

The Role of Peer Contacts in the Relationship Between Parental Knowledge and Adolescents' Externalizing Behaviors: A Latent Growth Curve Modeling Approach

Ellen Reitz · Peter Prinzie · Maja Deković ·
Kirsten L. Buist

Received: 16 June 2006 / Accepted: 11 October 2006 / Published online: 16 November 2006
© Springer Science+Business Media, LLC 2006

Abstract The purpose of the present study was to examine the direct and indirect effects (through peer contacts) of parental knowledge on adolescents' delinquent and aggressive problem behavior, using latent growth curve modeling. A sample of 457 13- to 14-year old adolescents at first measurement wave ($M = 13.27$; $SD = 0.45$ years) filled out questionnaires about their parents, peers, and problem behavior three times with 1-year intervals in between. Regarding ini-

tial levels of behavior, both direct and indirect effects of parental knowledge were found on aggressive as well as on delinquent behavior. When the rate of change in behaviors was considered, only direct effects were found for both types of problem behavior, whereas indirect effects were absent. Gender differences were also found, with stronger effects of parenting on both aggressive and delinquent problem behavior for boys and stronger effects of peer contacts on aggressive behavior for girls. The present study shows that different behaviors of the externalizing spectrum have different trajectories and diverse relations with parenting and should not be treated as identical.

Ellen Reitz is an Assistant Professor, Research Centre Psychosocial Development in Context, Utrecht University, The Netherlands. Major research interests include the development of problem behaviors, family relations, and peer relations during adolescence.

Peter Prinzie is an Associate Professor, Research Centre Psychosocial Development in Context, Utrecht University, The Netherlands. Major research interests include development and determinants of externalizing and internalizing problems in children.

Maja Deković is a Full Professor, Research Centre Psychosocial Development in Context, Utrecht University, The Netherlands. Major research interests include the development of child and adolescent problem behavior and family and peer relationships.

Kirsten L. Buist is an Assistant Professor, Research Centre Psychosocial Development in Context, Utrecht University, The Netherlands. Major research interests include: psychosocial development, problem behavior and family relationships during early adolescence, in particular the family as a system.

E. Reitz (✉) · P. Prinzie · M. Deković · K. L. Buist
Utrecht University,
P.O. Box 80140, 3508 TC Utrecht, The Netherlands
e-mail: e.reitz@fss.uu.nl

P. Prinzie
e-mail: p.prinzie@fss.uu.nl

M. Deković
e-mail: m.dekovic@fss.uu.nl

K. L. Buist
e-mail: k.l.buist@fss.uu.nl

Keywords Externalizing problems · Parents · Peers · Latent growth curve modeling · Indirect effects

A body of research shows that the family plays an important role in the development of adolescent problem behavior (e.g., L'Abate, 1998; O'Donnell et al., 1995). It seems that family factors that are most proximal to the child, i.e. factors related to parenting and the parent-child interaction, are especially relevant for the development of pathology (Deković et al., 2003; Patterson et al., 1992). A significant aspect of parenting and the parent-child relationship is parental knowledge of adolescent's whereabouts, activities, and companions (Kerr and Stattin, 2000; Patterson, et al., 1992). Although parental knowledge is often conceptualized as an aspect of parental control, other studies also found high associations between parental knowledge and the quality of the parent-child relationship (Dishion and McMahon, 1998; Patterson et al., 1992). Dishion and McMahon (1998) have even conceptualized a 'parenting triad' where motivation, parental monitoring, and behavioral management are embedded within the parent-child relationship. Overall, several studies have shown that higher levels of parental knowledge are related to

lower levels of externalizing problem behavior (e.g., Fletcher et al., 1995; Jacobson and Crockett, 2000).

As the child matures, influence of parents on problem behavior is supplemented with influence of peers. It is often assumed that the association with deviant peers affects adolescent problem behavior (Berndt and Keefe, 1995). Research findings showed that adolescents who are involved with deviant peers exhibit more norm-breaking behavior (Brendgen et al., 2000), more substance use (Aseltine, 1995), more school problems (Berndt and Keefe, 1995), and more antisocial behavior in general (Patterson et al., 1992). One of the explanations for these findings is that deviant peers provide opportunities to engage in antisocial behavior and supply the adolescents with attitudes, motivation, and rationalization for supporting such behavior (Dishion et al., 1995). In addition, exposure to deviant peers may foster antisocial behavior through positive reinforcement and through modeling of new types of problem behavior.

Though the effects of parents and peers on adolescent problem behavior are well-established, a more important issue is how these two social worlds are intertwined. Several theories have considered the combined effects of parents and peers. Hirshi (1969) stated in 1969 in his social control theory that social bonds to both parents and peers are important for the development of problem behavior: when attachment to parents and commitment to peers is low, the adolescent will show higher levels of problem behavior. Somewhat later, the coercion theory was developed by Patterson (1982). The general premise of this theory suggests that problem behaviors are learned through reinforcing events in the social environment. Negative reinforcement of the child's negative behavior by the parent predicts deviant peer affiliation during adolescence, which subsequently leads to increasing levels of problem behavior. Research findings up to now seem to support a model of parental and peer influence presuming that a negative, conflicting parent-adolescent relationship contributes to adolescents' problem behavior directly as well as indirectly through deviant peer associations (Lahey et al., 1999). Adolescents from families with low levels of cohesion and closeness (Werner and Silbereisen, 2002), low quality of relations (Deković et al., 2004), low levels of responsiveness (Weaver and Prelow, 2005), or low levels of autonomy and warmth (Goldstein et al., 2005) tend to associate with deviant peers, which in turn predicts increases in adolescents' problem behavior. Findings from these studies suggest that the quality of parenting predicts the level of exposure to peers: low quality of parenting leads to high exposure to peers (Urberg et al., 2003). A possible mechanism is that negative parenting behaviors may lead adolescents to invest more time and attention in their peer relationships (Engels et al., 2002) and may make adolescents more susceptible to the influence of peers (Svensson, 2003), which consequently, may lead to more participation in delinquent or aggressive behaviors.

Whereas the above-mentioned research seems to indicate that contact with peers mediates the relation between parenting and adolescent problem behavior, the bulk of research has utilized cross-sectional data. Even when longitudinal designs are used, the focus is often on testing how certain behaviors or constructs measured at an earlier time point influence subsequent levels of problem behavior, without considering changes over time (e.g., Prinzie et al., 2003; Stouthamer-Loeber et al., 2002). However, parenting, peers, and problem behavior are developing constructs and relations between over-time trajectories might shed more light on the processes through which parents and peers are related to the development of problem behavior. The present study is aimed to advance research on parenting and peer effects on problem behavior by taking a dynamic perspective in which changes in these constructs are incorporated.

There are some recent studies that examined changes over time but studied other variables or did not investigate mediator effects. Dishion et al. (2004), for example, found an interaction-effect of changes in family management degradation and deviant peer involvement in predicting late adolescent problem behavior. A study of Bray et al. (2003) examined longitudinal relationships between individuation, peer alcohol use, and adolescent alcohol use and showed that increasing levels of individuation relate to smaller increases of adolescent alcohol use. We found only one study that tested mediator effects and also considered changes over time (Simons et al., 2001). In this study, quality of parenting mediated the effects of childhood defiance on affiliation with deviant peers and delinquency during adolescence. The authors concluded that early oppositional behavior relates to less effective parenting which, in turn, predicts an increase in involvement with deviant peers and delinquent behavior. As far as we know, no study has yet examined contact with peers as a mediator of the effects of parenting on problem behavior during early adolescence, while also taking into account changes over time.

