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Aspects of the Parent–Adolescent Relationship and Associations With Adolescent Risk Behaviors Over Time

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Parents' actions and knowledge of adolescents' whereabouts play key roles in preventing risk behaviors in early adolescence, but what enables parents to know about their adolescents' activities and what links there are to adolescent risk behaviors, such as substance use and delinquent behavior, remain unclear. In this study, we investigated whether different aspects of the parent–adolescent relationship predict parental knowledge, and we examined the direct and indirect longitudinal associations between these aspects of the parent–adolescent relationship and adolescents' self-reported delinquent behavior and substance use. The participants were 550 parents and their adolescent children from two small and two mid-sized municipalities in Sweden. Parental data were collected when the adolescents were 13 years old (mean), and adolescent data on risk behaviors were collected on two occasions, when they were 13 and 14 years of age (mean). Structural path analyses revealed that adolescent disclosure, parental solicitation, and parental control predicted parental knowledge, with adolescent disclosure being the strongest source of parental knowledge and the strongest negative predictor of adolescent risk behaviors. Parenting competence and adolescents' connectedness to parents were indirectly, through adolescent disclosure and parental solicitation and parental control, associated with substance use and delinquent behavior. Some paths differed for boys and girls. In conclusion, confident parenting and a close parent–adolescent relationship in which adolescent disclosure is promoted, seem protective of adolescent engagement in risk behaviors.

Keywords: parent–adolescent relationships, parental knowledge, adolescent disclosure, parenting competence, risk behaviors

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Among parents' most fundamental responsibilities is to protect their children against being harmed or harming others. During adolescence, when young people spend time unsupervised, this has to be achieved through indirect means rather than via direct supervision. In early adolescence, there is an increase in risk behaviors such as delinquent behavior and substance use (Steinberg,

2007). While adolescents do not necessarily perceive such behaviors as harmful, the engagement in risk behaviors may potentially harm both themselves and others (Jessor, 1991). Consequently, building knowledge of what parents can do to help their early adolescent children steer clear of engagement in risk behaviors is an important task for developmental researchers, and a central aspect of parenting adolescents (Stattin & Kerr, 2000).

Parental knowledge of adolescents' activities seems protective against various risk behaviors (Abar, Jackson, & Wood, 2014; Kapetanovic, Bohlin, Skoog, & Gerdner, 2017; Laird, Pettit, Dodge, & Bates, 2003; Racz & McMahon, 2011), and presumably works by enabling parents to implement adequate parenting practices. But what are the main sources of parental knowledge and what aspects of the parent–adolescent relationship may enable parents to obtain parental knowledge? In the current study, we investigated whether parents gain knowledge through their active efforts, namely parental solicitation and control, or through adolescent-driven effort, thus adolescents' voluntary disclosure. We also test whether parents' confidence in their parenting, and adolescents' emotional connectedness to parents are psychosocial correlates of parental knowledge. We assume that parenting con-

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fidence and adolescents' connectedness to parents are associated aspects of the parent–adolescent relationship that precede adolescent disclosure and parental solicitation and control, which in turn precede parental knowledge. In addition, we also test whether these family processes directly and indirectly predict adolescent engagement in risk behaviors over time.

Potential Sources of Parental Knowledge

Parents can obtain knowledge of their adolescent's whereabouts through parent-driven sources of parental knowledge, namely parental solicitation (i.e., actively asking the adolescent and his or her friends for information) and parental control (i.e., setting behavioral rules; Laird, Marrero, & Sentse, 2010) and adolescents' voluntary self-disclosure. The latter seems to be the most important source of parental knowledge (Keijsers, Branje, VanderValk, & Meeus, 2010; Kerr & Stattin, 2000; Kerr, Stattin, & Burk, 2010; Racz & McMahon, 2011). Although parents show interest in their adolescents by soliciting information from them (Keijsers et al., 2010; Laird et al., 2010), parental information-seeking may be perceived as intrusive by adolescents (Tilton-Weaver & Galambos, 2003). When parents are responsive to conversations induced by their adolescents, they are able to give advice without being intrusive. In other words, it is likely that parents' responsiveness to adolescents' voluntary disclosure, more than parents' own active soliciting efforts, has a protective function for adolescent engagement in risk behaviors.

What, then, makes adolescents willing to spontaneously share information about their lives with their parents? Open parent–child communication may be a function of the quality of the parent–child relationship, where adolescents' connectedness to their parents helps adolescents to share information (Kerns, Aspelmeier, Gentzler, & Grabill, 2001; Tilton-Weaver, 2014) and thus expands what parents know about their adolescents' activities away from home. According to Laird et al. (2003), it is easier for adolescents to bond and communicate with parents when they feel emotionally close to them. That, in turn, provides opportunities for parents to acquire information about their adolescent children's activities and protect them from harm (Crouter, Bumpus, Davis, & McHale, 2005).

Another central factor influencing how parents obtain information about their adolescent's activities is parents' beliefs in their competence to cope with parenting tasks efficiently (Coleman & Karraker, 1998). Parenting confidence refers to competence in the parenting role in general or in particular domains of parenting, such as discipline or promotion of learning (see Jones & Prinz, 2005 for a review). When parents believe that they can make a difference to their adolescents' lives, they may be more likely to make efforts to gain information about their adolescents' whereabouts. Accordingly, parents' competence is associated both with perceived parent–adolescent connectedness (Coleman & Karraker, 1998) and with constructive use of parenting practices (Bogenschneider, Small, & Tsay, 1997), such as proactive encouragement and control (Glatz & Buchanan, 2015; Izzo, Weiss, Shanahan, & Rodriguez-Brown, 2000). Low parenting competence is associated with higher levels of adolescent substance use and delinquent behavior (Jones & Prinz, 2005). Consequently, parents' beliefs about their parenting ability relate to parenting practices and in turn to adolescent behavior.

