

Can parental knowledge predict adolescent delinquency?

Examining the role of hanging on the streets with friends and SES

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Master Youth Studies (2019-2020)

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June 15, 2020

Abstract

Because delinquent behavior can have such a detrimental effect on individual and societal well-being, it is important to identify its risk factors. This longitudinal TRAILS study investigated the impact of parental knowledge on delinquent behavior. It was expected that particularly adolescents with a lower SES background would engage in delinquent behavior in the absence of parental knowledge. Furthermore, it was hypothesized that adolescents who perceive low levels of parental knowledge, would spend more time hanging on the streets with friends (unsupervised activity), which would induce them to engage in more delinquent behavior.

The present study involves longitudinal data of TRacking Adolescents' Individual Lives Survey (TRAILS) (T1: N = 2230; T2: N = 2149; T3: N = 1816). The sample was assessed at three waves. Self-report questionnaires that assessed parental knowledge, delinquency, time spent hanging on the streets with friends and SES were used.

Results indicated that adolescents who perceived higher levels of parental knowledge (T2) were less likely to engage in delinquent behavior (T3). In addition, results showed that hanging on the streets with friends (T2) partially mediated the relationship between parental knowledge (T2) and delinquent behavior (T3), while SES was not found to moderate this relationship. These findings indicate that delinquent behavior in adolescence could be reduced or prevented by more parental involvement during adolescence.

Keywords: adolescents, delinquent behavior, parental knowledge, SES, unsupervised activities

Abstract (NL)

Omdat delinquent gedrag zo'n nadelig effect kan hebben op het individuele en het maatschappelijke welzijn, is het belangrijk om de risicofactoren in kaart te brengen. Deze longitudinale TRAILS-studie onderzocht de impact van ouderlijke kennis op delinquent gedrag. Verwacht werd dat vooral adolescenten met een lagere SES-achtergrond delinquent gedrag zouden vertonen bij gebrek aan ouderlijke kennis. Daarnaast werd er verondersteld dat adolescenten die minder ouderlijke kennis waarnemen, meer tijd op straat zouden doorbrengen met vrienden (activiteit zonder ouderlijk toezicht), wat hen zou aanzetten tot meer delinquent gedrag.

De huidige studie omvat longitudinale data van Tracking Adolescents' Individual Lives Survey (TRAILS) (T1: N = 2230; T2: N = 2149; T3: N = 1816). De sample werd op drie momenten beoordeeld. Er werd gebruik gemaakt van zelfrapportage vragenlijsten die het delinquent gedrag van de adolescent, de tijd die zij op straat hangen met vrienden, de door hen waargenomen ouderlijke kennis en hun SES beoordeelden.

De resultaten gaven aan dat adolescenten die meer ouderlijke kennis (T2) waarnamen minder vaak delinquent gedrag vertoonden (T3). Daarnaast toonden de resultaten aan dat het op straat hangen met vrienden (T2) de relatie tussen ouderlijke kennis (T2) en delinquent gedrag (T3) gedeeltelijk verklaarde, terwijl SES deze relatie niet bleek te versterken of te matigen. Deze resultaten geven aan dat delinquent gedrag in de adolescentie kan worden voorkomen of verminderd door meer betrokkenheid van de ouders tijdens de adolescentie.

Keywords: adolescents, delinquent behavior, parental knowledge, SES, unsupervised activities

Introduction

According to the Espad study, investigating substance use and problem behavior in several European countries, 27% of European adolescents have engaged at least once in their lives, in at least one type of delinquency (Miller, Nociar & Molinaro, 2011). Fulkerson et al. (2008) found that the most common delinquent behaviors during adolescence are; not following school rules (45.8%), followed by detention (25.1%), stealing from a store (9.0%), and skipping school (3.4%).

However, there are also subgroups of youth that get in trouble with the police more often than their peers, and engage in more serious offenses. (Moffitt, 2015; Scott & Steinberg, 2008).

According to the developmental theory (Moffitt, 1993; Moffitt, 2015) there is a peak in delinquent or antisocial behavior during mid-adolescence, visible in the age curve of adolescents' antisocial behavior life-course. Although a temporal peak of delinquency in mid-adolescence is nowadays perceived as normal behavior for some adolescents (Moffitt, 1993; Vettenburg, 1998), it remains interesting to investigate the factors that play a role in persistent delinquency as these factors could give insights on how to deal with delinquency and prevent adolescents to continue this behavior throughout their lives.

Some delinquent behaviors, like substance use and truancy are not only problematic for society but also have negative consequences for the development of adolescents. (Loeber, 1990). These delinquent behaviours have been associated with lower education, unemployment and psychosocial problems later in life (Mason et al., 2007; Vermeiren, 2003; Tanner, Davies & O'Grady, 1999).

Low parental knowledge (Stavriniades, 2011; Walters, 2018) and hanging on the streets with friends (Agustina & Felson, 2015; Hakkert, 1998) are commonly perceived as behaviors that promote adolescent delinquent behaviors. Many studies have investigated the effect of parental knowledge and the effect of unsupervised activities on adolescents' delinquent behavior. However, not many studies have investigated the indirect effect of parental knowledge on delinquent behavior, via unsupervised and unstructured activities, or the effect of specific unsupervised activities (e.g. hanging on the streets with friends). Therefore, this study will investigate the indirect effect of parental knowledge on delinquent behavior, via hanging on the streets with friends.

