English Summary
Adolescence has been long regarded as a period of frequent and extreme mood fluctuations, in which adolescents need to learn to come to grips with their emotions. However, despite the fact that adolescence is a sensitive period for the development of mood variability and the accumulating evidence that heightened mood variability is related to worse adjustment, little research, especially longitudinal research, has been conducted on mood variability during adolescence. The aims of the present thesis concerned the (1) measurement, (2) development, and (3) consequences of mood variability during adolescence. Specifically, the present thesis addressed the following research questions:

1. **Measurement of mood variability:** The aim was to critically test the measurement of adolescent mood variability.
   a. Are daily diary emotion reports, the basis of our mood variability measure, measurement invariant between boys and girls, and across days within weeks and days across years?
   b. Given the strong relation between mood variability and average mood level, to what extent is mood variability a unique construct that is different from average negative mood level?

2. **Developmental changes in mood variability:** The aim was to get a better insight into the development of mood variability across adolescence.
   a. What are the average developmental changes of the variability of happiness, anger, sadness, and anxiety from age 13 to 18 years, and do these apply to boys and girls in a similar way?
   b. Do all adolescents follow a similar developmental course or are there distinct subgroups of adolescents with different trajectories of mood variability?

3. **Association between mood variability and adjustment:** The aim was to get a better understanding of the developmental significance of mood variability by studying the role of mood variability in the development of personal and social adjustment.
a. How do adolescent adjustment problems develop as a function of distinct mood variability trajectories?
b. What is the direction of effects between mood variability and adolescent adjustment?

In order to answer these questions, we analyzed data from the RADAR study, a longitudinal research project in the Netherlands that follows 497 adolescents and their families and friends since the adolescents were 13 years old. In the study, adolescents reported on their daily emotions for happiness, anger, sadness, and anxiety for three weeks per year over the course of five years (i.e., 15 assessment weeks, 75 assessment days in total; ages 13-18). The assessment weeks were scheduled in June, September, and December of each year. Based on these daily emotion assessments, the day-to-day variation in emotions were calculated as a measure of adolescent mood variability. In addition to the internet assessments, annual data were collected on adolescent internalizing and externalizing problem behaviors as well as parent-adolescent conflicts (the latter rated by adolescents, mothers, and fathers).

**Research Topic 1: Measurement of Mood Variability**

The studies described in Chapter 2 to 5 are central to the topic of the measurement of mood variability. In Chapter 2, we specifically addressed the question whether emotions as collected with daily diaries, the basis of our mood variability indices, can be reliably compared between boys and girls, days within weeks, and days across years. In other words, can we be sure that we measure the same thing, if we ask adolescent boys and girls how they feel, or if we ask them how they feel on a Monday compared to a Friday, or if we ask them how they feel when they are 13 years compared to when they are 18 years old? Only if the measurements are comparable (i.e., measurement invariant) can we use these scores in studies on individual and developmental differences. We found that the structure (i.e., configural invariance), unit of measurement (i.e., metric invariance), and the starting point (i.e., scalar invariance) in rating emotions was equal between boys and girls and
ENGLISH SUMMARY

does not change across shorter and longer time frames. This indicates that the importance of the items for the overall scale is equal across sex and time and that there is no systematic bias in the assessment of daily emotions across sex and time. This makes it possible to compare relations between daily mood and other variables across sex and time, to compare mean scores between boys and girls, and to study developmental trends across shorter and longer periods. Moreover, it supports the appropriateness of aggregating daily mood scores across days within weeks into weekly mood variability and level scores.

We also addressed the question whether mood variability is a construct with unique importance over and above average negative mood level, because both constructs are highly correlated. Results in Chapter 3 suggested that girls show more happiness and sadness variability even after controlling for the average emotional tone. The studies in Chapter 4 and 5 showed that there were unique associations between mood variability and different types of psychopathology and parent-adolescent conflicts, even after accounting for average mood level. Lastly, comparing the results on developmental trajectories of mood level in Chapter 2 with the developmental trajectories of mood variability in Chapter 3 reveal that both constructs showed different developmental courses, which provides further evidence that mood level and mood variability are distinct constructs.

Research Topic 2: Developmental Changes in Mood Variability

The studies presented in Chapter 3 and 4 are central for the topic of developmental changes. Chapter 3 addressed the average adolescent developmental changes of mood variability of happiness, anger, sadness, and anxiety. Our results suggest that, overall, mood becomes more stable across adolescence. There were few differences between the course of variability trajectories of different emotions in terms of their generally declining developmental courses, although anxiety variability showed a slightly different pattern. While happiness, anger, and sadness variability declined linearly across adolescence, anxiety variability showed a waxing and waning course. It initially increased, then decreased, and then
increased again toward late adolescence, which might be due to the upcoming transition to young adulthood, which is associated with new responsibilities. Moreover, the results also indicated that the developmental course was largely similar between boys and girls, meaning that both sexes showed a comparable decrease in their mood fluctuations. Although the developmental course did not differ, girls showed higher happiness and sadness variability across the whole course of adolescence.

In Chapter 4, we further addressed the question whether the overall decline in mood variability applied to all adolescents. Results from that study suggest that not all adolescents experience a decline in mood variability. Although the largest group indeed showed a decrease in overall mood variability, there was a small group consisting of 12 percent of adolescents that showed an increase in mood variability across adolescence, particularly in early to middle adolescence.

**Research Topic 3: Association between Mood Variability and Adjustment**

The studies presented in Chapter 4 and 5 clearly indicated that heightened mood variability affects the personal and social adjustment of adolescents. Results in Chapter 4 indicated that, when compared to adolescents who experienced decreasing levels of mood variability, adolescents who experienced increasingly instable moods across adolescence, also developed more depressive and delinquency problems in early and middle adolescence. This difference remained stable until late adolescence. This indicates that adolescents that do not come to grips with their emotions also experience more psychopathological problems. Interestingly, those adolescents also reported consuming alcohol less frequently in young adulthood than adolescents who developed more stable moods. Although this latter result might seem counterintuitive, it might be that adolescents with highly instable moods have difficulties to make friends, because mood swings can be quite impairing in interpersonal relationships (see also Chapter 5). Therefore, they may simply have fewer opportunities to drink alcohol, which is often consumed in a peer context.
In Chapter 5 we further studied whether there was a specific temporal relationship between mood variability and adolescent adjustment. Results from that study suggested that mood variability was the driving factor in internalizing problem and parent-adolescent conflict development. That is, we found that mood variability predicted higher levels of depressive and generalized anxiety symptoms, but not the other way around. This suggests that mood variability is an important vulnerability factor for the development of psychopathology in adolescents. Moreover, results also indicated that mood variability did not only influence the personal, but also the social adjustment of adolescents. Higher levels of mood variability predicted higher levels of parent-adolescent conflicts, whereas parent-adolescent conflicts did not predict changes in adolescent mood variability.

**Conclusion**

The studies presented in this dissertation shed light on the concept of mood variability during adolescence by addressing its measurement, development, and association with adjustment. The results indicate that adolescent daily mood can be reliably assessed and compared between boys and girls and across different time-scales. Moreover, mood variability presented itself as a construct with unique importance, which is different from (negative) mood level. Results further showed that adolescence is a time in which mood becomes more stable for most adolescents, which is a positive message. However, a minority struggles with the demands of adolescence and suffers from increasing mood swings during that time and also more internalizing and externalizing problems. Lastly, the present dissertation clearly indicated that heightened mood variability drives the development of psychopathological problems and difficulties in interpersonal relationships with parents, highlighting the important role that mood variability plays in the adjustment development of adolescents.