So, how are these aspects of the parent–adolescent relationship related? When parents perceive themselves as having close relationships with their adolescents, they are also likely to trust in their parenting skills, and this is a possible reason why the constructs of parenting competence and adolescents' connectedness to parents are interrelated (Coleman & Karraker, 1998). Furthermore, when parent–adolescent relationships are strong, adolescents may share information with their parents, which is protective against adolescent engagement in risk behavior (Kerr, Stattin, & Burk, 2010). When parents know what their adolescents are doing away from home, they may use that information to steer their adolescents away from harmful activities, such as substance use. Glatz and Buchanan (2015) revealed that the link between parenting competence and adolescent engagement in risk behaviors is mediated by parent–child communication, parental knowledge, and parental involvement. Also, sources of parental knowledge may be directly linked to adolescent behavior. For example, Kapetanovic et al. (2017) showed that while adolescent disclosure is directly and negatively related to adolescent substance use and delinquent behavior, parents' active efforts do not have the same protective function against such behaviors. In order to understand how aspects of the parent–adolescent relationship are related to adolescent risk behavior, the links among parenting competence, parent–adolescent connectedness, and parental knowledge and sources thereof, and their associations with adolescent risk behaviors need to be investigated.

Adolescent Gender and Links Between Parenting and Adolescent Risk Behavior

In this study, we test gender as a moderator of the links between aspects of the parent–adolescent relationship and adolescent risk behaviors. Although gender differences regarding adolescent alcohol and drug use seem to be diminishing (Gripe, 2015) boys are likely to engage in most forms of risk behaviors to a greater extent than girls (Moffitt & Caspi, 2001). Adolescent engagement in risk behaviors may in part be related to boys' and girls' relationships with their parents. For example, Fontaine, Carbonneau, Vitaro, Barker, and Tremblay (2009) suggest that girls are taught from an early age to conform to parental expectations, which in turn is related to lower engagement in risk behaviors in girls than in boys. In addition, girls seem to be more emotionally connected to their parents than boys (Geuzaine, Debry, & Liesens, 2000). Girls also share more information with parents and are more closely monitored by their parents than boys, which appears to have a protective function for the former (Kerr & Stattin, 2000). But then again, has the role of aspects of the parent–adolescent relationship on adolescent risk behavior changed, as with the declining gender gap for substance use? It is possible that the role played by various aspects of the parent–adolescent relationship and their links to adolescent risk behaviors may be moderated by genders, and such moderation may differ between risk behaviors and over time.

Central Gaps of Knowledge in the Literature

In conclusion, there is a substantial body of literature on aspects of the parent–child relationship and communication on the one hand, and risk behavior on the other hand during early adolescence, but there are still some important gaps of knowledge. First,

whereas the literature is consistent regarding adolescent disclosure being the strongest source of parental knowledge, the link between parents' soliciting and controlling efforts and parental knowledge is still unclear (Kerr et al., 2010; Laird et al., 2010). Second, studies on how parenting competence and connectedness between parents and their children relate to parental knowledge are scarce. In order to understand what enables parents to know about their adolescent children's activities, parents' competence in their parenting and the connectedness between parents and their adolescent children are examined as factors associated with parental knowledge (Jones & Prinz, 2005; Kerns et al., 2001). Third, most studies in the field focus on parental knowledge as a key predictor of adolescent risk behavior, but it is possible that sources of parental knowledge are directly and uniquely related to adolescent behavior (Kapetanovic et al., 2017), which is why both direct and indirect associations between adolescent disclosure, parental solicitation, and parental control on the one hand, and adolescent risk behaviors on the other, should be investigated. Investigating links among parent-adolescent connectedness, parenting competence, and parental knowledge and sources thereof, and how these factors are associated with adolescent risk behavior in an integrated model, would help close these gaps. Finally, although studies report diminishing gender differences regarding alcohol use (Gripe, 2015), the parenting of boys and girls still seems to differ (Fontaine et al., 2009; Kerr & Stattin, 2000), which is why possible moderation by gender between aspects of the parent-adolescent relationship and adolescent risk behaviors should be investigated.

Aim of the Study

The aim of this longitudinal study is to investigate the associations among parent-adolescent connectedness, parenting competence, and parental knowledge and its sources, and relations to two common types of adolescent self-reported risk behaviors, namely delinquent behavior and substance use. In a structural path model, adolescents' connectedness to parents and parenting competence are correlated and followed by adolescent disclosure, parental solicitation, control, and knowledge. The parenting variables are followed by adolescent risk behaviors, that is, delinquent behavior and substance use as outcome variables in two separate models, one for each risk behavior. Risk behaviors are measured at two time points, and a significant relation between aspects of parent-adolescent relationship and risk behaviors at both time points would indicate longitudinal associations. The research questions are: (1) how do adolescent disclosure, parental solicitation, and control relate to parental knowledge?, (2) are parenting competence and adolescents' connectedness to their parents associated with parental knowledge?, (3) in what way does the parental knowledge and its sources, together with parenting competence and adolescents' connectedness to their parents, relate to adolescent delinquent behavior and substance use?, and (4) are the links in the models moderated by gender?

Method

The study is part of an ongoing research program Longitudinal Research on Development in Adolescence (LoRDIA), in which adolescents' health, school functioning, social networks, and substance use are studied. The program is designed to follow 1,866

adolescents in two small and two middle-sized cities in southern Sweden from age 12 or 13 until they are 18 years. In 2013, contact was established with all primary schools in four Swedish municipalities, which agreed to participate in the study. In a letter, the parents were informed about the study, of their part in the study, confidentiality, and the voluntary basis of participation, where the adolescents themselves as well as the parents on behalf of the adolescents had the right to opt out of all data collection. The participating adolescents filled in questionnaires on an annual basis. The questionnaires were collected by the research team in the classrooms. Mail questionnaires were sent to the parents in the first data collection wave. Mothers and fathers could respond to the questionnaire separately or in collaboration with each other. The study received ethical approval from the Regional Research Review Board in X Gothenburg (No. 362-13; 2013-09-25; 2014-05-20; 2015-09-02).