A low socioeconomic status (SES) is also often linked to delinquency, by society but also in science (Agnew et al., 2008; Erickson, 1973). However, there is no scientific consensus on the exact role that SES plays in the development of delinquent behavior, as there is a lot of contradicting evidence. These contradictions in the literature make it interesting to investigate the actual effect of SES on adolescent delinquent behavior. Therefore, the present study will focus on the role that SES plays in the relationship between parental knowledge and adolescent delinquent behavior.

Theoretical framework

Delinquency

Many researchers define delinquent behavior as behavior that violates criminal laws and norms (Farrington, 2004; Johnson & Menard, 2012; Loeber, 1990). Adolescents engage in problem and risk behaviors to gain acceptance and respect from peers and friends, gain independence and cope with stress (Karaman, 2013; Moffitt, 1993). This means that delinquency is often being used by adolescents as a tool to gain more autonomy and status and to cope with personal problems.

Moffitt (1993) identified two groups of delinquent adolescents, the adolescence limited (AL) and the life course persistent (LCP) delinquents. Individuals in the AL-group mostly engage in minor delinquency during adolescence as a response to the maturity gap and decrease this behavior when entering adulthood (Barnes & Beaver, 2010); Moffitt, 1993). Individuals in the LCP-group often already engage in antisocial behavior at a young age, engage in more heavy delinquency during adolescence and continue this behavior during their life course (Moffitt, 1993). The persistent delinquent behavior of LCP-individuals may have serious negative physical, social and psychosocial outcomes for the individual. Odgers and colleagues (2008) found that LCP-individuals at age 32 experienced considerably more mental health, physical health and economic problems compared to AL-individuals and low antisocial individuals.

Because LCP-individuals continuously engage in (more heavy) delinquent behavior throughout their lives, the problems that are the result of this delinquent behavior are often also continuous and persistent. As AL-individuals only temporarily engage in (minor) delinquent behavior, the problems that are the result of delinquent behavior are often also temporary. The LCP trajectory, compared to the AL trajectory has much more negative consequences for the

individual, and as these individuals often need extra governmental and societal support during their lives, also for society. Because there is a substantial difference in (individual and societal) impact of the two trajectories, it is important to identify the predictors of the two trajectories.

The role of parents; parenting and delinquent behavior

Parents can have a large effect on the development of their child's delinquent behavior through parental monitoring (Loeber & Stouthamer-Loeber, 1986). Parental monitoring constitutes certain parenting behaviors that are related to attention to- and tracking of- the child's whereabouts and activities (Dishion & McMahon 1998). Multiple longitudinal studies found direct and indirect effects of parental monitoring (parental control and solicitation) on delinquency, with low levels of parental monitoring predicting high levels of delinquent behavior (Barnes et al., 2006; Janssen, 2016; Keijsers. et al., 2010; Fletcher et al., 2004; Laird, Marrero & Sentse, 2010). Multiple studies also found that high levels of (perceived) parental knowledge are associated with lower levels of delinquency (Abar, Jackson & Wood, 2014; Fletcher et al., 2004; Pettit et al., 2001; Rekker et al., 2015; Jacobson and Crockett, 2000). These findings indicate that high levels of parental monitoring and knowledge can prevent or reduce the risk of adolescent delinquent behavior.

In the literature, parental knowledge and parental monitoring are often used as one and the same, but the concepts are different. Parental knowledge is the result of both the parents' monitoring and the child's disclosure (Stattin & Kerr, 2000). Stattin and Kerr (2000) categorized parental knowledge into different sources: parental solicitation, child disclosure and parental control, and found that child disclosure, which means that the child reveals or exposes information about him or herself, is the source of parental knowledge that is most strongly associated with adolescent delinquency. Kerr, Stattin, and Burk (2010) found in their longitudinal study that low levels of youth disclosure predicted high levels of delinquency and that parental monitoring (e.g. parental control and solicitation) did not. This suggests that parental knowledge has a stronger link to delinquency than parental monitoring. In this paper we will therefore focus on parental knowledge.

Unsupervised activities with peers and peer delinquency

Parental knowledge may be an important factor in whether children spend unsupervised time outside the home, and in particular spend time on the streets (Osgood & Anderson, 2004; Borawski et al., 2003). Hanging on the streets (with friends) may enable and promote minor delinquency because it is an unsupervised and unstructured activity (Barnes et al., 2007; Sentse et al., 2010). Multiple studies found that, according to routine activity theory, adolescents who participate in unsupervised and unstructured activities in the presence of peers are more likely to engage in delinquent behavior (Agnew & Petersen, 1989; Maimon & Browning, 2010; Osgood et al., 1996; Osgood and Anderson 2004). Gerstner & Oberwittler (2018) found that adolescents who spend time unsupervised and unstructured with friends or peers who are frequently involved in crime, are at an increased risk for engaging in delinquent behavior. These findings suggest that adolescents are more likely to engage in delinquency during unsupervised and unstructured activities and that peer delinquency plays an important role in this.

