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Gender Differences in Developmental Links Among Antisocial Behavior, Friends' Antisocial Behavior, and Peer Rejection in Childhood: Results From Two Cultures

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This study addressed gender differences in the developmental links among antisocial behavior, friends' antisocial behavior, and peer rejection. High and increasing, moderate, and low antisocial developmental trajectories were identified among 289 Dutch children, ages 7 to 10, and 445 French-Canadian children, ages 9 to 12. Only boys followed the high trajectory. These boys had more deviant friends and were more often rejected than other children. A minority of girls followed the moderate antisocial behavior trajectory. These girls had fewer deviant friends than moderate antisocial boys, but moderate antisocial boys and girls were equally likely to be rejected. The influence of friends and poor peer relations plays a crucial but different role in the development of antisocial behavior among boys and girls.

Developmental trajectories of antisocial behavior in childhood and adolescence have received increased attention in the developmental literature in recent years (e.g., Bongers, Koot, van der Ende, & Verhulst, 2004; Broidy et al., 2003; Nagin & Tremblay, 1999; van Lier & Crijnen, 2005; for clarity, the term *antisocial behavior* will be used unless more specific forms of antisocial behavior, such as physical aggression, are meant). These studies all identified a small minority of boys who are chronically antisocial from childhood into adolescence. These studies also found that girls exhibit lower levels of antisocial behavior. Still, a small group of girls appear to follow a deviant trajectory characterized by consistently elevated levels of antisocial behavior. It has also been shown that the levels of antisocial behavior among these small groups of at-risk boys and girls increasingly diverge from those of their more normative peers, who exhibit low and desisting levels of antisocial

behavior. These findings are from studies conducted in Canada, the Netherlands, New Zealand, and the United States.

Although these results enhance our understanding of the potential courses of antisocial behavior, these studies do not explain why these small groups of highly antisocial children increasingly diverge from the larger group of their prosocial counterparts. There is a consensus that a wide variety of factors contribute to the course of antisocial behavior in children (Conduct Problems Prevention Research Group, 1992; Lahey, Waldman, & McBurnett, 1999; Patterson, Reid, & Dishion, 1992). Researchers have focused on preexisting characteristics within the child, such as learned behavioral or personal dispositions (Moffitt & Caspi, 2001; van Lier & Crijnen, 2005), and the influence of deviant friends or peer rejection as the driving forces behind the course of antisocial behavior (Asher & Parker, 1989; Coie, Belding, & Underwood, 1988; Elliott & Menard, 1996; Vitaro, Brendgen, & Tremblay, 2000). Many of these risk factors, however, are not simply preexisting conditions but continue to occur throughout childhood. Unfortunately, few studies have examined the contribution of multiple, contemporaneous risk factors to the development of antisocial behavior. Therefore, this study addresses the simultaneous,

time-varying influence of peer rejection and friends' antisocial behavior on the developmental trajectories of children's antisocial behavior. We expected to find a small group of children, particularly boys, who follow an increasingly deviating high-level trajectory. We also expected to find lower level trajectories with commensurate levels of maladjustment. The way these trajectories are associated with social context processes is less clear.

Antisocial children's coercive interaction styles are believed to be learned in the preschool years and continue to influence their transactions with low antisocial peers throughout elementary school (Dodge, 1983; Patterson et al., 1992). Antisocial children's acts of coercion, physical force, and threats are reinforced when non-antisocial peers respond to such behaviors by backing down (Coie, Dodge, Terry, & Wright, 1991). As a result, antisocial children are inclined to believe that antisocial behavior has positive consequences. Conversely, as a result of proximity and victimization, normative children become increasingly mistrustful of the antisocial children and reject them in favor of other normative children (Haselager et al., 2002; Newcomb, Bukowski, & Pattee, 1993). The rejection by nondeviant peers deprives antisocial children of normative socialization experiences. Indeed, peer rejection has been associated with early-onset conduct problems (Miller-Johnson, Coie, Maumary-Gremaud, & Bierman, 2002) and with adolescent externalizing behavior and delinquency (Coie, Terry, Lenox, Lochman, & Hyman, 1995; Miller-Johnson, Coie, Maumary-Gremoud, Lochman, & Terry, 1999). There is evidence that the link between peer rejection and later antisocial behavior may depend on children's age, such that younger children are more susceptible to the adverse effects of peer rejection than older children (McDougall, Hymel, Vaillancourt, & Mercer, 2001). Early peer rejection may mark the beginning of a chronic experience of peer rejection as suggested by researchers who have found that children who are repeatedly rejected exhibit the highest rates of antisocial behavior of all children from kindergarten to early adolescence (Brendgen, Vitaro, Bukowski, Doyle, & Markiewicz, 2001; Dodge et al., 2003; Ladd & Troop-Gordon, 2003).

Rejection by nondeviant peers places antisocial children at risk for drifting toward similarly antisocial peers (Dishion, Patterson, Stoolmiller, & Skinner, 1991). In turn, affiliation with deviant friends can exacerbate the development of the antisocial behavior. For instance, Coie et al. (1999) showed that the interaction between mutually aggressive dyads plays a key role in the overall aggression level of these children. Moreover, Patterson, Dishion, and Yoerger (2000) found that adolescent delinquency is predicted by behavioral reinforcement from deviant peers and not by the child's own level of aggression. By school entry, aggressive children already tend to affiliate with aggressive friends from whom they expect positive social consequences. An affiliation process based on behavioral homophily and possibly fueled by peer rejection may start as early as 6 years of age (Snyder, West, Stockemer, Gibbons & Alquist–Parks, 1996).

