Adolescent Affect Dysregulation
- General Discussion
CHAPTER 7

Work in the present thesis is grounded in the notions that affect dysregulation is a core aspect of almost all forms of psychopathology, and that close social relationships provide a context for affective development and regulation. In the last two decades, there has been an increased interest in the role of affect, its regulation and dysregulation as related to different forms of psychopathology, with a range of studies showing associations between affect regulation deficits and diverse mental health problems (see Gratz & Roemer, 2004). At the same time, many studies have shown that the parent-child relationship may undergird as well as undermine the development of adaptive affect regulation (see Morris et al., 2007). Despite a generally increasing interest in the sources and consequences of affect dysregulation, there is a relative lack of studies on affect dysregulation focusing on adolescence, which is regrettable, given that adolescence is a time of important developmental changes regarding social relationships, affective experiences, and prevalence of several forms of psychopathology.

The studies reported in this thesis addressed this void of research on affective dysregulation in adolescence. Main goals were: (1) to evaluate measures for the assessment of affect dysregulation in adolescence, thereby also shedding more light on the concept of affect dysregulation in adolescence in general, (2) to establish how different forms of affect dysregulation relate to diverse forms of psychopathology in adolescents, (3) to study the parent-adolescent relationship as a context for the development of affect dysregulation and internalizing and externalizing psychopathology in adolescents, and (4) to establish how adolescent affect dysregulation and parent-child interactions jointly impact adolescent behavioral development depending on the broader social context of the family (single parent versus two-caregiver family, neighborhood characteristics).

Results of the in the present thesis clearly show that affect dysregulation can be assessed reliably in adolescence, on the level of emotion dynamics, as well as at the meta-cognitive level (chapters 2 and 3). Further, affect dysregulation appears to be associated with adolescent psychopathology cross-sectionally and longitudinally. Specifically, dimensions of affect dysregulation at the meta-cognitive level relate to anxiety, depression, aggressive and delinquent behavior in rather specific ways (chapter 2) and emotion dynamics underlie the continuity of anxiety disorder, depressive symptoms, and aggressive behavior from age 13 to age 14 (chapter 3). While it is clear that affective dynamics are related to the development of psychopathology, there is little evidence of specific associations of discrete emotions with psychopathology (with the exception of a more prominent role of anger compared to other emotions in relation to aggressive behavior; chapter 3). Moreover, parent-adolescent interactions evidently play an important role for adolescent affective development: parenting and relationship quality are associated with adolescent affect regulation difficulties at the meta-cognitive level (chapter 4), and parent-adolescent interactions are associated directly, and indirectly, via affective dysregulation with externalizing problems (chapter 5). Notably, parenting may also protect against some of the risks that high levels of adolescent behavioral dysregulation pose for the development of antisocial behavior in adolescents, and the same applies for the protection of potential risk at the family (single parenthood), and neighborhood (low informal social control, economic deprivation) level (chapter
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6. Adolescent gender played a role in several associations between social context and adolescent development (chapter 4 and 6), while only few and inconsistent gender differences were found in associations between affective dysregulation and adolescent psychopathology (chapters 3, 5, and 6).

In this chapter I will first discuss results relating to the conceptualization and assessment of affect dysregulation in adolescence. Next, I turn to links between different forms of affect dysregulation and psychopathology. Then, the focus will be on the role of the parent-adolescent relationship for adolescent affect dysregulation and psychopathology, and finally, effects of the broader social context will be discussed. Though not an explicit goal of the present thesis, adolescent gender emerged as a moderating variable for associations between the studied variables and these gender effects will be discussed where relevant. Finally, implications of the present studies for clinicians and policy makers are presented, limitations of the studies are discussed, and suggestions for future research are offered.

Affect Dysregulation and its Assessment in Adolescence

Despite the increasing interest in and research on affect dysregulation, it is still an ill-defined concept. This is likely due to the fact that affect, and consequently its regulation, are affected by a number of different ‘systems’, including psychophysiological, cognitive, and behavioral ones. One consequence of the equivocality of affect dysregulation as a concept is that little is known about its normative development, especially beyond the childhood years. Approaching affect dysregulation from different levels of experience (emotion dynamics and meta-cognitive), the present thesis adds to the understanding of what constitute important aspects of affective dysregulation in adolescence.

