56
Level 1				
Slope (β_1)[b]	0.078 (0.025)	3.08**	0.106 (0.026)	4.07**
Level 2 predictors of Level 1 slope				
T1 depressive symptoms (γ_{11})	0.053 (0.025)	2.13*	0.003 (0.026)	0.12
Age (γ_{12})	−0.025 (0.025)	−0.98	−0.031 (0.027)	−1.17

Note. For Level 1 models, dfs = 96. For Level 2 results, dfs = 94. HLM = hierarchical linear modeling; T in T1–T3 = time.
[a] Level 1 intercepts represent baseline levels of goal disengagement and goal reengagement capacities. [b] Level 1 slopes represent the within-person associations between time since study entry and levels of goal disengagement capacities and levels of goal reengagement capacities.
* $p < .05.$ ** $p < .01.$

symptoms were not significantly associated with between-person differences in participants' goal reengagement slope, and age did not exert a significant effect in either model.

We illustrated the significant effect of baseline levels of depressive symptoms on the development of goal disengagement capacities in Figure 1. The solid lines represent simple slopes of goal disengagement capacities, calculated from HLM analyses, separately for the averaged upper quartile (BDI = 17.48) and lower quartile (BDI = 1.36) of the baseline depressive symptoms distribution (Curran, Bauer, & Willoughby, 2006). The dotted lines illustrate the same associations by plotting raw data of goal disengagement capacities across time, separately for participants who scored within the lower quartile and within the upper quartile of the depressive symptoms distribution at baseline.

The observed pattern of results was highly similar for the linear trajectories (calculated from HLM) and the raw data (see Figure 1).
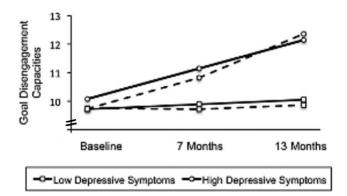

Figure 1. Changes in goal disengagement capacities across the first three waves for participants who scored high versus low on the BDI-Depression Scale. Solid lines represent goal disengagement changes for the averaged upper and lower quartiles of the BDI-Depression Scale, calculated in HLM. Dotted lines illustrate raw data of goal disengagement capacities for participants scoring in the lower and upper quartile of the depressive symptoms distribution.

In addition, the findings support our hypotheses by suggesting that higher baseline levels of depressive symptoms were associated with a steeper increase in goal disengagement capacities across time, as compared with lower levels of depressive symptomatology. In other words, to the extent that they experienced high levels of depressive symptoms at baseline, participants became better at disengaging from unattainable goals over the next year. Follow-up analyses calculating the simple slope coefficients for the averaged lower and higher quartiles of the depressive symptoms distribution support this conclusion by demonstrating that goal disengagement capacities increased only among participants with high levels of baseline depressive symptoms (coefficient = 0.16, SE = 0.04, T ratio = 3.48, $p < .01$) but not among participants with low levels of baseline scores of depressive symptomatology (coefficient = 0.02, SE = 0.03, T ratio = 0.73, $p > .10$).

To test our second hypothesis, that an increase in goal adjustment capacities over the 1st year of study would be associated with a reduction in depressive symptoms over time, we conducted two different types of analyses. First, we estimated a growth-curve model to examine whether changes in depressive symptoms over 19 months could be reliably predicted by an increase in goal adjustment capacities over the 1st year of study. Because in this analysis part of the variance in predictor and outcome variables was assessed at the same measurement points, we additionally estimated a regression model, which predicted T4 levels of depressive symptoms (controlling for previous levels of depressive symptoms) by changes in goal adjustment capacities from T1 to T3.

In the Level 1 model, the growth-curve analysis estimated the within-person variability in participants' depressive symptomatology over 19 months of study (using data from T1, T2, T3, and T4) as a function of months since study entry (β_1 value) and a residual term. The Level 2 model subsequently tested our hypothesis by estimating between-person variation in participants' depressive symptomatology slopes (β_1 value) as a function of changes in goal disengagement capacities (γ_{11} value) and goal reengagement capacities (γ_{12} value) over the 1st year of study, age (γ_{13} value), and

a random residual term. As described in the Method section, change scores of goal adjustment capacities were calculated in separate linear regression models (with Excel) and represent within-person regression coefficients across the 1st year of study (predicting goal disengagement and goal reengagement capacities by years since study entry for T1, T2, and T3). The Level 1 model also predicted the intercept of participants' depressive symptoms (β_0 value, which reflects participants' depressive symptoms at study entry). In addition, the Level 2 model was estimated to predict the intercept of participants' depressive symptomatology (γ_{01}, γ_{02}, and γ_{03} values, which represent the effects of changes in goal disengagement and goal reengagement capacities, and age, on the Level 1 intercept).

