Chapter 7

General discussion
Introduction

The general objective of this thesis was to further advance adolescent stress research by developing and testing theoretically guided models of particular stress-symptom associations. In particular, we aimed to gain more insights into stress generation and stress reaction models involving particular stressful life events. In this final Chapter, we discuss the results for the specific stressful life events that were involved in our studies: relationship losses, peer victimization, conflict with authorities, and family instability. In the interpretation of the results, the ideas on which the mechanisms were based will be discussed. We end this chapter with some methodological considerations and general directions for future adolescent stress research. First, however, we will give a brief overview of the main results.

Summary of the main results

Chapter 2 examined whether boys and girls are susceptible to different peer stressors (peer victimization versus relationship losses), and whether they are likely to express stress differently (internalizing versus externalizing problems). Relationship losses were associated with internalizing and externalizing problems in girls but not in boys, while peer victimization appeared to be an important stressor for both genders. Peer stress did not result in different mental health problems in boys and girls.

In Chapter 3 we investigated whether young adolescent boys and girls with poor assertion or poor self-control were more susceptible to experience either peer victimization or conflict with authorities. Additionally, we tested whether early physical maturation increased the effects of the social skills deficits on these interpersonal stressors. Poor assertion was associated with peer victimization in boys, while in girls poor self-control was associated with peer victimization. Early physical maturation did not result in more peer victimization in boys and girls with these gender-incongruent behaviors. Poor self-control rather than (poor) assertion was associated with conflict with authorities in both genders. Early physical maturation resulted in more conflict with authorities in boys and girls with deficits in self-control.

Chapter 4 explored the existence of internalizing-specific and externalizing-specific stress generation processes. Illness and victimization appeared to specifically carry forward internalizing problems, while out-of-school suspension and contact with police carried forward externalizing problems. The mediation effects for the subset of life events that appeared to contribute to the continuation of either internalizing or externalizing problems was modest.

In Chapter 5, we investigated whether childhood family instability was related to internalizing and externalizing problems during late adolescence, and whether this effect was better explained by continued family instability or by the early onset of mental health problems. Childhood family instability was associated with both internalizing and externalizing problems during late adolescence. Most of these longterm mental health risks were due to a pre-adolescent onset of these mental health problems.
Chapter 6 examined whether adolescents’ self-regulation capacities protected them against developing internalizing and externalizing problems when they were exposed to family instability. Adolescent family instability was associated with both types of mental health problems. Effortful control protected adolescents from developing externalizing problems but not from developing internalizing problems. Attentional flexibility (in this case, measured with a set-shifting task) had limited predictive value.

**Relationship losses**

Belongingness is a fundamental human need that drives adolescents to form and maintain social bonds (Baumeister & Leary, 1995). The social sphere approach to belongingness proposes that both boys and girls have a strong need for belongingness but that they pursue it in different social contexts; boys mainly pursue it in the broader peer group, while girls pursue it more in close dyadic peer relationships (Baumeister & Sommer, 1997). Based on this approach, we proposed that boys and girls would be affected differently by peer group stress (peer victimization) and dyadic peer stress (relationship losses).

Consistent with the social sphere approach, girls’ mental health was negatively affected by the loss of close friendships and romantic partners, whereas this was not the case for boys (Chapter 2). Contrary to the social sphere approach, boys and girls were not differently affected by peer victimization (Chapter 2). Altogether, our findings support the social sphere approach to belongingness for relationship losses; young adolescent girls develop more mental health problems due to relationship losses than young adolescent boys (e.g. Rose & Rudolph, 2006; Rudolph, 2002). Effects of relationship losses for boys could be different in older samples, where dating behaviors are more frequent (e.g. Monroe et al., 1999). Thus, we propose that the social sphere approach should also be tested during middle and late adolescence. Additionally, our results indicate that young adolescent girls are negatively affected by peer stress irrespective of social context (e.g. Rudolph, 2002), which could be explained by their high affiliative need (e.g. Cyranowski et al., 2000).

Relationship losses increase the chance that young adolescent girls develop mental health problems (Chapter 2; Rose & Rudolph, 2006; Rudolph, 2002). However, few studies have researched which individual characteristics make girls either more or less susceptible to relationship losses. Thus, future peer stress research could develop and test theoretically guided moderation and mediation models for this particular stressor.