Inspired by cross-sectional reports that adolescents, compared to both children and adults experience heightened levels of negative emotions (Larson & Lampman-Petraidis, 1989) and heightened emotional variability (Larson, Csikszentmihalyi, & Graef, 1980), we studied levels and variability of happiness, anger, anxiety, and sadness longitudinally. In support of the notion of high emotional variability as an indication of affective dysregulation, it was shown that correlations between the day-to-day variability and intensity of negative emotions are large and positive, but large and negative between variability and intensity of happiness. Importantly, longitudinal analyses provided support for general developmental trends, as well as for intraindividual stability of emotion dynamics. Specifically, results of the present thesis are the first to show that slopes of negative affect increase from age 13 to age 15 (chapter 5), and to show moderate intraindividual stability of emotional variability over the course of three and six months (chapter 3), supporting the notion of emotional variability as an individual difference characteristic (Larsen & Diener, 1987).

Because we are interested in affect dysregulation as a risk factor for psychopathology, we also approached affect dysregulation from the meta-cognitive level, inspired by work that identified clinically important dimensions of affective dysregulation in adults (Gratz & Roemer, 2004). These dimensions include the awareness and clarity of perceived emotions, the ability to control attention and behavioral impulses when distressed, the non-acceptance of emotional responses, and low emotional self-efficacy. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer,
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2004) was developed to assess these dimensions in adults. Results of our study of the DERS with samples of adolescents show that these dimensions are important and can be reliably distinguished in adolescents (chapter 2). Significant positive correlations between emotional variability and adolescent self-reported difficulties with emotional clarity and impulse control were found, as well as with the nonacceptance of emotional responses, low confidence in one’s ability to modulate negative emotional responses, and difficulties engaging in goal-directed behavior when distressed (Neumann, van Lier, Frijns, Meeus, & Koot, unpublished data). This finding supports the notion that emotion dynamics and perceived difficulties in emotion regulation represent different parts of one underlying concept in adolescence, namely affective dysregulation.

Gender emerged as an important variable in the study of affect dysregulation in adolescence. Though only few gender differences were found in emotion dynamics (females scored slightly higher on happiness variability and on sadness intensity and variability; chapter 3), female participants reported significantly higher levels of emotion regulation difficulties on four of the six DERS subscales, including Lack of Emotional Clarity, Difficulties Engaging in Goal-Directed Behavior when Distressed, Nonacceptance of Emotional Responses, and Limited Access to Emotion Regulation Strategies, while males reported more difficulties with emotional awareness. Observed gender differences on some of the DERS subscales should be interpreted with caution, as they may reflect gender-based differences/bias in the ratings of emotion-related items in addition to true gender differences in emotion regulation difficulties (chapter 2). Nevertheless, taken together, results of the present thesis pertaining to gender differences in levels of affect dysregulation suggest that, while male and female adolescents may not experience very different levels and variability of emotions, their meta-cognitive analyses of experienced emotions differ to a good extent.

In sum, results of the present thesis add to our understanding of affect dysregulation in adolescence by showing intraindividual stability and normative developmental change in emotion dynamics, and by identifying clinically relevant dimensions of meta-cognitive affect dysregulation and gender differences in affect dysregulation in adolescents. In addition, the daily web-based ratings of experienced emotions used in our studies and the DERS are identified as reliable ways to assess different dimensions of affect dysregulation in adolescence, that relate in predictable ways to adolescent psychopathology and the family context, as will be further discussed below. Given their comparatively easy, time-effective and inexpensive procedures, these measures are well suited for the use with larger samples, and in longitudinal studies of emotional development in adolescence.

Affect Dysregulation and Psychopathology in Adolescence

Two main issues were identified as important for the study of affect dysregulation and psychopathology in adolescence. First, there is a lack of longitudinal studies on associations between affect dysregulation and psychopathology. Secondly, it is not clear how discrete emotions and specific dimensions of affect dysregulation relate to different forms of psychopathology. Below, contributions of the present thesis to these issues will be discussed in turn.
Longitudinal Associations Between Affect Dysregulation and Psychopathology

Cross-time associations between affect dysregulation and psychopathology were demonstrated in chapters 3 and 5 of the present thesis, with a focus on emotion dynamics. Chapter 3 shows that individual differences in the dynamics of happiness, anger, anxiety, and sadness partly account for changes in adolescent internalizing symptoms, while dynamics of negative emotions, but not of happiness, play a role in the development of aggressive behavior from age 13 to age 14. Parallel growth curves described in chapter 5 indicate parallel change between dynamics of adolescent negative affect and physical aggression from age 13 to age 15. In general, these results are consistent with theory, proposing that emotion dysregulation underlies the development of psychopathology (Bradley, 2000), and add to a growing body of evidence from studies showing longitudinal associations between affect dysregulation and internalizing problems in children and adolescents (Beauchaine, Gatzke-Kopp, & Mead, 2007; Bosquet & Egeland, 2006; Yap, Allen & Ladouceur, 2008).

