



Universiteit  
Leiden  
The Netherlands

## **Well-being and headache in adolescence : A self-regulation perspective**

Massey, E.K.

### **Citation**

Massey, E. K. (2009, April 21). *Well-being and headache in adolescence : A self-regulation perspective*. Retrieved from <https://hdl.handle.net/1887/13750>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/13750>

**Note:** To cite this publication please use the final published version (if applicable).

## *Chapter Seven*

### Summary & General Discussion

## Summary

The main aim of this thesis was to explore the role of self-regulatory processes in well-being in the general population of adolescents: among both 'healthy' adolescents and those with recurrent headache. This thesis contributes new insights on how frustration to successful goal pursuit and strategies to cope with goal frustration are related (both cross-sectionally and prospectively) to psychological well-being and quality of life in adolescents under the age of 18. Moreover, this is the first investigation of goal frustration and cognitive coping in the context of a health complaint in adolescence, namely headache. Headache was chosen as an example of a physical complaint commonly reported by adolescents which has substantial impact on well-being and quality of life.

*Chapter One* introduces the theoretical framework of the research presented in this thesis, namely self-regulation theory. In *Chapter Two* a review of the literature on adolescent goal content and process appraisals is presented. The aim of this review was to summarize the research published since Nurmi's review in 1991 and to identify avenues for future development. Examination of ninety-four studies revealed that the goals adolescents strive to attain vary according to both their personal characteristics (e.g. gender and age) and the characteristics of their environment (e.g. familial and cultural context, educational setting, and availability of resources). These sociodemographic and cultural factors contribute to the channelling of adolescent goals (Nurmi, 2004). Furthermore, the goals that adolescents set for themselves, the way they think about and go about pursuing these aspirations appears to be linked to health compromising and deviant behaviour and psychological well-being. On the basis of the current literature, however, no conclusions can be drawn as to the causality of these associations. Various suggestions for future research were offered in this review, some of which were addressed in the studies that followed. For example, it was concluded from the review that there is yet much to learn about the goals that adolescents set themselves and what factors shape goal setting and pursuit. There was a noticeable paucity of research on how individual and environmental characteristics are related to goal cognitions and processes. Similarly, a need was identified for greater exploration of the relationships between goal process appraisals, behavioural and psychological

outcomes. Finally, a greater emphasis on prospective or daily process research is required.

Following from this review a cross-sectional questionnaire study was conducted, as presented in *Chapter Three*. The main research questions in this study were: (1) to what extent are the content of adolescent goals and goal-process appraisals related to the individual characteristics of gender, age, ethnicity and educational track?; and (2) to what extent are the type of goals reported, perception of difficulty in goal attainment, goal related self-efficacy, experience of obstacles and goal frustration related to well-being in adolescence? In order to address these questions, 438 Dutch high-school students aged 12 to 19 completed written questionnaires. In order to maximize personal relevance of the questions, an open goal-elicitation procedure was employed through which youths generated a self-articulated list of their important personal goals in various life domains (school/future, leisure, relationships, self, and health). Goal frustration was assessed by indicating the extent of emotional reaction to obstacles to goal pursuit in terms of being fed up, stressed or angry. Results revealed that girls reported more school, relationship, self and body goals and older students reported more future trajectory goals. In addition, girls and ethnic minority adolescents were more likely to report goal frustration. Furthermore, hierarchical regression analyses showed that a greater focus on self goals, low goal related self-efficacy, high perceived difficulty in attaining goals, and high goal frustration were all significantly related to lower well-being. In the following study among adolescents with varying frequency of headache, an attempt was made to replicate and extend these findings, employing more comprehensive measures of psychological well-being and quality of life. Further, the influence of goal-related coping was also investigated.