Participants

The present study used three data sets: a parental survey from Wave 1 ($n = 550$), and adolescent surveys from Wave 1 ($n = 1,520$) and Wave 3 ($n = 1,324$). This resulted in a final dataset, the analytical sample for this study, with $n = 550$ parent and adolescent dyads at the baseline and $n = 436$ dyads at Wave 3. The adolescents' mean age was 13.0 years (± 0.56) at Wave 1, and 14.3 years (± 0.61) at Wave 3. In 450 families, the adolescents lived with both parents. In these cases, the questionnaires were filled out by mothers ($n = 120$), fathers ($n = 76$), or parents in collaboration with each other ($n = 254$). In 100 families, the adolescents lived either with their mother, father, or alternated between the parents. In those cases where adolescents lived exclusively with the mother or the father ($n = 44$), the questionnaires were filled out by the parent the adolescent lived with ($n = 40$), or by both parents in collaboration with each other ($n = 4$). In those cases where adolescents alternated between the parents ($n = 56$), the questionnaires were filled out by mothers ($n = 40$) or fathers ($n = 16$).

Thus, the parental data of the analytical sample included questionnaires filled in by both parents in collaboration with each other ($n = 258$), separate reports from mothers ($n = 141$) and fathers ($n = 50$), as well as averaged reports from mothers and fathers from the same household ($n = 51$). For 62 adolescents, both the mother and father filled in the parental questionnaires separately. In those cases where parents were living together ($n = 51$), the correspondence (Cohen's Kappa) between reporters on connectedness, parental knowledge, child disclosure, parental solicitation and parental control, was fair to moderate (K values = .41-.60). These responses were mean calculated and combined into one for each of the parenting variables. In those cases where parents were living apart ($n = 11$), the correspondence was worse (K values < .20). Therefore, we randomly chose five reports from mothers and six from fathers, and included them in the analyses.

The attrition analyses, in which data from adolescents in our analytical sample were compared with all other responding adolescents in Wave 1, revealed that parents of girls and parents of boys participated in our study to the same extent (30% of the total adolescent population for both groups), but parents of students of other ethnicities than Swedish responded to a lesser degree (8.3% vs. 33.0%; $p < .001$). Parental responses were more frequent for

students with higher grades (mean grades: 217 [\pm 41] vs. 198 [\pm 48], $p < .001$) and less school absenteeism in comparison with students of nonresponding parents (mean absent percent of hours per year: 5.6 [\pm 5.7] vs. 6.6 [\pm 6.7], $p = .002$). Compared with the Swedish population of similar age, the participating mothers in the analytical sample had somewhat lower full-time employment (62.8% vs. 68.3%), had university education to a somewhat lesser degree (52.3% vs. 54%), and were more likely to have been born outside of Sweden (8% vs. 6%). The participating fathers had somewhat higher full-time employment (94.2% vs. 90.2%), had university education to a lesser degree (36.6% vs. 40%), and were more often born outside of Sweden (9.4% vs. 5.9%). There were some moderate—yet statistically significant—differences among the adolescents included in this study and those who were excluded due to lack of parental data. The included adolescents reported higher index scale levels of family income (0.71 [\pm 0.14] vs. 0.69 [\pm 0.14], $p = .002$), parental knowledge (2.77 [\pm 0.3] vs. 2.72 [\pm 0.37], $p = .009$) and parental solicitation (2.20 [\pm 0.48] vs. 2.14 [\pm 0.48], $p = .019$). There were no significant differences regarding substance use (.23 [\pm 0.60] vs. .27 [\pm 0.67], $p = .226$) and delinquent behavior (1.02 [\pm 0.08] vs. 1.02 [\pm 0.10], $p = .435$) at baseline among the adolescents included in the study and those who were excluded due to lack of parental data. The adolescents who were included in the analytical sample but who dropped out at Wave 3 reported significantly higher substance use (.35 [\pm 0.70] vs. .19 [\pm 0.57], $p = .024$) than those adolescents who participated at Wave 3. There was no significant difference regarding engagement in delinquent behavior (1.01 [\pm 0.06] vs. 1.03 [\pm 0.11], $p = .376$).

Measures

Adolescents' connectedness to their parents. In this scale, which previously was used (with reversed coding) by Kerr, Stattin, & Pakalniskiene, (2008), parents rated their adolescents' emotional bonding with parents through five statements on five-point scales with opposite statements, for example "Our child wants to be close to us (parents) when she/he is upset" (coded as 1) and "Our child comforts her/himself when she/he is upset" (coded as 5). These were later reversed ($\alpha = .79$).

Perceived parenting competence. This is a subscale based on six items from the Tool to Measure Parenting Competence (TOPSE; Kendall & Bloomfield, 2005). In this scale, the statements were formulated separately for mothers and fathers. Items such as "I know that I am good as a parent" and "My child feels safe when I am around" were rated from 0 (*not at all true*) to 10 (*definitely true*) with satisfactory internal consistency ($\alpha = .78$ for mothers, $\alpha = .79$ for fathers). Mothers' and fathers' ratings were combined into one (mean) perceived parenting competence scale ($\alpha = .87$).