Three models account for the development of antisocial behavior in relation to the two processes of social influences described previously. The first is the selection model, which states that antisocial children will self-select into deviant groups by actively seeking friendships with children who exhibit similarly antisocial behavior (Cairns, Cairns, Neckerman, Gest & Gariépy, 1988). This implies that children who follow a high antisocial path will increasingly select antisocial friends. Poor relations with nondeviant peers do not contribute to the development of antisocial behavior. In contrast, the socialization (or facilitation) model states that it is poor bonding with nondeviant children that predicts the development of antisocial behavior (Elliott, Huizinga, & Ageton, 1985). In this model, antisocial children are actively rejected by non-antisocial peers, which deprives the antisocial children of normative socialization experiences and exacerbates their resentment of normative peers (Haselager, et al., 2002; Newcomb et al., 1993). Rejection by normative peers also places antisocial children at risk for drifting toward similarly deviant peers who model and reinforce deviant behaviors (Dishion, Patterson, & Griesler, 1994). The final model, the enhancement model, combines the elements of the selection and socialization models. The enhancement model suggests that existing antisocial behavior is exacerbated both by affiliation with deviant friends and by rejection by nondeviant peers (Vitaro, Tremblay, & Bukowski, 2001). As a result of their behavior problems, antisocial children are placed in a social context that facilitates the further development of antisocial behavior (Coie & Jacobs, 1993; Patterson et al., 1992). This study addressed each of these possibilities and hypothesized that both peer processes are active, in accordance with the enhancement model.

Despite the importance of processes of affiliation and rejection for the development of antisocial behavior, no prior study has examined them in concert with empirically identified subpopulations of children who follow different developmental courses of antisocial behavior. Such a study would inform us as

to how these peer processes relate to the development of antisocial behavior among distinct subgroups of children with varying levels of risk. For example, it is uncertain whether these processes apply only to children with high levels of antisocial behavior, to those with moderate levels, or to both. Moffitt (1993) argued that early onset antisocial behavior is associated with family, personality, or temperamental characteristics, and is exacerbated by negative peer influences. Patterson and Yoerger (1997), however, hypothesized that a late onset of problem behavior (i.e., in adolescence) is associated with deviant peer affiliation. This hypothesis was supported by Vitaro, Tremblay, Kerr, Pagani, and Bukowski (1997), who found that delinquent behavior at age 13 was facilitated by affiliation with deviant friends for moderately aggressive boys but not for highly aggressive boys. The authors argued that the moderate trajectory of aggressive behavior may correspond to a late onset, whereas the high trajectory may correspond to an early onset. We expected that children who follow a high antisocial trajectory from an early stage develop friendships with increasingly deviant, antisocial children. We also expected that higher levels of peer rejection at young ages would predominantly be observed in children following the high antisocial behavior trajectory relative to moderate or low antisocial behavior trajectories. In addition, we hypothesized that a trajectory with increasing levels of antisocial behavior, if found, would also be associated with increases in friends' antisocial behavior and high levels of peer rejection.

Although the importance of the social context on the development of antisocial behavior has been amply described for boys, it is uncertain whether the same processes are active in girls. Gender differences may emerge both in the patterns of change in antisocial behavior exhibited by boys and girls, and in the extent to which peer processes are associated with these trajectories. With regard to potential gender differences in the developmental trajectories, theories on developmental taxonomies of male antisocial behavior suggest that some boys engage in such behavior early in life, whereas others experience late or adolescent onset of antisocial behavior (Loeber & Stouthamer Loeber, 1998; Moffitt, 1993; Patterson, DeBaryshe, & Ramsey, 1989; Patterson & Yoerger, 1993, 1997). Silverthorn and Frick (1999) suggested that this distinction may not accurately describe the development of antisocial behavior in females. According to these authors, girls primarily follow a delayed-onset trajectory in which the development of antisocial behavior is delayed until adolescence, and

very few follow an early-onset trajectory. Recent findings support this assumption by showing that the early-onset trajectory is rare in girls (Fergusson & Horwood, 2002; Moffitt & Caspi, 2001).

Gender differences may emerge not just in the shape of trajectories of antisocial behavior but also in the paths linking antisocial behavior to co-occurring processes. For example, predictors of conduct disorder differ for boys and girls (Cote, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002). Because girls are generally less antisocial than boys and girls tend to affiliate with other girls, they affiliate with generally less antisocial peers. Moreover, girls have more intimate relationships with peers than boys (Moffitt, Caspi, Rutter, & Silva, 2001). Furthermore, the result of one study suggests that peer rejection influences boys' antisocial behavior more strongly than it influences girls' antisocial behavior (McDougall et al., 2001), although other studies did not reproduce this finding (Dodge et al., 2003; Ladd & Troop-Gordon, 2003). These differences between boys and girls cannot, however, account for the overall differences between boys and girls with respect to levels of antisocial behavior. The differences in mean levels of risk variables could explain 56% of the difference in mean levels of adolescent antisocial behavior and 65% of the difference in prevalence of conduct disorder (Moffit et al., 2001), leaving a substantial amount of the difference unexplained. Additional, nonidentified factors may account for these differences. Alternatively, the strength of the association between deviant friend affiliation and peer rejection with antisocial behavior may vary across genders. We explored this possibility by comparing the co-occurrence of antisocial behavior and problematic peer relations between boys and girls who shared a developmental trajectory of antisocial behavior, in addition to exploring gender differences in trajectory membership and outcomes. To test the generalizability of our models, we also assessed whether the relations tested in this study are equivalent across culture, age, and school systems. Specifically, this study examined the development of antisocial behavior in a sample of Dutch children, ages 7 to10, and a sample of French-Canadian children, ages 9 to 12.