Moderation models can be based on a risk-buffering approach, which suggests that favorable individual characteristics can mitigate the effects of stressful life events on mental health (e.g. Veenstra et al., 2006). For example, girls with positive emotionality rather than negative emotionality are likely to focus more on the positive aspects of their environment rather than to dwell on the negative aspects, and to maintain a relatively positive mood despite negative experiences (e.g. Lengua et al., 2000). Perhaps positive emotionality protects girls against developing mental health problems, whereas negative emotionality promotes mental health problems after experiencing relationship losses.
Mediation models could be based on a transactional approach, which integrates stress-generation and stress-reaction processes. According to this approach, stressful life events are important intermediate steps in the path to mental health problems. It states that individual characteristics contribute to the occurrence of stressful life events, and that these stressors, in turn, lead to mental health problems (Eberhart & Hammen, 2010; Rudolph & Hammen, 1999). Based on a transactional approach, girls with high negative emotionality, the tendency to perceive the world as negative and threatening, could be more likely to experience relationship losses (e.g. Kercher, Rapee, & Schniering, 2009), which in turn increases the chance of developing mental health problems (Eberhart & Hammen, 2010). Testing these models in girls could improve our knowledge about the conditions under which relationship losses result in mental health problems, which might also have implications for prevention and intervention.

Peer victimization

The social misfit hypothesis argues that adolescents who do not “fit in” are more likely to be victimized by peers (Graham & Juvonen, 2002; Nadeem & Graham, 2005; Wright et al., 1986). Put in other words, adolescents who display social behaviors that are deviant from the group norm are at risk for peer victimization (e.g. Nadeem & Graham, 2005; Sentse, Scholte, Salmivalli, & Voeten, 2007). Additionally, the extended social misfit hypothesis states that early physical maturation is nonnormative during early adolescence and therefore a risk factor for peer victimization in this developmental period (Nadeem & Graham, 2005).

Our findings support the social misfit approach to peer victimization. We specified it further by proposing that there might be gender-specific antecedents to peer victimization. Consistent with our gender-incongruence hypothesis, poor assertion rather than poor self-control was associated with peer victimization in boys, while in girls poor self-control was more strongly associated with peer victimization (Chapter 3). Thus, despite that peer victimization is likely to be an important stressor for boys and girls during early adolescence, the behavioral determinants of peer victimization might partly differ for the genders. To be able to disentangle which risk factors actually contribute to peer victimization it could therefore be useful and appropriate to take a gender-specific approach.

Early physical maturation did not lead to victimization when adolescents were already perceived as “social deviants” by showing gender-incongruent behaviors (Chapter 3). This finding does not support the extended social misfit hypothesis. However, this does not preclude the possibility that other nonnormative physical characteristics are relevant risk factors for peer victimization during (early) adolescence (Sweeting & West, 2001). For example, weight problems could increase the risk of being victimized by peers (e.g. Gray, Kahhan, & Janicke, 2009; Janssen, Boyce, & Pickett, 2004; Wang, Iannotti, & Luk, 2010). Although, simply being overweight or obese may not put adolescents at risk for victimization per se; it could be that insecure behaviors of overweight adolescents actually explains the risk of being victimized by peers (Fox & Farrow, 2009). Nonetheless, the social misfit hypothesis could perhaps be improved by studying the interplay between nonnormative behaviors (e.g. gender-incongruent
social skills) and other nonnormative physical characteristics besides pubertal timing (e.g. weight problems and physical impairments).

We showed that, at least in community samples, gender-incongruent social skills deficits contribute to the occurrence of peer victimization. Additionally, we demonstrated that peer victimization is associated with both preceding and later internalizing problems. On the whole, our findings point to the existence of transactional processes; individual characteristics (e.g. social skills, mental health symptoms) are likely to predispose adolescents to peer victimization, which in turn is likely to result in (more) internalizing problems (e.g. depression, anxiety). Up till now, however, only a few studies have taken a transactional approach to peer victimization (e.g. Salmivalli & Isaacs, 2005). Thus, research could focus more on developing and testing (gender-specific) transactional models, including multiple preceding individual risk factors, victimization, and specific internalizing outcomes. This is likely to further advance our understanding about the negative developmental trajectories of internalizing problems in (young) adolescents.

A practical implication of the findings is that it appears to be important to teach girls at risk for victimization more self-control, whereas efforts should be focused on improving assertiveness for at risk boys (Chapter 3). At risk adolescents, could be given special attention by means of targeted social skills training. However, social skills training alone does not decrease victimization that much (Vreeman & Carroll, 2007). This is in accordance with our finding that gender-incongruent social skills deficits contributed only marginally to the risk of being victimized by peers (Chapter 3). Peer victimization is most likely the result of both individual and social risk factors (e.g. Hodges et al., 1997). At risk adolescents, might therefore benefit the most from a whole-school approach to peer victimization, which includes school-wide rules and sanctions, teacher training, classroom curriculum, social skills training, and individual counseling (e.g. Vreeman & Carroll, 2007).