In the subsequent study described in *Chapter Four*, the main aim was to investigate goal cognitions, goal-related coping and well-being in adolescents with varying headache frequency. In this large scale cross-sectional study, 1202 adolescents aged 12 to 18 completed written questionnaires in schools. Goal importance and goal frustration were measured by means of an adolescent goals inventory, based on the self-articulated goals generated in the previous study (*Chapter Three*). An important addition to this study was the assessment of

frustration in different goal domains (personal values, self acceptance, social acceptance, school and health). In this and in the subsequent diary study, coping was measured using the Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2002b). Comparing adolescents with weekly, monthly or no headache complaints, few differences were found with regard to importance attached to personal goals. In contrast, adolescents with weekly headache compared to those with monthly or no headache complaints reported significantly higher frustration of self acceptance, school and health goals as well as higher use of catastrophizing, rumination, self blame, acceptance and putting into perspective in response to goal frustration. Moreover, greater goal frustration in the domains of self acceptance and health, and use of self blame, rumination, catastrophizing and other blame were related to lower well-being and quality of life for the group as a whole. However, greater experience of goal frustration appeared to be significantly more detrimental for those with weekly headache than for those without headache complaints. These findings replicate and extend those of the first empirical study presented in *Chapter Three*. Additionally, this study highlights the importance of goal-related coping and demonstrates that in the context of frequent headache, goal frustration may have more severe consequences for well-being and quality of life. This study, however, is limited by the cross-sectional design precluding conclusions regarding causality. In order to be able to explore the temporality between these factors, in the final study a daily diary method was employed. Eighty-nine adolescents aged 13 to 21 completed a daily online diary in their own home each evening. Daily frustration was assessed in relation to the goal domains of school, home, relationships and leisure. Due to the similarity of findings across these domains, the results were presented using a total daily frustration score. Results of this study are presented in *Chapters Five and Six*.

In *Chapter Five* the main aim was to investigate the prospective relationships between headache, daily frustration, cognitive coping and coping efficacy on the one hand and positive and negative affect on the other. Headache and daily frustration were found to be concurrently related to higher negative and lower positive affect. Moreover, the effect of goal frustration on affect was continued onto the following day. Furthermore, negative affect was related both

concurrently and prospectively to greater use of the cognitive coping strategies rumination and catastrophizing, and low coping efficacy beliefs. Positive affect on the other hand was concurrently related to acceptance, positive refocusing and high coping efficacy beliefs and prospectively predicted by low rumination and high positive refocusing.

In *Chapter Six* the impact of daily frustration to goal pursuit and ways of coping with this stress on headache occurrence in adolescence was explored. This chapter employs data from the same diary study as described in *Chapter Five*. Findings mirrored those of the previous cross-sectional study in that higher daily frustration was concurrently related to the occurrence of headache. Moreover, frustration to goal pursuit was predictive of headache on the following day. None of the cognitive coping strategies investigated were related to headache occurrence. However, coping-efficacy was shown to be related to lower headache occurrence on the following day. Figures 1 and 2 graphically represent the cross-sectional and prospective results of the combined studies (numbers indicate the chapters in which the relationships are tested).

————> = relationships supported    - - - - -> = relationships not supported

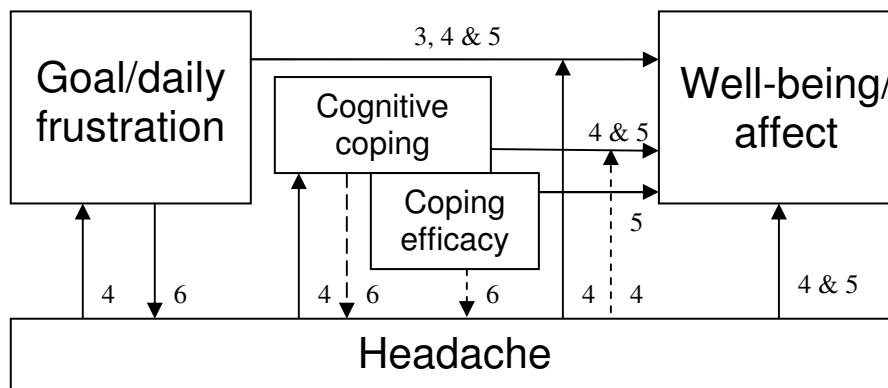


Figure 1. Cross-sectional/concurrent relationships (Chapters 3, 4, 5 & 6)