The results of the studied longitudinal associations between affect dysregulation and adolescent psychopathology, suggest that by adolescence the development of affect dysregulation and psychopathology is so intertwined, that each constitutes both a source and a consequence of the other. That is, negative affect and heightened affective variability add to increases in symptoms of psychopathology, which in turn lead to higher levels of negative emotions and heightened affective variability. This suggests that several adolescent strategies used to deal with affect are not effective, that is they do not alleviate the distress, and may even exacerbate it in the long run. Maladaptive coping strategies may exacerbate negative affect in more or less direct ways. For instance, rumination is likely to increase negative affect directly, whereas giving in to aggressive impulses may alleviate distress in the short-term, but increase it in the long run, because it interferes with one’s social relationships.

General and Specific Associations Between Affect Dysregulation and Different Forms of Psychopathology

It has been clearly demonstrated that affect dysregulation is a risk factor for many forms of psychopathology (e.g., Cole & Hall, 2008). To move the field further, studies investigating the general and specific ways in which diverse forms of affect dysregulation relate to different forms of psychopathology have been called for (Cole & Deater-Deckard, 2009). Results of the present thesis show both general and specific associations between affect dysregulation and psychopathology. Levels of discrete experienced emotions (low happiness, anger, anxiety and sadness) related in mostly general ways to symptoms of internalizing problems (anxiety, depression), and aggressive behavior (chapter 3), suggesting that the notion of functional continuity (i.e., the notion that discrete emotions are specifically associated with the development of different forms of psychopathology; Malatesta & Wilson, 1988) does not hold for experiential data in adolescence. On the other hand, two specific aspects of affect dynamics, the intensity and variability of emotions, related in specific ways to symptoms of psychopathology: while depressive symptoms were uniquely associated with the level of emotions, but not their variability, the reverse was true for symptoms of anxiety.
disorders (chapter 3). In addition, though anxiety and sadness also played a role in aggressive behavior in some analyses, associations between anger and aggressive behavior were found more consistently. Dimensions of affect regulation difficulties at the metacognitive level also related in rather specific ways to anxiety, depression, aggressive and delinquent behavior (chapter 2).

The finding that (dynamics of) discrete emotions are related to psychopathology in rather nonspecific ways, is in line with some earlier cross-sectional studies on the same subject (e.g., Silk et al., 2003), but diverges from at least one other. A study on the facial expression of emotions and psychopathology in male adolescents (Keltner et al., 1995) reports specific links between the expression of discrete emotions and internalizing and externalizing problems. Taken together, the results of the present thesis and these of earlier studies suggest that, at the experiential level, there is little or no specificity of links between discrete emotions and different forms of psychopathology, while at the level of emotional expression, there is. This raises the possibility that different operationalizations of emotions and their dynamics may lead to different results regarding their relation with psychopathology. It is well known that measures of emotion from different levels generally show very little convergence (e.g., physiological, experiential, and behavioral measurements; e.g., Hubbard, Parker, Ramsden, Flanagan, Relyea, Dearing et al., 2004). This may be because they are not experienced, not labeled correctly, experienced but behaviorally suppressed etc. In addition, if expressed they may be falsely interpreted by raters. For example, some adolescents may feel emotional arousal but denote it as dysphoria without labeling it as sadness, fear, or remorse. Some individuals may experience various, but express only some emotions (e.g., express anger, but suppress the expression of fear). Alternatively, some may express all negative emotions in similar ways (e.g., express fear by attacking, making it look more like anger than fear). However, each of these conditions may be related to psychopathology. The question thus arises is: What determines which emotion is experienced, which is expressed, and how it is expressed? Moreover, many questions remain on how dimensions of emotions interact in their relation with the development of psychopathology.