Peer victimization can potentially lock adolescents further into an internalizing maladaptive path (Chapter 4). Accordingly, to disrupt the harmful developmental spiral of peer victimization and internalizing problems, it might be appropriate or even necessary, in some cases, to transfer adolescents to another class or school. Before adolescents, parents and school administrators make such a decision, however, they should be aware that the adolescent might run into the same problems in a new environment because victimization is partly determined by their own behaviors (Chapter 3 and 4). Nevertheless, a change of environment can give some adolescents the much-needed opportunity to get rid of the stigma they were labeled with by their peers, and provide them with positive interpersonal changes and experiences (e.g. Kinney, 1993; Sentse et al., 2007).
Conflict with authorities

During early adolescence, the prevalence of conflicts and disagreements with adults increases because adolescents typically start to desire more autonomy than their parents or school administrators are willing to give (e.g. Agnew, 2003; Branje et al., 2009). The maturity gap hypothesis argues that despite that some adolescents are already biologically matured during early adolescence, Western society does not permit them social maturity; adults still set rules and exert control over them (e.g. Moffitt, 1993; Williams & Dunlop, 1999). According to this hypothesis, rule breaking behaviors and other offences are an attempt by early maturing adolescents to demonstrate autonomy from parents and other authority figures (Williams & Dunlop, 1999).

Our results indicate that adolescents’ behaviors play an important role in the way they cope with the changes, demands and social restrictions during early adolescence (Chapter 3 and 4). During this pivotal transitional period, assertiveness is likely to help adolescents to defend their rights (rigorously) when confronted with restrictions by adults without predisposing them to conflict with authorities (Chapter 3). Conversely, young adolescents with self-control deficits are likely to be hot-tempered and to react impulsively when confronted with restrictions (e.g. Moffitt, 1993), which can disrupt into more serious forms of conflict, like (self-initiated) running away from home, out-of-school suspension and police contacts (Chapter 3).

Consistent with the maturity gap hypothesis, early physical maturation increased the chance that young adolescents with self-control deficits were at risk for conflict with authorities in our sample (Chapter 3). Apparently, early matures with self-control deficits are especially likely to act out with rule breaking behaviors as a response to restrictions by authority figures. Running away from home, out-of-school suspension, and police contact could therefore be viewed as the negative social consequences of the attempts made by these at risk adolescents to bridge the “maturity gap”, and gain more autonomy from adults and respect from peers (e.g. Williams & Dunlop, 1997).

Out-of-school suspension and police contacts were also associated with preceding and subsequent externalizing problems during early adolescence (Chapter 4). These results give insights into the trajectory through which a self-perpetuating cycle of externalizing problems might develop. The findings demonstrate that social forces, at least in part, determine the developmental trajectory of adolescents with behavioral problems; out-of-school suspension and police contacts contribute to (further) externalizing problems. This is in line with previous research which found that out-of-school suspension is associated with the development of externalizing problems (Hemphill et al., 2006). The association between conflict with authorities and subsequent externalizing problems could be explained by the labeling theory. Adolescents who experience school suspensions and police contacts are likely to be labeled as rule breakers and troublemakers by official authorities (e.g. school administrators) and others (parents and peers). Having a negative label is likely to narrow adolescents’ options for conventional behaviors, resulting in (more) externalizing behaviors and attitudes (Bernburg et al., 2006; De Kemp et al., 2009; Heimer & Matsueda, 1994; Moffitt, 1993).
Altogether, our results suggest that, during early adolescence, poor self-control, externalizing problems, and early physical maturation are likely to contribute to the occurrence of conflict with authorities. Conflict with authorities is also likely to increase the chance of developing externalizing problems. Comparable to the results for peer victimization, the findings point to the existence of particular transactional processes; conflict with authorities appears to be an intermediate step towards (further) externalizing problems. In line with our recommendations for future peer victimization research, a next step could be to develop and test a more complex transactional model that integrates multiple preceding risk factors (e.g. social skills, temperament), conflict with authorities, and specific externalizing outcomes (e.g. delinquency). Such a model could contribute to unraveling the trajectories that push adolescents (further) into a maladaptive path of particular behavioral problems.