The results of the analysis are reported in Table 3. The intercept of the Level 1 model was significant, indicating that participants' baseline scores of depressive symptoms were significantly different from 0. The subsequent results from the Level 2 model showed that changes in goal disengagement capacities (but not changes in goal reengagement capacities or age) significantly predicted the intercept of participants' depressive symptomatology. This finding mirrors the results from the above-reported analyses by demonstrating that participants who increased their goal disengagement capacities over the 1st year of study experienced higher baseline levels of depressive symptomatology, as compared with participants who did not increase their goal disengagement capacities.

In addition, the results of the Level 1 model showed that time since study entry was associated with variability in participants' depressive symptomatology (see slope effect in Table 3). Levels of

Table 3
Results of HLM Analyses Predicting Individual Differences in Within-Person Changes (T1 to T4) in Depressive Symptomatology by Changes in Goal Disengagement and Goal Reengagement Capacities From T1 to T3 and by Age

Variable	Depressive symptomatology	
	Coefficient (SE)	T ratio
Level 1		
Intercept (β_0)[a]	7.624 (0.627)	12.16**
Level 2 predictors of Level 1 intercept		
Δ goal disengagement capacities (slope T1–T3) (γ_{01})	1.690 (0.681)	2.48**
Δ goal reengagement capacities (slope T1–T3) (γ_{02})	−0.734 (0.683)	−1.07
Age (γ_{03})	0.515 (0.625)	0.82
Level 1		
Slope (β_1)[b]	−0.102 (0.029)	−3.49**
Level 2 predictors of Level 1 slope		
Δ goal disengagement capacities (slope T1–T3) (γ_{11})	−0.098 (0.032)	−3.06**
Δ goal reengagement capacities (slope T1–T3) (γ_{12})	0.044 (0.032)	1.39
Age (γ_{13})	−0.038 (0.029)	−1.32

Note. For Level 1 model, *df*s = 96. For Level 2 results, *df*s = 93. HLM = hierarchical linear modeling; T in T1–T4 = time.
[a] Level 1 intercept represents baseline levels of depressive symptoms. [b] Level 1 slope represents the within-person associations between time since study entry and levels of depressive symptoms.
** $p < .01$.

depressive symptoms exhibited a significant linear decline over the course of 19 months. Time since study entry explained 13.9% of the variability in participants' depressive symptoms. In addition, there was significant variability around the average within-person slopes of depressive symptoms, $\chi^2(96, N = 97) > 129$, $p < .05$, suggesting the presence of reliable between-person differences in this slope.

The results of the Level 2 models further showed a significant effect of changes in goal disengagement capacities on participants' depressive symptoms slope. These findings support our hypothesis by demonstrating that increases in goal disengagement capacities over the 1st year of study forecasted declines in depressive symptomatology over 19 months.[6] Changes in goal disengagement capacities explained 29.9% of the between-person variance in the depressive symptoms slope over time (as compared with a Level 2 model that included only age and changes in goal reengagement capacities). However, changes in goal reengagement capacities and age were not significantly associated with participants' depressive symptoms slope.

Figure 2 illustrates the effect of changes in goal disengagement capacities on depressive symptomatology over time by displaying the trajectories of depressive symptoms across all four measurements separately for participants who exhibited large versus no increases in goal disengagement capacities over the 1st of year of study. The solid lines were calculated from HLM analyses and represent the averaged upper quartile ($M = .45$) and lower quartile ($M = −.23$) of the distribution of changes in goal disengagement over the 1st year of study. The dotted lines illustrate the same associations by plotting raw data of depressive symptoms across time separately for participants who scored within the lower quartile and within the upper quartile of the distribution of changes in goal disengagement capacities over the 1st year of study.