Moffitt (1993) states that peer delinquency is of great influence in adolescents' development of delinquent behavior. LCP-individuals engage more likely in delinquent behavior because they are characterized by social, familial and neurodevelopmental deficits during childhood (Moffitt, 2015; Odgers et al., 2008; Piquero, 2001). Delinquent behavior is part of their normal behavior repertoire. During adolescence, because of the maturity gap, delinquent behavior is sometimes awarded with social status. When AL-individuals notice that the delinquent behavior of LCP-individuals is awarded with social status, like popularity, they may copy this behavior (Barnes, Beaver & Piquero, 2011; Moffitt, 1993). This is called social mimicry.

All the above mentioned findings suggest that parental knowledge has an indirect effect on delinquent behavior, via unsupervised and unstructured activities with peers. Walters (2018) found evidence for this indirect effect in which low levels of parental knowledge led to an increase in unsupervised and unstructured activities with peers, which, in turn, led to more delinquent behavior among adolescents.

The role of the socioeconomic status

The socioeconomic status (SES) of parents may also have a significant influence on the relationship between parental knowledge and delinquent behavior. Parents with a relatively

lower SES may not have the resources to organize supervision and can invest less time and money in their children than parents with a higher SES (Conger, Conger & Martin, 2010; Kornrich & Furstenberg, 2013). Parents with a lower SES are also more likely to experience stress, which also may lead to less time-investment in their children and less positive parenting styles (Conger et al., 1994). Less investment (parental monitoring) leads to less parental knowledge, which, in turn, could lead to more delinquent behavior among adolescents. Multiple studies found that SES does have a negative effect on adolescents' delinquent behavior (Rekker et al., 2015; Bjerk, 2007; Jarjoura, Triplett & Brinker, 2002; Ellis & McDonald, 2001), indicating that adolescents with a low SES are more likely to develop delinquent behavior.

But, there are also studies that did not find any evidence for the relationship between SES and delinquency. Agnew and colleagues (2008) showed that effects of SES on delinquency are moderate in size and are not significant. The study of Jacobson and Crockett (2000) showed that SES was not significantly related to parental monitoring and not significantly related to minor delinquency.

These contradictory findings ask for further investigation. It is possible that the effect of parental knowledge on adolescent delinquency is stronger for low SES families.

Present study

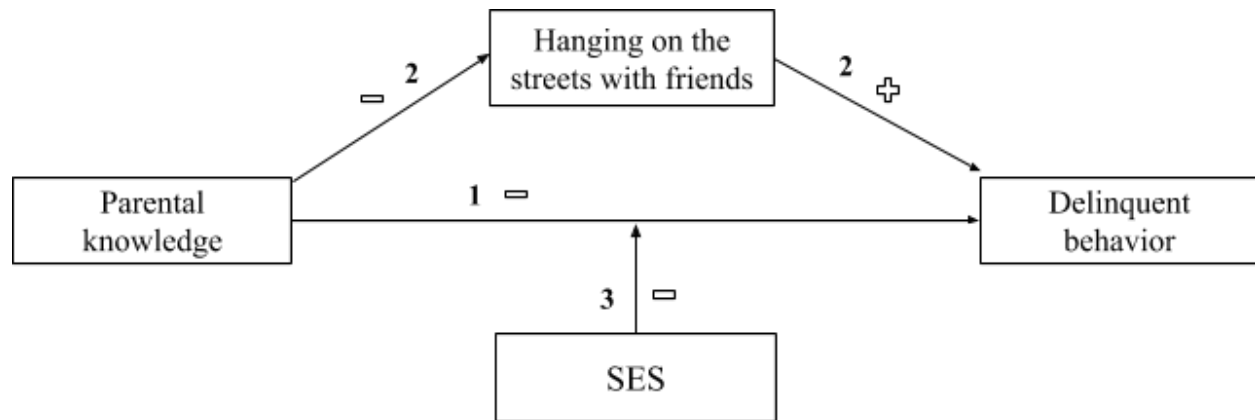
In this study, it is hypothesized that there is a direct negative effect of parental knowledge on delinquent behavior. Second, it is hypothesized that this effect is mediated by unsupervised and unstructured activities, such as hanging on the streets with friends. However, there is not much evidence from the literature to support this hypothesis. This is an important gap in the literature, as there may be large differences in how unsupervised and unstructured activities affect adolescents' delinquent behavior.

Third, the role of SES within the relationship between parenting style and delinquency is unclear. In the present study it is hypothesized that in families with a low SES there is a stronger effect of parental knowledge on adolescent's delinquent behavior.

These hypotheses are incorporated in a conceptual model, this model is shown in figure 1.

Figure 1.

Research Model including the hypothesized relationships and expected directions of these relationships. 1 = main effect, 2 = mediation and 3 = moderation.



Method

TRAILS

For the present study, the sample and data from the TRAILS (TRacking Adolescents' Individual Lives Survey) study was used. TRAILS is a Dutch longitudinal cohort study that follows children during their period of adolescence and young adulthood. Purpose of the study is to gather information on social, psychological and biological factors that play a role in adolescent development. TRAILS started in 2001 with their first wave of assessment (T1). At this time the participants were between 10 and 12 years old. Every two or three years there has been a follow up assessment, until the participants reached the age of at least 24. The present study involved the first (T1), second (T2) and the third (T3) assessment waves of TRAILS.

