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Bullying development across adolescence, its antecedents, outcomes, and gender-specific patterns

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Abstract

In contrast to victimization, prior research on the antecedents and outcomes of bullying perpetration has provided little conclusive knowledge. Some adolescent bullies may be well adjusted and popular among peers, while other bullies are rejected and lack self-control. There is also great variation in the outcomes, with a number of studies (but not all) showing increased risk for externalizing and internalizing problems. We used a developmental framework and data from 2,230 participants of the Dutch Tracking Adolescents' Individual Lives Survey (TRAILS) to examine bullying perpetration across adolescence, to test the links with various antecedents in preadolescence, and to elucidate the outcomes in early adulthood. Latent growth models indicated significant variance in initial bullying perpetration levels and an overall decrease between pre- and late adolescence. Individual, family, and peer factors were associated with initial levels and partially associated with bullying development over time. Bullying perpetration was linked to later maladjustment and substance use, although only in girls. Finally, bullying perpetration appears to function as an intermediate variable between preadolescent individual, family, and peer risk and substance use more than 10 years later. These results have important implications for understanding the gender-specific nature of bullying perpetration and its outcomes and for demonstrating that bullying carries early risk into adulthood.

Mirroring public attention, research into bullying–victimization has increased exponentially during the past few decades, with the bulk of studies examining the negative consequences of being victimized by peers for psychological adjustment (Hunter, Durkin, Heim, Howe, & Bergin, 2010; Kretschmer, Barker, Dijkstra, Oldehinkel, & Veenstra, 2014; Reijntjes, Kamphuis, Prinzie, & Telch, 2010) and behavioral development (Jackson, Hanson, Amstadter, Saunders, & Kilpatrick, 2012; Perren, Ettekal, & Ladd, 2013). With respect to antecedents, studies have shown that internalizing and externalizing problems (Hanish et al., 2004; Shapero, Hamilton, Liu, Abramson, & Alloy, 2013) and social factors (Hodges, Malone, & Perry, 1997; Shields & Cicchetti, 2001) contribute to the risk of being victimized.

What about the perpetrators of bullying? Though research has linked bullying to offending (Fergusson, Boden, & Horwood, 2014) and antisocial personality disorder (Copeland, Wolke, Angold, & Costello, 2013), results are mixed, and many studies find no support for adverse outcomes. Similarly, although well studied, knowledge on antecedents of bullying perpetration is ambiguous (Álvarez-García, García, & Núñez, 2015). This variability in results might stem from cross-sectional designs, temporal variation in bullying assessments, and individual differences in associations due to moderating factors.

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We tackled these potential sources of bias using longitudinal data spanning more than 10 years from over 2,000 adolescents and contribute to the literature on bullying perpetration in several ways. First, we studied bullying in a developmental manner by including multiple assessments across adolescence. Second, we examined associations with preadolescent individual, family, and peer risks and a range of problem outcomes in early adulthood. Third, we examined bullying as mediator between individual, family, and peer risks and later problem outcomes. Fourth, we tested gender moderation in all associations. We controlled for teacher-rated aggressive behavior in early adolescence to better understand the developmental significance of bullying once overlap with general aggression is accounted for. The comprehensive nature of this study sheds light on why some individuals turn to bullying, how this behavior develops over time, and how it is related to adjustment and behavior in early adulthood for boys and girls.

Bullying Development Across Adolescence

By definition ("repeated over time"; Olweus, 1996), bullying is a developmental phenomenon that needs to be examined in an appropriate methodological framework. Relying on a single assessment of bullying perpetration is problematic because associations with antecedents and outcomes likely depend on the timing of bullying. For instance, peer status will not predict temporally distant bullying perpetration to the same extent as it predicts concurrent or temporally proximal

bullying. Similarly, bullying during the first years of secondary school is likely less strongly associated with adult antisocial behavior than persistent bullying in middle and late adolescence. Assessing bullying only once or twice lacks crucial information about stability and change. Availability of multiple assessments, however, challenges the researcher to decide on which age to focus. If bullying is assessed at ages 11, 13, 16, and 19, as done in the sample used here, which assessment reflects most validly the true bullying behavior of the adolescent? Similar to single assessments, associations with antecedents and outcomes differ across time and feasibly also vary as a function of stability and change of bullying perpetration.

To make full use of longitudinal data, we modeled variation around the overall average trend using latent growth models. Latent growth models test *interindividual differences in intraindividual change* (Sterba & Bauer, 2010) by means of quantitative individual growth parameters, which can be retained and examined as dependent and independent variables.

Antecedents of Bullying Development

Prior research had difficulties identifying a clear set of risk factors for bullying because motivations differ and with them individual characteristics. On the one hand, bullying can be seen as an expression of aggressive behavior; it is found in children and adolescents who also show low self-control (Haynie et al., 2001) and low status (Farmer et al., 2010; Rodkin, Espelage, & Hanish, 2015) and are rejected by their peers (Veenstra et al., 2005). Bullies often grow up in dysfunctional family environments where aggressive behaviors are common and not sanctioned and where monitoring is low (Espelage, 2014). On the other hand, bullying can be a facet of popularity, and this pattern is typically observed in adolescence (Espelage, 2014). Popular bullies have been described as controlled, well adjusted, and selectively aggressive; thus, the risk factors listed above may operate differently (Juvonen & Graham, 2014).

Unfortunately, many studies into antecedents of bullying have relied on one-time assessments of bullying or focused on one antecedent at a time. Therefore, using latent growth indicators of bullying, we attempted to explain variation not only in levels of bullying but also in its course over time as a function of self-control, family dysfunction, peer popularity, and rejection. We tested predictors simultaneously and estimated models unadjusted and adjusted for general aggression to gain more clarity about the relative predictive power of risk factors.

Bullying Development and Associations With Later Adjustment

Benefiting from longitudinal cohort data that span adolescence and reach into early adulthood, we examined associations between bullying development and later adjustment. Bullies are at greater risk for externalizing problems such as aggression (Kim, Leventhal, Koh, Hubbard, & Boyce, 2006), intimate partner violence (Falb et al., 2011), antisociality (Copeland et al., 2013), and offending (Sourander et al., 2011), as well as substance use (Moore et al., 2014; Niemelä et al., 2011), depression (Klomek et al., 2008), and suicide ideation (Klomek et al., 2013; Winsper, Lereya, Zanarini, & Wolke, 2012, but see Skapinakis et al., 2011, who did not find this link). These studies were based on short measurement intervals (Kim et al., 2006), restricted to a single bullying assessment (Klomek et al., 2008; Moore et al., 2014) or averaged across assessments (Copeland et al., 2013; Sourander et al., 2011; Winsper et al., 2012). Thus, the same limitations that have been discussed with respect to studies into antecedents of bullying perpetration also affect associations with outcomes.

Bullying as Mediator

In addition to examining associations between bullying perpetration and its antecedents and outcomes, the proposed model allowed us to examine bullying development as intermediate variable between childhood risk and adjustment difficulties in adulthood (Rodkin et al., 2015). That is, maladjustment and substance use in early adulthood may result from peer rejection, low self-control, and family dysfunction earlier on, with bullying explaining the long reach of these risks. Espelage, Low, Rao, Hong, and Little (2014) found that bullying perpetration mediated the association between family violence and substance use in middle adolescence. We extended this work by using data from a larger sample spanning the transition into adulthood, examined not only substance use but also psychological maladjustment as outcomes, and included possible bullying antecedents from the individual and peer spectrum in addition to family risk.

Gender as Moderator

Boys engage more frequently in bullying than girls (Álvarez-García et al., 2015; Espelage, 2014; Fekkes, Pijpers, & Verloove-Vanhorick, 2005), and bullying is assumed to have different social functions for boys and girls: whereas boys strive for social dominance and bully to reduce status and power in the opponent, girls' bullying focuses on achieving close relationships through destroying such relationships in others (Espelage, Mebane, & Swearer, 2004). Gender-specific associations have been established between bullying, its antecedents, and outcomes (e.g., Sentse, Kretschmer, & Salmivalli, 2015). We add to this literature by exploring whether gender specificity is also present when bullying development is examined. Following the strategy by Espelage et al. (2014), we also tested whether indirect links differed by gender.

Current Study

Our study presents an approach to examine between-person variability in within-person change in bullying in adolescence, its antecedents in preadolescence, and its associations with early adult outcomes. First, we modeled developmental trajectories of bullying and victimization using data from a

longitudinal Dutch cohort study of over 2,000 adolescents. In line with previous studies, we expected to see a general decrease in bullying but also significant variation both in starting levels and in rate of change.

Second, we examined whether individual and social factors were predictive of initial levels and bullying development over time. Each of the antecedents examined here has been studied before (Espelage et al., 2014; Farmer et al., 2010; Haynie et al., 2001; Veenstra et al., 2005), but the current study allows insight into the *relative* contribution of each risk factor. Different assumptions about antecedents of bullying perpetration are tested in models unadjusted and adjusted for general aggression, and one would expect to initially see higher bullying in individuals who lack self-control, are rejected, and whose families are more dysfunctional. Thus, unadjusted models are hypothesized to reveal positive associations of bullying with peer rejection and family dysfunction, and negative associations of bullying with self-control.

In contrast, strategic bullying, geared toward obtaining social dominance, has been linked to greater popularity among peers; that is, popular and influential adolescents determine bullying norms and use bullying as mean to ensure their status in the group (Juvonen & Graham, 2014). These bullies are not perceived as generally aggressive. Thus, in adjusted models, we expected a positive association between popularity and bullying. Because strategic, status-oriented bullying is more common in well-adjusted youth, we tentatively expect changing signs in association between bullying and self-control, peer rejection, and family dysfunction.