Method

Samples

The Dutch sample consisted of children in the control condition of a school-based, preventive intervention study targeting disruptive behavior in

young children in the Netherlands (van Lier, Verhulst, van der Ende, & Crijnen, 2003). Elementary schools in the metropolitan area of Rotterdam and Amsterdam were eligible for inclusion. The first 13 schools that responded positively to the invitation to participate were included. Children in classrooms randomly assigned to the control group condition and who moved on from first to second grade were eligible for inclusion in this study ($N = 346$). Parents of 306 children (88.4%) signed a written informed consent granting the child permission to participate in the study. The socioeconomic status (SES) distribution of the sample was similar to that of the Netherlands (Netherlands Central Bureau of Statistics, 1999). During the 2-year intervention period (second and third grades), 17 children moved from a control classroom to an intervention classroom, reducing the sample to 289 children. At baseline, the mean age of the children was 6.9 years ($SD = 0.6$). Of the study children, 69% were Caucasian, 10% were Turkish, 9% were Moroccan, 5% were Surinam/Dutch Antilles, and 7% were from other ethnic groups. Also, 51% were male, which was similar among the ethnic groups, $\chi^2(7, N = 289) = 4.67, p > .05$. Eighty-six children were missing one or more assessments because of a move to another school or grade retention. One class refused to participate in the fourth-grade assessment. As a result, data from at least three out of four assessments were available for 243 children (84% of included children). Missing data were not related to gender of the child, $\chi^2(1, N = 289) = .254, p > .05$, but children who dropped out of the study had higher levels of peer-nominated antisocial behavior at baseline, $F(1, 288) = 12.1, p < .05$.

The Canadian sample consisted of 445 children (208 girls and 237 boys) with an average age of 9.07 years, ($SD = 0.5$) at baseline. All children resided in a small city in northwestern Quebec. The majority of the participants ($>90\%$) were French speakers of European descent. The SES of the sample was middle class (Blishen, Carroll, & Moore, 1987). There was missing data on one or more assessments for 195 children because of refusal to participate, school drop out, or geographical relocation. For 75% of the children, data were available for at least three of four assessments. Missing one or more assessments was not related to gender of the child, $\chi^2(1, N = 445) = .169, p > .05$, nor to peer-nominated antisocial behavior scores at baseline, $F(1, 444) = .620, p > .05$. An overview of the similarities and differences between the two samples is given in Table 1.

Measures

Dutch sample. Peer nominations of antisocial behavior were obtained through four behavioral descriptions in first through fourth grades. Children were asked to nominate all classmates of either sex that fit each of the four descriptions: starts fights, angers easily, says mean thing to peers, and is disruptive (Coie & Dodge, 1988). The four scores were divided by the number of children in the class minus 1 (nominating oneself was not allowed) and then added for a total score. Cronbach's alphas ranged from .92 to .94 over the four assessments.

Children's self-reported externalizing behavior problems over the last 2 months were assessed in fifth grade using the 120-item Youth Self-Report (YSR; Achenbach, 1991). The Aggressive Behavior, Delinquent Behavior, and the overall Externalizing subscales of the YSR were used. The YSR has shown adequate reliability and validity in the Netherlands (Verhulst, Van der Ende, & Koot, 1997). Cronbach's alphas for aggressive behavior, delinquent behavior, and externalizing were .86, .70, and .87, respectively.

Table 1
Characteristics of Dutch and Canadian Samples and School Characteristics

	Dutch sample	Canadian sample
Sample		
N	289	445
Boys (%)	51	53
Ages	6 through 10	8 through 12
Demographic	Two metropolitan areas	One small city
SES	Equal to Dutch pop.	Equal to Quebec pop.
School		
Average number children per class[a]	19.3 (6.3)	20.3 (6.5)
Classes per grade (range)	2 – 5	2 – 4
Class compilation over grades	Stable	Changed each grade

Note. Standard deviations are in parentheses.
[a]Mean number of children per classroom that were included in the study.

Canadian sample. Peer nominations of antisocial behavior were obtained in third through sixth grades by behavioral descriptions of the Pupil Evaluation Inventory (PEI; Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976). The following items were used: starts fights, is disruptive, says he can beat up everybody, and ridicules/makes fun of others. The four scores were divided by the number of children in the class minus 1 and then added for a total score. Cronbach's alphas ranged from .89 to .94 over the four assessments.

Self-reported delinquency was assessed in sixth grade (age 12) with the 26-item Self-Reported Delinquency Questionnaire (SRDQ; LeBlanc, 1996). The SRDQ assesses involvement in delinquent behavior over the previous 12 months. Each question was rated on a 4-point scale (0 = never, 1 = once or twice, 2 = often, 3 = very often) and time ratings were added for the Physical Violence, Theft, Vandalism, and Total Delinquency scales. The Physical Violence scale consisted of 11 items (e.g., used a weapon during a fight, beat someone for no reason, carried a weapon, engaged in a fistfight, threw rocks or other objects at someone). The Theft scale included seven items (stole $100 or more, broke a door or window to steal something, stole a bicycle, stole money from family members, entered without paying admission, stole something worth less than $10, entered without authorization). The Vandalism scale included five items (vandalized a car, intentionally set a fire, intentionally destroyed school property, intentionally destroyed instruments at school, intentionally destroyed other person's property). Cronbach's alpha for the Total Delinquency scale was .84 in this sample. The validity of self-reported delinquency was documented in several studies (Hindelang, Hirschi, & Weiss, 1981; Klein, 1989).

Both samples. Friends' antisocial behavior in both samples was computed using the following procedure. At each assessment, children were asked to nominate the three classroom peers that they liked most (Dutch sample) or up to four peers that they considered to be a best friend (Canadian sample). Because endorsements were limited to classroom peers, antisocial behavior scores were available for all nominated children. Therefore, for each target child, we calculated the mean of their friends' antisocial behavior.