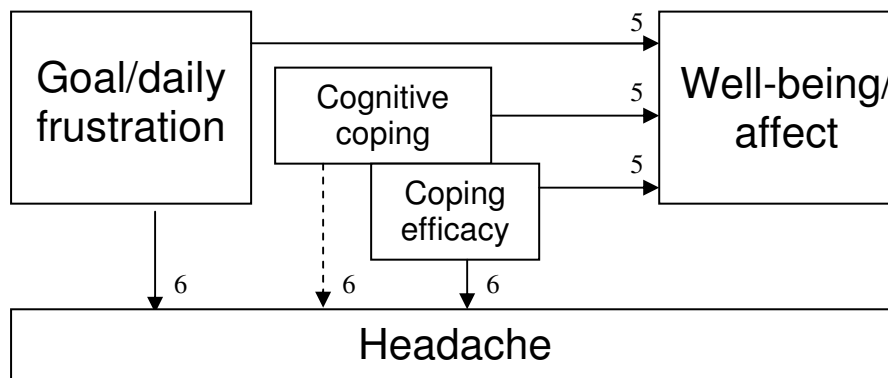


Figure 2. Prospective relationships (Chapters 5 & 6)

## General Discussion

### Goal pursuit and well-being in adolescence

The first main aim of this research project was to gain greater insight into the self-regulatory processes during adolescence, focusing largely on goal frustration but also on goal related self-efficacy, difficulty in attainability and the experience of obstacles. One consistent finding across the studies is that there is a significant concurrent negative relationship between goal frustration and well-being in adolescents (*Chapter Four & Five*). This was confirmed not only when investigating emotional distress (depressive symptoms and negative affect) but also healthy functioning (quality of life). Moreover, frustration to daily goal pursuits was predictive of subsequent affect (*Chapter Five*). This supports and extends previous cross-sectional studies with undergraduates and adults (Emmons, 1986; Emmons & King, 1988; Riediger & Freund, 2004; Schroevers et al., 2007). Furthermore, these results support the position of self-regulation theory that disruption to successful goal pursuit has implications for concurrent and subsequent emotional well-being (Carver & Scheier, 1999; Karoly, 1999). A notable finding in *Chapter Three* suggests that it is not the number of obstacles but rather the appraisal of these obstacles as frustrating or stressful that is important for emotional well-being, which is in line with the stress-coping theory of Lazarus (1991).

Notably, it was particularly the frustration of self (e.g. 'stand up for myself' and 'be confident') and health goals (e.g. 'be fit' and 'avoid bad habits') as opposed to, for example, social or school goals that was found to be related to poorer adolescent well-being (*Chapter Four*). A number of possible reasons for this can be speculated upon. The importance of frustration to these goals for well-being could be indicative of the centrality of these pursuits to self-identity (i.e. higher-order goals) (Carver & Scheier, 1998). Moreover, lower-order goals in this domain may be more strongly 'linked' to higher-order goals and thus to the sense of self (McIntosh, 1996). If this were the case, then frustration of these goals is likely to impact self-worth to a greater extent than frustration of goals in other domains (Pomerantz et al., 2000). Additionally, frustration of such intrinsic



goals may obstruct satisfaction of psychological needs such as that of autonomy (Ryan et al., 1995). In short, from a developmental perspective, frustration of self goals may be especially salient during adolescence as these are central to personal growth, self-actualization, and identity formation.

In line with the findings on goal frustration, self goals, difficulty in goal attainability, and low goal related self-efficacy were all related to lower well-being (*Chapter Three*). These findings underscore the importance of the cognitive representations of both the goal and the journey towards the goal for adolescent psychological adjustment (Karoly, 1999). These results concur with previous studies on undergraduate and adult samples (Brunstein, 1993; Emmons, 1986; King et al., 1998; Kuijer & de Ridder, 2003; Little, 1989; McGregor & Little, 1998; Yetim, 1993).

### Goal-related cognitive coping and well-being

A second aim was to investigate the role of cognitive coping with goal frustration in adolescent well-being. These studies are the first to examine cognitive coping specifically in response to goal frustration, and although they await replication, they underline the important contribution of coping to the self-regulation model (see Aspinwall, 2004; Carver & Scheier, 1999; Maes et al., 1996). Furthermore, these findings support earlier studies on the contribution of coping to well-being and quality of life in the context of goal disturbance (e.g. Echteld et al., 2001).