Third, we examined links between bullying development and maladjustment and substance use in early adulthood, one outcome at a time, and we tentatively expected an increased risk for problem outcomes in individuals who show higher levels of bullying.

Fourth, we combined antecedent and outcome models and tested the intermediate role of bullying development. In line with Espelage et al. (2014), we expected to detect that bullying partly explains the link between family dysfunction and later substance use and explored the effects of bullying development on other associations, one outcome at a time.

Fifth, we examined gender specificity in associations throughout. These analyses were largely exploratory, although the indirect link from family dysfunction to substance use via bullying development was hypothesized to be stronger in boys, comparable to Espelage et al.'s (2014) study.

Method

Participants and procedure

The present study includes data from all five waves of the Tracking Adolescents' Individual Lives Survey (TRAILS), which is a prospective cohort study of Dutch adolescents, with bi- or triennial follow-up assessments. Data collection at the first assessment wave at Time 1 (T1) took place in 2001 and 2002 (mean age = 11.1 years), the second wave at Time 2 (T2) in 2003 and 2004 (mean age = 13.6 years), the third wave at Time 3 (T3) in 2006 and 2007 (mean age = 16.3 years), the fourth wave at Time 4 (T4) in 2008 to 2010 (mean age = 19.1 years), and the fifth wave at Time 5 (T5) was conducted in 2012 and 2013 when participants were between 21 and 24 years old (average age = 22.3 years).

The TRAILS sample was obtained in five municipalities in the north of the Netherlands, including urban and rural areas. Initially, 135 primary schools were approached, of which 122 agreed to participate. Both parents and children were asked to provide informed consent for participation. Ethical approval for the study was obtained from the Dutch national ethics committee CCMO. Details about the study have been published in several reports (de Winter et al., 2005; Huisman et al., 2008; Nederhof et al., 2012; Oldehinkel et al., 2015). In brief, a total of 2,935 children were invited to participate of whom 2,230 (51% female) did so at T1. Initial participation was more likely when children were female, from higher socioeconomic status (SES) background, and with better school performance. Retention was excellent with 96% at T2, 81% at T3, 84% at T4, and 80% at T5. Individuals lost to attrition were more often male, of non-Western ethnicity, with divorced parents, low SES, low IQ and academic achievement, poor physical health and externalizing problems, as well as low peer status (Nederhof et al., 2012; Ormel et al., 2012). Attrition analyses for the data used in this study are reported below.

Measures

Bullying perpetration. Bullying was assessed at T1 to T4 from parent, peers, and adolescents themselves as part of various different measures (see Figure 1 for an overview of item availability). At T1, T2, and T3, parents completed the Child Behavior Checklist (Achenbach & Rescorla, 2001), which included the items "My child is cruel, mean, and a bully towards others" and at T2 and T3 also "My child bullies others a lot," assessed on a 3-point scale, ranging from *not at all/never* to *a lot/almost always*. This item was phrased differently at T1 ("My child teases others"), and this assessment was thus excluded from the analyses. At T2 and T3, adolescents completed the Youth Self-Report (YSR) and at T4 the Adult Self-Report (ASR; Achenbach et al., 2003), which included the item "I bully others a lot," assessed in the same way as the parent report. The YSR was also included at T1, but the item then was phrased differently ("I tease others a lot"). Note that we only used the bullying perpetration items in our analyses, not the complete scales.

Moreover, a subsample of TRAILS participants took part in classroom-based assessments at T1 and T2, in which TRAILS participants and their classmates nominated each other on a range of domains including bullying perpetration (Dijkstra, Cillessen, Lindenberg, & Veenstra, 2009; Veenstra et al., 2005). Peer nominations at T1 were only collected in classrooms with at least 10 TRAILS respondents. Young people in special education (5.6% of the sample), small schools

Figure 1. Items per wave and reporter. T1–T4, Times 1–4; YSR, Youth Self-Report; ASR, Adult Self-Report; CBCL, Child Behavior Checklist.

(6.4%), and those who repeated (16.9%) or skipped a grade (2.2%) were excluded. After selection of school classes and obtaining school agreement to participate, schools provided the names of classmates of TRAILS respondents. Subsequently, classmates of regular TRAILS respondents were approached by their tutor and received an information letter for themselves as well as their parents in which they were asked to participate in TRAILS on this occasion only. If pupils/parents refrained from participation, they had to send a reply card within 10 days. This method of informed consent was used in order to maximize participation. A total of 1,065 TRAILS respondents participated in the peer-nomination procedure at T1. An additional 639 non-TRAILS respondents completed this school assessment; these were excluded from subsequent analyses. At T2, peer nominations were conducted in classrooms with at least 3 regular TRAILS participants or 2 participants on the condition that both had also participated in T1 peer nominations. Again, peer nominations were assessed classroom based, including non-TRAILS participants. At T2, 1,007 TRAILS respondents participated in the peer nomination procedure, 2,305 non-TRAILS respondents completed the school assessment, and 671 TRAILS respondents took part in both peer nomination studies.

At both occasions, assessments of the peer nominations lasted for about 15 min and took place during regular lessons. After brief instructions in which a TRAILS staff member emphasized that information would be kept confidential, adolescents received the questionnaire with the names of the classmates listed. The teacher and TRAILS staff member remained in the classroom during the administration of the peer nominations. Among other topics, adolescents were asked who bullied others, for which they could nominate an unlimited number of classmates. The nominations received for being a bully were divided by the total number of participating pupils in the class, that is, the maximum number of nominations possible. These proportion scores take class size into account and range from 0 to 1, with higher scores indicating more bullying nominations. This procedure is commonly cited and a reliable way to treat peer nominations (Bukowski & Hoza, 1989).

Previous TRAILS studies that used these peer nominations provide additional detail on data collection and associations between other measures, including victimization, acceptance, and rejection (e.g., Dijkstra et al., 2009). We compared TRAILS and non-TRAILS respondents and found that at T1 TRAILS participants received more nominations for acceptance ($t = -6.92$, $p < .001$) and prosocial behavior ($t = -4.91$, $p < .001$) and fewer nominations for rejection ($t = 5.69$, $p < .001$) and being a bully ($t = 3.07$, $p = .002$). At T2, no differences between TRAILS and non-TRAILS respondents were detected. Note that no other information except peer nominations was collected in schools.

Antecedents of bullying. All measures that functioned as antecedents of bullying development were assessed at T1.

Self-control. Parents completed the Social Skills Rating System (Gresham & Elliott, 1990), from which we used the self-control subscale, consisting of 10 items, including "can stay calm in arguments with other children," "can stay calm in conflict with parents," and "avoids situations that could lead to problems," which were rated from 1 to 3 (*never* to *usually*). The measure was completed by 2,047 participants, the subscale was reliable ($\alpha = 0.80$), and the average score was $M = 2.30$ ($SD = 0.34$).

Family dysfunction. Parents ($n = 2{,}043$) completed the General Functioning Scale of the Family Assessment Device (Epstein, Baldwin, & Bishop, 1983), which measures family health/pathology with six items referring to healthy functioning (e.g., "When there are difficulties, we can rely on each other's support") and six items describing unhealthy function (e.g., "We cannot talk to each other when we feel unhappy"). Items were rated on a scale ranging from 1 (*completely disagree*) to 4 (*completely agree*). Note that items describing healthy functioning were reverse coded. The General Functioning Scale has been validated as an independent measure and showed good reliability in our sample ($\alpha = 0.85$) with an average score of $M = 1.77$ ($SD = 0.36$). Higher scores indicate greater dysfunction.

Peer popularity and peer rejection. As part of the peer-nomination procedures conducted in TRAILS respondents'

classrooms at T1 (detailed description above), adolescents were asked whom they disliked (rejection), for which they could nominate an unlimited number of classmates. Peer-rejection nominations ranged from 0 to 13 with an average of 2 nominations. As for bullying, nominations received for being disliked were also divided by the total number of children in the class ($M = 0.13$, $SD = 0.13$). The peer popularity measure was created using nominations on best friends and rejection. That is, standardized rejection scores (how many times an individual was nominated as disliked) were subtracted from standardized best friend scores (how many times an individual was nominated as best friend). Individuals with resulting values >1 whose standardized rejection scores were negative and whose standardized best friend scores were positive were coded as popular youths, in contrast to controversial youths (as popular but with positive standardized rejection scores), neglected youths (social preference below –1, and rejection and best friend scores negative) and rejected (social preference below –1, and rejection positive and best friend score negative). Seventeen percent of participants were classified as popular. Note that we only examined T1 peer nominations ($n = 1{,}065$) as antecedents of bullying development.

Outcomes in early adulthood. At T5, adolescents completed a range of measures, which we examined as outcomes of bullying development and dependent variables in mediation models.

Maladjustment was assessed with the ASR (Achenbach & Rescorla, 2001; Achenbach et al., 2003) using a response range from 0 (*never*) to 2 (*definitely/often*). Five subscales were used in the current study. *Withdrawal/depression* ("withdrawal" in the following) was completed by 1,499 participants, consisted of 9 items (e.g., "I prefer to be alone than with others" and "I have trouble making and keeping friends"), and showed good internal consistency ($\alpha = 0.80$). *Anxiety/depression* ("anxiety" in the following) consisted of 18 items (e.g., "I cry a lot" and "I'm anxious and worried"), was completed by 1,499 participants, and showed high internal consistency ($\alpha = 0.92$). *Somatic complaints* ($n = 1{,}498$) consisted of 12 items (e.g., "I have headaches, stomach aches, skin problems for no known medical reason") with an internal consistency of $\alpha = 0.75$. *Delinquent behavior* was measured using 14 items (e.g., "I do things that could bring me in conflict with the law" and "I steal or cheat") and the internal consistency of the scale was satisfactory ($\alpha = 0.73$, $n = 1{,}498$). Finally, *Aggressive behavior* ($n = 1{,}499$) was measured on a 15-item scale (e.g., "I fight a lot" and "I threaten people to hurt them") and showed good internal consistency ($\alpha = 0.84$). Average scores of these scales were as follows: withdrawal: $M = 0.23$, $SD = 0.29$, anxiety: $M = 0.31$, $SD = 0.34$, somatic complaints: $M = 0.25$, $SD = 0.25$, delinquency: $M = 0.18$, $SD = 0.19$, and aggression: $M = 0.21$, $SD = 0.24$.