Sample and procedure

Participants for the TRAILS study were selected from five municipalities in the North of the Netherlands, including both urban and rural areas. In these municipalities, 122 schools agreed to participate in the TRAILS study. In total, 2935 children and their parents were asked if they wanted to participate in TRAILS. Permission for participation was provided by parents. Well-

trained interviewers interviewed one of the parents or guardians (preferably the mother, 95.6%) at their homes about their child's health and wellbeing. Children had to fill out questionnaires at school, under the supervision of one or more TRAILS assistants. Teachers were also asked to fill out a brief questionnaire for all TRAILS-children in their class.

From the remaining 2935 children (and parents), 76,0% agreed to participate in the study ($N = 2229$, 50.8% girls). The mean age of children at T1 was 11.09 ($SD = 0.55$). At the second wave of assessment (T2), 96.4% ($N = 2149$, 51.0% participated). The mean age of children at T2 was 13.56 ($SD = 0.53$). At the third wave of assessment (T3), 81.4% ($N = 1816$, 52.1% girls) participated. The mean age of children at T3 was 16.3 ($SD = 0.73$).

An attrition analysis was done to check whether these drop-outs differed significantly from the remaining participants and thus had a significant effect on the outcome of the present study. Results showed significant differences for sex, age, SES, hanging on streets and parental knowledge, but not for delinquency. The group of drop-outs (M_0) consisted of more boys ($M_0 = .48$, $M_1 = .56$), $t(611) = 3.135$, $p = .002$, and children older of age ($M_0 = 13.5487$, $M_1 = 13.6631$), $t(2146) = 3.709$, $p < .001$. The group of drop-outs also scored lower on SES ($M_0 = .0203$, $M_1 = -.3646$), $t(2185) = 8.784$, $p < .001$, spent more time hanging on streets ($M_0 = 2.1691$, $M_1 = 2.6081$), $t(403) = 3.253$, $p = .001$, and perceived less parental knowledge ($M_0 = 1.7183$, $M_1 = 1.6576$), $t(404) = 2.844$, $p = 0.005$.

There were no outliers on any of the study variables.

Measures

Delinquent behavior. Delinquent behavior was measured at T2 and at T3. Delinquent behavior was measured using the 'Delinquent behavior' scale, which is part of the subsection 'Externalizing' of the 'Youth Self Report (YSR)' questionnaire (Achenbach & Rescorla, 2001). This questionnaire measured the (self-reported) behavior of the adolescent. The 'Delinquent behavior' scale measured to what extent certain delinquent behaviors apply to the child and consists of 15 statements/items (e.g. 'I steal outside of my home' or 'I use drugs (write down which and how much):' A 3-point scale was used $\rightarrow 0 =$ 'not at all', $1 =$ 'a little/sometimes', $2 =$ 'clearly/often'. Higher scores indicate a higher level/frequency of delinquent behavior. Cronbach's alpha: $\alpha = .71$ (T2) and $\alpha = .76$ (T3).

Parental knowledge. Parental knowledge was measured at T2. The used (self-reporting) questionnaire ‘What do your parents know about you?’ measured parental knowledge, perceived by the adolescent. The parental knowledge scale consists of 16 items, 8 items that measure the knowledge of the father (e.g. ‘How much does your father know about how much hash / weed you use?’) and (the same) 8 items that measure the knowledge of the mother. A 3-point scale was used → 0 = ‘nothing’, 1 = ‘a little/few’, 2 = ‘a lot’ (Patterson & Stouthamer-Loeber, 1984). A new variable was created for parental knowledge, combining the two scales (of the mother and the father) into one. A Pearson correlation test was done to check if this was possible. The results of this test indicated that the strength of correlation between the variables is high ($r = 0.691$), and that the correlation coefficient was significantly different from zero ($P < 0.001$). This meant that the scores on the two variables could be combined into one score. To create the new variable, the mean of the two items was calculated, indicating the average level of parental knowledge perceived by the adolescent. Higher scores indicate a higher level of parental knowledge. Cronbach's alpha: $\alpha = .78$ (father), $\alpha = .72$ (mother) and $.80$ (combined).

Hanging on the streets with friends. Hanging on the streets with friends was measured at T2. The, for TRAILS developed, used (self-reporting) questionnaire ‘What do you do in your leisure time?’ measured how many hours a day the adolescent spends on certain activities. Two statements/items of this questionnaire were used to measure the amount of hours a day that the adolescent spends on hanging on the streets with friends. (‘Number of hours a day on the streets with friends (Monday to Friday)’ and ‘Number of hours a day on the street with friends (Saturday and Sunday)’). A 9-point scale was used → 0 = ‘never’, 1 = ‘half an hour a day’, 2 = ‘1 hour a day’, 3 = ‘2 hours a day’, 4 = ‘3 hours a day’, 5 = ‘4 hours a day’, 6 = ‘5 hours a day’, 7 = ‘6 hours a day’, 8 = ‘7 hours a day or more’. A new variable was created for hanging on the streets with friends, combining the number of hours during the week and the weekend into one score. A Pearson correlation test was done to check if this was possible. The results of this test indicated that the strength of correlation between the variables is high ($r = 0.781$), and that the correlation coefficient was significantly different from zero ($P < 0.001$). This meant that the scores on the two variables could be combined into one score. To create the new variable, the mean of the two items was calculated, indicating the average number of hours a day on the

streets with friends from Monday to Sunday. Higher scores indicate a higher level of hanging on the streets with friends. Cronbach's alpha: $\alpha = .87$.