Furthermore, within cross-sectional studies, empirically based multivariate studies have distinguished two types of externalizing behavior problems: overtly aggressive behavior and more covertly delinquent behavior (Frick et al., 1993). Because relatively few longitudinal studies have made a distinction between different forms of externalizing behavior (see e.g., Bongers et al., 2003; Stanger et al., 1997), little is known about the normative co-development of aggressive and delinquent behavior in the general population (Prinzie et al., *in press*). The differentiation of externalizing behavior in these two domains enables one to study different developmental patterns for different domains of externalizing behavior. Moreover, distinguishing different domains of externalizing behaviors allows the study of different developmental pathways. For example, studies by Loeber and colleagues (e.g., Loeber et al., 1993) give evidence for three different

pathways of externalizing behavior problems in males that predict different outcomes. Recently, Barnow et al. (2005) found different correlates for aggressive and delinquent behaviors in adolescents.

With regard to developmental trends, findings are not unambiguous. Stanger et al. (1997) found that the aggressive syndrome was more stable over time than the delinquent syndrome. Using repeated measures analysis of variance (ANOVA) of data from 7 cohorts of Dutch children, they reported that aggression declined steadily from about age 4 on, whereas delinquency declined slightly from age 4 until age 10 and then started to increase again, reaching a peak at about age 17. On both delinquent and aggressive behaviors, girls scored lower than boys.

Bongers et al. (2003) showed a declining trajectory of mother-reported aggressive behavior over time for both boys and girls. However, aggressive behaviors decreased at a much faster rate with age in boys than in girls with nearly no gender difference left at age 18. Children with a lower initial value on aggressive behavior changed at a faster rate than did children with a higher initial level. Delinquent behavior showed a curvilinear developmental trajectory peaking at age 11 years, with boys showing more delinquent behaviors than girls. Children with a lower initial score had a greater quadratic change than did children with a higher initial value on delinquent behavior. In a review of Loeber et al. (1991) it appears that most symptoms of oppositional defiant disorder are common by at least age 4–5 years and then, in most children, decline in prevalence with increasing age. In contrast, other studies reported that the trajectories of boys' externalizing behaviors tend to increase or remain fairly stable through the period from kindergarten to seventh grade (see e.g., Loeber et al., 1993).

Purpose of the study

The main purpose of the study is to examine parenting and peer effects on adolescent problem behavior. More specifically, direct and indirect effects (through contact with peers) of parental knowledge on delinquent and aggressive behavior are investigated. Use will be made of a latent growth modeling (LGM) approach that takes into account both factor means and variances. This combination of individual and group level of analysis is an important advantage of the LGM procedure compared to for instance ANOVA-analyses that focus only on the factor means. The possibility of examining changes in constructs over time can advance research on parenting and peer effects on problem behavior. We expect direct as well as indirect effects of parental knowledge on adolescent problem behavior when initial levels of behavior (Time 1) are taken into account. However, it is still unclear from the literature whether this pattern is similar when changes in behaviors over time are considered.

Further, we expect some differences for delinquent and aggressive behavior. As is previously mentioned, several studies show different developmental trends and it can thus be expected that trajectories of both problem behaviors differ from each other. Also, it has been suggested that genetic and biological influences might be stronger for aggressive behavior than for delinquent behavior (Lahey et al., 1999; Loeber et al., 2000). Based on these studies, we expect that parent-child relationships and peer factors emerge as weaker predictors of aggressive behavior, as compared to delinquency.

Finally, studies of externalizing problem behavior almost exclusively focus on males and were often conducted with selected samples: adolescents who live in high-risk neighborhoods, youth offenders or clinical samples (Gorman-Smith et al., 1996; Nagin and Tremblay, 1999). The present study extends previous work by examining delinquent and aggressive behaviors in a community sample, including adolescents of both genders.

Method

Sample and procedure

Three secondary schools in the Netherlands participated in the study, located in medium- to large-sized municipalities. After schools agreed to participate, passive informed consent was obtained from the parents. The letters, containing information about the date and nature of the study, were handed out to all 8th Grade adolescents to take home to their parents. Parents were given the opportunity to send the letter back, indicating that they refused to let their child participate in the study. Less than 1% of the adolescents in each of the target schools were not allowed to participate.

The schools were visited three times, with one-year intervals between visits. At Time 1 the sample consisted of 650 adolescents between 12 and 15 years old ($M = 13.36$; $SD = 0.55$ years). Adolescents completed a battery of questionnaires during regular school hours. At Time 2, the schools were visited again and questionnaires (and a postage paid reply envelope) were sent to the homes of the adolescents who had left school or could not be reached at school (due to sickness or truancy). Nonresponders were called at home to ask whether they could fill out the questionnaire and send it back. A total of 563 adolescents participated again at this measurement wave. The same procedure was repeated at Time 3 and 503 adolescents were able to fill out the questionnaires. A total of 474 adolescents provided data on all three measurement waves. Because various ages can have distinct age/crime curves that might get lost in the aggregate data (Lauritsen, 1998; Piquero et al., 2002) and because not all ages were equally represented in the sample, we excluded the 12- ($N = 5$) and 15-year-olds ($N = 12$) from the analyses, resulting in a more homogeneous sample of 457 13- and

Table 1 Intercorrelations, means, standard deviations, and alphas among problem behaviors, parental knowledge, and contact with peers at Time 1, Time 2 and Time 3

	1	2	3	4	5	6	7	8	9	10	11	12
1. Delinquent Behavior T1	–											
2. Delinquent Behavior T2	.51**	–										
3. Delinquent Behavior T3	.51**	.58**	–									
4. Aggressive Behavior T1	.58**	.40**	.43**	–								
5. Aggressive Behavior T2	.34**	.64**	.46**	.61**	–							
6. Aggressive Behavior T3	.32**	.38**	.64**	.56**	.64**	–						
7. Parental Knowledge T1	–.27**	–.23**	–.27**	–.18**	–.19**	–.22**	–					
8. Parental Knowledge T2	–.16**	–.32**	–.31**	–.14**	–.26**	–.27**	.62**	–				
9. Parental Knowledge T3	–.17**	–.23**	–.34**	–.14**	–.17**	–.26**	.58**	.69**	–			
10. Peer Contacts T1	.28**	.19**	.23**	.16**	.14**	.14**	–.16**	–.04	.02	–		
11. Peer Contacts T2	.22**	.21**	.28**	.08*	.08*	.13**	–.13**	–.11**	–.08	.67**	–	
12. Peer Contacts T3	.12**	.17**	.24**	.04	.10*	.14**	–.10*	–.10*	–.08	.56**	.72**	–
Mean	.33	.36	.39	.42	.39	.36	2.95	2.79	2.78	3.35	3.45	3.65
Standard Deviation	.23	.24	.26	.26	.25	.26	.57	.55	.61	.91	.90	.87
Alpha	.64	.69	.71	.82	.82	.84	.88	.88	.91	.60	.71	.71

* $p < .05$; ** $p < .01$.