The pattern of findings was similar for the linear trajectories (calculated from HLM) and the raw data (see Figure 2). In addition, the results demonstrate different trajectories of depressive symptoms for the two groups of participants. While levels of depressive symptoms remained fairly stable among participants who did not experience an increase in their goal disengagement capacities over the 1st year of study (coefficient = 0.051, SE = 0.047, T ratio = 0.31, $p > .10$), participants who exhibited improvements in goal disengagement capacities exerted a steep decline in their initially higher levels of depressive symptomatology across time (coefficient = −0.242, SE = 0.054, T ratio = −4.51, $p < .01$). These findings demonstrate that to the extent participants became better at disengaging from unattainable goals, their depressive symptomatology linearly declined over time. Toward the last measurement point, the levels of depressive symptoms of participants with large improvements in their goal disengagement capacities were bound even below the levels of depressive symp-

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[6] We note that using T3 levels or residualized change scores (regressing T1 scores on T3 scores) of goal adjustment capacities as predictor variables showed the same pattern of results for the growth-curve model and the regression analysis. In these analyses, increases in goal disengagement capacities or high T3 levels of goal disengagement capacities were significant predictors of declines in depressive symptoms over 19 months (T ratios < −3.93, ps < .01) and lower T4 levels of depressive symptoms, controlling for previous depressive symptoms (Fs > 5.57, βs < −.17, ps < .05).
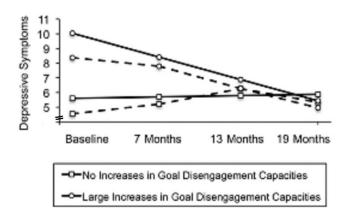
Figure 2. Depressive symptoms across time for participants with large versus no increases in goal disengagement capacities from T1 to T3. Solid lines represent changes in depressive symptoms for the averaged upper and lower quartiles of changes in goal disengagement. Dotted lines illustrate raw data of depressive symptoms over time for participants scoring in the lower and upper quartile of the slope measure of goal disengagement from T1 to T3.

tomatology of participants who did not experience increases in their goal disengagement capacities.

Because the previous analysis included predictor and outcome variables that were in part assessed at the same measurement points, we finally conducted a regression analysis to disentangle the predictor and outcome variables across measurements. This analysis predicted depressive symptoms obtained at T4 by the scores of depressive symptomatology obtained at T1, T2, and T3 (to operationalize an analysis of changes in depressive symptoms), as well as change scores of goal disengagement capacities and goal reengagement capacities (using the previously computed slope measures; see Method section) and participants' age.

The results of the analysis are reported in Table 4. Age was not significantly associated with changes in depressive symptoms over time, $F(1, 90) = 0.58$, $p > .05$. Depressive symptoms obtained at T1, T2, and T3 predicted 51% of the variance in T4 scores of depressive symptomatology, $F(3, 90) = 32.04$, $p < .01$. Of importance, the analyses demonstrated that above and beyond previous depressive symptoms, increases in goal disengagement capacities significantly predicted levels of depressive symptomatology at T4, $F(1, 90) = 5.20$, $p < .05$. This significant effect suggests that participants who exhibited larger increases in goal disengagement capacities over the 1st year of the study experienced a more pronounced reduction in depressive symptoms during the subsequent 6-month period, as compared with their counterparts, who reported less improvement in their goal disengagement capacities. Goal reengagement capacities were not associated with T4 scores of depressive symptomatology, $F(1, 90) = 1.08$, $p > .05$.

Discussion

We conducted this research to examine whether depressive symptomatology can serve adaptive functions in the self-regulation of behavior. In particular, we reasoned that depressive symptoms may contribute to the development of goal adjustment capacities in adolescence, a life phase during which people often adopt unrealistic and unattainable goals. Moreover, we examined whether increased levels of goal adjustment capacities can predict lower levels of subsequent depressive symptoms.

The reported findings provide evidence in support of the idea that depressive symptomatology can facilitate the development of goal disengagement capacities. Among adolescents with high baseline levels of depressive symptoms, goal disengagement capacities significantly increased over the subsequent year. By contrast, no increases in goal disengagement capacities were observed among their adolescent counterparts, who experienced low levels of baseline depressive symptoms. These findings demonstrate that the experience of depressive symptomatology is associated with an improvement in adolescents' goal disengagement capacities over time. This effect was substantial. Depressive symptomatology explained approximately 21% of the variance in change in goal disengagement capacities over time.