Socioeconomic Status. SES was measured at T1. The scale is based on the educational level of both parents, the occupational level of both parents and family income (e.g. 'Can you indicate approximately the joint net income per month of your household?' and 'What was your last occupation?'). SES was measured as the average of these five standardized variables (Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). Higher levels on the SES scale indicate a higher level of SES. Cronbach's alpha: $\alpha = .84$.

Data analysis

All the analyses performed in the present study were done in SPSS.

First, the descriptive analyses of age, sex and all the study variables were done.

The means and standard deviations of all variables were calculated and visually presented in a table. Second, a correlation analysis including all the study variables was performed. .. For sex a Spearman correlation test was used, for all other variables a Pearson correlation was requested.

Third, a hierarchical regression analysis was done to test for associations between parental knowledge (T2) and delinquent behavior (T3). Four different models were tested. In model 1, the effects of the control variables on delinquent behavior (T3) were tested. In model 2, the main effect of parental knowledge (T2) on delinquent behavior (T3) was tested. In model 3, the main effects of parental knowledge (T2), hanging on the streets with friends (T2) and SES (T1) on delinquent behavior (T3) were tested. In model 4 the moderating effect of SES (T1) on the relationship between parental knowledge (T2) and delinquent behavior (T3) was tested. Dummy variables were used to create two categories for SES (T1) (low SES and high SES). Parental knowledge (T2) (centered) was then multiplied with low SES and high SES, resulting in two interaction terms.

Finally, according to the method of Baron and Kenny, regression analyses in four steps were done to test whether the relationship between parental knowledge (T2) and delinquent behavior (T3) was mediated by hanging on the streets with friends (T2). In step 1, the main effect of parental knowledge (T2) on delinquent behavior (T3) was tested (path c). In step 2, the effect of parental knowledge (T2) on hanging on the streets with friends (T2) was tested (path a).

In step 3, the effect of hanging on the streets with friends (T2) on delinquent behavior (T3) was tested (path b). In step 4, the effect of parental knowledge (T2) on delinquent behavior (T3) was tested when controlling for hanging on the streets with friends (path c').

To check whether the assumptions of linearity and homoscedasticity were met, scatterplots and standardized residual plots were used. The plots showed that both assumptions were not met. Also the assumption of normality was not met, as test results of Shapiro-Wilk and Kolmogorov-Smirnov tests both showed that the dependent variable delinquent behavior is not normally distributed ($p < .01$). The assumptions of independent errors (Durbin-Watson = 1.999) and no multicollinearity ($VIF < 2$) were met.

Results

Descriptive statistics

Means and standard deviations of the study variables are presented in Table 1, together with the correlations between all study variables. All variables correlated significantly with delinquent behavior in the directions that were expected. That is, for parental knowledge and SES, negative correlations were found, which means that higher levels of parental knowledge (T2) and SES (T1) are related to lower levels of delinquent behavior (T3). For hanging on the streets with friends (T2), positive correlations were found, which means that higher levels of hanging on the streets with friends (T2) were related to higher levels of delinquent behavior (T3).

Additionally, parental knowledge (T2) was found to be positively correlated with SES (T2) which means that higher levels of SES (T1) were related to higher levels of parental knowledge (T2).

Hanging on the streets with friends (T2) was found to negatively correlate with parental knowledge (T2) and SES (T1), meaning that higher levels of parental knowledge (T2) and SES (T1) were related to lower levels of hanging on the streets with friends (T2). Finally, the control variables sex (T1) and delinquent behavior (T2) were found to be positively correlated with delinquent behavior (T3), indicating that boys and higher levels of earlier delinquent behavior (T2) are related to higher levels of delinquent behavior (T3).

Table 1

Means and standard deviations of- and correlations (Pearson) between sex, parental knowledge, hanging on the streets with friends, SES and delinquent behavior.

	Mean	SD	1 ¹	2	3	4	5	6
1. T1 Sex (1 = boys) ¹	.49	.50	1.00					
2. T2 Delinquent Behavior	.26	.20	.108**	1.00				
3. T2 Parental Knowledge	1.71	.33	-.012	-.500**	1.00			
4. T1 SES	-.05	.80	-.028	-.065**	.186**	1.00		
5. T2 Hanging on the streets with friends	2.23	2.06	.057*	.285**	-.277**	-.286**	1.00	
6. T3 Delinquent Behavior	.32	.24	.155**	.521**	-.383**	-.071**	.227**	1.00

Note: ¹Spearman correlation test, * p < .05. ** p < .01.

Regression analyses

The results of the hierarchical regression analyses testing the main effects and moderation effect, are reported in Table 2. In the first step, the main effects of the control variables on delinquent behavior (T3) were tested. Sex (T1) and delinquent behavior (T2) were found to significantly predict delinquent behavior at T3. Being a male and higher levels of delinquent behavior at T2 predicted higher levels of delinquent behavior at T3. In the second step, parental knowledge (T2) was added to the model to test for its main effect on delinquent behavior (T3). Parental knowledge (T2) was found to significantly predict delinquent behavior (T3) ($\beta = -.167$, SE = .018), $p < .01$). Higher levels of parental knowledge (T2) predicted lower levels of delinquent behavior at T3. In the third step, parental knowledge (T2), hanging on the streets with friends (T2) and SES (T1) were added to the model to test for their main effects on delinquent behavior (T3). Parental knowledge (T2) ($\beta = -.155$, SE = .019, $p < .01$) and hanging on the streets with friends (T2) ($\beta = .063$, SE = .003, $p < .01$) both significantly predicted delinquent behavior (T3) with lower levels of parental knowledge (T2) and higher levels of hanging on the streets with friends (T2) predicting higher levels of delinquent behavior at T3. No significant main effect was found for SES (T1) on delinquent behavior at T3 ($\beta = -.004$, SE = .007, $p = .854$).