Part of the answer to the questions posed above may lie in the meta-cognitive experience of affect and affect regulation. Dimensions of perceived emotion regulation difficulties were associated in divergent ways with aggressive and delinquent behavior and with internalizing symptoms. Specifically, in line with earlier findings it was found that difficulties in impulse control and engaging in goal-directed behavior when distressed associated with aggressive behavior (e.g., Beauchaine & Neuhaus, 2008), and a lack of emotional awareness with delinquency (e.g., Herpertz et al., 2001), while a lack of emotional clarity, nonacceptance of emotional responses and a limited access to emotion regulation strategies associated with symptoms of anxiety as well as depression, but not with externalizing problems (chapter 2).

Taken together, the results suggest that, whereas levels of discrete emotions relate in rather general ways to diverse forms of psychopathology, different forms of psychopathology may still be characterized by unique profiles of affect dysregulation (see Table 7.1 for an overview of dimensions of affect dysregulation as associated with different forms of psychopathology in the present thesis). For instance, while both depressive symptoms and anxiety disorder symptoms are
associated with increased negative affect and decreased positive affect, and by decreased emotional clarity, ineffective emotion regulation strategies, and the nonacceptance of emotional responses, only anxiety symptoms are additionally associated with high levels of emotional variability. Patterns of affect dysregulation underlying aggressive behavior may be better characterized by a combination of negative affectivity and impulse control difficulties, including difficulties in focusing attention to tasks at hand.

Future research may undertake efforts to combine diverse indices of affect dysregulation and study their unique and interactive effects on the development of psychopathology, thereby delineating the unique affect dysregulation profiles underlying different forms of psychopathology. These profiles might then be used to tailor effective prevention and intervention efforts.
Table 7.1
Overview of Dimensions of Affect Dysregulation Associated with Different Forms of Psychopathology in the Present Thesis

<table>
<thead>
<tr>
<th>Anxiety Disorder Symptoms</th>
<th>Depressive Symptoms</th>
<th>Aggressive Behavior (incl. Physical Agg &amp; ASB)</th>
<th>Delinquency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Emotion Regulation Difficulties</td>
<td>- Lack of Emotional Clarity</td>
<td>- Lack of Emotional Clarity</td>
<td>- Difficulties Controlling Impulsive Behavior When Distressed</td>
</tr>
<tr>
<td></td>
<td>- Nonacceptance of Emotional Responses</td>
<td>- Nonacceptance of Emotional Responses</td>
<td></td>
</tr>
<tr>
<td>Emotion Dynamics</td>
<td>- High Variability of positive and negative emotions</td>
<td>- High levels of negative and low levels of positive emotions</td>
<td>- High negative emotions, especially high anger</td>
</tr>
</tbody>
</table>

*Note. ASB = Antisocial Behavior.*
The parent-child relationship has long been recognized as an important context for emotional development during the childhood years. However, it is less clear, if and how interactions with parents continue to be associated with affect development in adolescence. Results of the studies described in the present thesis demonstrate the continuing importance of parents for adolescents’ affective lives by showing significant associations between the parent-adolescent relationship and adolescent affective dysregulation across different conceptualizations of parent-adolescent interactions (parenting, parent-adolescent relationship quality) and affect dysregulation (emotion dynamics, perceived difficulties in emotion regulation, impulsivity). Chapter 3 shows that maternal psychological control (and to a lesser extent maternal behavioral control) is significantly and consistently related to adolescent perceived emotion regulation difficulties. Results of chapter 4 demonstrate that both support and negative interactions in the adolescent-mother relationship are also associated with adolescents’ perception of their own affect regulation competencies. Results in chapter 5 extend these results to negative interactions in the adolescent-mother (cross-sectionally and longitudinally) as well as in the adolescent-father relationship (at least cross-sectionally), and to affective dysregulation assessed in terms of heightened negative affect. Two findings stand out: (1) the bidirectional nature of links between parent-adolescent interactions and adolescent affect dysregulation underscored by the longitudinal study in chapter 5, and (2) the fact that associations between parent-adolescent interactions and perceived affect regulation difficulties depend on adolescent gender.