Of importance, our data also suggest that there was no significant association between depressive symptoms and goal disengagement at baseline. This makes it unlikely that participants who were depressed at baseline also had difficulty with adjusting to unattainable goals, which may have subsided as their depressive mood improved. Instead, we feel that this finding strengthens our conclusion that depressive symptomatology may have triggered an improvement in goal disengagement capacities over time.

That said, we note that other studies have demonstrated concurrent associations between goal disengagement capacities and subjective well-being, more favorable biological profiles, and better health outcomes (Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). In this regard, the absence of a cross-sectional association between goal disengagement and depressive symptoms seems to be inconsistent with these previous findings. Nonetheless, our data suggest a substantial increase in goal disengagement capacities over time, which may imply that during phases of intra-individual changes in personality factors, it is individual differences in change, and not baseline levels, that determine adaptive outcomes. This may explain the differences found across studies, given that previous cross-sectional associations between goal adjustment and adaptive outcomes were found mostly in adult samples, in which stable individual differences in goal adjustment capacities may be more likely to be present.

In addition, the longitudinal findings from our study would support this argument by documenting that increased levels of goal

Table 4

Regression Analysis Predicting Depressive Symptomatology at T4 by Changes in Goal Adjustment Capacities From T1 to T3, Controlling for Age and Depressive Symptomatology From T1, T2, and T3

	Depressive symptoms at T4	
Variable	R^2	β
Depressive symptoms from T1, T2, and T3	.51**	
Age	.00	−.06
Δ goal disengagement capacities (slope T1–T3)	.03*	−.19*
Δ goal reengagement capacities (slope T1–T3)	.01	.08

Note. T in T1–T4 = time.
* $p < .05$.   ** $p < .01$.

disengagement capacities predicted lower levels of subsequent depressive symptomatology, controlling for previously experienced depressive symptoms. More specifically, our data showed that participants who did not improve their goal disengagement capacities experienced not much change in depressive symptomatology over time. By contrast, a linear decline in initially elevated levels of depressive symptomatology across measurements was confirmed among participants who experienced large increases in goal disengagement capacities. Toward the last measurement point, these declining trajectories of depressive symptomatology were bound even below the depressive symptom scores of participants who showed no increases in their goal disengagement capacities. These findings are consistent with the idea that improvements in goal disengagement capacities bring about declines in depressive symptomatology.

These data also indicate that adolescence is an important period for the development of goal disengagement capacities. Goal disengagement capacities increased over time, and these capacities were approaching levels that we have documented among adult samples (see Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). We suggest that goal disengagement capacities may develop in adolescence because this is a life phase during which people often adopt goals that later prove to be unrealistic (cf. Markus & Nurius, 1986; Miller & Wrosch, 2007). In such circumstances, individuals typically attempt to cope with goal failure, and some of them successfully adjust to the experience of unattainable goals. Such cycles of adjustments to specific unattainable goals may contribute over time to the emergence of more stable individual differences in people's general goal disengagement capacities (for stability of goal disengagement across different situations in adulthood, see Wrosch, Scheier, Miller, et al., 2003). This explanation would be consistent with previous findings suggesting that internal adjustments to environmental constraints (i.e., secondary control processes; Thurber & Weisz, 1997) develop in adolescence.

In a similar vein, our data suggest that participants' goal reengagement capacities also increased in adolescence. However, depressive mood did not make it easier for participants to identify, commit to, or pursue alternative goals. In addition, goal reengagement was not associated with subsequent depressive symptoms. It may be that predictors of goal reengagement capacities are different from those involved in the development of goal disengagement capacities, and processes that support the attainment of personal goals may facilitate the identification and pursuit of new goals (e.g., optimism, purpose, or perceived control; Lachman, 2006; Rasmussen, Wrosch, Scheier, & Carver, 2006; Scheier & Carver, 1985; Scheier et al., 2006; Wrosch, Scheier, Miller, & Carver, in press). In fact, goal reengagement typically exerts weaker effects on negative emotional states and associated physical problems than does goal disengagement (see Miller & Wrosch, 2007; Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). As discussed elsewhere, this may be due to the fact that the primary function of goal reengagement is to provide purpose for living and not to relieve negative emotional states (Wrosch, Miller, et al., 2007; for origins of positive and negative affect, see also Watson, Clark, & Tellegen, 1988).