Moderation

In the fourth step, the interaction of parental knowledge (T2) and SES (T1) was added to the model to test for the interaction effect of SES on delinquent behavior (T3). There was no significant interaction between parental knowledge and SES (high vs. medium: $\beta = .020$, $SE = .038$, $p = .457$; (low vs. medium: $\beta = -.004$, $SE = .039$, $p = .868$). This means that SES (T1) does not significantly moderate the relationship between parental knowledge (T2) and delinquent behavior (T3).

Table 2

Hierarchical regression analyses of delinquent behavior (T3) on sex (T1), age (T1), delinquent behavior (T2) parental knowledge (T2), hanging on the streets with friends (T2), SES (T1) and the interaction of parental knowledge (T2) and SES (T1).

	B	SE	β	95% CI		ΔR^2
				Lower	Upper	
Model 1						
T1 Sex (1 = boys)	.044	.010	.092**	.024	.064	
T1 Age	-.017	.009	-.039	-.035	.001	
T2 Delinquent Behavior	.650	.027	.517**	.598	.703	
Model 2						.021
T2 Parental Knowledge	-.126	.018	-.167**	-.162	-.090	
Model 3						.003
T2 Parental Knowledge	-.117	.019	-.155**	-.154	-.080	
T2 Hanging on the streets with friends	.008	.003	.063**	.002	.013	
T1 SES	-.001	.007	-.004	-.014	.012	
Model 4						.001
Parental Knowledge*Low SES	.028	.038	.020	-.046	.103	
Parental Knowledge*High SES	-.006	.039	-.004	-.082	.069	

Note: * $p < .05$. ** $p < .01$. Model 1 ($R^2 = .283$), Model 2 ($R^2 = .304$), Model 3 ($R^2 = .307$), Model 4 ($R^2 = .308$).

All models are significant ($p < .01$).

Mediation

Regression analyses tested the mediating effect of hanging on the streets with friends (T2) on the relationship between parental knowledge (T2) and delinquent behavior (T3). Regression analyses were performed in four steps, according to the Baron and Kenny method (1986). The results are presented in Figure 2.

In the first step, the effect of parental knowledge (T2) on delinquent behavior (T3) was tested, while controlling for sex (T1), age (T1) and delinquent behavior (T2). Parental knowledge (T2) was found to significantly predict delinquent behavior (T3) ($\beta = -.163$, $SE = .018$, $p < .01$). Higher levels of parental knowledge (T2) predicted lower levels of delinquent behavior at T3.

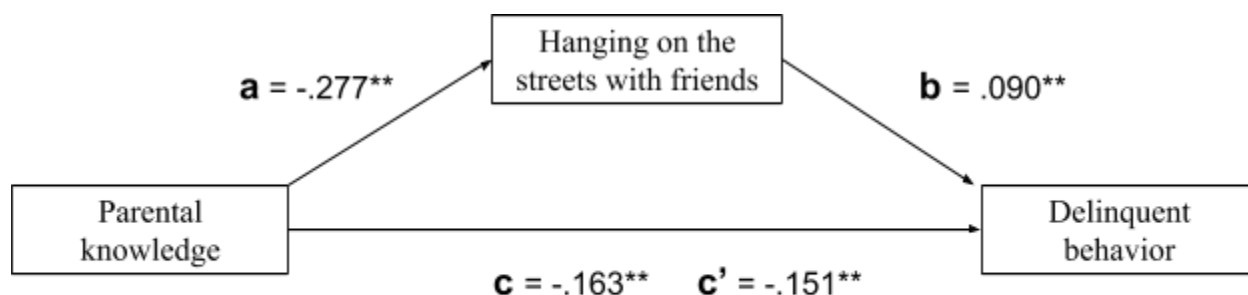
In the second step, the effect of parental knowledge (T2) on hanging on the streets with friends (T2) was tested. Parental knowledge (T2) was significantly related to hanging on the streets with friends (T2) ($\beta = -.277$, $SE = .131$, $p < .01$). Higher levels of parental knowledge (T2) were related to lower levels of hanging on the streets with friends (T2). In the third step, the effect of hanging on the streets with friends (T2) on delinquent behavior (T3) was tested, while controlling for sex (T1), age (T1) and delinquent behavior (T2). Hanging on the streets with friends (T2) was found to significantly predict delinquent behavior (T3) ($\beta = .090$, $SE = .003$, $p < .01$). Higher levels of hanging on the streets with friends (T2) predicted higher levels of delinquent behavior at T3. In the fourth step, the effect of parental knowledge (T2) on delinquent behavior (T3) was tested, while controlling for sex (T1), age (T1), delinquent behavior (T2) and hanging on the streets with friends (T2). Parental knowledge (T2) was found to significantly predict delinquent behavior (T3) ($\beta = -.151$, $SE = .018$, $p < .01$). The beta of parental knowledge (T2) decreased from $-.163$ to $-.151$. Hanging on the streets with friends (T2) was also found to significantly predict delinquent behavior (T3) ($\beta = .065$, $SE = .003$, $p < .01$).