Peer rejection in both samples was based on a combination of liked-most and liked-least nominations originating from classmates every year. Children were asked to nominate the children in their class who best fit these two descriptions. Children's liked-most and liked-least scores (based on their classmates' endorsements) were standardized within the classroom. Standardized social preference scores were computed by subtracting the liked-most z score from the liked-least z score for each child. This social preference score was then standardized within the classroom. A child was categorized as rejected if his of her social preference score was less than $-1.0\,SD$, standardized liked-most score was less than 0, and standardized liked-least score was greater than 0 (Coie & Kupersmidt, 1983). All remaining children were categorized as not rejected. The 1-year stability ranged between .39 and .53 ($p<.01$) for the Dutch sample and between .24 and .44 ($p<.01$) for the Canadian sample. This difference in stability may reflect the fact that classroom composition tended to remain stable in the Dutch sample whereas there was a reshuffling of classroom composition every year in the Canadian sample.

Procedures

In the Dutch sample, peer nominations were conducted annually by two trained research assistants in the spring of first through fourth grades. Children filled out the peer nomination forms in groups of six in a separate space in the school, supervised by the research assistants. Children were separated to ensure that they would not influence peers while filling out the forms. Children were asked whether they understood the description, and if necessary, an example was given. Children were instructed to keep their answers confidential.

The YSR was collected in the spring of the fifth grade as part of a larger set of questionnaires. Children completed these questionnaires in the classroom, supervised by a research assistant. Children were instructed to keep their answers confidential and were told that they did not have to answer any question they did not want to complete. The teacher was asked to leave the classroom during the assessment to ensure that children felt comfortable filling out the questionnaires.

Each spring, participants in the Canadian sample spent 2 hr of classroom time, with a 20-min break, completing the questionnaires. After the children were informed about the purpose of the study, they were told that all of their answers would be kept confidential and that they did not have to answer any of the questions if they did not want to answer. The children were encouraged to keep their answers private and not to discuss them with classmates. Trained research assistants administered and collected the questionnaires. Teachers were asked to leave the classroom during the assessment time to

underscore the fact that participants' answers would not be revealed to their teachers.

Statistical Approach

Developmental trajectories were analyzed using growth mixture modeling (GMM; Muthén, 2001; Muthén & Muthén, 2000; Muthén & Shedden, 1999). The objective of GMM is to find the smallest number of classes of individuals with similar developmental trajectories of antisocial behavior. GMM estimates mean growth curves, initial status (intercept), and change (slope) for each class of children and captures individual variation around these growth curves by estimating factor variances for each class.

Three criteria may be used to determine the optimal number of classes (Muthén & Muthén, 2004). The first is the Baysian information criterion (BIC; Kass & Raftery, 1993; Schwartz, 1978) in which a lower BIC value indicates improvement of model fit relative to a model with one fewer class. The second criterion is the classification quality of the model. High average posterior probabilities indicate that the model is well able to assign each child to one particular class. The third criterion is the subjective usefulness of the classes, which can be determined by comparing developmental trajectories, the number of children in each class, and differences in outcomes between classes. Each of these criteria was used to decide on the optimal number of classes of antisocial behavior in this study.

The onset of peer rejection for each child was assessed using discrete time survival mixture analyses (DTSMA; Masyn, 2003; Muthén & Masyn, in press) DTSMA is an extension of classical discrete time survival analyses. Discrete time survival analyses considers a set of binary (rejected–nonrejected) indicators indicating whether an individual experienced the event in the given period. A single, nonrepeatable event is considered. In classical discrete time survival analyses, cumulative survival curves could be estimated for groups of individuals in which group membership was known based on observed variables (e.g., gender or a preexisting risk factor). In DSTMA, cumulative survival curves for groups of children can be estimated with unknown group membership.

GMM can be incorporated into the more general framework of general growth mixture modeling (GGMM; Muthén & Muthén, 2000). This procedure allows for simultaneous estimation of developmental trajectories of target children, the developmental trajectories of their friends' antisocial behavior, and the cumulative survival curves of peer rejection for

each of the developmental trajectories of antisocial behavior. The estimated parameters of this analysis include (a) latent class membership probabilities, which give the probability of each individual belonging to each of the classes; (b) the means and variances of the growth factors (intercept, slope, and quadratic slope) of the children's individual antisocial behavior scores for each of the classes; (c) the means and variances of the growth factors of the friends' antisocial behavior scores for each of the classes; and (d) the cumulative survival curves on peer rejection for each of the classes. To analyze gender differences in the estimated growth factors, the growth factors were regressed on male gender for each of developmental trajectory classes in which both genders were present.

The overall GGMM and the separate GMM and DTSMA were analyzed with Mplus 3.0 (Muthén & Muthén, 2004). The missing data module was used to make optimal use of the data available and to take into account that the Dutch children who were lost to follow-up had a different level of initial peer-nominated antisocial behavior than children who remained in the study. The same procedure was used in both samples.

Results

Descriptive Statistics

Mean peer-nominated antisocial behavior scores (with standard deviations in parentheses) for the 7- to 10-year-old Dutch children were .73 (.65), .84 (.80), .63 (.76), and .47 (.62), respectively. Mean peer nomination scores for the 9- to 12-year-old Canadian children were .24 (.45), .25 (.49), .38 (.57), and .45 (.70), respectively. The correlations between the annually assessed peer-nominated antisocial behavior scores and the self-reported outcome scores are shown in Tables 2 and 3 for the Dutch and Canadian sample, respectively.