The findings also have practical implications. Reduced supervision by parents during early adolescence might enable boys and girls with self-control deficits to engage in rule breaking with less chance of detection and sanction (Agnew, 2003). It might be especially important for this subgroup of young adolescents that parents continue to exercise parental monitoring activities such as solicitation (information gathering) and control (having clear expectations and rules), although, not so much as to stifle autonomy needs (e.g. Agnew, 2003; Kiesner et al., 2009; Laird et al., 2009). Previous research also indicates that adolescents at risk for rule breaking behaviors could benefit from participating in special programs at school, including conflict management training and remedial teaching (e.g. Veenstra, Lindenberg, Verhulst, & Ormel, 2009; Wilson, Gottfredson, & Najaka, 2001; Wilson & Lipsey, 2007).

Out-of-school suspension might not be an appropriate response by school administrators to “punish” behavioral problems, as it potentially makes these adolescents worse off (Chapter 4; Hemphill et al., 2006). It might be more beneficial to keep these “volatile” adolescents within the school environment because in that case they are less at risk for (more) negative labeling, and have less opportunity to engage in rule breaking behaviors out of school. Hemphill and colleagues (2006) introduced some alternative methods to out-of-school suspensions that could also be implemented in the Netherlands; these include in-school suspensions (the adolescent is supervised and given work to complete within the school building), withdrawal of privileges (e.g. school excursions, extra-curriculum activities, free hours between courses) or writing a contract stating the terms under which the adolescent can remain at school (e.g. counseling or anger management training). Irrespective of the alternative methods that are mentioned above, out-of-school suspensions should be avoided as much as possible.
Family instability

Family instability is the accumulation of disruptive family events that undermine the predictability and stability of family life, including parental divorce, residential moves, parental death and illness, and change in family composition (e.g. Forman & Davies, 2003). We tested two possible “chains of effects” involving family instability; childhood family instability is associated with adolescent mental health problems through an early onset of mental health problems and through continued family instability during adolescence. Additionally, we applied a risk-buffering model to family instability: self-regulation capacities (e.g. effortful control) were expected to mitigate the adverse effects of family instability on adolescents’ mental health.

Consistent with the “chains of effects” approach, the association between childhood family instability and adolescent mental health problems was largely explained by pre-adolescent onset of mental health problems. However, we did not find much support for the continued family instability pathway. These findings indicate that childhood is an important developmental stage for shaping mental health trajectories. The results for continued family instability could also suggest that other types of adversities are more relevant in the chain from childhood family instability to adolescent mental health problems. Childhood family instability is likely to predispose children to multiple types of (interpersonal) stressful life events (e.g. Kendler, Gardner, & Prescott, 2002). Thus, future stress research could develop and test an extended “chains of effects” model, including different types of adversities, for example, academic difficulties, conflict with authorities and peer stress. Such a model is likely to improve our understanding about the adversity pathways that link childhood family instability to adolescent mental health problems.

The proposed risk-buffering model of self-regulation capacities was partly supported; under taxing family circumstances, effortful control protected adolescents against developing externalizing problems but not against developing internalizing problems (Chapter 6). It could mean that individual characteristics that protect against developing internalizing problems differ from those that protect against developing externalizing problems in the context of family instability. For example, positive emotionality rather than effortful control could be a relevant protective characteristic for internalizing problems in the presence of family instability (Chapter 6). Testing theoretically guided risk-buffering models including multiple protective factors and multiple mental health outcomes could provide us with more knowledge about how to best ameliorate or prevent mental health problems in children and adolescents from an unstable family environment.

Family instability appears to be causally related to adolescent mental health problems (Chapter 5 and 6). However, children share, on average, fifty percent of their genetic makeup with their parents. It could be that common genes between the parents and children influence the association between (childhood) family instability and mental health problems. Put in other words, parents may pass on the genes to their children that increase both the risk for exposure to family instability and mental health problems (Burt, Barnes, McGue, & Iacono, 2008). Thus,
the results might also point to gene-environment correlations (e.g. Rutter, Dunn, Plomin, & Simonoff, 1997; Rutter, Moffitt, & Caspi, 2006).

**Methodological considerations**

Some events might in part reflect prior manifestations of mental health symptoms (e.g. Dohrenwend, 2006; Grant et al., 2004; Hammen, 2006; Monroe, 2008). To reduce the potential overlap between stressors and symptoms in our studies, we adjusted for shared variance by including prior mental health symptoms in all the analyses. Adolescents with mental health symptoms might over-report the severity as well as the number of stressful life events (Dohrenwend, 2006; Grant et al., 2004; Monroe, 2008). However, the chance of recall-bias is likely to be more pronounced in severity ratings than in occurrence ratings of stressful life events (Wagner et al., 2006). Subjective severity ratings are not recommended because these are highly affected by the mental health status, and are perhaps the surest way to confound the measure of stress and the measure of the mental health outcome (Dohrenwend, 2006). To limit the chance of recall bias in our studies, we used occurrence ratings of stressful life events, not severity ratings.