In accordance with transactional models of development (e.g., Sameroff, 2010), and with the notion of affect (regulation) as both output and inputs of social interactions (e.g., Bell & Calkins, 2000), results of parallel growth curves, mapping the development of the adolescent-parent relationship and adolescent negative affect from age 13 to 15 years, clearly illustrate the bidirectional nature of associations between adolescent-parent relationship quality and adolescent affect dysregulation. Specifically, longitudinal associations between adolescent negative affect and relationships with mothers point to parallel change between affect and relationship quality (i.e., slope-slope associations), but no evidence for prediction of one by the other (i.e., intercept-slope associations) was found (chapter 5). Low quality parent-child interactions (i.e., low warmth/support, high levels of conflict) thus add to adolescent affect dysregulation, by inducing negative affect and by providing little support for handling negative affect. In turn, adolescent negative affectivity, difficulties in handling negative emotions and associated behavioral impulses, all add to less positive evaluations of the relationship by both the adolescent and the parent. Adolescent affect dysregulation likely increases both the frequency as well as the intensity of conflicts. In the worst case, parents and their adolescent children will find themselves in a continuous circle of negative affect and conflictual relationships that is increasingly hard to break. It will be vital for future research to determine which factors differentiate between parent-adolescent dyads that get stuck in this cycle, from those who do not.
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Findings of the present thesis suggest that adolescent gender acts as a powerful moderator of associations between parent-child relationship quality and affect dysregulation, at least on the meta-cognitive level. Results reported in chapter 4 demonstrate that the mother-adolescent relationship quality and maternal behavioral control is more strongly associated with perceived emotion regulation difficulties for female than male adolescents. These findings are in line with the notion that the interpersonal nature of emotions is more salient for females than males (Shields, 1995). This might be due to gender-typical emotion socialization in childhood (e.g., parents teach girls more relationship-oriented emotion regulation strategies and their sons more active and instrumental emotion regulation strategies [Eisenberg et al., 1998]). However, associations between growth of the adolescent-mother relationship quality and adolescent negative affect (chapter 5), were gender-invariant. Combined, the results of the present thesis suggest that relationship influences are stronger for female adolescents for affect dysregulation at the meta-cognitive level, while relationship quality affects more “basic” emotional experiences (levels of negative affect) in similar ways for male and female adolescents. It might be that negative affectivity is more biologically determined than (meta-) cognitive aspects of affect dysregulation, which are more easily influenced by socialization experiences.

In sum, results regarding associations between parent-adolescent interactions and adolescent affect dysregulation suggest that (1) parenting behaviors, especially psychological control, as well as relationship characteristics, especially high levels of negative interaction, but also low levels of support, are associated with adolescent affect dysregulation in adolescence, (2) these associations are best described as bidirectional, and (3) links between parent-adolescent relationship quality and adolescent affect dysregulation at the meta-cognitive level are stronger for females, while relationship quality relates to direct emotional experiences in similar ways for male and female adolescents.

Parent-Adolescent Relationships, Adolescent Affect Dysregulation and Psychopathology

Results of the present thesis pertaining to the joint effects of adolescent affect dysregulation, parent-adolescent interactions, and adolescent psychopathology, illustrate that parent-adolescent interactions may either present a risk for adolescent affect dysregulation and subsequent psychopathology development (chapter 5), or protect adolescents from the risks associated with high levels of dysregulation (chapter 6).

Parallel growth between the mother-adolescent relationship quality and adolescent physical aggression was in part explained by growth in adolescent negative affect (chapter 5). Normative developmental increases in negative interactions and decreases in support in the mother-adolescent relationship are thus associated with increases in adolescent psychopathology, because they go hand in hand with adolescent negative affect. Thus, it seems that developmental changes in the mother-adolescent relationship form a risk factor for the development of psychopathology, because they interfere with adolescent affect regulation. It might be that these developments are of a temporary nature (e.g., van Doorn, Branje, & Meeus, 2010) for many adolescents: decreased quality of
relationship with parents will make adolescents less likely to seek their parents’ help to deal with emotional situations. At the same time, they may not yet have acquired the skills to deal with their affective experiences in adaptive ways on their own, nor have yet formed intimate relationships with friends and intimate partners that allow for the adaptive co-regulation of emotions. Future studies may investigate whether by late adolescence increases in relationship quality have a more supportive impact on adolescent affect regulation again. Alternatively, associations between the parent-adolescent relationship and adolescent affect dysregulation, be they positive or negative in nature, may be diminished by late adolescence, either because the adolescent has acquired better individual regulation strategies or has other partners to help him/her deal with affective experiences.