Developmental Processes of Antisocial Behavior

For both the Dutch and Canadian samples, we analyzed the data in four steps. First, we evaluated the models needed to describe the repeatedly assessed antisocial behavior scores. For the overall Dutch sample a quadratic term was needed to describe the development of children's antisocial behavior, whereas a linear term was sufficient for describing the development of friends' antisocial behavior. In contrast, in the Canadian sample, a linear term was sufficient for describing the develop-

Table 2
Intercorrelations Between Peer-Nominated Antisocial Behavior and Self-Reported Delinquent and Aggressive Behavior in the Dutch Sample

| | Peer-nominated | | | | Self-reported | |
	1	2	3	4	5	6
1. ASB, age 7	–	.81	.73	.63	.15*	.21
2. ASB, age 8		–	.84	.79	.19	.23
3. ASB, age 9			–	.87	.18*	.23
4. ASB, age 10				–	.25	.28
5. Delinquency, age 11					–	.71
6. Aggression, age 11						–

Note. Correlation coefficients are significant at *p* < .01. ASB = antisocial behavior.
*p < .05.

ment of the child's antisocial behavior whereas the development of friends' antisocial behavior required a quadratic term. In the second step, the optimal number of unconditional developmental trajectories of children's antisocial behavior was determined for each sample. Initially, the variances of the continuous growth factors and the covariance between the growth factors were set to zero in an effort to find the optimal number of developmental trajectories (Muthén & Muthén, 2004). In each sample two-class (Dutch BIC = 1593; Canadian BIC = 1528), three-class (Dutch BIC = 1332; Canadian BIC = 1308), and four-class solutions (Dutch BIC = 1242; Canadian BIC = 1139) were fitted. Allowing for random variation in the growth factors and allowing the indicator variance to be different for the last (low antisocial behavior) class, improved the fit of the three class solutions (Dutch BIC = 773; Canadian BIC = 602). Hence, the three-class solutions best described the development of children's antisocial behavior in each sample. In the third step, the friends' antisocial behavior trajectories and survival curves of peer rejection were added to the three-class models. The

stability of these models was tested through a two-stage evaluation process. In the first stage, 100 random perturbations of specified starting values were generated by the program and the model was estimated for 20 iterations. In the second stage, the ending values from the 20 optimization with the highest log-likelihood from the first stage were used as the starting values for the final-stage optimization. The results showed that despite the differences in starting values, identical solutions were obtained. In the final step, the parameter estimates were regressed on males.

To study how loss to follow-up affected the model estimation, the final model was estimated only for children with complete data. Because loss to follow-up was related to initial level of antisocial behavior in the Dutch sample, we expected that fewer children were in the high-antisocial developmental trajectory. The findings confirmed our expectations. Nevertheless, in both samples, parameter estimates in these models were highly similar to those in the models that used all available data. We therefore concluded that loss to follow-up did not affect model

Table 3
Intercorrelations Between Peer-Nominated Antisocial Behavior and Self-Reported Fighting, Theft, and Vandalism in the Canadian Sample

| | Peer-nominated | | | | Self-reported | | |
	1	2	3	4	5	6	7
1. ASB, age 9	–	.81	.73	.56	.34	.21	.26
2. ASB, age 10		–	.72	.59	.28	.17	.22
3. ASB, age 11			–	.65	.40	.26	.35
4. ASB, age 12				–	.39	.26	.36
5. Fighting, age 12					–	.60	.49
6. Theft, age 12						–	.60
7. Vandalism, age 12							–

Note. Correlation coefficients are significant at *p* < .01. ASB = antisocial behavior.

estimation; therefore, the analyses reported in the remainder of this article used all available data.

Developmental process of high antisocial behavior. A small group of approximately 10% of each sample followed a developmental trajectory characterized by high levels of antisocial behavior (Figures 1 and 2, top). An examination of the distribution of boys and girls across the three developmental trajectories revealed that girls were not present in the high developmental trajectory in the Canadian sample, and only 1 girl (<1%) followed the high developmental trajectory in the Dutch sample (see Table 4). The trajectories of antisocial behavior were differentially associated with friends' antisocial behavior (see Figures 1 and 2, middle). In the Dutch sample, membership in the high antisocial trajectory was associated with stable and high levels of friends' antisocial behavior. In contrast, friends' antisocial behavior tended to decrease in the moderate or low antisocial behavior trajectories. In the Canadian sample, membership in the high antisocial behavior trajectory was associated with accelerated growth in friends' antisocial behavior. This pattern of accelerated growth was not characteristic of the change in friends' antisocial behavior of the other Canadian trajectory classes.

The cumulative survival curves of peer rejection are depicted in the bottom portions of Figures 1 and 2. It is clear that high antisocial behavior is associated with the highest levels of peer rejection. In the Dutch sample, almost all children on the high antisocial behavior trajectory experienced peer rejection between the ages of 7 and 10. Although the rate of rejection in high-antisocial children was lower in the Canadian sample, these children still experienced the highest rates of rejection of all children between the ages of 9 and 12.

Developmental process of moderate antisocial behavior for boys and girls. Forty-four percent of the Dutch sample and 39% of the Canadian sample followed a trajectory displaying moderate levels of antisocial behavior. In both samples, the majority of the boys followed the moderate developmental trajectory (55% of the boys in the Dutch sample, 56% of the boys in the Canadian sample; see Table 4). Therefore, we defined this moderate developmental trajectory as normative for boys. In contrast, a smaller proportion of the girls in the Dutch (33%) and Canadian (18%) sample followed the moderate developmental trajectory. Across genders, the primary feature differentiating the Dutch and the Canadian samples was a desisting trend of antisocial behavior the Dutch sample, which contrasted with an increasing trend in the Canadian sample. Likewise, friends'
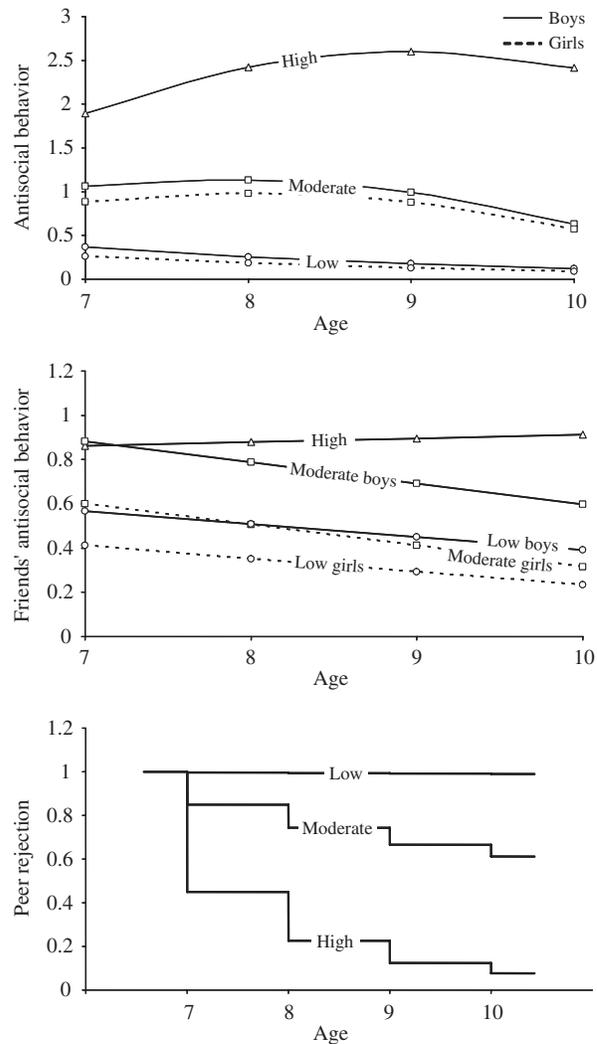