14-year-old adolescents at Time 1 (M age = 13.27; $SD = 0.45$ years). Subsequent analyses are based on this subsample.¹ Because listwise- and pairwise deletion can result in biased parameter estimates due to nonrandom attrition (Arbuckle, 1996), missing data (less than 5%) of the 457 youth is imputed using the multiple imputation procedure in LISREL 8.54 (Jöreskog and Sörbom, 1993). This procedure uses iterations to impute missing values based on all available data. Schafer and Graham (2002) recommend this procedure as being a highly efficient way to use the available data under the assumption that data are missing at random.

The 193 adolescents that were lost to follow up (or excluded from the analyses) – in particular the adolescents who only participated once – were significantly more likely to be delinquent ($F = 8.787$; $p < .001$) and to perceive lower levels of parental knowledge ($F = 6.817$; $p < .01$) than the group of 457 adolescents that were retained in the present study. Attrition of problematic youth is also a pattern that is often found in other studies on problem behavior (e.g., Aseltine, 1995; Scaramella et al., 2002).

The subsample consisted of predominantly middleclass white (Dutch) adolescents and there were slightly more girls ($N = 232$) than boys ($N = 225$). In 74.6% of the cases (at Time 1), the adolescent was living with both parents, 11.6% with the mother alone, 1.8% with their father alone, 7.9% with the mother and partner, 0.7% with the father and partner, 2.2% half the time with their mother and half the time with their father, and 1.3% with someone other than their parents.

¹ We investigated whether the growth models differed for 13- and 14-year-olds. The findings indicated no significant differences between the two age groups for any of the variables in the study. Given the smaller age range in our sample of 457 adolescents, the rather small standard deviation (0.45), and the fact that no significant differences were found within the sample, we decided to study the sample as a whole.

Instruments

The internal consistencies (alphas), means, and standard deviations of all measures at each wave are presented in Table 1.

Problem behavior

The Youth Self-Report (YSR; Achenbach, 1991; Verhulst et al., 1997) was used to obtain adolescent reports on their own problem behavior. All items were rated on a 3-point Likert scale where 0 indicates responses of “not true”, 1 “somewhat or sometimes true”, and 2 “very true or often true”. Two scales will be used in the present manuscript, including Delinquent Behavior (11 items: e.g., “I steal from home”) and Aggressive Behavior (19 items: e.g., “I fight a lot”).

Parental knowledge

Parental knowledge was assessed with an instrument that has frequently been used in previous studies in the Netherlands (e.g., Gerris et al., 1993; Deković, 1999). The 6-item scale measures the extent to which parents know about the whereabouts and daily activities of the adolescent. The adolescents were asked to indicate on a 4-point Likert scale, ranging from ‘almost nothing’ (1) to ‘almost everything’ (4), how much their mother and father know about the adolescent’s whereabouts after school, leisure time, who the adolescent’s friends are, etc. Given the medium to high strength of associations between maternal and paternal scores ($r = .68$ at Time 1, $r = .57$ at Time 2, and $r = .60$ at Time 3) in the following analyses maternal and paternal scores were averaged to provide a parental score.

Peer contact

To measure the extent to which adolescents have contacts with their friends, the Degree of Peer Activity scale (Kandel and Davies, 1982) was used, consisting of 5 items. The adolescents were asked to indicate on a 6-point Likert scale, ranging from ‘never’ (1) to ‘every day’ (6), how often he/she sees friends outside school, has a date, goes to parties, sports with friends, and goes out with friends at night.

Plan of analyses

A Latent Growth Curve (LGC) modeling approach was used to examine inter- and intra-individual changes of problem behavior over time (Duncan et al., 1999) and to investigate direct and indirect effects of changes in parental knowledge over time on changes in adolescent problem behavior. The LISREL 8.54 program was used for estimation of the models (Jöreskog and Sörbom, 1993) with covariance matrices used as input and maximum likelihood estimation method.²

In the first step of data analysis, we examined growth models for each of the variables under study to identify the statistical model that best describes growth. A two-factor latent growth model was used. The first factor, the intercept, represents the mean initial level of individuals of the outcome variable at Time 1 (intercept mean) and individual differences in the initial level (intercept variance). Since the intercept is a constant for any given individual across time, factor loadings were set at 1 for each wave. The second factor, the slope, describes the individuals’ rate of change over time (slope mean) and differences between individuals in rate of change (slope variance). Slope parameters represent years 1, 2, and 3 respectively.

To test whether the data are best described by linear- or nonlinear growth, two models were tested. In the linear model, factor loadings for slope were fixed at values corresponding to a linear time scale (0, 1, and 2). In the nonlinear model, constraints on linear growth were relaxed. For identification of the model, at least two factor loadings on the slope

factor must be fixed to two different values (Meredith and Tisak, 1990). The first two factor loadings were fixed at 0 and 1, whereas the third factor loading was allowed to be freely estimated. The factor loadings plotted against the observed time metric suggest the shape of growth. In all models, the error terms were constrained to be equal for each wave of measurement.

It was further tested, using multigroup analyses, whether the selected growth models (linear or nonlinear) differed for boys and girls in the magnitudes of means, variances, and—in the case of nonlinear growth—factor loadings. First, all parameters were estimated separately within each group (unconstrained model). Then parameters were constrained to be identical for boys and girls (constrained model).

Model fit was evaluated using the chi-square likelihood ratio statistic. Since this statistic is strongly dependent on sample size and is influenced by the distribution of variables and by model size, other fit indices were also included to evaluate the fit of a model. Because the Root Mean Square Error of Approximation (RMSEA) is sensitive to overfit, that is, it begins to increase when too many paths have been included (Rigdon, 1996), we used the Standardized Root Mean Square Residual (SRMR: good model < .08) as recommended by Hu and Bentler (1999). We also included the Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI) (good model > .95) (Hu and Bentler, 1999).

In the second step of data analysis, the best-fitting models for each of the variables were used to test hypotheses about direct and indirect effects of parental knowledge on adolescent delinquent and aggressive behavior. Three latent growth curves (for problem behavior, parenting, and peer contacts) were included in one model. Level and change of parental knowledge was related to level and change of problem behavior directly as well as indirectly through level and change of peer contacts.

In the final step, multigroup analyses were performed. It was tested whether direct and indirect effects of parenting on delinquent and aggressive behavior differed for boys and girls. When gender differences were found, we subsequently compared individual path coefficients to pinpoint more precisely which parameters differed for boys and girls.

Results

Descriptive statistics

Intercorrelations among problem behaviors, parental knowledge, and peer contacts across the three measurement waves can be found in Table 1. Parental knowledge was negatively related to delinquent and aggressive behavior on all three waves, with somewhat stronger relations for delinquent than for aggressive behavior. These differences were not

² Although structural equation modeling has the advantage to model and remove measurement error in growth parameters, we decided to use scale scores instead of item-level data for the following reasons. The first-order latent growth models that we use in our study have also been used in a number of other studies to analyze change in for example substance use (Duncan and Duncan, 1994), deviant behavior (Willett and Sayer, 1994), and family functioning (Willett et al., 1991). A first-order growth model becomes a problem when variable X is a multiple measured variable (a composite of the same instrument administered to for example youth, parents, and teachers). Hancock et al. (2001) illustrate this in their article and show that a second-order factor structure than becomes more appropriate. A second reason is that our models with item-level data would lead to extremely complex models and the number of parameters estimated will exceed current recommendations for subject to parameter ratios.