Parental knowledge, parental solicitation, parental control, and adolescent disclosure. Four scales based on Kerr and Stattin's (2000) work reflected parental knowledge and sources thereof. The Parental knowledge scale assessed how much parents knew about their adolescents' whereabouts, with six question such as "Do you know what your child does during his/her free time?" rated 1 (*almost always*) to 5 (*never*) and later reversed ($\alpha = .77$). The Parental solicitation scale assessed to what extent parents were actively seeking information from their child or their child's peers

(Kerr et al., 2010), with six question such as "Do you ask your child to tell you about his/her friends (what they like to do and how things are in school)?" rated 1 (*very often*) to 5 (*never*), later reversed ($\alpha = .69$). The Parental control scale assessed to what extent parents set rules that required adolescents to inform them of their whereabouts, with five questions such as "Does your child need your permission to stay out late on a weekday evening?," with ratings 1 (*yes, always*) to 5 (*no, never*; $\alpha = .78$). The Adolescent disclosure scale assessed adolescents' voluntary and spontaneous disclosure to parents about their activities during free time, with five questions such as "When your child has been out in the evening, does he or she talk about what he or she has done that evening?," with ratings 1 (*very often*) to 5 (*almost never*), and later reversed ($\alpha = .78$).

The following risk behaviors were assessed by adolescent self-reports in both Waves 1 and 3:

Delinquent behavior. This was a brief version (nine items) of an original 24-item scale about delinquent behavior used in a school survey among ninth graders (Ring, 2013). One example item was "During the past 12 months, how many times have you carried a knife or a weapon when you were out?" The ratings ranged from 1 (*never*) to 3 (*several times*; $\alpha = .73$ and $\alpha = .87$ for Wave 1 and Wave 3, respectively).

Substance use. This scale was based on questions modified from The Swedish Council for Information on Alcohol and Other Drugs' (CAN) yearly survey on substance use among ninth graders (Gripe, 2015). The measure contained four yes/no questions regarding whether adolescents had ever used cigarettes, snuff, alcohol, or had ever been drunk (KR20 = .60 and KR20 = .83 for Wave 1 and Wave 3, respectively).

Data Analyses

First, we performed t tests between boys and girls with regard to engagement in risk behaviors (see Table 1). Then, we conducted structural path analyses by using the manifest variables to examine the links between perceived parenting competence, adolescents' connectedness to their parents, sources of knowledge, and parental knowledge from Wave 1 (in the analyses named T1), and adolescent self-reported delinquent behavior and substance use both from Wave 1 and Wave 3 (thus T2). Controlling for baseline involvement in risk behavior may elucidate possible links between parenting at one time point and adolescent risk behaviors over time. Full Information Maximum Likelihood (FIML) was used to handle missing data, by which it is possible to produce unbiased parameter estimates as well as bias-corrected confidence intervals (Byrne, 2010). We examined univariate indices of skewness and kurtosis for each of the variables in the models. Skew and kurtosis were problematic for three of the variables—parental control, delinquent behavior, and substance use—at both T1 and T2. Because of that, to obtain a bias-corrected $\chi^2 p$ value of each model, we conducted a Bollen-Stein bootstrap with 200 algorithms, and a 200-algorithm bootstrap to obtain bias-corrected p values and confidence intervals for the estimation of the direct and indirect paths in each model.

Separate models were tested for each adolescent risk behavior, and we evaluated goodness of fit by using chi-square ($p > .05$), Tucker Lewis index (TLI $> .95$), comparative fit indices (CFI $> .90$) and root mean square error of approximation (RMSEA $< .08$).

Table 1

Descriptive Statistics for all Study Variables for Girls and Boys Separately, and Independent *t* tests of Possible Gender Differences in the Variable Means

Variable	Girls				Boys				<i>df</i>	<i>t</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	Min-Max	<i>n</i>	<i>M</i>	<i>SD</i>	Min-Max		
Parenting variables T1										
Adolescents' connectedness	275	3.86	.70	1.60–5.00	274	3.69	.72	1.80–5.00	547	2.81*
Parenting competence	275	8.40	1.15	2.00–10.0	273	8.42	1.10	4.20–10.0	546	-.198
Parental knowledge	273	4.39	.52	2.17–5.00	273	4.39	.49	2.00–5.00	544	.148
Parental solicitation	275	3.74	.67	1.33–5.00	269	3.75	.67	1.67–5.00	542	-.035
Parental control	273	4.80	.45	1.00–5.00	267	4.74	.47	1.00–5.00	538	1.37
Adolescent disclosure	274	4.17	.61	1.00–5.00	272	3.94	.58	1.60–5.00	544	4.59**
Adolescent risk behaviors T1										
Delinquent behavior	260	1.01	.04	1.00–1.33	260	1.04	.14	1.00–2.11	283.93	-3.64**
Substance use	255	.16	.53	.00–4.00	266	.30	.67	.00–4.00	447.68	-2.62**
Adolescent risk behaviors T2										
Delinquent behavior	221	1.03	.09	1.00–1.89	208	1.10	.27	1.00–2.67	252.37	-4.09**
Substance use	218	.58	1.01	.00–4.00	214	.66	1.21	.00–4.00	417.79	-.73

* $p < .05$. ** $p < .001$.

To test gender as a moderator of the links in the model, multiple group analyses were conducted. In multiple group analysis, a constrained model, where effects are set equivalent across genders, and unconstrained models with freely varying effects, are compared using χ^2 -difference tests. A significantly better fit of the unconstrained model (as indicated by significant $\Delta\chi^2$ statistics) would indicate a moderation effect (Byrne, 2010).

Results

Adolescent Engagement in Delinquent Behavior and Substance Use at T1 and T2

As shown in Table 1, engagement in delinquent behavior at both time points was more prevalent in boys than in girls. Involvement

in substance use was more prevalent among male adolescents at T1, but there was no significant difference between the genders regarding substance use at T2.

Links Among Parental Knowledge, Solicitation and Control, Adolescent Disclosure, Parental Confidence, and Adolescents' Connectedness to Parents

As shown in Figures 1 and 2, adolescent disclosure, parental solicitation, and parental control were positively associated with parental knowledge. The confidence interval of adolescent disclosure (95% confidence interval (CI) [.29, .41]) did not overlap the confidence intervals of parental solicitation (95% CI [.09, .19]) and parental control (95% CI [.05, .22]), which indicated that adolescent disclosure was the strongest predictor (Cumming, 2009).