Figure 1. The Dutch sample: Development of antisocial behavior (top), friends' antisocial behavior (middle), and cumulative survival curves of peer rejection (bottom) for children following a high, moderate, or low developmental trajectory of antisocial behavior.

antisocial behavior decreased in the boys and girls from the Dutch sample but steadily increased in the Canadian sample.

Because both boys and girls were present in the moderate antisocial trajectory, the impact of gender on the growth parameters was analyzed. Results are shown in Table 4 and Figures 1 and 2 (dotted lines represent girls). The significant associations of gender with the intercept of the Dutch and Canadian moderate antisocial trajectory indicate that boys were higher on their initial level of antisocial behavior than were girls. In contrast, cultural differences in the relation between gender and the rate of change in antisocial behavior were observed. The
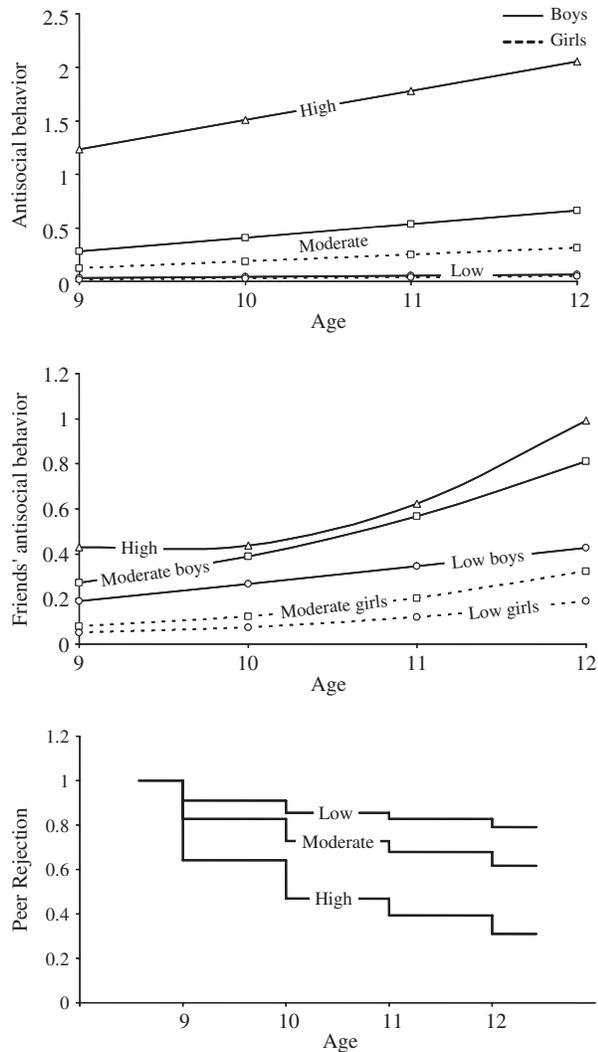
Figure 2. The Canadian sample: Development of antisocial behavior (top), friends' antisocial behavior (middle), and cumulative survival curves of peer rejection (bottom) for children following a high, moderate, or low developmental trajectory of antisocial behavior.

rate of growth in antisocial behavior among Canadian boys in the moderate trajectory was greater than that of Canadian girls. For both Canadian and Dutch children, boys in the moderate trajectory group affiliated with more antisocial friends than did girls in this trajectory group. No difference between boys and girls in the moderate trajectory was found on the survival curve of peer rejection.

Developmental process of low antisocial behavior for boys and girls. Approximately 50% of the Dutch and Canadian sample followed a low antisocial behavior trajectory, characterized by consistently low levels in the Dutch sample and low, but slightly increasing levels in the Canadian sample. The majority of the

girls in both the Dutch sample (67%) and the Canadian sample (82%) followed the low antisocial behavior trajectory. We therefore defined the low antisocial behavior trajectory as normative for girls.

Because both genders were present in the low antisocial behavior trajectory, the impact of gender on the growth parameters was analyzed. Low-antisocial-trajectory boys from both samples had higher levels of antisocial behavior than did girls. Although both boys and girls in this trajectory affiliated with low-level antisocial friends, the boys' friends had higher levels of antisocial behavior than did the girls' friends. The rate of peer rejection among low-antisocial children was very low in the Dutch sample (1%). In contrast, approximately 20% of Canadian children in the low antisocial behavior trajectory were rejected. The survival curves of peer rejection were similar for boys and girls.