Table 2 Fit indices for linear and nonlinear latent growth curve models of changes in problem behavior, parental knowledge, and peer contacts

	df	χ^2	<i>p</i>	SRMR	NNFI	CFI
<i>Individual growth models</i>						
Delinquent behavior— <i>Linear</i> ^a	3	0.361	.948	0.01	1.00	1.00
Delinquent behavior—Nonlinear	2	0.004	.998	0.00	1.00	1.00
Aggressive behavior— <i>Linear</i>	3	0.611	.894	0.01	1.00	1.00
Aggressive behavior—Nonlinear	2	0.492	.782	0.01	1.00	1.00
Knowledge— <i>Linear</i>	3	18.370	.000	0.03	0.97	0.97
Knowledge— <i>Nonlinear</i>	2	6.649	.036	0.04	0.98	0.99
Peer Contacts— <i>Linear</i>	3	13.243	.004	0.05	0.98	0.98
Peer Contacts—Nonlinear	2	13.105	.001	0.05	0.97	0.98
<i>Growth models of direct and indirect effects on problem behavior</i> ^b						
a. Delinquent behavior—Knowledge	29	64.139	.000	0.04	0.97	0.98
b. Aggressive behavior—Knowledge	29	57.606	.001	0.04	0.98	0.98

^aBest-fitting models are italicized.

^bThe models *a* and *b* correspond with the models *a* and *b* in Fig. 1.

significant however, as was tested with Fisher's Z. In contrast, contact with peers was positively related to both types of problem behavior, with somewhat stronger relations to delinquent behavior (significant differences for three out of nine correlations, tested with Fisher's Z). Correlations between parental knowledge and peer contacts were low or not significant. This seems to indicate that the amount of contact with peers does not mediate the relation between parenting and adolescent problem behavior. However, these correlations say little about the amount of change over time in the different variables and the effect that change of one variable has on change on the other variable. Also, the means in Table 1 were computed from observed scores and measurement error may obscure the nature of the true growth trajectory. Latent growth analysis models the true growth trajectory by separating observed scores into a component describing true growth and a component representing the stochastic effect of measurement error.

Growth models

The upper part of Table 2 presents the fit indices for linear and nonlinear growth models of problem behaviors, parental knowledge, and peer contacts. We also tested for gender differences in the selected growth models (not

in the table) but found that the models in which the means, variances, and path loadings were constrained to be equal for boys and girls did not significantly differ from the models where parameters were estimated freely. This means that the growth models were equal across gender.

For delinquent behavior, the linear growth model produced an adequate fit. The nonlinear model, in which the third factor loading on the slope factor was estimated freely, did not show a significantly better fit ($\Delta\chi^2 = 0.357$, $\Delta df = 1$, $p = 0.55$). This means that delinquent behavior increased over time (mean slope = 0.028; see also Table 3). Regarding aggressive behavior the nonlinear model also did not provide a better fit than the linear model ($\Delta\chi^2 = 0.119$, $\Delta df = 1$, $p = 0.73$). In contrast with delinquent behavior, aggressive behavior decreased over time (mean slope = -0.031). The covariance between the intercept and slope factors for both delinquent and aggressive behavior was not significant, indicating that adolescents who start at the higher end of delinquent/aggressive behavior do not increase/decrease more rapidly than adolescents starting at the lower end of delinquent/aggressive behavior. This means that the initial levels are not related to the rate of change over time.

The linear model for parental knowledge showed a significantly worse fit ($\Delta\chi^2 = 11.721$, $\Delta df = 1$, $p < .001$) than

Table 3 Parameter estimates for latent growth curve models of problem behavior, parental knowledge, and peer contacts

	Delinquency	Aggression	Knowledge	Peer Contacts
<i>Intercept: Mean</i>	0.331***	0.422***	2.933***	3.335***
Variance	0.026***	0.044***	0.223***	0.624***
<i>Slope: Mean</i>	0.028***	-0.031***	-0.127***	0.149***
Variance	0.001	0.004**	0.051**	0.063***
Covariance intercept—slope	-0.002	-0.003	-0.023	-0.073***

** $p < .01$; *** $p < .001$.

the nonlinear model. Overall, parental knowledge declined (mean slope = -0.127) from Time 1 to Time 2 and from then remained relatively stable (estimated factor loading of 1.23 compared to 2). The covariance between the intercept and slope factors was negative but not significant: adolescents who perceive higher initial levels of parental knowledge do not tend to perceive a slower decrease in parental knowledge over time.

Finally, contacts with peers followed a linear pattern. The nonlinear model was not significantly better than the linear model ($\Delta\chi^2 = 0.138$, $\Delta df = 1$, $p = .71$) and was therefore rejected. Contacts with peers increased over time (mean slope = 0.147). It was found that initial levels of contact with peers was related to the rate of change: adolescent with higher initial levels of contact with peers tend to have slower increases in contact with peers over time.

All parameter estimates for the best-fitting growth models of the different constructs are presented in Table 3. All intercept and slope variances were significant (except for the slope variance of delinquent behavior) which indicates that there were interindividual differences in initial status and in changes over time. This also provided justification for including predictor variables to explain this variation (Byrne and Crombie, 2003).

Predicting problem behavior

The best fitting models were used to examine direct and indirect effects of changes in parental knowledge on changes in problem behavior. Two models were tested (see Fig. 1): The model with direct and indirect effects (through peer contact) of parental knowledge was tested separately for delinquent (panel a) and aggressive (panel b) behavior. We started out with models in which all paths between intercepts and slopes were estimated. Intercept – Slope paths *between* the three individual growth models proved to be nonsignificant (for both delinquent and aggressive behavior) and therefore, for parsimony reasons, less complex models were analyzed (the covariances between the intercept and slope factors *within* individual growth models, however, were retained).^{3,4}

³ We investigated mediation effects by testing an unmediated model (a model with paths only from parental knowledge to problem behavior) and compared this model with a mediated model (where we also estimated paths from parental knowledge to peer contacts and from peer contacts to problem behavior). The mediated model provided a significantly better fit than the unmediated model (delinquent behavior: $\Delta\chi^2 = 60.87$, $\Delta df = 4$, $p < .001$; aggressive behavior: $\Delta\chi^2 = 26.67$, $\Delta df = 4$, $p < .001$). However, the path coefficients between parental knowledge and problem behavior remained approximately equal in both models.