Substance use included assessments concerning smoking, alcohol and cannabis use, and use of hard drugs. *Smoking* ($n = 1{,}508$) was measured using several questions, including "Have you ever smoked shag or cigarettes?" to which young adults responded with 0 (*I never smoked*; 28%) to 4 (*I smoke every day*; 24%). We used a binary indicator of smoking (*never or rarely*: 48% vs. *sometimes or often*: 52%) in the current analyses. *Alcohol use* ($n = 1{,}509$) was measured using the Alcohol Use Disorders Identification Test (Saunders, Aasland, Babor, Fuente, & Grant, 1993), but we only used the frequency indicator ("On how many occasions during the past 4 weeks did you drink alcohol?") and scored responses in line with the Alcohol Use Disorders Identification Test (*never*: 14%, *once*: 5%, *2 to 4 times*: 27%, *5 to 10 times*: 34%, *more than 10 times*: 20%). *Cannabis use* ($n = 1{,}506$) was measured using the Cannabis Use Problems Identification Test (Bashford, Flett, & Copeland, 2010). Again we used the frequency indicator ("On how many days in the past 12 months did you consume cannabis?)" and scored responses in accordance with the Cannabis Use Problems Identification Test (*never consumed cannabis*: 42%, *did not consume any in the past 12 months*: 23%, *less than once a month*: 19%, *around once a month*: 4%, *two to three times per month*: 5%, *around once a week*: 1%, *twice a week*: 1%, *3 to 4 days a week*: 1%, *five to six days a week*: 2%, *every day*: 1%). *Hard drugs* ($n = 1{,}503$) were assessed by asking respondents to indicate how often in their life they had consumed amphetamines (*ever used*: 12%), cocaine (*ever used*: 13%), heroine (*ever used*: <1%), magic mushrooms (*ever used*: 8%), and ecstasy (*ever used*: 20%). We recoded responses into binary format (*never* vs. *ever*) and summed scores to obtain a variety score where most respondents scored 0 (75%) and only one respondent scored 5.

Covariates

We controlled for family SES and teacher-rated aggression in all analyses and for baseline maladjustment in models with withdrawal, anxiety, somatic complaints, delinquency, and aggression as outcomes. All covariates were assessed at T1. *Family SES* ($n = 2{,}188$) was assessed using information on both mothers' and fathers' educational and occupational levels as well as a combined indicator of family income. Educational level of parents was coded into five categories. Occupational level was based on the International Standard Classification of Occupations (Ganzeboom & Treiman, 1996). Family income level was assessed, with low family income defined as a monthly net family income of less than €1,135 per month, which approximately amounted to a welfare payment at time of assessment. SES was measured as the average of the five items (standardized). The SES scale captures 61.2% of the variance in the five items and has a high internal consistency ($\alpha = 0.84$).

Teacher-rated *aggressiveness* ($n = 1{,}926$) was assessed using a vignette that described several behaviors (e.g., starts fights, bullies, destroys their own and others' properties, physically harms other people, curses, and threatens others) and asked teachers to indicate their agreement on a scale

from 0 (*fully disagree*) to 4 (*fully agree; M* = 0.31, *SD* = 0.49). The vignette is based on the Teacher's Checklist of Psychopathology (TCP; Achenbach, 1991). The validity of the vignette was assessed among 36 teachers for 103 children. Teachers completed the vignette and the TCP for the same children within 3 months. The Pearson correlation coefficient was $r = .69$, suggesting a strong association between the vignette and the TCP.

Baseline *maladjustment* (n = 2,176–2,195) was assessed using the YSR (Achenbach & Rescorla, 2001), which is similar to the ASR described above. Internal consistency ranged from $\alpha = 0.64$ (withdrawal and delinquency) to $\alpha = 0.82$ (aggression) and average scores were as follows: withdrawal: $M = 0.34$, $SD = 0.29$, anxiety: $M = 0.33$, $SD = 0.27$, somatic complaints: $M = 0.43$, $SD = 0.31$, delinquency: $M = 0.23$, $SD = 0.17$, and aggression: $M = 0.31$, $SD = 0.25$.

Attrition analyses

We compared cases with complete data on all variables used in this study (n = 299, 13%) to those who had at least one missing data point. Incomplete cases were more often bullies at T1 as nominated by peers ($t = 2.47$, $p = .01$), and at T2 as reported by mothers ($t = 2.16$, $p = .03$), in self-reports ($t = 2.32$, $p = .02$), and peer nominations ($t = 3.09$, $p = .002$) and at T3 as assessed in self-reports ($t = 2.07$, $p = .04$). With respect to antecedents of bullying, incomplete cases showed less self-control ($t = –3.66$, $p < .001$), came from more dysfunctional families ($t = 2.36$, $p = .02$), were less popular ($t = –2.57$, $p = .01$) and more rejected ($t = 2.27$, $p = .02$). With regard to outcomes of bullying, incomplete cases showed greater withdrawal ($t = 2.05$, $p = .04$) and somatic complaints ($t = 2.19$, $p = .03$), and smoked more ($t = 2.21$, $p = .03$). In contrast, they drank less alcohol ($t = –3.74$, $p < .001$). With respect to covariates, incomplete cases came from families with lower SES ($t = –8.27$, $p < .001$) and were rated as more aggressive by teachers ($t = 6.66$, $p < .001$), but no differences were observed with respect to baseline maladjustment. Note that all subsequent analyses are based on full information maximum likelihood estimation, which results in deletion of cases only if they had missing data on all variables in the model.

Analytic strategy

The data available for this study have many advantages, including the developmental period they cover and the presence of multiple-reporter information on the same constructs. Taking, for instance, T2, where adolescents were asked directly whether they bullied others, their parents completed a measure to that effect, and peer nominations were also available. A common way of integrating several sources of information is second-order structures where factor scores that are based on the different reports constitute indicators for next-level latent variables models. Second-order latent growth models have been published, for instance, with respect to the development of alcohol use (Edwards et al., 2014).

In TRAILS, however, bullying was not assessed in the same manner across all time points (see Figure 1). Nonidentical indicators are common in studies where developmentally appropriate assessments are important. Using different instruments to assess the same construct is sometimes also a result of studies that span many years where different research priorities or innovations in measurement meant that different instruments were used. A novel strategy of dealing with such instances is shifting indicator models (Hancock & Buehl, 2008) that make use of anchor indicators. For instance, Indicator A was used at T1 and T2, Indicator B was used at T2 and T3, and Indicator C was used at T3 and T4. While no indicator was assessed at all times, indicator shifts can be modeled because T2 shares indicators with both T1 and T3. Second-order latent growth models with shifting indicators allow for the use of several indicators per time point through modeling of factor scores and do not require all indicators to be present at all times. Such models have been examined by Raczynski (2012) and Bandalos and Raczynski (2015), who showed that results did not diverge substantially from models where all indicators were continuously present.

In estimating second-order latent growth models with shifting indicators for bullying development in TRAILS, we largely followed Muthén and Muthén (2010) and Bandalos and Raczynski (2015), who recommend to determine the shape of the growth curve for each indicator, followed by analyses to establish metric and scalar measurement invariance for time-specific factor scores across all assessments. Metric invariance is present if factor loadings are equal for identical items at different waves. Scalar invariance is present if item intercepts are equal for identical items at different waves. For instance, as depicted in Figure 1, the YSR indicator was used at T2, T3, and T4 but will be combined with different coindicators to form factors at the different time points. We needed to make sure that the loading and intercept of this particular indicator were nonetheless equivalent across time points. Although researchers usually aim to establish full measurement invariance where residual variances are also invariant across time points, requirements can be relaxed when estimating second-order latent growth models (Bandalos & Raczynski, 2015).

Once measurement invariance was established and identical growth curves for all items modeled, the second-order latent growth model was estimated based on the first-order factor scores (Figure 2). We centered first-order factors and estimated factor means, allowed intercept and slope to be correlated, and determined that associations between first-order factors were explained by second-order factors (i.e., the growth parameters) in this step. Note that Muthén and Muthén (2010) suggest examining fit and loadings for separate factors using exploratory factor analyses. We omitted these analyses due to the small number of indicators per factor (two to three), which causes identification problems. In skipping this step, we followed Bandalos and Raczynski (2015) and Edwards