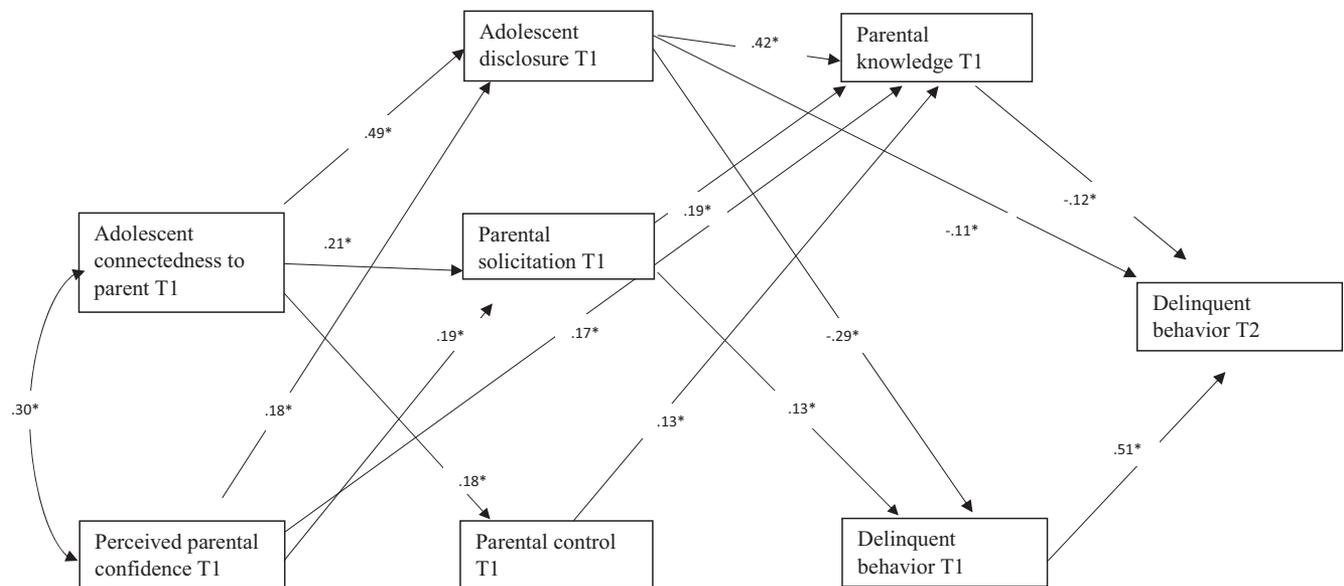


Figure 1. A structural path model showing relations between aspects of parent-adolescent relationship and longitudinal associations to delinquent behavior. * $p < .05$.

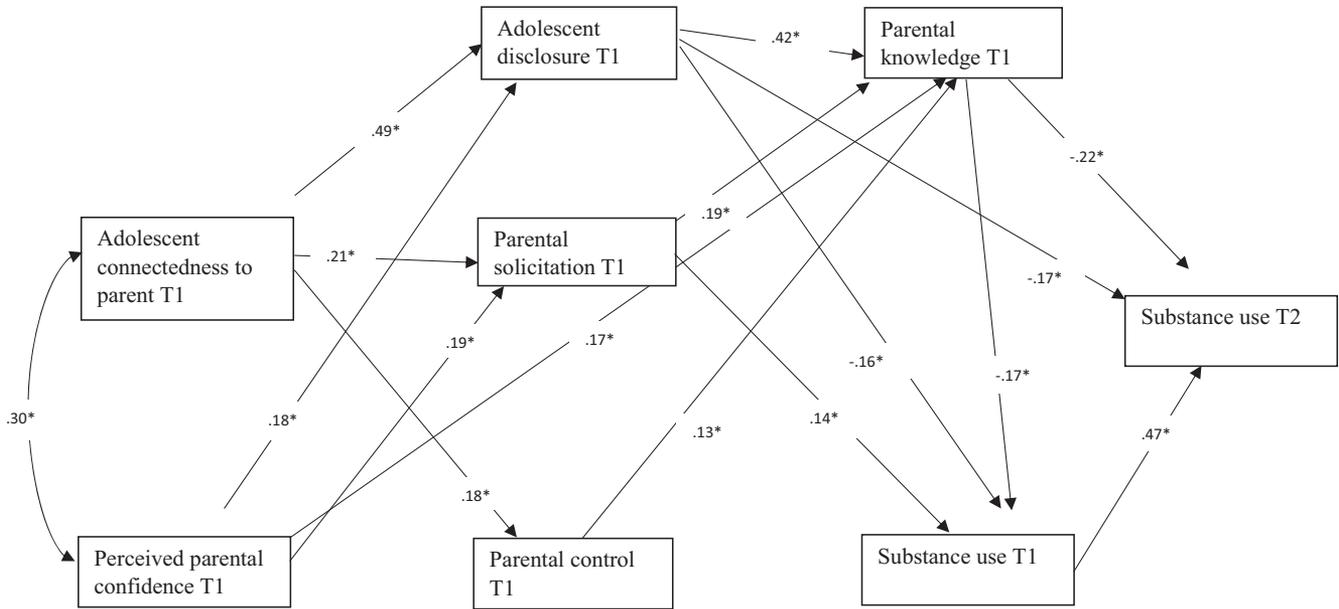


Figure 2. A structural path model showing relations between aspects of parent-adolescent relationship and longitudinal associations to substance use. * $p < .05$.

Next, adolescents' connectedness to their parents predicted adolescent disclosure, parental solicitation, and parental control, and it was also indirectly related to parental knowledge through the three sources of knowledge ($\beta = .27, p = .003$). Parenting competence predicted adolescent disclosure, parental solicitation, and parental knowledge, and was indirectly related to parental knowledge through the three sources of knowledge ($\beta = .13, p = .023$).