Outcomes: Self-reported antisocial behavior. The boys who followed the high antisocial behavior trajectory also had the highest scores on self-reported aggressive and delinquent behavior (Dutch sample) and fighting, stealing, or vandalism (Canadian sample; see Table 5). In the Dutch sample, boys and girls on the moderate antisocial behavior trajectory had intermediate levels of aggressive and delinquent behavior. Likewise, Canadian boys and girls on the moderate trajectory reported intermediate levels of fighting, stealing, and vandalism. No gender differences in the problem behaviors were found among children in the moderate trajectory in either sample. Dutch and Canadian children in the low antisocial behavior trajectory had the lowest levels of self-reported problem behaviors. No gender differences in self-reported behaviors were identified among low-antisocial children.

Discussion

The purpose of this study was to explore the development of antisocial behavior in relation to the social context in which children operate. Children were classified into empirically identified trajectories of antisocial behavior. Associations among trajectory membership, the development of friends' antisocial behavior, and onset of peer rejection were explored. These associations were studied in two samples in an effort to assess the potential impact of cultural context, school systems, age and gender. Generally, the findings were similar across cultures.

Our results tended to support our hypotheses. For example, in accordance with our expectations, only a small group of children in each sample followed a trajectory characterized by high levels of antisocial

Table 4

Percentage of Total Sample, Percentage of Males and Females of Total Sample, and Impact of Gender on Growth Parameters of Antisocial Behavior and Friends' Antisocial Behavior for the Dutch and Canadian Samples

	Developmental trajectory					
	High	Moderate			Low	
Dutch sample						
Sample (%)	9	44			47	
Male (%)	96	64			31	
Percentage of all females	–	33			67	
ASB: boys vs. girls		Est.	*SE*		Est.	*SE*
Intercept	–	0.17	0.08*		0.11	0.04*
Linear slope	–	− 0.01	0.11		− 0.04	0.04
Quadratic slope	–	− 0.01	0.03		0.01	0.01
Friends' ASB: boys vs. girls		Est.	*SE*		Est.	*SE*
Intercept	–	0.32	0.06**		0.15	0.06*
Linear slope	–	− 0.03	0.03		0.00	0.03
Survival curve: boys vs. girls	–	− 0.25	0.31		− 1.40	1.35
Canadian sample						
Sample (%)	10	39			51	
Male (%)	100	78			26	
Percentage of all females	–	18			82	
ASB: boys vs. girls		Est.	*SE*		Est.	*SE*
Intercept	–	0.16	0.03**		0.02	0.01*
Linear slope	–	0.07	0.03*		0.00	0.01
Friends' ASB: boys vs. girls		Est.	*SE*		Est.	*SE*
Intercept	–	0.19	0.04**		0.14	0.03**
Linear slope	–	0.06	0.06		0.07	0.04
Quadratic slope	–	0.01	0.03		− 0.01	0.02
Survival curve: boys vs. girls	–	− 0.31	0.31		0.04	0.35

Note. Dashes indicate that effect of gender was not tested. ASB = antisocial behavior.
*$p < .05$. **$p < .01$.

behavior. This finding is consistent with the results of previous studies (Bongers et al., 2004; Broidy et al., 2003; Moffitt, Caspi, Harrington, & Milne, 2002; Nagin & Tremblay, 1999). Also consistent with previous studies, the levels of antisocial behavior exhibited by children following the high developmental trajectory diverged from the levels exhibited by children in the other trajectories. To enhance our understanding of the process of this diverging trajectory, we studied two concurrent developmental processes.

The first process was the development of friends' antisocial behavior. In both the Dutch and Canadian samples, it was apparent that children affiliate with peers who exhibit levels of antisocial behavior that parallel their own. Hence, children on the high antisocial trajectory, whose antisocial behavior diverges from that of other children, choose friends whose antisocial behavior also diverges from that of other children.

The second process we studied was peer rejection. In both samples the cumulative survival curves of peer rejection indicated that highly antisocial children were much more likely to have experienced peer rejection than were moderate- or low-antisocial children. The combined results suggest that children who are high on antisocial behavior at an early age undergo a process of affiliation with increasingly deviant friends and of deteriorating relations with the larger peer group.

Patterson and Yoerger (1997) posited that a late-onset trajectory of delinquency was primarily driven by normative children affiliating with deviant peers during adolescence. The present study, however, found contradictory results. Specifically, affiliation with deviant peers appeared to be most common among children in the high antisocial behavior trajectory and not among children in the more normative moderate or low antisocial behavior trajectories. In a previous study using the Dutch sample, van Lier

Table 5

Self-Reported Behavioral Problems of Children Following the High, Moderate, or Low Developmental Trajectory of Antisocial Behavior

| | Developmental trajectory | | | | | |
| | High | | Moderate | | Low | |
	M	SD	M	SD	M	SD
	Dutch sample					
Aggression	10.0	6.8$_a$	6.7	5.5$_b$	5.2	4.2$_c$
Delinquency	4.1	3.5$_a$	2.6	2.8$_b$	2.0	1.7$_b$
Total externalizing	14.0	9.7$_a$	9.3	7.8$_b$	7.2	5.5$_c$
	Canadian sample					
Fighting	4.3	3.8$_a$	2.1	2.2$_b$	0.8	1.5$_c$
Stealing	3.5	3.9$_a$	1.6	2.4$_b$	1.1	2.1$_b$
Vandalism	2.0	2.3$_a$	0.9	1.4$_b$	0.5	0.9$_c$
Total delinquency	12.5	10.5$_a$	5.5	5.8$_b$	3.5	4.8$_c$

Note. No gender differences in mean scores within trajectory classes were found. Means in the same row that do not share subscripts differ at $p < .05$ in the least significant difference multiple comparisons.

and Crijnen (2005) examined risk factors for following a high antisocial behavior trajectory and found that attention deficit/hyperactivity problems and academic problems at elementary school entry predicted which children would follow this trajectory. These findings were in line with studies suggesting that neurocognitive (Moffitt & Caspi, 2001) or genetic factors (Rutter, Giller, & Hagell, 1998) are associated with early high levels of antisocial behavior. The findings of the present study indicate that in addition to the risk factors that may explain early existing high levels of antisocial behavior, the social context plays a crucial role in the further development of antisocial behavior in these children.