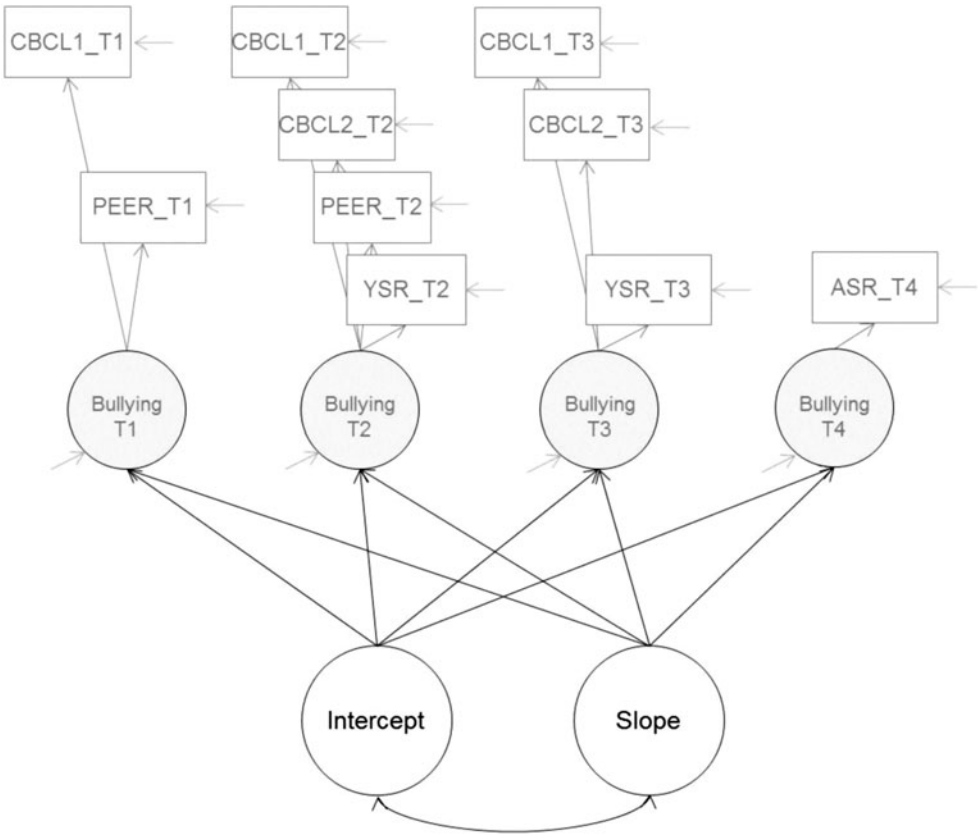

Figure 2. Second-order latent growth model with shifting indicators.

et al. (2014). We evaluated models using conventional measures of fit (χ^2 ideally nonsignificant, root mean square of approximation [RMSEA] < 0.06, comparative fit index [CFI] > 0.95, standardized root mean residual [SRMR] < 0.08; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999).

Once the latent growth model was established, we saved growth parameters for each individual and carried out subsequent analyses using path models in Stata. We began with unadjusted models in which growth parameters functioned as outcomes of self-control, family dysfunction, peer popularity, and peer rejection, followed by adjusted models in which we controlled for SES of the family and teacher-rated aggression. Next, models in which growth parameters functioned as predictors of maladjustment and substance use were estimated. Finally, we examined models in which antecedents and outcomes were included simultaneously and indirect effects via bullying growth parameters estimated. Associations were tested one outcome at a time, and we examined path differences for boys and girls.

Results

Descriptive statistics and correlations

Table 1 depicts numbers (n) and descriptive statistics for the various bullying measures used in this study and correlations between them. All correlations were significant except for the pair parent report at T1 and self-report at T3. Assessments from same reporter and closer in time showed greater overlap. Table 2 includes correlations among antecedents, outcomes, and control variables. Pearson coefficients are presented for continuous measures, and Spearman coefficients are presented when correlations involved ordinal measures. Antecedents showed some overlap, except for family dysfunction. Outcome measures also overlapped, particularly delinquency with substance use measures, and withdrawal and anxiety with each other, with somatic complaints, and with cannabis use. Self-control, family dysfunction, and peer rejection at T1 were linked to various outcome measures assessed at T5, particularly withdrawal, delinquency, and aggression, thus providing justification for assuming an indirect model involving bullying.

Bullying development

As recommended by Muthén and Muthén (2010) and Bandalos and Raczynski (2015), we determined the shape of the growth curve for each indicator, followed by analyses to establish metric and scalar measurement invariance.

Individual growth curves. Estimating intercept and slope requires at least three time points; thus, we fitted models for bul-

Table 1. *Descriptive statistics and pairwise correlations of bullying measures*

	n	*M* (*SD*)	1	2	3	4	5	6	7	8	9
1. T1 PR CBCL 1	2051	0.15 (0.37)									
2. T2 PR CBCL 1	1921	0.13 (0.35)	.38***								
3. T3 PR CBCL 1	1510	0.10 (0.31)	.29***	.40***							
4. T2 PR CBCL 2	1922	0.12 (0.36)	.38***	.51***	.32***						
5. T3 PR CBCL 2	1505	0.09 (0.30)	.23***	.37***	.57***	.41***					
6. T1 Peer nomination	1065	0.06 (0.08)	.13**	.14***	.11**	.11***	.09**				
7. T2 Peer nomination	1007	0.02 (0.06)	.15***	.17***	.16***	.26***	.16***	.12***			
8. T2 SR YSR	2083	0.15 (0.37)	.10**	.07*	.16***	.29***	.16***	.16***	.29***		
9. T3 SR YSR	1659	0.10 (0.32)	.04	.07*	.08**	.12***	.12***	.09*	.15***	.18***	
10. T4 SR ASR	1659	0.04 (0.21)	.13**	.23***	.14***	.12***	.19***	.25***	.10**	.14***	.11**

Note: T1–T4, Times 1–4; PR, parent report; CBCL, Child Behavor Checklist; SR, self-report; YSR, Youth Self-Report. Coefficients > .13, all *p*s < .001; coefficients > .07, all *p*s < .05.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 2. *Pairwise correlations of antecedents and outcomes*

	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 PR self-control												
2. T1 PR family dysfunction	−.31**											
3. T1 peer rejection	−.15**	.05										
4. T1 peer popularity	.14**	−.03	−.40**									
5. T5 withdrawal	−.08*	.07*	.09*	−.04								
6. T5 anxiety	−.07*	.08*	.02	.01	.68**							
7. T5 somatic complaints	−.09**	.07*	.04	.03	.41**	.57**						
8. T5 delinquency	−.11**	.07*	.12*	−.08*	.40**	.36**	.25**					
9. T5 aggression	−.14**	.08*	.08*	.01	.57**	.72**	.53**	.48**				
10. T5 tobacco	−.07*	.03	.06	−.03	.02	.03	.07*	.32**	.14**			
11. T5 alcohol	.03	−.05*	.01	.01	−.09**	−.10**	−.12**	.25**	−.06*	.26**		
12. T5 cannabis	−.01	−.02	.08*	−.05	.08**	.07**	.02	.43**	.14**	.33**	.11*	
13. T5 hard drugs	−.01	−.01	.07	.03	.07*	.03	<.01	.38**	.10**	.34**	.21**	.50**

Note: T1, Time 1; PR, parent report; T5, Time 5.
*$p < .05$. **$p < .001$.

lying assessed using the YSR/ASR indicator (T2–T4) and parent-reported bullying based on the Child Behavior Checklist 1 item (T1–T3; see Figure 1 for items). The YSR/ASR model was based on $n = 2{,}136$ cases and showed an excellent fit: χ^2 (1) = 1.22, $p = .27$, RMSEA = 0.01, CFI = 0.99 with positive intercept (0.15, $SE = 0.008$, $p < .001$) and negative slope (–0.05, $SE = 0.005$, $p < .001$), suggesting a decrease in bullying over time. Intercept and slope showed significant variance (intercept 0.06, $SE = 0.01$, $p < .001$; slope 0.01, $SE = 0.002$, $p = .01$) and covariance (–0.02, $SE = 0.006$, $p < .001$). The fit for the parent-report model ($n = 2{,}158$) was also excellent: χ^2 (1) = 0.46, $p = .50$, RMSEA = 0.00, CFI = 1.00, and both intercept and slope variance were significant (intercept 0.07, $SE = 0.01$, $p < .001$; slope 0.01, $SE = 0.005$, $p = .01$) as was covariance (–0.02, $SE = 0.006$, $p = .01$). The intercept was positive (0.15, $SE = 0.008$, $p < .001$), and the slope was again negative (–0.02, $SE = 0.01$, $p < .001$). Thus, both instruments displayed a similar developmental pattern though coming from different reporters and covering slightly different age periods.

Measurement invariance. The unconstrained model yielded a reasonable fit to the data, with the exception of the CFI estimate: χ^2 (30) = 127.0, $p < .001$, RMSEA = 0.04, CFI = 0.91, SRMR = 0.06. Note that we had to fix the residual variance of the indicator item for the T4 factor because factor and residual variance and their respective standard errors cannot be estimated simultaneously for single-indicator factors. Thus, we estimated the model without standard errors to obtain the residual variance for the indicator (0.008) and fixed the residual variance to this value in subsequent invariance test models.

When factor loadings were constrained to be equal across time, the model fit worsened but was still borderline acceptable, again with the exception of CFI: χ^2 (33) = 145.6, $p < .001$, RMSEA = 0.04, CFI = 0.90, SRMR = 0.07. When intercepts were also constrained, model fit worsened further and

was not acceptable anymore: χ^2 (39) = 284.6, $p < .001$, RMSEA = 0.05, CFI = 0.78, SRMR = 0.09. Modification indices suggested that freeing the intercepts for the YSR/ASR indicator and for the peer nominations would improve the fit substantially; thus, we reestimated the model with these modifications. The fit of the final model ($n = 2{,}221$) was acceptable for most indices, χ^2 (36) = 145.6, $p < .001$, RMSEA = 0.04, CFI = 0.90, SRMR = 0.07. The less than satisfactory CFI in measurement invariance models points at low correlations between the measures in the model, which is likely a consequence of using data from different reporters and time points as far apart as 6 years.