Links Between the Parenting Variables and the Adolescent Risk Behaviors

The structural model with delinquent behavior as the outcome variable fit the data well, $\chi^2(9) = 9.714, p = .374$; TLI = .998; CFI = .999; RMSEA = .012. As shown in Figure 1, the results indicated that delinquent behavior was stable over time. Furthermore, only adolescent disclosure was negatively related to delinquent behavior at both time points. Parental solicitation was positively associated with engagement in delinquent behavior at T1 and parental knowledge was negatively associated with delinquent behavior at T2. Adolescents' connectedness to their parents was indirectly, and negatively related to delinquent behavior at both time points (T1: $\beta = -.12, p = .005$; T2: $\beta = -.15, p = .008$). Parenting competence was indirectly and negatively related to delinquent behavior at both time points (T1: $\beta = -.03, p = .036$; T2: $\beta = -.06, p = .003$).

The model in which substance use was the outcome variable also fit the data well, $\chi^2(7) = 9.210, p = .238$; TLI = .991; CFI = .998; RMSEA = .024. As shown in Figure 2, substance use at T2 was predicted by substance use at T1, indicating that substance use was a stable behavior over time. Adolescent disclosure was directly and negatively related to substance use at T1, and parental knowledge was directly and negatively related to substance use at both time points. Parental solicitation was directly and positively

related to engagement in substance use at both time points. Adolescents' connectedness to their parents (T1: $\beta = -.09, p = .006$), and parental solicitation ($\beta = -.03, p = .002$) were indirectly and negatively related to substance use at baseline. Parenting competence (T1: $\beta = -.06, p = .003$; T2: $\beta = -.06, p = .003$), parental control (T1: $\beta = -.02, p = .003$; T2: $\beta = -.04, p = .006$), and adolescent disclosure (T1: $\beta = -.07, p = .005$; T2: $\beta = -.20, p = .003$) were indirectly and negatively related to substance use at both time points.

In sum, parental solicitation was directly and positively related to delinquent behavior and substance use at T1. Adolescent disclosure was directly and negatively related to delinquent behavior and substance use at both time points, and parental knowledge was negatively related to substance use at both time points. Parental control had an indirect negative association with substance use at both time points. Both parenting competence and adolescents' connectedness to their parents were indirectly and negatively related to risk behaviors at both time points.

Gender as a Moderator in the Models

Finally, multiple group analyses were performed to test for moderation effects of gender. First, we tested gender as a moderator in the delinquent behavior model. When the paths were constrained to be equal between the groups of boys and girls, the fit decreased, $\Delta\chi^2(15) = 38.202, p = .001$. Individual constraining of the paths showed three paths that differed between genders. The path between adolescents' connectedness to their parents and parental control, $\Delta\chi^2(1) = 8.083, p = .004$, was significant for girls ($\beta = .27, p = .016$), yet not for boys ($\beta = .02, p = .703$). Furthermore, the path between adolescent disclosure and delinquent behavior at T1, $\Delta\chi^2(1) = 10.992, p = .001$, was significantly stronger for girls ($\beta = -.33, p = .009$) than for boys

($\beta = -.09, p = .005$). The path between delinquent behavior at T1 and T2, $\Delta\chi^2(1) = 4.832, p = .028$, was stronger for boys ($\beta = .52, p = .007$) than for girls ($\beta = .25, p = .016$).

The constrained substance use model differed from the unconstrained model, $\Delta\chi^2(16) = 32.958, p = .05$. Individual constraining of the paths showed that the path between substance use at T1 and T2, $\Delta\chi^2(1) = 5.084, p = .024$, was stronger for boys ($\beta = .57, p = .020$) than for girls ($\beta = .35, p = .016$).

In sum, adolescents' connectedness to parents and parental control, and the path between adolescent disclosure and delinquent behavior at baseline, was stronger for girls than for boys, whereas the paths between delinquent behavior at T1 and T2 and between substance use at T1 and T2 were stronger for boys than for girls.

Discussion

Risk behaviors such as delinquent behavior and substance use increase markedly in early adolescence (Steinberg, 2007). In order to understand the developmental processes between aspects of the parent-adolescent relationship and early adolescent risk behaviors, we investigated links among parents' ratings of their adolescents' connectedness to parents, perceived parenting competence, sources of parental knowledge and parental knowledge at T1, and the associations of these links with adolescent self-reported risk behaviors at T1 and two years later (T2). In addition, we tested potential moderation effects of gender on these associations.

In sum, the results showed that parents' active soliciting efforts were associated with parental knowledge, but that adolescent disclosure was the strongest correlate of parental knowledge. Adolescents' connectedness to their parents had an indirect association with parental knowledge, while parenting competence showed both direct and indirect associations with parental knowledge. Adolescent disclosure had direct and negative associations with delinquent behavior and substance use at both T1 and T2. Parental solicitation was positively associated with delinquent behavior and substance use at T1. Gender moderated the links between the parenting variables and the links between delinquent behavior at T1 and T2, and substance use at T1 and T2.

Parental Knowledge, Parent-Adolescent Connectedness, and Parenting Competence

Our finding that parental soliciting efforts were linked to parental knowledge is in line with some (Kerr et al., 2010; Waizenhofer, Buchanan, & Jackson-Newsom, 2004), but not all prior studies (Kapetanovic et al., 2017). Whereas parental soliciting efforts could increase parents' knowledge of their adolescents' activities, it is possible that the questions parents ask have different meanings for parents and adolescents (Janssens et al., 2015). Parents may perceive solicitation as small talk or part of daily conversation, whereas adolescents perceive parents' questions as direct queries. Parental knowledge was most strongly related to adolescent voluntary disclosure, which is in line with earlier research including both parents' and adolescents' reports (Kerr & Stattin, 2000; Kerr et al., 2010). As agentic individuals in the family, adolescents influence what their parents know about their lives. It has been suggested that when adolescents are able to control what type of information to share with their parents, it is likely that they feel that parents have "the right to know," which promotes voluntary disclosure by the adolescents (Rote & Smetana, 2016).