With regard to specific coping strategies, rumination and catastrophizing in response to frustration to goal pursuit were related both concurrently and prospectively to lower well-being (*Chapter Four & Five*). It appears therefore that excessively focusing on the negative aspects of goal frustration is maladaptive for emotional well-being in adolescence. These findings support earlier evidence that rumination in response to threatening or stressful life events is related to greater depressive symptoms in adolescence (e.g. Abela et al., 2002; Broderick & Korteland, 2004; Garnefski et al., 2003; Garnefski & Kraaij, 2006; Papadakis et al., 2006). It is suggested that use of such strategies may sustain the negative affect generated by goal frustration, thus contributing to reduced well-being. Excessive dwelling on the frustrated goal may serve to maintain commitment to the goal

without promoting effort or problem solving to overcome the obstacle. Although rumination has been conceptualized as a normal problem solving process aimed at re-establishing goal pursuit (Eccleston & Crombez, 2007; Martin & Tesser, 1996), this may become maladaptive if there is no solution to the problem, for example, if the individual cannot generate alternative pathways to goal attainment, adjust the goal or disengage if the goal is unattainable. Furthermore, this inflexibility may preclude pursuit of attainable goals and experience of the associated positive affect.

The findings with regards to a number of other strategies are also worth noting. Positive refocusing was related both cross-sectionally and prospectively to better adjustment outcomes (lower depressive symptoms and higher positive affect, *Chapter Four & Five*). Focusing on positive aspects of life or pleasurable events may, in contrast to rumination and catastrophizing, detract attention from the negative emotions generated by the goal frustration. It has been suggested that temporary positive distraction may facilitate problem solving (see Nolen-Hoeksema, 1998). Interestingly, positive refocusing has been shown to correlate with goal reengagement (Schroevers et al., 2008). The findings here replicate previous evidence of a link with better psychological outcomes (Garnefski & Kraaij, 2006; Schroevers et al., 2007) although it is noted that some previous studies have failed to replicate this relationship (e.g. Garnefski et al., 2003). In addition to this, acceptance and coping efficacy beliefs were also found to be related to higher same day positive affect (*Chapter Five*). Moreover, coping efficacy beliefs were predictive of both concurrent and subsequent negative affect (*Chapter Five*). This corroborates findings from previous longitudinal studies on adults (Aldwin & Revenson, 1987) and youths (Sandler et al., 2000) that the effects of coping efficacy on emotional well-being may be enduring. It is possible that such strategies and beliefs stimulate the adaptive process of disengaging from unattainable goals (one might argue that acceptance would be essential to be able to do this) and reengagement with new goals (promoted via either enhanced problem solving and focusing on alternative life domains): this is an interesting question for further investigation.

Both other blame (*Chapters Four & Five*) and self-blame (*Chapter Four*) were cross-sectionally related to lower well-being, however, there was no

evidence for a prospective relationship. Attributions of blame either internally or externally may impede further goal pursuit via reducing feelings of personal efficacy or control over goal pursuits. An excessive focus on blame may also be at the expense of more problem solving strategies. The findings on self-blame are consistent with earlier cross-sectional studies (e.g. Garnefski et al., 2005; Garnefski et al., 2002a; McGee, 2001), however, previous studies on other blame have not found evidence for a relationship with well-being (e.g. Garnefski et al., 2003; Garnefski & Kraaij, 2006). Other strategies such as positive reappraisal, putting into perspective and focusing on planning were unrelated to well-being in these studies. Previous findings on these strategies in relation to well-being have also been mixed (Garnefski et al., 2003; Garnefski & Kraaij, 2006; Garnefski et al., 2002a). Further research is required on these strategies as for example, focusing on planning may be associated with other outcomes not measured here such as reinitiating progress towards the goal after the experience of frustration.

### Goal pursuit and cognitive coping in adolescent headache

The third aim of this thesis was to investigate self-regulatory processes in the context of a health complaint in adolescence, namely headache. For the most part, the importance assigned to personal goals did not differ as a function of headache frequency, supporting previous findings in adolescents with diabetes (Seiffge-Krenke, 1998). In contrast, adolescents with weekly headache reported higher levels of frustration in most goal domains compared to their peers with less frequent headache (*Chapter Four*). Moreover, frustration to daily goal pursuit was significantly related to headache on both the same day and following day in the diary study (*Chapter Six*). It is possible that this relationship is reciprocal; that headache generates greater goal frustration, either by threatening health goals or impeding progress in other goal domains (Scheier & Carver, 2003; Schwartz & Drotar, 2006). However, the findings in this thesis also suggest that goal frustration may be one means by which headache is initiated or maintained. This implies that there is a direct relationship between goal pursuit appraisals and physical outcomes such as headache in addition to an indirect relationship between goal appraisals on physical outcomes via coping (e.g. Maes et al., 1996). These findings are consistent with those of Emmons and King

(1988) and add to the existing literature on altered goal-cognitions in the context of pain (Karoly & Lecci, 1997; Karoly & Ruchlman, 1996).