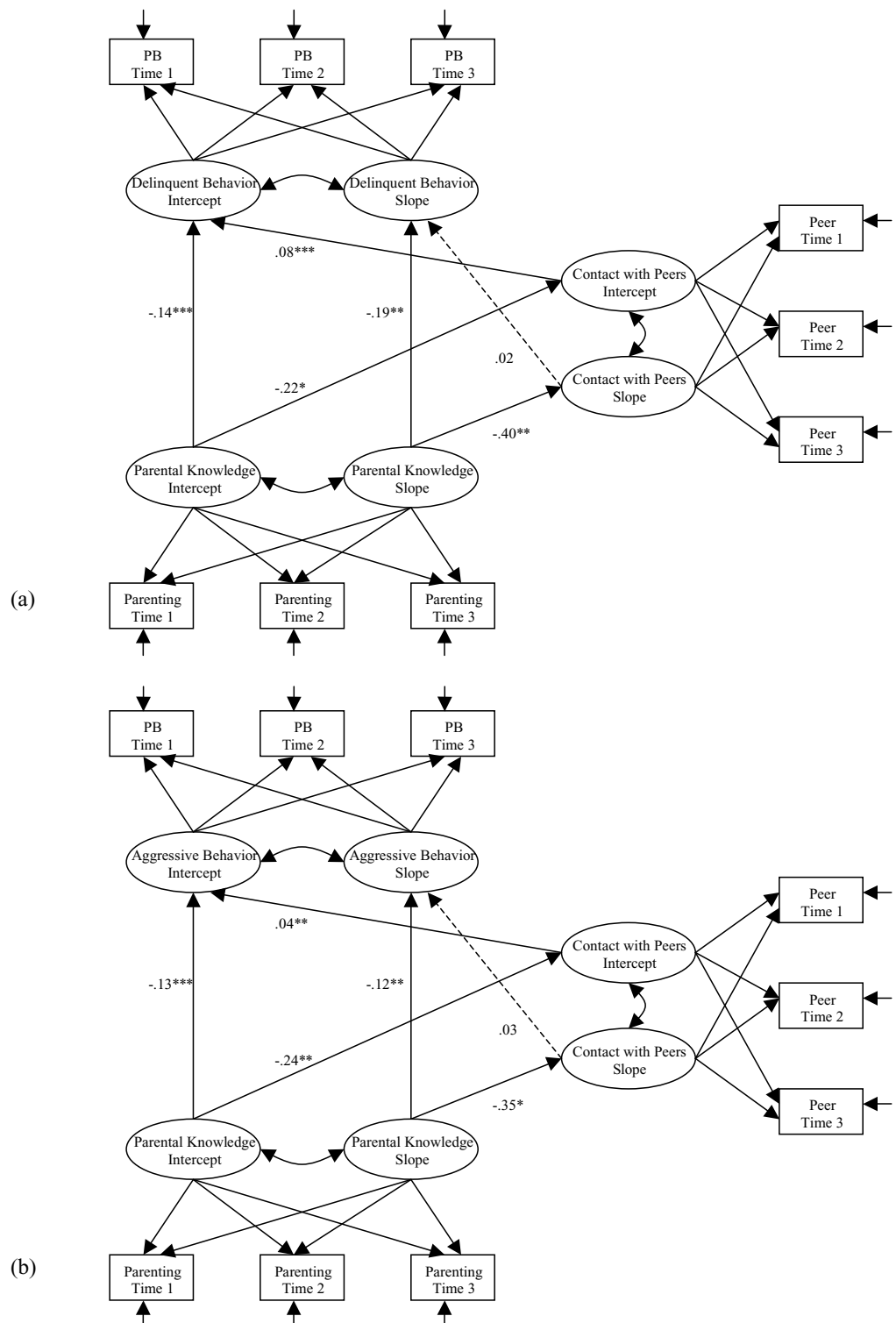
⁴ We also tested the possibility that parental knowledge mediates the relationship between peer contact and problem behavior. It appeared that

For both models, the fit was acceptable (see the lower part of Table 2 for fit indices). As can be seen in Fig. 1, the coefficients between the different intercepts in the two models (a and b) were all significant. This indicates that the initial status (Time 1) of parental knowledge has direct negative effects on both types of problem behaviors: the less parents are perceived to know about the adolescents' whereabouts, the more problem behavior adolescents show. Indirect effects regarding initial status were also significant. Low levels of perceived parental knowledge related to higher levels of peer contacts, which in turn were related to higher initial levels of problem behavior. Effects of initial levels of parental knowledge and peer contacts together accounted for 32% of the variance in initial level of delinquent behavior and accounted for somewhat less (12%) of the variance for aggressive behavior. This indicates that parental knowledge and peer contacts seem to be more important in predicting delinquent behavior than aggressive behavior, at least for initial levels.

The results regarding the effects for changes (slopes) in parenting and peer contacts over time on adolescent problem behavior showed a direct effect of changes in parental knowledge on changes in problem behavior over time. Decreasing levels of parental knowledge relate to increasing levels of delinquent behavior and decreasing levels of aggressive behavior. In contrast to findings for initial levels of behaviors, indirect effects were absent. Although decreasing levels of parental knowledge affect increasing levels of contact with peers, no relations were found between changes in contact with peers and changes in delinquent or aggressive behavior. The proportion of explained variance for delinquent behavior (slope factor) was 56% and the proportion explained variance for aggressive behavior (slope factor) was 24%. These proportions of explained variance of the slope factors seemed to be somewhat larger compared to the intercept factors. Again, changes in parental knowledge and peer contacts seem to be more strongly related to changes in delinquent behavior than to changes in aggressive behavior.

the fit indices of both models (the model where peer contact mediates the relationship between parental knowledge and problem behavior and the model where parental knowledge mediates the relationship between peer contact and problem behavior) were approximately the same. Path coefficients were also identical, except for the path between parental knowledge and contact with peers. The model in which peer contact mediated the relation between parental knowledge and problem behavior showed higher path coefficients ($-.22$ for delinquent behavior and $-.24$ for aggressive behavior) than the model in which parental knowledge mediated the relation between peer contacts and problem behavior ($-.10$ for both delinquent and aggressive behavior), suggesting higher effects of parental knowledge on peer contacts than vice versa.

Fig. 1 Latent growth curve models of direct and indirect (via Peer contacts) effects of changes in parental knowledge on changes in adolescent problem behavior (PB). (a) Effects of parental knowledge and peer contacts on adolescent delinquent behavior; and (b) effects of parental knowledge and peer contacts on adolescent aggressive behavior. * $p < .05$; ** $p < .01$; *** $p < .001$



Multigroup analyses: Boys versus girls

The models that were tested so far included a sample of both boys and girls. To test for gender differences in magnitudes of the path coefficients between the intercepts and slopes we conducted multigroup analyses. First, the

path coefficients between the intercepts and slopes (β) were estimated separately within each group (unconstrained model). Then these path coefficients were set equal for both genders (constrained model).

Differences between boys and girls were found in both models. For delinquent behavior, the constrained model

(χ^2 (80) = 160.58, $p < .000$; SRMR = .06; NNFI = .96; CFI = .96 differed significantly ($\Delta\chi^2 = 25.69$, $\Delta df = 6$, $p < .001$) from the unconstrained model (χ^2 (74) = 134.89, $p < .000$; SRMR = .05; NNFI = .97; CFI = .97). The same holds for aggressive behavior: the constrained model (χ^2 (80) = 149.60, $p < .000$; SRMR = .06; NNFI = .97; CFI = .96) and the unconstrained model (χ^2 (74) = 121.17, $p < .000$; SRMR = .06; NNFI = .98; CFI = .97) were significantly different ($\Delta\chi^2 = 28.43$, $\Delta df = 6$, $p < .001$), indicating gender differences. To check more precisely which of the path coefficients were significantly different for boys and girls, path coefficients were released one by one and the subsequent models were compared with the constrained model. In both models for delinquent and aggressive behavior it appeared that changes in parental knowledge were related to increasing levels of contact with peers for boys (del. behavior: $-.84$; $p < .001$; agg. behavior: $-.76$; $p < .001$) but not for girls (del. behavior: $-.09$; $p > .05$; agg. behavior: $-.08$; $p > .05$). These models, in which path coefficients between the slope of parental knowledge and the slope of contact with peers were estimated freely, differed significantly from the constrained model where these path coefficients were constrained to be equal (del. behavior: $\Delta\chi^2 = 15.456$, $\Delta df = 1$, $p < .001$; agg. behavior: $\Delta\chi^2 = 17.661$, $\Delta df = 1$, $p < .001$). Furthermore, the initial level of contact with peers was related to the initial level of aggressive behavior for girls (.06; $p < .01$) but not for boys (.03; $p > .05$): higher levels of contact with peers were associated with higher levels of aggressive behavior for girls ($\Delta\chi^2 = 9.615$, $\Delta df = 1$, $p < .005$).