Of course, adolescent-parent interactions are not the only source of affect dysregulation. On the contrary, several aspects of affect dysregulation are likely to be genetically determined (Hariri & Forbes, 2007). One aspect of affect dysregulation that is at least partially genetically determined is heightened impulsivity (Forbes, Brown, Kimak, Ferrell, Manuck, & Hariri, 2009). In the context of the present thesis, heightened levels of impulsivity represent a dimension of affect dysregulation, which is closely related to behavioral self-regulation (Carver, 2004), and is thought to be genetically determined to a greater extent than for instance meta-cognitive emotion regulation difficulties. In accordance with Bronfenbrenner’s (e.g., 1986) bioecological model of development, which postulates a greater impact of more proximal as opposed to more distal risk factors, Chapter 6 identifies impulsivity as the main predictor of adolescent antisocial behavior, in a model which also includes family and neighborhood risk factors. Importantly, and also in line with predictions made by the bioecological and other current dynamic transactional models of development (Sameroff, 2010), the impact of impulsivity was moderated by family (single parent) and neighborhood risk (economic disadvantage), at least for female adolescents. Most important for the current discussion, the study also demonstrates the protective influence of parenting. In particular, it was demonstrated that parental monitoring acts as a buffer against some of the risk that high levels of impulsivity (and neighborhood and family risk factors) pose for the development of both male and female antisocial behavior. Thereby, this study points to the importance for parents to stay knowledgeable about and engaged with their child through mid adolescence, especially if the child’s behavioral control is low and is jeopardized additionally by environmental risk.

In sum, the parent-child relationship seems to affect both affect regulation and behavioral regulation of adolescents and thus to influence the development of psychopathology in the child. Reducing negative interactions, and maintaining support and monitoring when needed seem important ways to influence the development of both internalizing and externalizing adolescent problem behavior.

Clinical and Policy Implications

Never mind the rather basic nature of most of the work reported in the present thesis, I do believe that the present results have several important implications for clinical and policy work. Concerning clinical work, a number of points are important. First, studies in the present thesis
clearly show that emotion regulation related meta-cognitions can be assessed reliably in adolescents, and given that they are differentially associated with different forms of psychopathology, may be used as an additional diagnostic tool. Further, they may offer useful starting points for treatment (e.g., working on increasing emotional clarity and acceptance). Secondly, work in the present thesis underscores the usefulness of day-to-day registration of emotion intensity as a tool for diagnosis and treatment. That is, daily emotional experiences may be added to patient-diaries, for instance as a means to uncover sources of emotional instability. Regarding daily emotional experiences, it is necessary to include a diversity of discrete emotions, no matter the seemingly predominant psychopathological problem. Studies in this thesis show that, regarding clinical disorders, there may not be one predominant emotion that reigns the development of each specific type of psychopathology. A possible exception might be the role of anger in the development of aggressive behavior. Nevertheless, heightened anxiety and sadness were also implicated in aggression. Anxiety disorders are not only associated with increased feelings of anxiety and fear, but also with decreased positive affect and increased sadness. Despite that, there may still be specific patterns of affect dysregulation associated with the development of the anxiety disorders, as for instance it was found that heightened emotional variability, and diminished emotional clarity, low emotional self-efficacy, and nonacceptance of own emotional responses were all related to anxiety disorders. Consequently, clinicians should be aware that dysregulation in several discrete emotions may play a role in any given behavioral or emotional disorder, or that the presence of any given emotion, may not come to expression or be expressed as a different emotion. If one misses out on potential underlying feelings of fear, worry, and sadness, and focuses on anger, important opportunities for diagnosis and intervention may be missed. A final result of the present thesis, which has ramification for clinical work, is that symptoms of psychopathology fuel affect dysregulation, just as affect dysregulation fuels psychopathology development. Consequently, working on adaptive affect regulation is highlighted as an effective means of preventing further development of psychopathology, and on the other side of the coin, one cannot expect psychopathology to improve, as long as affect regulation does not.

An important message for clinicians and policy makers alike is that context matters, and that the parent-adolescent relationship continues to provide a central context in adolescence, but is not the only one. For clinicians, this implies that adolescent behavior should be interpreted in light of the relationship, family, and neighborhood context, and the possibility of including parents into treatment, or helping adolescents to deal differently with conflicts with their parents, should be assessed carefully. For policy makers, it means that they need to be aware of the fact that, while intervention efforts at the individual level may be helpful, efforts may also usefully be aimed at the family (e.g., support groups for single parents) and community levels (e.g., increasing informal social control through neighborhood activities that foster a sense of community).
Results of the present thesis must be interpreted in light of its limitations. The first limitation concerns the samples used in the present thesis. Although the studies in the present thesis used several different samples from the Netherlands, Germany, and Scotland, all these samples contained mostly white adolescents (and their families), limiting the generalizability of our findings to adolescents from other ethnic background. In addition, it would also be interesting to see to what extent our findings can be replicated in samples of adolescents with clinical levels of internalizing and externalizing problems, as problems with affect regulation seem to have a significant impact in this group. For example, Tromp and Koot (2010) showed that affective instability of adolescents referred for mental health services was related to affective disorders, but also to self-harm behavior, and the ability to observe rules in the home and perform age-appropriate tasks.