What could prompt adolescents to disclose information to their parents and thereby enable parents to know about their adolescents' activities? As indicated by the indirect associations between adolescents' connectedness to parents and parental knowledge, having emotionally close relationships with parents is related to adolescents' self-disclosure and thereby to parental knowledge (Kerns et al., 2001; Kerr & Stattin, 2000; Vieno, Nation, Pastore, & Santinello, 2009). Parents' beliefs in their capacity as parents play an important role in the parenting of adolescents. We found that parenting competence not only had indirect associations with parental knowledge, but was also directly related to higher levels of parental knowledge. Parents' trust in themselves makes it feasible to elicit information about adolescent activities (Glatz & Buchanan, 2015). The direct link between competence and parental knowledge could not be fully explained and might be partly due to other related factors, such as parental engagement or time spent with the adolescent (Waizenhofer et al., 2004).

The Longitudinal Associations Between Parenting and Adolescent Risk Behavior

The findings indicate a protective function of adolescents' disclosure on their engagement in delinquent behavior two years later, even when controlling for baseline levels of delinquent behavior. More spontaneous talk by adolescents about what they do and where they are, is associated with less engagement in delinquent behavior over time. One possible explanation is that adolescents who historically have not engaged in risk behaviors have nothing to hide and are therefore more likely to be communicative with their parents. Another explanation is that open and voluntary communication between parents and adolescents has a long-term protective function on adolescent engagement in delinquent behaviors (Keijsers et al., 2010).

In contrast to other studies (Abar et al., 2014; Kerr et al., 2010; Laird et al., 2003), parental knowledge was only modestly associated with adolescent delinquent behavior at T2. One possible explanation for the finding is the relatively young age of the adolescents in our study. Other studies typically concern middle or late adolescence, age periods during which risk taking is at its peak (Abar et al., 2014; Laird et al., 2003). Although early adolescents start disengaging from their families, older adolescents spend less time with their families and engage in less intergenerational activities (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996). Another explanation may be that parents' knowledge of what their adolescents are doing is just not enough. As involvement in delinquent behavior is related to problems with low maturity and self-regulation (Steinberg, Cauffman, & Monahan, 2015), perhaps parents do not know how to approach their adolescents and need more information on how to address their concerns and behaviors. Given the indirect associations between adolescent disclosure and adolescent delinquent behavior in our study, it could be that parental knowledge works as mediator between adolescent disclosure and adolescent delinquency. When parents and adolescents have established relationships with open communication, parents obtain knowledge of their adolescents' whereabouts, and are able to protect them from engaging in delinquent behaviors.

The findings concerning substance use were somewhat different. Both adolescent disclosure and parental knowledge were related to less substance use over time. Open and close family

relationships help parents to know about their children's activities (Tilton-Weaver, 2014), and parents who know how to steer their adolescents away from alcohol and drug use can provide adequate guidance for their adolescent children. It is possible that school-based substance use prevention programs that involve parents provide information to parents on how to prevent or address adolescent substance use (Koning et al., 2009), which in turn affects their adolescents' behavior. In Sweden, such parental interventions are widespread and take place during regular parent meetings at schools (Bodin & Strandberg, 2011; Koutakis, Stattin, & Kerr, 2008). In contrast, parental interventions concerning delinquent behavior are uncommon.

Somewhat counterintuitively, solicitation as a parental strategy for gaining knowledge of adolescent whereabouts was related to higher levels of adolescent engagement in delinquent behavior and substance use concurrently. While it is possible that parents use such strategies to initiate conversations with their adolescents (Keijsers et al., 2010), their search for information may be perceived as intrusive by adolescents (Kapetanovic et al., 2017). Even though parental soliciting efforts may relate to parental knowledge, the sense of privacy intrusion caused by parental solicitation may instead lead to poor psychosocial development in adolescents (Tilton-Weaver & Galambos, 2003). Another possibility is that adolescents' risk behavior elicits parental soliciting strategies. The current finding shows that parental solicitation was not directly linked to risk behavior over time. More research is needed to elucidate the direction of effects between parental solicitation and adolescent engagement in risk behavior.

Gender Moderates Some of the Links

In line with the findings of previous research (Moffitt & Caspi, 2001), we found that boys engage in delinquent behavior more frequently than girls do. This was true for both time points. The stability in engagement in such behaviors in boys confirms the well-established idea that boys are specifically at risk of involvement in risk behaviors over time (Moffitt & Caspi, 2001). Substance use, however, was only more common among boys at T1, when participants were 13 years old. There was no gender difference at T2, two years later. This finding is in line with the results from recent reports that indicate that gender differences in relation to substance use decrease with age (Gripe, 2015). A positive link between connectedness to parents, and parental control was found among girls but not boys. As has been identified previously (Kerr & Stattin, 2000), parents seem to be more protective of girls. It could be that parents put more effort into building close and open relationships with adolescent girls, while letting boys separate from them to a higher degree (Keijsers & Poulin, 2013). Although significant for both boys and girls, adolescent disclosure had stronger association with girls' delinquent behavior than with boys'. We suggest that having strong relationships and open communication with parents could be beneficial for boys' and girls' behavioral development, but that it has a particular significance for girls' behavior. However, it could also be that girls are more likely to disclose bad behavior to their parents (Smetana, Metzger, Gettman, & Campione-Barr, 2006). Again, more research is needed to clarify the nature of the links over time.