Discussion

The present study investigated the direct and indirect effects (through peer contacts) of parental knowledge on adolescents' delinquent and aggressive problem behavior. We used a latent growth curve modeling approach and findings showed direct as well as indirect effects for both types of problem behaviors. Notable differences were found when initial levels of behaviors versus changes in behaviors were considered, which will now be discussed.

Looking at the results concerning the *initial level* of behaviors it appeared that parental knowledge showed a direct negative effect on delinquent and aggressive behavior, consistent with the existing literature: the less parents know about the whereabouts of the adolescent, the more problem behavior the adolescent shows (Fletcher et al., 1995; Jacobson and Crockett, 2000). These findings also seem to provide some support for the social control theory of Hirschi (1969): low social bonds with parents leads to more problem behavior. In addition, linkages between the parent and peer context were demonstrated, indicating combined effects of parental

knowledge and peer contacts on problem behavior. These interrelated effects were already described by the coercion theory of Patterson (1982) and previous research findings have also shown these effects: adolescents from families with negative parent-adolescent relationships tend to associate with deviant peers, which in turn predicts increases in problem behavior (Deković et al., 2004; Goldstein et al., 2005; Weaver and Prelow, 2005; Werner and Silbereisen, 2002). This provides some support for the possibility that low quality of the parent-child relationship may lead adolescents to invest more time and effort in their peer relationships and may make them more susceptible to the influence of peers (e.g., Engels et al., 2002; Svensson, 2003). This, in consequence, may lead to more participation in different forms of externalizing behaviors.

When *changes* of behaviors over time were considered, we found the following results. First, it appeared that delinquent behavior increased over time, whereas aggressive behavior decreased over time. Previous studies also showed declining trajectories of aggression over time (Bongers et al., 2003; Loeber et al., 1991). Regarding delinquent behavior, several studies have found that this behavior increases over time or remains stable, depending on the age group studied (Bonger et al., 2003; Loeber et al., 1993; Stanger et al., 1997). It seems that during the period of early to mid-adolescence, delinquent behavior increases over time (Stanger et al., 1997), so the findings of the present study follow the expected direction.

Second, whereas direct effects of parental knowledge were found for both delinquent and aggressive behavior, it seems that decreases in perceived parental knowledge over time lead to increasing levels of self reported delinquent behavior, but to decreasing levels of self-reported aggressive behavior. Apparently, parental knowledge has more negative consequences for delinquency than for aggressiveness over time. Previous studies have also shown that parental knowledge relates to higher levels of delinquent behavior, antisocial behavior, and drug use (e.g., Laird et al., 2003; Stattin and Kerr, 2000). Less is known, however, about the relation between parental knowledge and aggressive behavior. The findings of our study suggest that decreasing levels of parental knowledge relate to a slower decrease of aggression which thus seems to indicate that low levels of parental knowledge counteracts the normal decline of aggressiveness that has previously been found (Bongers et al., 2003; Loeber et al., 1991). It seems important for future studies to examine this relation in more detail.

Third, although indirect effects were found for both types of problem behavior at the intercept level, these effects were absent when changes in behaviors over time were considered. Strong effects were found, however, for the relationship between parental knowledge and peer contacts. Thus, while

decreasing levels of parental knowledge were important for the level of contact with peers over time, increasing levels of contact with peers was not an important factor for changes in problem behavior. It might be that mere exposure to peers is an important factor for the development of problem behavior in early adolescence, but when adolescents grow older, other factors within the peer relationship become more important, like the quality of relation (Berndt, 2002) or group identification (Kiesner et al., 2002). It is shown for example that when identification with a group is strong, the group has a stronger influence on the individual (Kiesner et al., 2002). Another explanation for the absence of peer effects might be that it is unclear whether peers socialize a youth to develop problem behavior or whether a youth with a predisposition to problem behavior seeks out more deviant friends (Ennett and Bauman, 1994). This issue of selection versus socialization effects is important to consider in future studies on peer effects. In conclusion, while the indirect effects at the intercept level were in concordance with our postulated hypothesis and the existing literature, when changes over time were considered the findings were contrary to our expectations regarding peer effects.

In general, findings seem to imply that parental knowledge and—to a lesser extent—contact with peers emerge as stronger predictors for delinquent behavior than for aggressive behavior. The fact that the percentages explained variance at both the intercept and slope level were higher for delinquent behavior than for aggressive behavior corroborates this implication. A possible explanation is that aggressive behavior might be more strongly influenced by genetic and biological factors, whereas delinquent behavior is more related to parent-child relationships and peer factors (Lahey et al., 1999; Loeber et al., 2000). A recent study for example shows that peer deviance is more tightly linked to delinquent behavior than to aggressive behavior (Barnow et al., 2005). When delinquent behaviors are regarded as positive in the group, processes like group pressure and peer modeling might explain the increases of delinquent problem behavior in the individual group member. More studies are needed to further investigate the different correlates of delinquent and aggressive problem behavior.

Finally, it turned out that decreasing levels of parental knowledge were related to increasing levels of contact with peers for boys but not for girls. This finding can partially be explained by the fact that parental knowledge is generally greater for girls than for boys (Pettit et al., 2001; Smetana and Daddis, 2002). Girls are often closer and more intimate with their parents and appear more likely to share information about their whereabouts and daily activities voluntarily than do boys (Field et al., 1995; Waizenhofer et al., 2004). A second explanation might be that boys' friendships are more often embedded within a larger group context, whereas girls' friendships occur in isolation (e.g., Benenson and Christakos,

2003). Boys may therefore be more easily exposed to contact with peers than girls, especially when parental knowledge of their whereabouts is low or decreasing. Another gender difference was, but only for initial levels of behavior, that contact with peers related to higher levels of aggressive behavior for girls but not for boys. Girls generally experience higher levels of intimacy and emotional closeness with peers than boys (Johnson, 2004; Moffitt et al., 2001). This generally leads to more openness in their feelings towards their friends and it might be, in consequence, that they also show more (relational) aggression.

There are some limitations worth noticing. A first limitation is that all measures of the present study are derived from adolescents' self-reports, which might lead to shared method variance bias. However, there are several strong arguments for using self-reports. Since parental knowledge of adolescents' whereabouts and activities primarily depends on the information the adolescent discloses towards parents, the adolescent is a most valid source of information on the level of knowledge their parents have. Studies have further demonstrated that measures based on adolescent reports concerning how they perceive their parents' behavior are not inherently less valuable than more objective measures (Steinberg et al., 1994; Chen et al., 1998). The level of contact with peers is difficult to determine without asking the adolescent him/herself, since most contact with peers usually happens outside of direct adult supervision (Laird et al., 1999). Regarding self-reports of problem behavior, it has been shown that adolescents report more externalizing problem behavior about themselves than their parents or teachers about them (Verhulst and van der Ende, 1992; Youngstrom et al., 2000).