Another main limitation of the studies presented in the present thesis is the heavy reliance on adolescent self-reports which may be influenced by the individual’s willingness or ability to report accurately on his or her behaviors. Though when possible, we combined self- and other reports (chapter 5), included census data (chapter 6), and made use of the experience sampling method (chapter 3 and 5) in addition to traditional self-report questionnaires, the main use of self-reports may have resulted in an overestimation of links between parent-adolescent interactions, adolescent affect dysregulation, and adolescent psychopathology due to shared-method variance (e.g., Fergusson & Horwood, 1987).

Though not a specific focus of the present thesis (since its focus is on dimensions of affective dysregulation), it is still regrettable that not more of a differentiation between affect and its regulation could be made. Because affect is modulated as or even before it is generated, and not only afterwards, neurobiological perspectives suggest that affect regulation should be investigated as part of affect itself (Thompson et al., 2008). The notion of affect and its regulation as undividable also receives support from functional approaches to emotion research (Campos, Frankel, & Camras, 2004). Nevertheless, there exists quite some agreement that both science and clinical work may profit from concepts that describe how individuals modulate their affective experiences (e.g., Cole & Deater-Deckard, 2009; Goldsmith, Pollak, & Davidson, 2008). Successful approaches to do so should combine different methods and levels of analyses as well as samples of typically and atypically developing children and adolescents (Cole & Deater-Deckard, 2009).

A final limitation of the present dissertation is the fact that not every topic addressed in this thesis could be studied longitudinally. For instance, affect dysregulation at the meta-cognitive level was only studied cross-sectionally. This is unfortunate, because cross-sectional studies do not allow any conclusions about the direction of effects, and because we cannot draw any conclusions about potential developmental changes of affect dysregulation at the meta-cognitive level throughout adolescence. Fortunately, longitudinal data on affective dysregulation at the meta-cognitive level obtained in the RADAR study (Eichelsheim, Buist, Deković, Wissink, Frijns, van Lier et al., 2010) are ready for analysis.
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As studies in the present thesis are among the few that focus on affective dysregulation, its consequences and sources in adolescence, it offers several ideas for potential research regarding the concept and development of affect dysregulation in adolescence, the foundations of adolescent affect dysregulation, the role of affect dysregulation in adolescent psychopathology, and potential moderators of its effects. Longitudinal studies of affect dysregulation in adolescence, that have the potential to show both general developmental trends and the emergence of intraindividual differences, will be important to further our understanding of affect dysregulation in this important developmental period. The present thesis shows that negative affect increases from age 13 to age 15 years. Important follow-up questions are: Is this increase paralleled by, or does it follow or is it followed by increases in other aspects of affect dysregulation? How does puberty impact affect dysregulation? What happens towards late adolescence: Does affect dysregulation level off, or decrease? In addition to the study of normative developmental changes in affect and indicators of affect dysregulation, affect regulation strategies should be studied. It would be highly informative to see studies assessing the development of several indices of affective development from late childhood to young adulthood, including experiential and meta-cognitive aspects of affect dysregulation, but also psychophysiological measures, and observational data. In addition, it may be worthwhile to design studies that identify changes in affective reactivity as well as changes in affect regulation strategies across adolescence.

Ultimately, studies of the normative developmental changes regarding affect and its regulation may prove of great use for the study of associations between affect dysregulation and psychopathology. Once we have a better picture of how affect regulation and dysregulation develops normally across adolescence, we can try to find early markers of affect dysregulation that indicate ‘when things turn to go wrong’. In addition, person-centered analyses may be used to differentiate youths low in affective reactivity from those that are high in affective reactivity but are able to regulate their affect in adaptive ways, from those that are at double jeopardy, because they are highly reactive and use inefficient affect regulation strategies. By including different aspects of affect, affect regulation and dysregulation in one study, one may also identify unique, additive and interactive effects of different dimensions of affective dysregulation on the development of distinct forms of psychopathology. For instance, using frequent assessments of emotions (several ratings daily over a course of 3-4 days) and a Stop Signal Reaction Task, Hoeksma and colleagues (Hoeksma, Oosterlaan, Schipper, and Koot, 2007) showed that anger accelerates less fast as inhibitory control increases, and that high anger variability is associated with low inhibitory control in a sample of preadolescent boys and girls. It would be interesting to see how anger (and other emotions) and inhibitory control develop across adolescence, and how they, and their interaction relate to the development of psychopathology.