For adolescents with weekly headache compared to those with less frequent or no headache, goal frustration was more strongly related to well-being (*Chapter Four*, we note that this relationship was not replicated in the diary study although this may be attributable to use of a dichotomous variable for headache or a lack of power to detect the effect). It is possible that in the context of headache, goal frustration is appraised as more stressful. Further, a reallocation or draining of resources due to headache may generate goal frustration in other life domains; thus exacerbating the effect on well-being (Carver & Scheier, 1998). These findings on goal frustration in the context of a health complaint are consistent with previous studies in patients with pain complaints (Affleck et al., 1998; Karoly & Ruchlman, 1996) and other illnesses (Boersma et al., 2005a; Boersma et al., 2005b; Echteld et al., 2003; Echteld et al., 2001; van der Veek et al., 2007).

With regard to the use of cognitive coping strategies in response to goal frustration, adolescents with weekly headache reported higher use of rumination, self blame, catastrophizing and acceptance (*Chapter Four*). When compared to norm scores, use of these strategies was in the 'average' to 'above average' range (depending on age and gender, Garnefski et al., 2002b). A greater tendency to ruminate and catastrophize about frustrated goals may be indicative of less flexible goal pursuit in adolescents with headache (Carver & Scheier, 1999; Eccleston & Crombez, 2007). Adolescents with headache may have greater difficulty in finding alternative pathways to goal attainment, in adjusting or disengaging from their frustrated goals (Martin & Tesser, 1996). Indeed, an inability to disengage has been associated with poorer health (Seiffge-Krenke, 2000; Wrosch et al., 2007). Furthermore, a focus on self-blame, rumination and catastrophizing may preclude the use of alternative strategies such as focusing on new or alternative goals. Difficulty with disengagement from unattainable goals may stem from the propensity to 'link' lower-order goals to high-order ones (Martin & Tesser, 1996; McIntosh, 1996). Being unable to disengage from important but unattainable goals has been suggested to be at the heart of

depression (Carver & Scheier, 1990). These are important questions for future research into the goal pursuits of adolescents with headache.

None of the coping strategies used to deal with goal frustration was able to predict headache occurrence on the next day (*Chapter Six*). Coping strategies in these studies were measured in relation to goal pursuit; however, it may be that specific pain-related coping strategies are more closely linked to subsequent pain (see Eccleston et al., 2001). The finding of no predictive relationship between rumination and headache is contrary to findings from previous prospective studies (Brosschot & van der Doef, 2006; Thomsen et al., 2004). One possibility is that rumination may be related to headache characteristics such as intensity or duration as opposed to headache occurrence. This is an interesting question for future research. Furthermore, cognitive coping strategies were measured as general responses to goal frustration that day rather than specifically in response to one particular frustrated goal. It may be that coping in response specifically to frustration of pain-management or health related goals is more closely related to subsequent experience of headache than coping with frustration to goals in other life domains (see Eccleston et al., 2001). In contrast to these findings, coping efficacy was not related to same day headache but was predictive of headache on the following day. The extent to which belief in coping abilities are important for physical health among youths therefore deserves further investigation.

## Strengths & Limitations

A number of methodological strengths and limitations should be mentioned. Firstly, a particular strength of these studies is the substantial number of adolescents included, particularly in *Chapter Four*. As a result it is suggested that the sample is likely to be representative of the target population: the general population of adolescents. A caveat to this is that due to recruitment via schools, adolescents who were not in attendance, for example those who play truant or who are chronically ill may be under-represented in these samples. Furthermore, it is noted that the response rate of those invited to participate in the diary study (*Chapter Five & Six*) was rather low which may have introduced bias into this sample. A possible reason for this low response rate may be the

amount of effort required to participate in a daily diary study. Underrepresentation or bias in the sample may be particularly important in view of the research questions with regard to headache complaints: it may be that adolescents with more serious headache complaints were not included here.