A second limitation considers the attrition group. This group scored higher on delinquent behavior and perceived lower levels of parental knowledge than the group of adolescents on which the analyses were based. Attrition of problematic youth has also been a problem in other research: 'dropouts' scored lower on nurturant and involved parenting (Scaramella et al., 2002) and higher on externalizing problem behavior (Aseltine, 1995). Thus, the most seriously troubled youth are underrepresented in the analyses, which might have resulted in weaker associations due to less variance and in decreasing the generalizability of the findings.

A third limitations concerns the fact that only three data points were available. Although we tested the possibility of nonlinearity by freeing the final data point, a quadratic trajectory could not be tested (minimum of four data points). Also, because we found nonlinear growth for parental knowledge, interpretations regarding changes in parental knowledge on changes in the other variables has limitations: relations between trajectories only apply to the linear part of the model. As a consequence, findings regarding these

relationships should be read with caution. A final limitation concerns the sample that was studied, which consisted of predominantly middleclass white (Dutch) adolescents. Findings of the present study can therefore not be generalized to other social classes or ethnic groups. Future research is needed to conduct similar studies in different populations of youths.

Despite these limitations, the present study extends previous studies not only by including direct and indirect effects of parental knowledge on adolescent problem behavior but also by including *changes* in these behaviors and how these changes relate to each other. Using a latent growth modeling approach, trajectories were studied that shed more light on the linkages between different contexts and behaviors over time. Furthermore, findings suggest that it is important to treat different forms of externalizing problem behavior as separate constructs, since they have different trajectories and relationships, particularly with parenting. In addition, our findings elaborate on previous studies that primarily focused on males in high-risk samples since the focus of the present study was on both genders from a community sample. Overall, the results of the present study provide new insights with respect to the existing literature and suggest new ways of looking at relations between parents, peers, and problem behavior.

References

- Achenbach TM (1991) Manual for the Youth Self-Report and 1991 Profile. Burlington, University of Vermont, Department of Psychiatry
- Arbuckle JL (1996) Full information in the presence of incomplete data. In: Marcoulides GA, Schumacker RE (eds) *Advanced structural equation modeling: Issues and techniques*. Erlbaum, Mahwah, NJ, pp 243–277
- Aseltine RH (1995) A reconsideration of parental and peer influences on adolescent deviance. *J Health Soc Behav* 36:103–121
- Barnow S, Lucht M, Freyberger HJ (2005) Correlates of aggressive and delinquent conduct problems in adolescence. *Aggressive Behav* 31:24–39
- Benenson JF, Christakos A (2003) The greater fragility of females' versus males' closest same-sex friendships. *Child Dev* 74:1123–1129
- Berndt TJ (2002) Friendship quality and social development. *Curr Dir Psychol Sci* 11:7–10
- Berndt TJ, Keefe K (1995) Friends' influence on adolescents' adjustment to school. *Child Dev* 66:1312–1329
- Bongers IL, Koot HM, van der Ende J, Verhulst FC (2003) The normative development of child and adolescent problem behavior. *J Abnorm Psychol* 112:179–192
- Bray JH, Adams GJ, Getz JG, McQueen A (2003) Individuation, peers, and adolescent alcohol use: A latent growth analysis. *J Consult Clin Psychol* 71:553–564
- Brendgen M, Vitaro F, Bukowski WM (2000) Deviant friends and early adolescents' emotional and behavioral adjustments. *J Res Adolesc* 10:173–189
- Byrne BM, Crombie G (2003) Modeling and testing change: An introduction to the latent growth curve model. *Understanding Stat* 2:177–203
- Chen C, Greenberger E, Lester J, Dong Q, Guo MS (1998) A cross-cultural study of family and peer correlates of adolescent misconduct. *Dev Psychol* 34:770–781
- Deković M (1999) Risk and protective factors in the development of problem behavior during adolescence. *J Youth Adolesc* 28:667–685
- Deković M, Janssens JMAM, As van NMC (2003) Family predictors of antisocial behavior in adolescence. *Fam Process* 42:223–235
- Deković M, Wissink IB, Meijer AM (2004) The role of family and peer relations in adolescent antisocial behaviour: Comparison of four ethnic groups. *J Adolesc* 27:497–514
- Dishion TJ, Andrews DW, Crosby L (1995) Antisocial boys and their friends in early adolescence: Relationship characteristics, quality, and interactional process. *Child Dev* 66:139–151
- Dishion TJ, McMahon RJ (1998) Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation. *Clin Child Fam Psychol Rev* 1:61–75
- Dishion TJ, Nelson SE, Bullock BM (2004) Premature adolescent autonomy: Parent disengagement and deviant peer process in the amplification of problem behaviour. *J Adolesc* 27:515–530
- Duncan SC, Duncan TE (1994) Modeling incomplete longitudinal substance use data using latent variable growth curve methodology. *Multivariate Behav Res* 29:313–338
- Duncan TE, Duncan SC, Strycker LA, Li F, Alpert A (1999) An introduction to latent variable growth curve modeling: Concepts, issues and applications. Erlbaum, Mahwah, NJ
- Engels RCME, Deković M, Meeus W (2002) Parenting practices, social skills and peer relationships in adolescence. *Soc Behav Pers* 30:3–18
- Ennett ST, Bauman KE (1994) The contribution of influence and selection to adolescent peer group homogeneity: The case of adolescent cigarette smoking. *J Pers Soc Psychol* 67:653–663
- Field T, Lang C, Yando R, Bendell C (1995) Adolescents' intimacy with parents and friends. *Adoles* 30:133–140
- Fletcher AC, Darling N, Steinberg L (1995) Parental monitoring and peer influences on adolescent substance use. In: McCord J (ed) *Coercion and punishment in long-term perspectives*. Cambridge University Press, Cambridge, MA, pp 259–271
- Frick PJ, Lahey BB, Loeber R, Tannenbaum LE, van Horn Y, Christ MAG, Hart EA, Hanson K (1993) Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clin Psychol Rev* 13:319–340
- Gerris JRM, Boxtel DAAM, Vermulst AA, Janssens JMAM, Zuthpen RAH van, Felling AJA (1993) *Parenting in Dutch families*. University of Nijmegen, Institute of Family Studies, Nijmegen, The Netherlands
- Goldstein SE, Davis-Kean PE, Eccles JS (2005) Parents, peers, and problem behavior: A longitudinal investigation of the impact of relationship perceptions and characteristics on the development of adolescent problem behavior. *Dev Psychol* 41:401–413
- Gorman Smith D, Tolan PH, Zelli A, Huesmann LR (1996) The relation of family functioning to violence among inner-city minority youths. *J Fam Psychol* 10:115–129
- Hancock GR, Kuo WL, Lawrence FR (2001) An illustration of second-order latent growth models. *Struct Equat Model* 8:470–489
- Hirschi T (1969) *Causes of delinquency*. University of California Press, Berkeley
- Hu L, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equat Model* 6:1–55
- Jacobson KC, Crockett LJ (2000) Parental monitoring and adolescent adjustment: An ecological perspective. *J Res Adolesc* 10:65–97