Overall, the results of this project suggest two conclusions that are at odds with conventional wisdom in psychology. The first is that symptoms of depression, which are widely viewed as pathologic, are likely to have some adaptive value, at least for the development of self-regulatory capacities. Second, and perhaps even more important, our findings demonstrate that these improvements in the capacity to disengage were associated with declines in subsequent depressive symptoms. These results suggest that when key life goals have become unattainable, depressive mood can facilitate the most adaptive response for mental and physical health: that is, to withdraw effort and commitment from pursuing these goals. While this view makes sense intuitively and is consistent with theories assuming that depressive symptoms are associated with subsequent disengagement of efforts from a variety of goals (Seligman, 1975; Wortman & Brehm, 1975), it is at odds with the deeply held beliefs in Western culture (and much of scientific psychology; e.g., Bandura, 1997; Taylor & Brown, 1988) suggesting that giving up is detrimental to success and quality of life. It is, however, consistent with ideas advanced by a small group of evolutionary and personality psychologists focusing on the adaptive value of negative emotions (Keller & Nesse, 2006; Klinger, 1975; Nesse, 2000).

Finally, we think that the reported findings may have some implications for clinical treatment. If depressive symptomatology can facilitate the development of goal disengagement capacities, the most useful interventions among depressed adolescents may be those that directly aim at strengthening a person's self-regulation skills, such as psychotherapy. However, many clinical scientists and practitioners have focused on techniques that promote engagement in activities and goal attainment (e.g., Nathan & Gorman, 1998). In this regard, we think it is equally important to strengthen a person's goal disengagement capacities because goal disengagement can be an adaptive process that enables a person to manage difficult life circumstances.

Limitations and Future Research

While this is the first study demonstrating that depressive symptomatology can be an adaptation by facilitating the development of goal disengagement capacities in adolescence, there are important limitations that need to be addressed in future research. First, our sample included adolescent girls who were at high risk for experiencing an affective disorder. This limits the generalizability of the findings with respect to gender and range of depressive symptomatology.

To address these issues, future research should replicate the reported findings in adolescent boys. Gender differences in depressive symptomatology often emerge in adolescence (Hankin, Abramson, Moffitt, Silva, & McGee, 1998) and could have implications for the development of goal adjustment capacities, although we note that gender did not explain levels or effects of goal adjustment capacities in adult samples (Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). In addition, clinical samples of adolescents should be studied. This is important because studies suggest that young people have moved toward more unrealistic expectations (Reynolds et al., 2006), and increases in depression have been documented over the past decades (e.g., Klerman, 1988). Therefore, we suggest that researchers examine whether goal disengagement can also be facilitated by syndromal depression. In this regard, there may be a tipping point at which

extreme levels of depressive symptoms cause people to prematurely abandon goals that would otherwise be attainable and contribute to their quality of life.

Second, our study focused on changes in general goal adjustment capacities and did not examine the regulation of specific goals. In this regard, we would expect that the regulation of specific goals may underlie the changes in broader goal regulation capacities observed in our study. In addition, we note that there may be factors other than depressive symptoms that could influence the ease of goal adjustment. For example, research suggests that optimistic expectations in the presence of alternatives may facilitate goal disengagement (Aspinwall & Richter, 1999). In a similar vein, goal-related behaviors may depend on differences in the importance of people's goals or may be influenced by automatic cognitive processes and contextual factors (e.g., Bargh & Chartrand, 1999; Heckhausen & Schulz, 1995; Shah, 2005; Wrosch, Scheier, Carver, & Schulz, 2003). Given these considerations, we think that future research is warranted to examine how emotional states can determine the regulation of specific goals and how these processes are influenced by other personal, contextual, and social–cognitive factors.

Finally, while we think it is provocative that a process associated with previously measured high levels of depressive symptoms can predict lower levels of subsequent depressive symptomatology, the reported analyses did not demonstrate effects on long-term developmental outcomes. As discussed earlier, we would not be surprised if the observed improvements of goal adjustment capacities could facilitate adaptation to critical life events in adulthood (Wrosch, Miller, et al., 2007; Wrosch, Scheier, Miller, et al., 2003). We therefore suggest that future research follow adolescents into adulthood to further illuminate the differential functions of depressive symptomatology on long-term psychological and biomedical endpoints.

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