Secondly, with regard to the operationalization of goal frustration, various methods were used including an assessment of the emotional reaction to obstacles (*Chapter Three*), a combination of importance and success (*Chapter Four*, see also Boersma et al., 2005a; Boersma et al., 2005b) and a rating of daily frustration in various goal domains (*Chapter Five*). In future, it will be necessary to develop a validated measure of goal frustration. One possibility might be to add a measure of goal frustration (e.g. internal and external obstacles and associated emotional reaction) to current goal systems batteries (Goal Systems Assessment Battery: Karoly & Ruehlman, 1996; Personal Projects Analysis: Little, 1983).

Thirdly, another strength is the inclusion of a prospective study (*Chapter Five & Six*) to further explore the findings presented in the cross-sectional studies. Caution is, however, heeded in interpreting the results of the diary study since goal frustration, coping, pain and affect were nevertheless measured simultaneously. In the future, in order to separate out measurements of different constructs and to capture fluctuations over the day, use of an experience sampling method may prove useful. Furthermore, investment in prospective methods over a longer period of time in the future is essential in order to go beyond testing associations and to generate greater insight into causal, dynamic and interactive relationships between goal appraisal, coping and well-being.

In addition, a number of theoretical strengths and limitations need to be addressed. In the studies presented, a broad array of idiographic goals in various domains was assessed. A consideration of the broad taxonomy of adolescent goals resonates with the daily reality of multiple goal pursuit (Austin & Vancouver, 1996; Sheldon & Elliot, 2000). The self-regulatory concepts investigated here, however, represent only a small proportion of the self-regulation model. In these studies we did not make a distinction between, for example, frustration of approach versus avoidance goals. It has been suggested that these different feedback loops are differentially related to depression-

elation and anxiety-relief dimensions (Carver & Scheier, 1990b; Carver & Scheier, 1999; Higgins, 1987). In future, it may be insightful to make a differentiation of the orientation of the frustrated goals in question. Another important consideration is whether the frustrated goal is self-set or imposed, an issue of particular pertinence in adolescence when one of the major normative developmental tasks relates to autonomy. Other self-regulatory constructs of interest in adolescent well-being include alignment and conflict (Ford, 1992), balance (Oyserman & Markus, 1990a), goal ambivalence (Boekaerts, 1999; Emmons & King, 1988), and goal facilitation (Gebhardt, 2007; Riediger & Freund, 2004). Concepts which may interact with or influence the perception of goal frustration and use of coping strategies include optimism (Scheier & Carver, 2003), hope (Bruininks & Malle, 2005), future time perspective (McInerney, 2004; Simons et al., 2004b), regulatory focus, social support (Brunstein et al., 1996; Emmons & Colby, 1995) and other resources (Hobfoll, 1989).

With regard to coping, strategies were assessed in response to goal frustration; however, the aim of these strategies was not assessed. In other words, what was the coping goal (Boekaerts, 1999)? This may have been to reinstate emotional homeostasis (Bonanno, 2001), to overcome the frustration and re-establish goal progress (Carver & Scheier, 1999), or perhaps to disengage from the goal altogether. An assessment of the coping goal is essential in order to understand whether or not the coping strategy was effective. Furthermore, these studies have focused on the use of cognitive coping strategies in response to goal frustration. It may be useful to extend this line of research to include behavioural responses to goal frustration. It could be speculated that behaviour coping strategies (such as drug, alcohol or substance use and emotional expression) rather than cognitive ones assessed here may have a stronger effect on physical health as well as exerting an effect on psychological well-being. This is an important line of research for future studies particularly considering the likelihood of experimentation with risky behaviours in this age group (Lerner & Galambos, 1998).