- Johnson HD (2004) Gender, grade and relationship differences in emotional closeness within adolescent friendships. *Adolescence* 39:243–255
- Jöreskog KG, Sörbom D (1993) LISREL 8: User's guide. Scientific Software, Chicago
- Kandel D, Davies M (1982) Epidemiology of depressive mood in adolescents. *Arch Gen Psychiatry* 39:1205–1212
- Kerr M, Stattin H (2000) What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Dev Psychol* 36:366–380
- Kiesner J, Cadinu M, Poulin F, Bucci M (2002) Group identification in early adolescence: Its relation with peer adjustment and its moderator effect on peer influence. *Child Dev* 73:196–208
- L'Abate L (1998) Discovery of the family: From the inside to the outside. *Am J Fam Ther* 26:265–280
- Lahey BB, Waldman ID, McBurnett K (1999) The development of antisocial behavior: An integrative causal model. *J Child Psychol Psychiatry* 40:669–682
- Laird RD, Pettit GS, Bates JE, Dodge KA (2003) Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: Evidence of correlated developmental changes and reciprocal influences. *Child Dev* 74:752–768
- Laird RD, Pettit GS, Dodge KA, Bates JE (1999) Best friendships, group relationships, and antisocial behavior in early adolescence. *J Early Adolesc* 19:413–437
- Lauritsen JL (1998) The age-crime debate: Assessing the limits of longitudinal self-report data. *Soc Forces* 77:127–155
- Loeber R, Green SM, Lahey BB, Frick PJ, McBurnett K (2000) Findings on disruptive behavior disorders from the first decade of the Developmental Trends Study. *Clin Child Fam Psychol Rev* 3:37–60
- Loeber R, Lahey B, Thomas C (1991) Diagnostic conundrum of oppositional defiant disorder and conduct disorder. *J Abnorm Psychol* 100:379–390
- Loeber R, Wung P, Keenan K, Giroux B, Stouthamer-Loeber M, van Kammen WB, Maughan R (1993) Developmental pathways in disruptive child behavior. *Dev Psychopathol* 5:103–133
- Meredith W, Tisak J (1990) Latent curve analysis. *Psychometrika* 55:107–122
- Moffitt TE, Caspi A, Rutter M, Silva PA (2001) Sex differences in antisocial behaviour. *Conduct disorder, delinquency, and violence in the Dunedin longitudinal study*. University Press, Cambridge
- Nagin D, Tremblay RE (1999) Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child Dev* 70:1181–1196
- O'Donnell J, Hawkins JD, Abbott RD (1995) Predicting serious delinquency and substance use among aggressive boys. *J Consult Clin Psychol* 63:529–537
- Patterson GR (1982) *Coercive family process*. Castalia, Eugene, Oreg
- Patterson GR, Reid J, Dishion TJ (1992) *Antisocial boys*. Castalia, Eugene, OR
- Pettit GS, Laird RD, Dodge KA, Bates JE, Criss MM (2001) Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. *Child Dev* 72:583–598
- Piquero AR, Macintosh R, Hickman M (2002) The validity of a self-reported delinquency scale. Comparisons across gender, age, race, and place of residence. *Sociol Methods Res* 30:492–529
- Prinzle P, Onghena P, Hellinckx W (in press) A cohort-sequential multivariate latent growth curve analysis of normative CBCL aggressive and delinquent problem behavior: Associations with harsh discipline and gender. *Int J Behav Dev*
- Prinzle P, Onghena P, Hellinckx W, Grietens H, Ghesquière P, Colpin H (2003) The additive and interactive effects of parenting and children's personality on externalizing behaviour. *Eur J Pers* 17:95–117
- Rigdon EE (1996) CFI versus RMSEA: A comparison of two fit indexes for structural equation modeling. *Struct Equat Model* 3:369–379
- Scaramella LV, Conger RD, Spoth R, Simons RL (2002) Evaluation of a social contextual model of delinquency: A cross-study replication. *Child Dev* 73(1):175–195
- Schafer JL, Graham JW (2002) Missing data: Our view of the state of the art. *Psychol Methods* 7:147–177
- Simons RL, Chao W, Conger RD, Elder GH (2001) Quality of parenting as mediator of the effect of childhood defiance on adolescent friendship choices and delinquency: A growth curve analysis. *J Marriage Fam* 63:63–79
- Smetana JG, Daddis C (2002) Domain-specific antecedents of parental psychological control and monitoring: The role of parenting beliefs and practices. *Child Dev* 73:563–580
- Stanger C, Achenbach TM, Verhulst FC (1997) Accelerated longitudinal comparisons of aggressive versus delinquent syndromes. *Dev Psychopathol* 9:43–58
- Stattin H, Kerr M (2000) Parental monitoring: A reinterpretation. *Child Dev* 71:1072–1085
- Steinberg L, Lamborn SD, Darling N, Mounts NS, Dornbusch SM (1994) Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Dev* 65:754–770
- Stouthamer-Loeber M, Loeber R, Wei E, Farrington DP, Wikstrom POH (2002) Risk and promotive effects in the explanation of persistent serious delinquency in boys. *J Consult Clin Psychol* 70:111–123
- Svensson R (2003) Gender differences in adolescent drug use. The impact of parental monitoring and peer deviance. *Youth Soc* 34:300–329
- Urberg KA, Luo Q, Pilgrim C, Degirmencioglu SM (2003) A two-stage model of peer influence in adolescent substance use: Individual and relationship-specific differences in susceptibility to influence. *Addict Behav* 28:1243–1256
- Van Lier PAC, Vitaro F, Wanner B, Vuijk P, Crijnen AAM (2005) Gender differences in developmental links among antisocial behavior, friends' antisocial behavior, and peer rejection in childhood: Results from two cultures. *Child Dev* 76:841–855
- Verhulst FC, van der Ende J (1992) Agreement between parents' and adolescents' self-reports of problem behavior. *J Child Psychol Psychiatry* 33:1011–1023
- Verhulst FC, Van Der Ende J, Koot HM (1997) Handleiding voor de Youth Self-Report (YSR) [Manual for the Youth Self-Report (YSR): Dutch version] Rotterdam: Afdeling Kinder- en jeugdpsychiatrie, Academisch Ziekenhuis/Erasmus Universiteit
- Waizenhofer RN, Buchanan CN, Jackson-Newsom J (2004) Mothers' and Fathers' Knowledge of Adolescents' Daily Activities: Its Sources and Its Links With Adolescent Adjustment. *J Fam Psychol* 18:348–360
- Weaver SR, Prellow HM (2005) A mediated-moderation model of maternal parenting style, association with deviant peers, and problem behaviors in urban African American and European American adolescents. *J Child Fam Stud* 13:343–356
- Werner NE, Silbereisen RK (2003) Family relationship quality and contact with deviant peers as predictors of adolescent problem behaviors: The moderating role of gender. *J Adolesc Res* 18:454–480
- Willett JB, Sayer AG (1994) Using covariance structure analysis to detect correlates and predictors of individual change over time. *Psychol Bull* 116:363–381
- Willett JB, Ayoub CC, Robinson D (1991) Using growth modeling to examine systematic differences in growth: An example of change in the functioning of families at risk of maladaptive parenting, child abuse, or neglect. *J Consult Clin Psychol* 59:38–47
- Youngstrom E, Loeber R, Stouthamer-Loeber M (2000) Patterns and correlates of agreement between parent, teacher, and male adolescent ratings of externalizing and internalizing problems. *J Consult Clin Psychol* 68:1038–1050