Prospective research has empirically shown that stressful life events are associated with increases in symptoms over time, but account for only small to moderate portions of the variance in the change of mental health symptoms. The average effect size of unique variance of stressful life events is approximately four percent (Grant et al., 2004). The studies that are reported in this thesis are no exception to this rule, that is, the explained variance of the different models was small to modest. Nonetheless, it is important to recognize that our findings reflect unique variance attributable to stressful life events after adjusting for prior levels of symptoms. Thus, adolescents did experience increased symptoms following the different types of stressful life events over and above the baseline levels of these symptoms.

Lack of comparability of life event measures across studies makes it more difficult to replicate or falsify hypotheses (Grant et al., 2004; McMahon et al., 2003; Monroe, 2008). To improve the comparability of stress research, it is recommended to operationalize stressful life event measures based on theoretically-derived categories (McMahon et al., 2003). For example, peer victimization is defined as physical, verbal and psychological abuse of victims by perpetrators who intend to cause them harm (e.g. Graham & Bellmore, 2007; Olweus, 1993). The following events are therefore most likely to be prototypical for peer victimization: victim of physical violence, victim of sexual harassment, victim of bullying, and victim of negative gossip. For victimization research, we advocate that these four prototypical events (continue to) be used for the combined measure of peer victimization across studies. Another example is family instability, which is defined as an accumulation of common disruptive family events that undermine the predictability and stability of family life from the child’s perspective (Ackerman et al., 1999; Forman & Davies, 2003). The term “family” refers to biological parents, brothers and sisters, step parents, stepbrothers and sisters, half brothers and sisters, foster brothers and sisters. The following events are in accordance with the definition of family instability: parental divorce, romantic relationships of biological parents after divorce,
changes in residence, changes in family composition, death of family member, serious somatic illness of family member, mental health problems of family members, parental addiction (alcohol or drugs), and long-term conflict between family members. We propose that, in future research, these events are included in the measure of family instability. In a similar manner, more specific theoretically guided definitions could be developed and used to categorize other types of stressful life events.

**General directions for future adolescent stress research**

Common mental health problems in adolescents can be distinguished into internalizing problems and externalizing problems (Krueger, 1999; Krueger, Cheventsova-Dutton, Markon, Goldberg, & Ormel, 2003). However, which adolescents are more at risk to develop either internalizing problems or externalizing problems has not been widely studied. This thesis related the risk of internalizing and externalizing problems to specific kinds of stressful experiences. It showed that whether adolescents develop internalizing problems or externalizing problems is, at least in part, dependent on the stressful life events they experience (Chapter 4). This finding underscores the need for a specificity approach in adolescent stress research; not only relating to types of stressful life events but also to types of mental health problems. We propose that etiological models of common mental health problems at least include two types of stressful life events (e.g. victimization and conflict) and two types of mental health outcomes (e.g. internalizing and externalizing problems) to be able to determine specificity in stress-symptom associations (McMahon et al., 2003). We recommend that specificity models of common mental health problems are tested with theoretically-derived categories of stressful life events (McMahon et al., 2003).

Our studies focused on stress generation or stress reaction models involving particular stressful life events. We proposed earlier in this discussion that a next step could be to incorporate particular stressful life events (e.g. victimization) into a broader transactional model that integrates both stress processes. In general, the transactional model states that individual characteristics contribute to the occurrence of stressful life events, and that these stressors, in turn, lead to mental health problems (Eberhard & Hammen, 2010; Rudolph & Hammen, 1999). Transactional models are likely to contribute greatly to unraveling the etiology and development of particular types of common mental health problems. However, these models are relatively understudied in adolescent stress research (e.g. Caldwell et al., 2004; Kercher et al., 2009; Eberhard & Hammen, 2010; Rudolph et al., 2000). Thus, we advocate that adolescent stress research could focus more on developing and testing hypotheses that are based on the transactional approach.
The stress generation and stress reaction models in this thesis included either moderators or mediators. Few studies investigating stress-symptom associations have tested models that incorporate specific mediators in relation to particular moderating contexts (Bouma et al., 2008; Grant et al., 2003). Thus, adolescent stress research could also focus more on developing and testing models including both mediators and moderators. This would further improve our understanding about the complex ways in which stressful life events are linked to common mental health problems.