## Practical implications

How might these findings inform interventions with adolescents? Interventions aimed at either preventing or improving psychological and physical health outcomes may benefit from targeting goal-appraisals and cognitive coping skills. Intervention programmes might be augmented by teaching adolescents how to set realistic but challenging goals: setting unrealistically high goals is likely to lead to them being persistently out of reach leaving the individual perpetually frustrated. Other skills include how to devise step-by-step plans for goal attainment and, most importantly, to consider possible obstacles, roadblocks and interferences and to devise ways of dealing with them. As research has shown, visualizing plans prior to implementation increases likelihood of intended action (Gollwitzer, 1999). Other considerations include optimal balance between positive and negative goals. A focus on avoidance goals with lack of a positive image to work towards is likely to preclude positive outcomes (Oyserman & Markus, 1990a). Teaching emotion regulation strategies to effectively deal with negative affect generated by goal frustration also appears to be essential for maintenance of psychological well-being. In particular targeting ruminative or catastrophic thoughts may be beneficial given the predictive relationship with subsequent negative affect (*Chapter Five*). As highlighted in *Chapter Two*, disadvantaged youths may benefit the most from such interventions.

A begin has already been made in this area. Interventions employing a self-regulation framework with adolescents have demonstrated a positive effect on academic outcomes, mental health and behavioural problems (Oyserman et al., 2006; Oyserman et al., 2002). These interventions typically include consideration of 'roadblocks' and strategies to overcome them. Although these interventions are typically aimed at improving school outcomes, they may also have utility with adolescents with a chronic health problem such as headache. In addition, youths most at risk of developing health compromising behaviour, deviant behaviour or psychological problems may be those who lack self-regulatory and coping skills. This implies that screening youths on these skills may be an innovative way to identify those most in need of intervention. This would be an interesting question for future research.



## Future directions

In addition to those already identified, a number of possible avenues for future research can be outlined based on the findings, limitations and practical implications of these studies. We can conclude from these findings that goal frustration and associated cognitive coping are related to psychological well-being; however, the extent to which goal frustration and coping are related to subsequent goal pursuit (e.g. effort, persistence, dis- and reengagement) awaits further investigation. Under what conditions might goal frustration lead to enhanced or inhibited goal efforts, disengagement or reengagement? Which cognitive coping strategies are likely to enhance successful goal attainment via renewed efforts and which lead to stagnation? Given the demonstrated benefits of dis- and reengagement (Wrosch et al., 2003a; Wrosch et al., 2003b), an important direction would be to assess which strategies promote flexible goal pursuit and what impact this has on physical and psychological health. Furthermore, of particular importance in adolescence are other outcomes not considered here such as externalizing, delinquency, and school achievement (Boekaerts, 1999; Garnefski et al., 2005; Oyserman & Markus, 1990b; Oyserman & Saltz, 1993).

An important theoretical question with regard to coping is the extent to which coping with goal frustration mediates or moderates the relationship with well-being? Preliminary exploration of this question by others (focusing on rumination) has suggested support for both moderation (Papadakis et al., 2006) and mediation (Roelofs et al., 2007). However, the literature on this is scarce and research on strategies other than rumination is lacking. In future, an important theoretical question will therefore be to test the possible mediating and moderating effects of strategies to cope with goal frustration on physical and psychological well-being.

The self-regulation model which has guided these studies assumes that goal frustration and goal-related coping lead to psychological and physical well-being. It is of course plausible that well-being is just as influential on the self-regulation process and cognitions (see Nolen-Hoeksema, 1998). Depression or anxiety may negatively bias interpretation of the goal pursuit process and cause greater perception of greater goal frustration. Indeed, research indicates that

depression is related to specific patterns of goal orientation (Dickson & MacLeod, 2004a, 2004b). Similarly, the question can be posed to what extent is headache prospectively related to goal frustration and coping? To what extent is frustration of these personal goals perceived to be a direct result of headache and how does headache relate to other goal-cognitions and appraisals? In future it will be important to disentangle these possibly bidirectional influences by investigating these dynamic relationships over time.

With regard to headache, factors such as the severity and duration of headache episodes are likely to be of great importance in these relationships. Furthermore, as the studies presented here were conducted were on adolescents from the general population, an interesting expansion would be to explore the whether the relationships can be replicated in clinical samples, for example adolescents presenting at the general practitioners with headache complaints or those attending pain clinics. In relation to this, it is striking that both depression and headache are significantly higher in girls (Bandell-Hoekstra, et al., 2000; Nolen-Hoeksema & Girgus, 1994). The extent to which the experience of goal frustration and use of cognitive coping strategies may contribute to these higher rates of headache or depression among female adolescents is not known. These are interesting avenues for future investigation into self-regulatory processes in adolescence.