Our findings also differed from those of Abar et al. (2014) who found that links between parental knowledge and substance use,

but not between parental knowledge and delinquency, differed for boys and girls over time. One explanation may be the differences in operationalization of parental knowledge as well as substance use, or perhaps cultural differences in the samples. As noted in recent reports of Swedish adolescents' use of tobacco and alcohol, the gender differences between boys' and girls' consumption are diminishing (Gripe, 2015). Another explanation may be the non-significant difference between genders concerning substance use. One unexpected finding is the somewhat larger effects in the beta weights in paths from adolescent disclosure and parental knowledge to substance use at T2 than at T1. A likely explanation for this finding is the larger variability in the observations at T2 than at T1 (Goodwin & Leech, 2006).

The current findings on the role of parent-child relationships and communication in adolescent risk behavior need to be viewed from a developmental context perspective. Here, we will bring up three aspects of the development context, although there are more that are likely to play a role in understanding and interpreting the findings. The first is the societal context. The parenting environments in Sweden, as in other Western societies, are moving toward a more egalitarian pattern, where autonomy and equal responsibilities and opportunities between parents and children are valued (see, e.g., Olivari, Wahn, Maridaki-Kassotaki, Antonopoulou, & Confalonieri, 2015). The protective role of adolescent disclosure found in our study, but also in studies from other Western countries, such as the Netherlands (Keijsers et al., 2010) may partly be attributable to such values. The second aspect is family history. Relationships between parents and their adolescent children are embedded in a history of dynamic environments and bidirectional influences (Kuczynski & De Mol, 2015). Thus, relationships between parents and their adolescents are affected by their interactions in the past. Although the paths in our study are unidirectional, we acknowledge that the dynamics in the past may have had an effect on relationships between parents and their adolescents in the present. The third aspect is the age and developmental period of the sample. Early adolescence is a stage of profound change in life. It is the time of puberty (Stattin & Skoog, 2016) but also the time when adolescents begin disengaging from family by spending more time outside of parents' supervision, and engaging with peers (Larson et al., 1996). The shift from children's dependence on parents toward physical maturity and personal autonomy, which occurs during early adolescence, may be turbulent for both parents and their children. As shown in our study, maintaining the emotional bond between parents and their growing adolescent children while promoting open communication rather than parental controlling efforts, may be beneficial for adolescent psychosocial development. In sum, the developmental context, broadly speaking, is likely to have an influence on the findings and implications of this, or any, study on parent-child relationships and adolescent development. Future researchers should strive to acknowledge this and should design their studies in order to tap the role of the development context for the links between parent-adolescent relationships and adolescent outcomes.

Study Limitations and Strengths

There are some limitations to this study that need to be considered when interpreting the findings. Because of the relatively low parental participation in the LoRDIA research pro-

gram, the number of parental reports was significantly lower than the number of adolescent reports. Consequently, because this study included parent–adolescent dyads, only a large subgroup of the LoRDIA participants were included in this study. Adolescents whose parents responded had somewhat less absenteeism and somewhat higher grades than adolescents of nonresponding parents. Also, the adolescents in the sample reported rather low engagement in risk behaviors. Girls, in particular, reported low levels of delinquent behavior at both time points. It is therefore possible that the results could differ depending on the sample characteristics and the severity of adolescents' behavioral problems. This is a threat to the external validity of the findings. Even though recent school surveys in Sweden (Gripe, 2015; Ring, 2013) report decreasing levels of adolescent engagement in delinquency and substance use compared with earlier years, a more comprehensive analysis of the severity of problem behaviors in adolescents, would provide more insight into the links between parenting and adolescents' behavior. However, recognizing the processes between parenting and adolescent engagement in risk behavior at an early level, may help in protecting the adolescents from involvement in more severe problem behavior. Furthermore, the option for parents to fill out the questionnaire together resulted in fewer possibilities to analyze mothers' and fathers' data separately, but seemed necessary in order to acquire responses from more families. In the questionnaire, the questions regarding perceived parenting competence were available for both the mother and father separately; however, because other questions on parenting were not available for both parents, we decided to average the mothers' and fathers' reports on perceived parental competence. Also, the data on parental reports were cross-sectional and the links between the parenting variables were interpreted as unidirectional. Future research should test several measuring points, which may offer possibilities to detect changes in parenting in regard to adolescent behavior and the transactional effect of the parent–child relationship over time.

Despite these limitations, this study has several strengths and contributes to the understanding of the role of parent–adolescent relationships in early adolescent risk behavior. Studies on direct and indirect relations between monitoring behaviors and adolescent outcomes are scarce, but this study contributes by clarifying the direct and indirect relations between parental knowledge and adolescent engagement in risk behaviors. We investigated risk behavior at two time points, which gave insights into how parenting directly and indirectly may relate to adolescent outcomes over time. Moreover, our study uniquely includes parenting competence and parent–adolescents' connectedness as important sources of parental knowledge and adolescent involvement in risk behavior. By taking such an approach we gain more understanding of the dynamics in the associations between parenting and early adolescent risk behaviors. Finally, whereas previous research in this field has focused on middle and late adolescence (Abar et al., 2014), this study contributes to the literature by focusing on a development period when adolescents start spending more time away from home (i.e., away from parent/adult direct supervision) and when delinquency and substance use increase markedly. From a prevention perspective, this is an important developmental period for interventions aimed at reducing the

incidence and prevalence of substance use and delinquent behavior.

Conclusions

At a time when adolescent engagement in risk behaviors is on both the political and medial agendas, with debates on parent–child relationships and their influences on each other, questions concerning parenting are as important as ever. Our findings indicate that parental confidence in parenting as well as emotional connectedness between parents and adolescents are associated with less likelihood of risk behavior, specifically delinquency and substance use. Strengthening parents' trust in themselves and in their relationship with their adolescent children may enhance open communication between parents and adolescents. When open communication is established, parents may have better opportunities to protect their adolescents from engagement in risk behaviors without being intrusive. This appears to be the case for both boys and girls.

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