Second-order latent growth model. Initially, we retained modifications to the basic model as explained above (fixing residual variance of T4 indicator, freeing intercepts for peer nominations and self-report instruments). This resulted in a model with unsatisfactory fit, χ^2 (40) = 264.2, $p < .001$, RMSEA = 0.05, CFI = 0.80, SRMR = 0.09. After examining the modification indices, we removed the fixed residual variance for YSR T4, which resulted in a largely satisfactorily fitting model, though with low CFI value: χ^2 (39) = 162.6, $p < .001$, RMSEA = 0.04, CFI = 0.89, SRMR = 0.07. Note that the first-order T4 factor changed from being a purely exogenous variable (predicting the single T4 bullying indicator) to an endogenous variable (being predicted by intercept and slope of bullying development), which affected the covariance matrix and resulted in a larger residual variance for the T4 indicator. The fixed value of 0.008 did not represent the data well anymore in this more complex model.

The growth indicators showed significant variance (intercept = 0.03, *SE* = 0.01, slope = 0.003, *SE* = 0.001) and covariance (–0.01, *SE* = 0.002) and the slope had a negative mean (–0.01, $p < .001$), confirming the pattern obtained when estimating individual growth curves. That is, bullying decreased over time, but individuals varied substantially in this development. Intercept and slope were saved for each individual and subsequent models estimated in Stata.

Antecedents of bullying development

Table 3 presents standardized coefficients for models unadjusted and adjusted for family SES and teacher-rated aggression. The results between both were virtually identical and suggest that less self-control, greater family dysfunction, and more peer rejection were linked to higher relative initial bullying levels. Peer rejection was also linked to slope, even though we controlled for intercept in models with slope as outcome. The negative sign of the associations between peer rejection and slope indicates that higher peer rejection was associated with steeper declines in bullying, as indicated by larger negative slope values. In addition, adolescents were more likely to remain stable on their levels of bullying or nonbullying or even increase (thus have a slope of zero or positive slope) if they had experienced lower levels of peer rejection. Note that the association was larger when we did not control for intercept (β = –0.23, $p < .001$), showing that the link between peer rejection and stability and change in bullying to some extend depended on level of intercept. No gender differences were observed in these associations.

Table 3. *Antecedents of bullying development*

	Intercept	Slope
Self-control	−0.29 (0.02)***	0.00 (0.007)
	−0.26 (0.02)***	0.00 (0.007)
Family dysfunction	0.11 (0.02)***	−0.01 (0.01)
	0.10 (0.02)***	−0.01 (0.01)
Peer rejection	0.25 (0.04)***	−0.04 (0.01)**
	0.19 (0.04)***	−0.04 (0.01)**
Peer popularity	0.00 (0.02)	−0.01 (0.01)
	0.00 (0.02)	−0.01 (0.01)

Note: Standardized coefficients from fully adjusted path models are presented. The upper rows for each independent variable represent estimate from models unadjusted for family socioeconomic status and teacher-reported aggression. We corrected for missing values using the maximum likelihood for missing values estimation and for nonnormality in the outcomes using robust standard error estimation. Slope models were adjusted for intercept.
**$p < .01$. ***$p < .001$.

Outcomes of bullying development

As depicted in Table 4, we found that the bullying intercept was associated with increases in withdrawal, delinquency, and aggression but not anxiety or somatic complaints. Moreover, higher relative bullying levels were linked to tobacco, cannabis, and hard drug use in early adulthood. We tested nine outcomes, and thus examined whether associations remained statistically significant when adjusting the p value cutoff for multiple testing using the Bonferroni correction ($p = .005$). A higher p value was observed for the associations between intercept and aggression ($p = .045$). All other associations remained significant with all ps $< .004$.

Gender moderated the associations between intercept and tobacco use, χ^2 (1) = 5.02, $p = .03$, and by trend also between intercept and withdrawal, χ^2 (1) = 2.78, $p = .09$, delinquency, χ^2 (1) = 3.84, $p = .05$, and aggression, χ^2 (1) = 3.68, $p = .06$. Separate analyses for boys and girls showed that all paths were significant for girls but not boys: tobacco use: girls β = 0.16, $p < .001$, boys β = 0.07, $p = .10$; withdrawal: girls β = 0.11, $p = .01$, boys β = 0.03, $p = .51$; delinquency: girls β = 0.16, $p < .001$, boys β = 0.03, $p = .49$; and aggression: girls β = 0.13, $p < .01$, boys β = 0.04, $p = .37$.

Slope was also associated with withdrawal, anxiety, delinquency, and aggression for the full sample, though p values for associations with withdrawal ($p = .009$) and anxiety ($p = .02$) did not meet correction for multiple testing. All associations were positive, indicating a stronger increase in delinquency and aggression in adolescents who remained stable (declined the least) or increased in bullying behavior compared to those whose bullying decreased more steeply. A trend-level interaction with gender was found in the prediction of somatic complaints, χ^2 (1) = 3.51, $p = .06$. Here, the

Table 4. *Outcomes of bullying intercept and slope*

	Withdrawal	Anxiety	Somatic	Delinquency	Aggression	Tobacco	Alcohol	Cannabis	Hard drugs
Intercept	0.07 (0.03)*	0.01 (0.03)	0.04 (0.03)	0.10 (0.03)**	0.07 (0.03)*	0.12 (0.03)***	0.04 (0.03)	0.09 (0.03)**	0.10 (0.03)**
Slope	0.27 (0.11)**	0.22 (0.10)*	0.03 (0.09)	0.39 (0.13)**	0.40 (0.12)**	0.15 (0.09)	−0.09 (0.10)	0.15 (0.10)	−0.03 (0.09)

Note: Standardized coefficients from path models are presented in which we controlled for parental socioeconomic status, teacher-rated aggression at Time 1, and, in withdrawal, anxiety, somatic, delinquency, and aggression models, for baseline levels of the respective adjustment problem. In models with slope as predictor, we also controlled for intercept. We adjusted for missing values using the maximum likelihood for missing values estimation and for nonnormality in the outcomes using robust standard error estimation.
*$p < .05$. **$p < .01$. ***$p < .001$.

association with slope was positive for girls and negative for boys, though not statistically significant for either group.

Bullying development as mediator

To elucidate whether bullying development acted as intermediate variable between peer and family environments in preadolescence and maladjustment and substance use in early adulthood, we estimated path models where bullying intercept or slope acted as mediators. We focused on those outcomes for which significant associations with intercept and slope, respectively, had been found. We excluded peer popularity as predictor in both intercept and slope models because no associations with any measure had been established in earlier analyses. In addition, we included self-control and family dysfunction in intercept models only because no association with slope models had been found (see Table 3).

We modeled indirect effects separately for each predictor (controlling for parental SES, prior maladjustment, and teacher-reported aggression as well as intercept in the slope models) and subsequently examined associations in adjusted models, which included all predictors. Again we also controlled for prior maladjustment, teacher-rated aggression, and parental SES in all models and for intercept in slope models. All models are presented in Table 5.

Bullying intercept functioned as an intermediate variable between self-control, family dysfunction, and peer rejection in preadolescence and tobacco, cannabis, and hard drug use in early adulthood; all effects being stable in the adjusted model. In addition, indirect effects from self-control and peer rejection to delinquency via bullying intercept were found; however, these remained only trend-level significant in the adjusted model. Marginally significant indirect effects were further observed from self-control, family dysfunction, and peer rejection to withdrawal, from family dysfunction to aggression, but dropped to nonsignificance in the adjusted models.

Significant indirect effects involving bullying slope were found from peer rejection to delinquency and aggression, and at trend-level also to withdrawal and anxiety. Self-control and family dysfunction were not associated with slope, thus not tested as predictors in these indirect effect models. Finally, no gender moderation was detected; that is, boys and girls did not differ with respect to the strength of indirect effects.

Note that we only computed indirect effects models with intercept or slope as mediator of antecedents and outcomes of bullying when separate associations between bullying intercept and slope and outcomes were significant. This was not the case for somatic complaints and either intercept or slope; thus, this outcome is not included in the table at all. Moreover, bullying intercept was not linked to anxiety; thus, we did not compute indirect effect models for this association.

Discussion

We modeled bullying development over time using multiple-informant data from over 2,000 adolescents, examined associa-

Table 5. *Indirect associations between antecedents and outcomes of bullying via bullying intercept and slope*

	Intercept as Mediator						Slope as Mediator	
	Self-Control		Family Dysfunction		Peer Rejection		Peer Rejection	
	Adjusted for Covariates	Adjusted for Covariates and Predictors	Adjusted for Covariates	Adjusted for Covariates and Predictors	Adjusted for Covariates	Adjusted for Covariates and Predictors	Adjusted for Covariates	
Withdrawal	−0.02 (0.01)	−0.01 (0.01)	0.01 (0.01)	0.004 (0.003)	0.03 (0.02)	0.02 (0.01)	−0.02 (0.01)	
Anxiety	—	—	—	—	—	—	−0.02 (0.01)	
Delinquency	−0.01 (0.01)*	−0.01 (0.01)	0.01 (0.003)*	0.004 (0.002)	0.02 (0.01)*	0.02 (0.01)	−0.02 (0.01)*	
Aggression	−0.01 (0.01)	−0.004 (0.01)	0.01 (0.004)	0.002 (0.002)	0.02 (0.01)	0.01 (0.01)	−0.03 (0.01)*	
Tobacco	−0.05 (0.01)***	−0.05 (0.01)***	0.03 (0.01)***	0.02 (0.01)**	0.09 (0.03)**	0.08 (0.03)**	—	
Cannabis	−0.16 (0.06)*	−0.13 (0.05)*	0.09 (0.03)*	0.05 (0.02)*	0.25 (0.11)*	0.23 (0.10)*	—	
Hard drugs	−0.10 (0.03)**	−0.08 (0.03)**	0.05 (0.02)**	0.03 (0.01)*	0.15 (0.06)*	0.15 (0.06)*	—	

Note: Standardized coefficients from path models are presented in which we controlled for parental socioeconomic status, teacher-rated aggression at Time 1, and, in withdrawal, anxiety, delinquency, and aggression models, for baseline levels of the respective adjustment problem. In models with slope as predictor, we also controlled for intercept. Note that we computed indirect effects models with intercept or slope as mediator of antecedents and outcomes of bullying only when associations between bullying intercept and slope and outcomes were significant. We adjusted for missing values using the maximum likelihood for missing values estimation and for nonnormality in the outcomes using robust standard error estimation.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

tions with antecedents and outcomes, tested whether bullying development functioned as mediator between preadolescent risk factors and early adult adjustment and substance use, and examined gender-specific patterns in associations.