Although in the present thesis, little evidence was found for specific associations between discrete emotions and different forms of psychopathology, it may still be worthwhile to study discrete emotions. Thereby, one may find answers to questions such as: What is it that leads from the experience of one emotion to its expression, possibly masked as another emotion? In this context, it would also be interesting to compare clinical and non-clinical samples. While our data
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imply that the experience of discrete emotions is not linked with different forms of psychopathology in specific ways, this may differ at extreme ends of the continuum, i.e., for clinically high symptom levels.

Regarding sources of affect dysregulation, the present thesis shows that negative affect arises in the context of negative parent-adolescent interactions. For future research, it would be interesting to see whether and how other family relationships, for instance relationships with siblings or the marital relationship are associated with adolescent affective dysregulation. Since the social context outside the family gains in importance in adolescence, future studies may also focus on links between peer- and intimate partner relationships and affect (dys)regulation. Because of the high variability of findings relating environmental influences to child development (e.g., Rothbaum & Weisz, 1994), an especially promising avenue for future research is the study of combined genetic and environmental influences on affect regulation (e.g., Zimmermann, Mohr, & Spangler, 2009). Amongst others, variations in genes related to the dopamine (e.g., Drabant, Hariri, Meyer-Lindenberg, Munoz, Mattay, Kolachana et al., 2006) and serotonin systems (e.g., Canli & Lesch, 2007) have been associated with interindividual differences in affect regulation. It is well established however, that individuals carrying vulnerability genes may only develop mental health problems, if they are additionally exposed to significant environmental stressors (e.g., Caspi, McCay, Moffitt, Mill, Martin, Craig et al., 2002; Hariri & Forbes, 2007). One interesting question for developmental studies might be whether affectivity is mostly genetically determined, whereas regulation of affective responses and coping are more influenced by socialization experiences. If that was the case, positive socialization experiences may ameliorate the influence of risk genes. Given that genetic risk might be better conceptualized as genetic susceptibility to environmental influences (Belsky & Pluess, 2009), both positive and negative aspects of the environment and both positive and negative developmental outcomes should be studied.

Conclusions

The present thesis clearly demonstrates that affect dysregulation is a risk factor for the development of mental health problems in adolescence. It may both mediate the effects of social experiences on the development of psychopathology, or be moderated by environmental influences. The present thesis points out that affect dysregulation is a multidimensional construct, and offers ways to assess several of these dimensions reliably in research with adolescents. The need to approach affect dysregulation at diverse levels of experience is stressed by the fact that the precise nature of associations between affect dysregulation and psychopathology depends on the conceptualization of affect dysregulation and the form of psychopathology in question. Results of the present thesis show that in this regard, the form of dysregulation may be more important than the discrete emotion under study, at least when it comes to the conscious experience of emotions. Consequently, scientists and clinicians alike should be aware that diverse emotional experiences may underlie any form of psychopathology.
Further, the present study clearly demonstrates that parent-adolescent interactions form an important context for adolescent mental health and affect dysregulation, and that associations between parent-adolescent interactions and adolescent outcomes are best characterized as bi-directional or closely co-developing. It appears that the development of parent-adolescent interactions may not always be associated with the development of internalizing and externalizing problems directly, but indirectly through adolescent affective dysregulation. This underscores the necessity to include potential intervening variables in studies of associations between contextual factors and developing psychopathology.

Finally, a factor that should not be underestimated when studying adolescent affect dysregulation is adolescent gender. This might be especially true for studies focusing on affect dysregulation in the context of social relationships: Results of the present thesis suggest that adolescent gender affects links between the social relations and the broader social context and adolescent development, whereas links between affect dysregulation and psychopathology might be more gender-invariant. One interesting exception to the latter may be a role of internalizing emotions (anxiety, sadness) in the development of aggressive behavior for female, but not for male adolescents. However, this finding clearly needs to be replicated in different samples.

All in all, the studies reported in this thesis evidence that early adolescent affect dysregulation is an important construct that deserves ample attention from researchers and clinicians alike. Simultaneously, they only scratch the surface of this phenomenon, and indicate that much more work needs to be done to understand its nature and influence.