This study also identified gender differences in processes related to antisocial behavior development. As hypothesized, girls were very unlikely to be members of the high antisocial behavior trajectory. It was also found that only a minority of the girls followed the moderate developmental trajectory, whereas this trajectory appeared to reflect normative development among boys. The moderate trajectory may well evolve into an adolescent onset trajectory, although the age range of our samples, which ends at the start of adolescence, prohibits us from drawing firm conclusions regarding this hypothesis. The increase in antisocial behavior found in Canadian boys in the moderate trajectory and the increase in their friends' antisocial behavior, however, suggest that these boys are at risk for following an adolescent onset path of antisocial behavior, which is considered near normative in boys (Moffitt, 1993).

Girls in the moderate antisocial behavior trajectory may be at risk for following the hypothesized delayed onset trajectory (Silverthorn & Frick, 1999). No gender differences were found between the levels of self-reported aggressive and delinquent behavior among children in the moderate antisocial behavior trajectory. However, gender differences in the association among antisocial behavior, friends' deviancy, and peer rejection were found. For instance, we did not identify a gender difference in the rates of peer rejection among youth in the moderate antisocial behavior trajectory despite the finding that girls were less antisocial than boys. An explanation could be that girls have poor relations with classmates for reasons different from boys' reasons. For instance, Abecassis, Hartup, Haselager, Scholte, and Van Lieshout, (2002) found that mutual antipathies in boys were especially related to aggressive and bullying behavior, whereas among girls, antipathies were related to less prosocial, socially ineffective, and withdrawn behavior. Also, we found that girls in this trajectory affiliated with less antisocial peers than did their male counterparts. One possible explanation for this is the well-established finding that children generally form friendships with same-sex counterparts during childhood (Hartup, 1996). Deviant girls were thus less likely to select high-antisocial friends. It must be noted, though, that deviant girls may affiliate with and be influenced by deviant (male) peers from outside school, as suggested by Kiesner, Poulin, and Nicotra (2003). This fact notwithstanding, the finding of similarities in self-reported problem behavior among boys and girls despite gender differences in the process leading toward these problem behaviors suggests different pathways for boys and girls. The results suggest that

girls who follow a deviant developmental trajectory are less affected by deviant peers than are boys. In contrast, they suggest that deviant girls are more affected by poor relations with normative girls.

The findings of this study underscore models that emphasize the role of ostracism by nondeviant peers and of active affiliation to similarly deviant peers in the development of antisocial behavior. Two findings are of interest for the association between these processes. First, it became clear that for boys on the high developmental trajectory, affiliation with deviant friends and poor relations with nondeviant peers coincide. This is in accordance with the enhancement model in the development of antisocial behavior (Vitaro et al., 2001). Second, the finding that affiliation with deviant peers is less strongly related to maladjustment in girls suggests that the socialization model of the development of antisocial behavior may be more applicable to girls.

The difference in the stability of classroom composition between the Dutch and Canadian sample warrants further attention. This difference may explain the lower rates of rejection among Canadian children in the high antisocial behavior trajectory and different shapes of the growth trajectories between the Canadian and Dutch samples. Because children in the Dutch sample remained in the same peer group over time, the reputation processes and group pressure may have been stronger than in the Canadian sample. Moreover, rejection reflects the punishing effect of peer pressure (Boivin & Vitaro, 1995), which may cause normatively developing children and even children on the high developmental path to regulate their antisocial behavior downward. The lower rejection rates in the Canadian sample could therefore explain the continuing increase in antisocial behavior for boys following the high trajectory. An alternative explanation for the difference in rates of rejection could be the age differences of the samples. For example, direct bullying was positively related to rejection in third-grade children but negatively related to rejection in first-grade children, suggesting that the consequences of antisocial behavior vary with age (Dodge, Coie, Pettit, & Price, 1990). Still, the results of this study showed consistencies in the number of trajectories, the percentage of children in each trajectory, and the gender differences in the pathways toward aggressive, delinquent, and externalizing behavior across the samples.

Some limitations to this study should be noted. First, we used peer nominations of antisocial behavior. It has been hypothesized that peer nominations reflect peers' perceptions of children's behavior, not actual behavior. In a prior study that used the Dutch sample, however, it was found that peer reports coincided with teacher reports (van Lier & Crijnen, 2005). In this study, peer nomination scores coincided with self-reported externalizing behavior and delinquency, which also suggests that peer nominations represent actual behavior.

Friends' antisocial behavior scores were based on nominated friends, not on reciprocal friendships. The use of reciprocal friendships results in the loss of children who are without a mutual friend at each data point. These children are often the most disruptive in their classroom. Hence, removing them from the analyses would result in loss of power and possibly biased estimates. Alternatively, mutual friends may have a stronger influence on children's externalizing problems than nonreciprocal friends (Newcomb & Bagwell, 1996). Therefore, including both reciprocal and nonreciprocal friends should result in a conservative test of the role of deviant friends. Aloise-Young, Graham, and Hansen (1994), however, found that nonreciprocal friends had a stronger influence on one form of problem behavior in children—smoking initiation—than did reciprocal friends. It therefore seemed advisable to include both reciprocal and nonreciprocal friends in the present study.

Finally, it is important to note that no causal inferences can be made based on our findings. Although friends' nominations were provided by each child, this does not imply, for example, that children on the high developmental trajectory actually selected high-antisocial friends or that the high-antisocial friends initiated the contact. Despite these limitations, the findings of the study provide valuable insight into the processes that co-occur with developmental trajectories of antisocial behavior and show that these processes are different for boys and girls.

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