As expected, we observed an overall decreasing trend in bullying perpetration as indicated by a negative slope. Intercept and slope were negatively correlated; thus, those who started high decreased the most. We also observed stability and even increasing bullying, but pronounced increases were less common than pronounced decreases. A close look at the distribution suggests that less than 2% of the sample increased at a rate of 1 *SD* above the mean whereas 12% decreased at a rate of 1 *SD* below the mean (details available from first author). This overall trend mirrors the development of aggression between late childhood and early adulthood often found in samples drawn from the general population (e.g., Bongers, Koot, Van der Ende, & Verhulst, 2003).

Antecedents of bullying development

Significant variance in intercept and slope enabled us to examine associations with previously discussed antecedents (Álvarez-García et al., 2015; Rodkin et al., 2015). Several studies have been published on impaired self-control at least in some bullies (Espelage, Bosworth, & Simon, 2001; Haynie et al., 2001) and suggested that children who cannot control their temper are more likely to act out on the slightest provocation. We found an association between self-control and intercept but not slope, which suggests that low self-control was linked to an increased risk to bully others in early adolescence but did not contribute to stability or change in bullying perpetration.

Family dysfunction has been suggested as a risk factor as well (Espelage et al., 2014; Hemphill et al., 2012). Children who grow up in families with a lot of conflict perceive hostile interaction patterns as normal and readily employ aggressive strategies. Our results supported this link with respect to bullying intercept. Adolescents whose parents had reported high levels of family dysfunction showed relatively more bullying behavior in early adolescence. As for self-control, no significant association with slope was found; thus, family dysfunction did not seem to be linked to the developmental course of bullying perpetration.

It is important that these interpretations refer to analyses in which we controlled for intercept. Both self-control (positively) and family dysfunction (negatively) were linked to bullying slope when intercept was removed from the model, suggesting that adolescents with low self-control and growing up in highly dysfunctional families decreased most strongly in bullying perpetration. To better understand these patterns, we examined associations between slope and risk factors separately for those who increased in bullying perpetration and those who decreased (details available from first author). Self-control and family dysfunction were only related to the decrease. In combination with disappearing slope associations when intercept was controlled for, our assumption that

only those with high initial levels of bullying could actually show the substantial decrease is plausible.

Turning to potential predictors of bullying perpetration within young adolescents' peer ecology, we observed that rejected individuals were more likely to show high initial levels of bullying. Peer rejection was also associated with slope, suggesting that greater levels of peer rejection were linked to greater decrease in bullying above and beyond the effect of high initial levels. Some youth bully others as a reaction to being rejected, and it is possible that this form of bullying disappears relatively rapidly compared to bullying that is strategic, status oriented, and carried out by accepted and well-adjusted youth who do not experience severe interpersonal difficulties. This association could reflect well-adjusted youth who are accepted by their peers and therefore find themselves in safe positions to engage in bullying. We did not, however, find any association between popularity and bullying development.

In addition to expecting a positive link between popularity and bullying, a tentative assumption of ours was that associations between self-control and family dysfunction might change signs once models were adjusted for general aggression. Finding neither might suggest that bullying in our sample did not reflect controlled, status-oriented behavior but is a symptom of problem behavior. The combination of findings, that accepted but not necessarily popular adolescents seem to increase in bullying, demonstrates the complexity of these mechanisms and provides interesting material for future research.

Bullying development and associations with later development

Both intercept and slope were linked to some forms of maladjustment and substance use in early adulthood. In detail, adolescents with higher initial bullying levels showed an increase in withdrawal, delinquency, and aggression, more frequent tobacco and cannabis use, and a higher likelihood for hard drug use. No association with alcohol use was found, possibly an indication that alcohol use in early adulthood is so normative that it does not indicate precedent problem development. Decreasing bullying was linked to decreases in withdrawal, anxiety, delinquency, and aggression. Overall, these results reflect findings reported in prior studies (Kim et al., 2006; Moore et al., 2014; Niemelä et al., 2011; Sourander et al., 2011) but extend the existing literature by relying on a developmentally appropriate methodological framework. For instance, our results show that some associations between intercept and outcomes are weaker than between slope and outcomes. This discrepancy might reflect a variation in effect sizes as a function of temporal proximity. In contrast, only intercept but not slope was linked to substance use, potentially demonstrating an early developing risk.

Perhaps most surprising were the gender-specific patterns that we uncovered for associations between intercept and tobacco use, and to a slightly weaker degree, withdrawal, delinquency, and aggression. All associations were found for girls only, providing consistent support for the notion that girls who bully in early adolescence will likely face more problematic consequences in early adulthood than boys. Gender-specific functions and evaluations of bullying perpetration may help to interpret our findings: on a microsocial level, the psychological literature on bullying perpetrators suggests that boys tend to bully to achieve social status and dominance and are more popular when they bully (Caravita & Cillessen, 2012), whereas girls' bullying is argued to target relationships between others (Espelage et al., 2004). These functions probably explain why boys exceed girls in levels of physical aggression, whereas fewer gender differences can be observed for indirect aggression such as becoming friends with others as act of revenge, saying bad things behind others' back, or trying to get others to dislike them. Our measures of bullying, though assessed from multiple reporters, might have picked up overt and physical aggression but not the more subtle ways of harming others' relationships. Thus, girls who scored high on bullying in our study likely exerted overt aggression, which may be indicative of a general propensity for externalizing problems, whereas in boys such behaviors are more normative.

Extending this interpretation to a more macrosocial level, it may be that bullying perpetration is normatively masculine but deviant when referring to girls. In line, using a feminist approach, Ringrose and Renold (2010) discussed how bullying others corresponds to "doing boy" but not "doing girl" because girls are expected to refrain from engaging in physical violence or open confrontation. Children who self-attributed masculine traits were found to bully others more often regardless of their actual gender (Gini & Pozzoli, 2006). Is it possible that this characterization of being a "gender deviant" (Ringrose & Renold, 2010) leaves psychological marks that are expressed through substance use and maladjustment later on? Future research that explicitly examines why bullying perpetration is differently associated with outcomes, and why there seem to be gender-specific pathways, is needed to get a clear understanding of this pattern.

Bullying as mediator

Examining outcomes in addition to antecedents also allowed us to estimate indirect effect models and compare our findings to those presented by Espelage et al. (2014), who showed that bullying in adolescence mediated the link between family conflict and substance use. We also found that adolescents from dysfunctional family backgrounds, with low levels of self-control and who were rejected by their peers, were more involved in bullying perpetration, which, in turn, placed them at greater risk for tobacco, cannabis, and hard drugs use in early adulthood. Thus, bullying partly explained the effect of earlier risk in contributing to substance use, even if the latter was measured more than 10 years later.

Finally, higher peer rejection predicted a decrease in bullying across adolescence, which was associated with decreases in delinquency and aggression across the same period. These associations demonstrate that the initially higher risk for externalizing problems in early adulthood that we have

observed for rejected youth is ameliorated if these individuals decrease in bullying across adolescence. Thus, intervening early with an aim to reduce bullying in those who heavily engage in it has added benefits in curbing other externalizing problems that are related to earlier risks.

Strengths and limitations

To our knowledge, this study is the first to simultaneously test various antecedents and outcomes of bullying in a multireporter study, with a developmental framework spanning over a decade, and relying on information from over 2,000 adolescents. Despite the insights gained, the findings need to be interpreted with some shortcomings in mind.

First, we relied on information on bullying perpetration from several reporters, but assessments were not optimal. That is, we used single items that were largely collected within other constructs but did not define what bullying precisely entails or give examples thereof. Whereas some have argued that single-item measures can be useful (Solberg & Olweus, 2003), multiple-item assessments of bullying–victimization are usually considered to be more reliable and objective (Huang & Cornell, 2015; Thomas, Connor, & Scott, 2014). Some studies have examined statistical and conceptual consequences of using single-item measures, though most have focused on the victim rather than the perpetrator. These studies showed that single-item measures result in lower estimates of victimization (Huang & Cornell, 2015) with some comparisons reporting striking discrepancies of 28% victims when using single-item assessments compared to 82% when using multiple-item measures (Esbensen & Carson, 2009; Sawyer, Bradshaw, & O'Brennan, 2008). It is not clear whether differences in personal definitions of victimization explain this discrepancy; in other words, whether victims underreport in single-item measures or whether multiple-item measures present enough possible forms of victimization for almost everyone to recognize themselves in the examples.

With respect to bullying, single- and multiple-item self-reports appear to yield more similar prevalence rates: single-item studies report a proportion of bullies of 9% to 24% (Haynie et al., 2001; Spriggs, Iannotti, Nansel, & Haynie, 2007), with the Health Behavior in School Aged Children study reporting 11% (Craig et al., 2009). Multiple-item studies report between 8% and 22%, depending on age and form of bullying (Ttofi et al., 2011; Wang, Iannotti, & Nansel, 2009). In balance, it seems difficult to ascertain the true prevalence of bullying–victimization if only self-reports are used, and the inclusion of parent reports and peer nominations has hopefully alleviated some of the bias introduced by less than optimal conceptualization and single-item use.