Hanging on the streets with friends (T2) was found to be a significant predictor of delinquent behavior (T3). When adding hanging on the streets with friends (T2) to the model, the beta, and thus the effect, of parental knowledge (T2) on delinquent behavior (T3) decreased, but the remained significant. Therefore, hanging on the streets with friends (T2) is found to partially mediate the relationship between parental knowledge (T2) and delinquent behavior (T3) among adolescents. However, the effect was small, according to the Sobel test ($t = -2.61$, $p = 0.01$).

Figure 2

Research model including regression coefficients of all four steps of the Baron and Kenny method (1986) to test for mediation. Step 1 = c , Step 2 = a , Step 3 = b and Step 4 = c' .

** $p < .01$.



Discussion

This longitudinal study investigated the effect of parental knowledge on delinquent behavior and evaluated whether this relationship was mediated by hanging on the streets with friends and moderated by the level of SES. Results show that parental knowledge predicted adolescent delinquent behavior. The results of this study also indicate that this relationship was partially mediated by hanging on the streets with friends.

The first hypothesis that was tested in this study, a direct negative effect of parental knowledge on delinquent behavior, has been confirmed. Low parental knowledge seemed to be a risk factor of future delinquent behavior, as parental knowledge around age 14 predicted more delinquent behavior at age 16, while controlling for delinquency at age 14. This is consistent with previous findings showing that less parental knowledge predicted more delinquent behavior (Abar, Jackson & Wood, 2014; Fletcher et al., 2004; Pettit et al., 2001). Because there is evidence that suggests that different sources of parental knowledge have different associations with delinquent behavior (Kerr, Stattin, & Burk, 2010; Keijsers et al., 2010), future research should focus more on how parental knowledge is obtained and what sources and types of parental knowledge have the strongest effect on adolescents' delinquent behavior, to really clarify how this mechanism works and how delinquent behavior can be prevented and reduced as best as possible.

In line with hypothesis 2, hanging on the streets with friends partially mediated the effect of parental knowledge on delinquent behavior. A lower level of parental knowledge had an indirect effect on more delinquent behavior among adolescents via more time spent hanging on the streets with friends. This means that adolescents that perceive/experience less parental knowledge were more likely to hang on the streets with friends, which in turn predicted more delinquent behavior at age 16. However, this mediating effect was weak, so it should be interpreted with caution.

This finding is in line with previous studies, revealing an association between parental knowledge and unsupervised activities, of which hanging on the streets with friends is an example (Osgood & Anderson, 2004; Borawski et al., 2003); and an association between these unsupervised activities and delinquent behavior among adolescents (Osgood et al., 1996; Osgood & Anderson 2004; Maimon & Browning, 2010). These findings already suggested a possible indirect effect of parental knowledge on delinquent behavior, via unsupervised and unstructured activities. Walters (2018) found supporting evidence for this indirect relationship, and the present study confirmed this finding.

However, not much research has been done on specific unsupervised activities. Therefore, this study aimed to investigate whether the unsupervised activity hanging on the streets with friends has a large mediating effect and therefore is a risk factor of adolescent delinquent behavior. Because a significant, although small, effect was found, it is important to further investigate this relationship. In addition to this, it is important to investigate more unsupervised activities (e.g. partying, riding around in a car for fun, getting together with friends) in order to identify the unsupervised activities that have the strongest effect. These unsupervised activities could then be included in future policymaking and prevention programmes like ‘Ouders van Tegendraadse Jeugd’ (OvTJ), which only focus on parental influence, in order to prevent delinquent behavior among adolescents more effectively.

The third hypothesis that was tested in this study, was the moderating effect of SES on the relationship between parental knowledge and delinquent behavior among adolescents. Results showed no interaction effect between parental knowledge and SES. This indicates that the effect of parental knowledge on delinquent behavior does not differ between different levels of SES. Low levels of parental knowledge predict more delinquent behavior among adolescents, but this effect is not stronger for adolescents with a low SES.

There have not been many studies investigating whether SES moderates the relationship between parental knowledge and delinquent behavior. The present study focused on this gap in the literature and found that SES does not moderate this relationship. This study also did not find a direct effect of SES on delinquent behavior among adolescents, indicating that there are no differences in delinquent behavior among adolescents from varying SES backgrounds. This is not in line with findings of previous studies, which did find SES to be a significant predictor of delinquent behavior among adolescents (Rekker et al., 2015; Bjerck, 2007; Jarjoura, Triplett & Brinker, 2002). It is possible that this study did not find any effects of SES on delinquent behavior because the adolescents who participated were too young of age and therefore engaged in too little delinquent behavior.

Future research should include adolescents with varying ages, as older adolescents possibly engage in more delinquent behavior.

Strengths and Limitations

This study used data of the TRAILS study, a well-known longitudinal study. Using this data resulted in a number of advantages: longitudinal data, which made it possible to investigate causality; a big sample size, consisting of more than 2200 participants; and a well-designed selection process and representative sample of the study population, which make the findings generalizable.