Of related interest, we did not have the same information available at all time points. The shifting indicator model provided a good alternative to deal with this issue that is common in longitudinal studies, but its estimation is complex and sophisticated models such as dual growth or latent mixture models often do not converge, result in latent variable correlations greater than 1, or result in negative residual variances. Moreover, we were not able to establish full measurement invariance across time, which is a weakness to our model.

Second, outcome measures were tested one at a time, which means that we cannot draw conclusions about the relative likelihood of each outcome compared to other outcomes. This information would have been interesting given the multifinality of bullying. Latent classes of outcomes could have provided a strategy to examine the relative likelihood of different outcomes (Kretschmer et al., 2014), but the second-order shifting indicator models did not allow for testing associations with other complex latent models for reasons similar to those that prevented us from examining dual-growth models.

Third, we controlled for teacher-rated aggression assessed at T1, which was not the most optimal timing, and it may have been more informative to include a measure of aggression that precedes the first peer nominations. That is, if children were aggressive throughout the primary school year, it will be reflected in the T1 peer nominations. However, no earlier assessments were available. Moreover, we controlled for aggression to gain a better understanding of different motivations and antecedents of bullying. A different strategy could be to formally distinguish between popular, well-adjusted bullies and rejected, not well-adjusted ones in group-based models. Connected to this point, our results only partly compare to other studies on bullying. Trajectory models assume that subgroups follow distinct developmental trajectories and have been employed by Reijntjes et al. (2013), who derived three bullying trajectories that differed with regard to level of bullying and showed substantial stability over time. Barker, Arseneault, Brendgen, Fontaine, and Maughan (2008) showed that most adolescents belonged to a low/decreasing trajectory, but 16% showed a high/increasing development. Haltigan and Vaillancourt (2014) also derived a moderately high/increasing trajectory for 13% of the sample. Our data were not well suited for this approach because trying to combine a shifting indicator model with a trajectory model led to convergence problems. It would be interesting to compare the current results to other empirical studies examining second-order latent growth models with shifting indicators, but to our knowledge, the approach as such has not yet been used widely. We do believe, however, that the shifting indicator approach can be of exceptional value to research into developmental phenomena. Comparable approaches are common in testing achievement across grades and when harmonizing data for purposes such as meta-analyses (Curran & Hussong, 2009).

Fourth, the effects sizes were modest, particularly for indirect and gender interaction effects. However, the indirect effects referred to chains of associations spanning more than a decade, and interaction effects did not indicate opposite effects for boys and girls but null effects for boys and nonnegligible effects for girls. These results need replication in other samples to provide more support for the notions that girls suffer worse outcomes if they bully others during adolescence and that bullying perpetration works as mediator between preadolescent risk and early adult outcomes.

Fifth, it is puzzling that some forms of maladjustment and substance use were associated with preadolescent risk and bullying development, whereas others, such as alcohol use, were not. It is possible that alcohol use among young adults in the Netherlands is so common that risk experiences will not explain variance within the normal spectrum. Whether this finding can be generalized to young people who grow up in cultures that are more restrictive toward alcohol use is unclear and warrants further, ideally cross-cultural, study.

Conclusion

We examined associations between bullying perpetration, its antecedents, and outcomes, and placed particular attention on the developmental framework and gender-specific patterns. We found that the overall decrease was accompanied by substantial variation in bullying levels as well as in rate of change. This variation was partly explained by peer rejection, family dysfunction, and self-control, and contributed to variance in substance use and maladjustment. Gender-specificity emerged, suggesting that girls who bully might need particular attention to prevent problems in early adulthood. Finally, for both genders, bullying functioned as mediator between preadolescent risk and early adult substance use, indicating that reducing bullying through suitable preintervention and intervention programs should have a broader effect on externalizing development in general.

References

Achenbach, T. M. (1991). *Manual for the Teacher's Report Form and 1991 TRF profile*. Burlington, VT: University of Vermont.

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Department of Psychiatry.

Achenbach, T. M., Rescorla, L. A., McConaughey, S., Pecora, P., Wetherbee, K., & Ruffle, T. (2003). The Achenbach system of empirically based assessment. In C. R. Reynolds & R. W. Kamphaus (Eds.), *Handbook of psychological and educational assessment of children: Vol. 2. Personality, behavior, and context* (pp. 406–432). New York: Guilford Press.

Álvarez-García, D., García, T., & Núñez, J. C. (2015). Predictors of school bullying perpetration in adolescence: A systematic review. *Aggression and Violent Behavior*, *23*, 126–136.

Bandalos, D. L., & Raczynski, K. A. (2015). Capturing family-school partnership constructs over time: Creating developmental measurement models. In S. M. Sheridan & E. Moorman (Eds.), *Foundational aspects of family–school partnership research* (pp. 77–103). New York: Springer.

Barker, E. D., Arseneault, L., Brendgen, M., Fontaine, N., & Maughan, B. (2008). Joint development of bullying and victimization in adolescence: Relations to delinquency and self-harm. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 1030–1038.

Bashford, J., Flett, R., & Copeland, J. (2010). The Cannabis Use Problems Identification Test (CUPIT): Development, reliability, concurrent and predictive validity among adolescents and adults. *Addiction*, *105*, 615–625.

Bongers, I. L., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology*, *112*, 179–192.

Bukowski, W. M., & Hoza, B. (1989). Popularity and friendship: Issues in theory, measurement, and outcome. In T. J. Berndt & G. W. Ladd (Eds.), *Peer relationships in child development* (pp. 15–45). Oxford: Wiley.

Caravita, S., & Cillessen, A. H. (2012). Agentic or communal? Associations between interpersonal goals, popularity, and bullying in middle childhood and early adolescence. *Social Development*, *21*, 376–395.

Copeland, W. E., Wolke, D., Angold, A., & Costello, E. J. (2013). Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry*, *70*, 419–426.

Craig, W., Harel-Fisch, Y., Fogel-Grinvald, H., Dostaler, S., Hetland, J., Simons-Morton, B., et al. (2009). A cross-national profile of bullying and victimization among adolescents in 40 countries. *International Journal of Public Health*, *54*, 216–224.

Curran, P. J., & Hussong, A. M. (2009). Integrative data analysis: The simultaneous analysis of multiple data sets. *Psychological Methods*, *14*, 81–110.

de Winter, A. F., Oldehinkel, A. J., Veenstra, R., Brunnekreef, J. A., Verhulst, F. C., & Ormel, J. (2005). Evaluation of non-response bias in mental health determinants and outcomes in a large sample of pre-adolescents. *European Journal of Epidemiology*, *20*, 173–181.

Dijkstra, J. K., Cillessen, A. H., Lindenberg, S., & Veenstra, R. (2009). Same-gender and cross-gender likeability: Associations with popularity and status enhancement: The TRAILS study. *Journal of Early Adolescence*, *30*, 773–802.

Edwards, A. C., Joinson, C., Dick, D. M., Kendler, K. S., Macleod, J., Munafò, M., et al. (2014). The association between depressive symptoms from early to late adolescence and later use and harmful use of alcohol. *European Child & Adolescent Psychiatry*, *23*, 1219–1230.

Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. *Journal of Marital and Family Therapy*, *9*, 171–180.

Esbensen, F.-A., & Carson, D. C. (2009). Consequences of being bullied results from a longitudinal assessment of bullying victimization in a multisite sample of American students. *Youth & Society*, *41*, 209–233.

Espelage, D. L. (2014). Ecological theory: Preventing youth bullying, aggression, and victimization. *Theory into Practice*, *53*, 257–264.

Espelage, D. L., Bosworth, K., & Simon, T. R. (2001). Short-term stability and prospective correlates of bullying in middle-school students: An examination of potential demographic, psychosocial, and environmental influences. *Violence and Victims*, *16*, 411–426.

Espelage, D. L., Low, S., Rao, M. A., Hong, J. S., & Little, T. D. (2014). Family violence, bullying, fighting, and substance use among adolescents: A longitudinal mediational model. *Journal of Research on Adolescence*, *24*, 337–349.

Espelage, D. L., Mebane, S. E., & Swearer, S. M. (2004). Gender differences in bullying: Moving beyond mean level differences. In D. L. Espelage & S. M. Swearer (Eds.), *Bullying in American schools: A social-ecological perspective on prevention and intervention* (pp. 15–35). Mahwah, NJ: Erlbaum.

Falb, K. L., McCauley, H. L., Decker, M. R., Gupta, J., Raj, A., & Silverman, J. G. (2011). School bullying perpetration and other childhood risk factors as predictors of adult intimate partner violence perpetration. *Archives of Pediatrics & Adolescent Medicine*, *165*, 890–894.

Farmer, T. W., Petrin, R. A., Robertson, D. L., Fraser, M. W., Hall, C. M., Day, S. H., et al. (2010). Peer relations of bullies, bully-victims, and victims: The two social worlds of bullying in second-grade classrooms. *Elementary School Journal*, *110*, 364–392.

Fekkes, M., Pijpers, F. I., & Verloove-Vanhorick, S. P. (2005). Bullying: Who does what, when and where? Involvement of children, teachers and parents in bullying behavior. *Health Education Research*, *20*, 81–91.

Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2014). Bullying in childhood, externalizing behaviors, and adult offending: Evidence from a 30-year study. *Journal of School Violence*, *13*, 146–164.

Ganzeboom, H. B., & Treiman, D. J. (1996). Internationally comparable measures of occupational status for the 1988 International Standard Classification of Occupations. *Social Science Research*, *25*, 201–239.

Gini, G., & Pozzoli, T. (2006). The role of masculinity in children's bullying. *Sex Roles*, *54*, 585–588.

Gresham, F. M., & Elliott, S. N. (1990). *Social Skills Rating System: Manual*. Circle Pines, MN: American Guidance Service.

Haltigan, J. D., & Vaillancourt, T. (2014). Joint trajectories of bullying and peer victimization across elementary and middle school and associations with symptoms of psychopathology. *Developmental Psychology*, *50*, 2426–2436.

Hancock, G. R., & Buehl, M. M. (2008). Second-order latent growth models with shifting indicators. *Journal of Modern Applied Statistical Methods*, *7*, 39–55.

Hanish, L. D., Eisenberg, N., Fabes, R. A., Spinrad, T. L., Ryan, P., & Schmidt, S. (2004). The expression and regulation of negative emotions:

Risk factors for young children's peer victimization. *Development and Psychopathology*, *16*, 335–353.
Haynie, D. L., Nansel, T., Eitel, P., Crump, A. D., Saylor, K., Yu, K., et al. (2001). Bullies, victims, and bully/victims: Distinct groups of at-risk youth. *Journal of Early Adolescence*, *21*, 29–49.
Hemphill, S. A., Kotevski, A., Tollit, M., Smith, R., Herrenkohl, T. I., Toumbourou, J. W., et al. (2012). Longitudinal predictors of cyber and traditional bullying perpetration in Australian secondary school students. *Journal of Adolescent Health*, *51*, 59–65.
Hodges, E. V., Malone, M. J., & Perry, D. G. (1997). Individual risk and social risk as interacting determinants of victimization in the peer group. *Developmental Psychology*, *33*, 1032–1039.
Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*, 53–60.
Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.
Huang, F. L., & Cornell, D. G. (2015). Question order affects the measurement of bullying victimization among middle school students. *Educational and Psychological Measurement*. Advance online publication. http://doi.org/0013164415622664
Huisman, M., Oldehinkel, A. J., Winter, A. D., Minderaa, R. B., Bildt, A. D., Huizink, A. C., et al. (2008). Cohort profile: The Dutch "Tracking Adolescents" Individual Lives' Survey; TRAILS. *International Journal of Epidemiology*, *37*, 1227–1235.
Hunter, S. C., Durkin, K., Heim, D., Howe, C., & Bergin, D. (2010). Psychosocial mediators and moderators of the effect of peer-victimization upon depressive symptomatology. *Journal of Child Psychology and Psychiatry*, *51*, 1141–1149.
Jackson, C. L., Hanson, R. F., Amstadter, A. B., Saunders, B. E., & Kilpatrick, D. G. (2012). The longitudinal relation between peer violent victimization and delinquency: Results from a national representative sample of U.S. adolescents. *Journal of Interpersonal Violence*, *28*, 1596–1616.
Juvonen, J., & Graham, S. (2014). Bullying in schools: The power of bullies and the plight of victims. *Annual Review of Psychology*, *65*, 159–185.
Kim, Y. S., Leventhal, B. L., Koh, Y.-J., Hubbard, A., & Boyce, W. T. (2006). School bullying and youth violence: Causes or consequences of psychopathologic behavior? *Archives of General Psychiatry*, *63*, 1035–1041.
Klomek, A. B., Kleinman, M., Altschuler, E., Marrocco, F., Amakawa, L., & Gould, M. S. (2013). Suicidal adolescents' experiences with bullying perpetration and victimization during high school as risk factors for later depression and suicidality. *Journal of Adolescent Health*, *53*, S37–S42.
Klomek, A. B., Sourander, A., Kumpulainen, K., Piha, J., Tamminen, T., Moilanen, I., et al. (2008). Childhood bullying as a risk for later depression and suicidal ideation among Finnish males. *Journal of Affective Disorders*, *109*, 47–55.
Kretschmer, T., Barker, E. D., Dijkstra, J. K., Oldehinkel, A. J., & Veenstra, R. (2014). Multifinality of peer victimization: Maladjustment patterns and transitions from early to mid-adolescence. *European Child & Adolescent Psychiatry*, *24*, 1169–1179.
Moore, S. E., Norman, R. E., Sly, P. D., Whitehouse, A. J., Zubrick, S. R., & Scott, J. (2014). Adolescent peer aggression and its association with mental health and substance use in an Australian cohort. *Journal of Adolescence*, *37*, 11–21.
Muthén, L. K., & Muthén, B. (2010). *Growth modeling with latent variable using Mplus: Advanced growth models, survival analysis, and missing data*. Retrieved from https://www.statmodel.com/download/Topic4-v.pdf
Nederhof, E., Jorg, F., Raven, D., Veenstra, R., Verhulst, F. C., Ormel, J., et al. (2012). Benefits of extensive recruitment effort persist during follow-ups and are consistent across age group and survey method: The TRAILS study. *BMC Medical Research Methodology*, *12*, 93–108.
Niemelä, S., Brunstein-Klomek, A., Sillanmäki, L., Helenius, H., Piha, J., Kumpulainen, K., et al. (2011). Childhood bullying behaviors at age eight and substance use at age 18 among males: A nationwide prospective study. *Addictive Behaviors*, *36*, 256–260.
Oldehinkel, A. J., Rosmalen, J. G., Buitelaar, J. K., Hoek, H. W., Ormel, J., Raven, D., et al. (2015). Cohort profile update: The Tracking Adolescents' Individual Lives Survey (TRAILS). *International Journal of Epidemiology*, *44*, 76–76n.
Olweus, D. (1996). Bullying at school: Knowledge base and an effective intervention program. *Annals of the New York Academy of Sciences*, *794*, 265–276.
Ormel, J., Oldehinkel, A. J., Sijtsema, J., van Oort, F., Raven, D., Veenstra, R., et al. (2012). The Tracking Adolescents' Individual Lives Survey (TRAILS): Design, current status, and selected findings. *Journal of the American Academy of Child & Adolescent Psychiatry*, *51*, 1020–1036.
Perren, S., Ettekal, I., & Ladd, G. (2013). The impact of peer victimization on later maladjustment: Mediating and moderating effects of hostile and self-blaming attributions. *Journal of Child Psychology and Psychiatry*, *54*, 46–55.
Raczynski, K. A. (2012). *Performance of second-order latent growth curve models with shifting indicators: A Monte Carlo study*. Unpublished manuscript, University of Georgia.
Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect*, *34*, 244–252.
Reijntjes, A., Vermande, M., Goossens, F. A., Olthof, T., van de Schoot, R., Aleva, L., et al. (2013). Developmental trajectories of bullying and social dominance in youth. *Child Abuse & Neglect*, *37*, 224–234.
Ringrose, J., & Renold, E. (2010). Normative cruelties and gender deviants: The performative effects of bully discourses for girls and boys in school. *British Educational Research Journal*, *36*, 573–596.
Rodkin, P. C., Espelage, D. L., & Hanish, L. D. (2015). A relational framework for understanding bullying. *American Psychologist*, *70*, 311–321.
Saunders, J. B., Aasland, O. G., Babor, T. F., Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption—II. *Addiction*, *88*, 791–804.
Sawyer, A. L., Bradshaw, C. P., & O'Brennan, L. M. (2008). Examining ethnic, gender, and developmental differences in the way children report being a victim of "bullying" on self-report measures. *Journal of Adolescent Health*, *43*, 106–114.
Sentse, M., Kretschmer, T., & Salmivalli, C. (2015). The longitudinal interplay between bullying, victimization, and social status: Age-related and gender differences. *Social Development*, *24*, 659–677.
Shapero, B. G., Hamilton, J. L., Liu, R. T., Abramson, L. Y., & Alloy, L. B. (2013). Internalizing symptoms and rumination: The prospective prediction of familial and peer emotional victimization experiences during adolescence. *Journal of Adolescence*, *36*, 1067–1076.
Shields, A., & Cicchetti, D. (2001). Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. *Journal of Clinical Child Psychology*, *30*, 349–363.
Skapinakis, P., Bellos, S., Gkatsa, T., Magklara, K., Lewis, G., Araya, R., et al. (2011). The association between bullying and early stages of suicidal ideation in late adolescents in Greece. *BMC Psychiatry*, *11*, 11–22.
Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, *29*, 239–268.
Sourander, A., Klomek, A. B., Kumpulainen, K., Puustjärvi, A., Elonheimo, H., Ristkari, T., et al. (2011). Bullying at age eight and criminality in adulthood: Findings from the Finnish Nationwide 1981 Birth Cohort Study. *Social Psychiatry and Psychiatric Epidemiology*, *46*, 1211–1219.
Spriggs, A. L., Iannotti, R. J., Nansel, T. R., & Haynie, D. L. (2007). Adolescent bullying involvement and perceived family, peer and school relations: Commonalities and differences across race/ethnicity. *Journal of Adolescent Health*, *41*, 283–293.
Sterba, S. K., & Bauer, D. J. (2010). Matching method with theory in person-oriented developmental psychopathology research. *Development and Psychopathology*, *22*, 239–254.
Thomas, H. J., Connor, J. P., & Scott, J. G. (2014). Integrating traditional bullying and cyberbullying: Challenges of definition and measurement in adolescents—A review. *Educational Psychology Review*, *27*, 135–152.
Ttofi, M. M., Farrington, D. P., Lösel, F., Farrington, D. P., Loeber, R., Stallings, R., et al. (2011). Bullying perpetration and victimization as predictors of delinquency and depression in the Pittsburgh Youth Study. *Journal of Aggression, Conflict and Peace Research*, *3*, 74–81.
Veenstra, R., Lindenberg, S., Oldehinkel, A. J., Winter, A. F. D., Verhulst, F. C., & Ormel, J. (2005). Bullying and victimization in elementary schools: A comparison of bullies, victims, bully/victims, and uninvolved preadolescents. *Developmental Psychology*, *41*, 672–682.
Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health*, *45*, 368–375.
Winsper, C., Lereya, T., Zanarini, M., & Wolke, D. (2012). Involvement in bullying and suicide-related behavior at 11 years: A prospective birth cohort study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *51*, 271–282.