Besides these strengths, there were also some limitations to this study. The assumptions of linearity, homoscedasticity and normality were not met, possibly resulting in bias in the interpretation of results. A reason for the skewed data could be that delinquent behavior is not yet strongly present at age 16 (mean = 0.26), making the group that engages in delinquent behavior very small. In addition, all study variables were measured using self-report questionnaires, possibly making the data biased. Williams & Nowatzki (2005) investigated the validity of adolescent self-report of substance use and found that 28% of the self-reports did not match test results. A meta-analysis on social desirability response bias in self-report found that in 43% of the studies that tried to control for social desirability, socially desirable responding influenced the results (Van de Mortel, 2008). These findings suggest that the validity of (adolescent) self-report is questionable. However, in the present study, the usage of adolescent self-report of parental knowledge, hanging on the streets with friends and delinquent behavior

was probably more accurate and less biased than when parental reports would have been used. Parents would then have reported on unsupervised activities of their children, of which they obviously know less than the children themselves because they are not present at these activities. This would have caused biased data. In addition to this, parents with low parental knowledge who report on their child's behavior would also have caused biased data, and thus results. Both options (self-report and parental report) would probably have resulted in biased data, but adolescent self-report causing the least bias. Another limitation was that there was some overlap between parental knowledge and hanging on the streets with friends, as 2 items of the parental knowledge scale measured how much the parents know about where their children hang out after school and what they do in their spare time. This may have resulted in biased results. Future research should be aware of this and consider changing these items or removing them from the scale. Another limitation was that both parental knowledge (predictor) and hanging on the streets with friends (mediator) were measured at T2. This means that no causal relationship could have been established between parental knowledge and hanging on the streets with friends, which makes a test for true mediation impossible.

Future research should keep these limitations in mind and try to overcome and reduce them in order to come up with more accurate and reliable results.

Conclusion and Implications

In the present study we investigated the relationship between parental knowledge and delinquent behavior among adolescents, and whether there is an indirect effect via the unsupervised activity hanging on the streets with friends. The goal was to gain more knowledge about the risk factors of adolescent delinquent behavior and the underlying mechanisms. Information on and knowledge of the possible mechanisms how these risk factors operate in relation to delinquency can contribute to the development of (more) effective prevention efforts in reducing delinquent behavior in adolescence. Results showed that low levels of parental knowledge predict higher levels of delinquent behavior among adolescents and thus confirmed findings of earlier research (Abar, Jackson & Wood, 2014; Fletcher et al., 2004; Pettit et al., 2001). This finding can assist in developing policies and planning interventions regarding reducing and preventing delinquent behavior among adolescents. Future policies and interventions should focus on the role of parents and parental knowledge in the development of delinquent behavior among adolescents.

The intervention program ‘Ouders van Tegendraadse Jeugd’ (OvTJ) already focuses on the role that parents play in the development of adolescent delinquent behavior. It aims to prevent and reduce adolescent delinquent behavior and recidivism by strengthening parenting skills like supervising, positive reinforcement and parental involvement). Boendermaker et al. (2010) evaluated this intervention program and found it to be effective in reducing adolescent delinquent behavior and recidivism, through the improvement of parenting skills.

In addition, the present study also found an indirect effect of parental knowledge on adolescent delinquent behavior, via the unsupervised (and unstructured) activity hanging on the streets with friends. This mediating effect, although small, showed the influence of leisure time, unsupervised (peer oriented) activities and peer influence on adolescent delinquent behavior. This finding may also be of value in developing policies and planning interventions regarding reducing and preventing adolescent delinquent behavior. Future policies should focus on the role of unsupervised (and unstructured) activities and leisure time in general; and peer influence in the development of delinquent behavior among adolescents. The intervention program ‘Alleen jij bepaalt wie je bent’ (AJB) already focuses on the role of unsupervised (and unstructured) leisure time and (delinquent) peers in the development of delinquent behavior among adolescents. The intervention aims to strengthen protective factors (e.g. structured leisure time for adolescents) and reduce risk factors (e.g. delinquent peers/friends) of delinquent behavior. An evaluation study on the effectiveness of the intervention program found a positive short term effect, meaning that participants of the intervention engaged in less delinquent behavior after the intervention (Gubbels, van der Put & Stams, 2018)

The present study showed that parents and peers both seem to play an important role in the development of adolescent delinquent behavior. Therefore it is important that future research, policies and intervention programmes regarding reducing and preventing delinquent behavior among adolescents do not only focus on either parents or peers, like the above mentioned intervention programmes, but on the interplay of both. ‘Multidimensional Family Therapy’ (MDFT) is an intervention program that uses such a combined approach, focusing not only on the adolescent itself but also on the adolescents’ social environment, which includes the parents, family, friends and peers. It aims to reduce adolescent delinquent behavior and to prevent recidivism of adolescent delinquents by improving communication and interaction between the parents and the child, providing more structured leisure time for the adolescent and encouraging

the adolescent to drop delinquent friends and find more positive friends. The intervention is proven to be effective in reducing adolescent delinquent behavior (Rigter et al., 2015).

This study supports the use of the MDFT intervention and recommends intervention planners and policy makers to develop more interventions with a combined approach like MDFT, focusing on the interplay of parents and peers, to prevent and reduce delinquent behavior among adolescents.

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