

A Between- and Within-Person Analysis of Parenting and Time Spent in Criminogenic Settings During Adolescence: The Role of Self-Control and Delinquent Attitudes

Youth & Society

2018, Vol. 50(2) 229–254

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DOI: 10.1177/0044118X16636138

journals.sagepub.com/home/yas



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Abstract

Although spending time in criminogenic settings is increasingly recognized as an explanation for adolescent delinquency, little is known about its determinants. The current study aims to examine the extent to which (change in) self-control and (change in) delinquent attitudes relate to (change in) time spent in criminogenic settings, and the extent to which they mediate the effects of (change in) parenting. Time spent in criminogenic settings was measured comprehensively, by including social and physical characteristics of micro settings (200 × 200 meters). Multilevel structural equation models on two waves of panel data on 603 adolescents (aged 12–19) showed that self-control and delinquent attitudes contributed to between-person differences

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in time spent in criminogenic settings. Within-person increases in time spent in such settings were predicted by increased delinquent attitudes. For indirect effects, self-control partially mediated between-person effects of parenting, whereas delinquent attitudes partially mediated both between- and within-person effects.

Keywords

time spent in criminogenic settings, parenting, self-control, delinquent attitudes, unstructured socializing

Scholars have increasingly recognized that spending time in certain settings is linked to involvement in deviant and delinquent behavior (e.g., Osgood & Anderson, 2004; Osgood, Wilson, O'Mally, Bachman, & Johnston, 1996; Warr, 2005; Weerman, Bernasco, Bruinsma, & Pauwels, 2013; Wikström, Ceccato, Hardie, & Treiber, 2010; Wikström, Oberwittler, Treiber, & Hardie, 2012). Nevertheless, little is known about the determinants of spending time in criminogenic settings. The present study attempts to address this gap in the literature by examining the role of *parenting*, *self-control*, and *delinquent attitudes* as predictors of *time spent in criminogenic settings*.

Criminogenic Settings

During adolescence, as a result of increasing mobility and freedom, young people expand their activity fields and spend a considerable amount of their leisure time outside their residential neighborhood (Simons, Burt, Barr, Lei, & Stewart, 2014; Wikström et al., 2012). They gain greater agency in selecting the settings where they spend their time and come into contact with a wider range of social contexts (Osgood, Anderson, & Shaffer, 2005; Wikström et al., 2012). Certain characteristics of settings can encourage or discourage involvement in delinquency (Augustine & Felson, 2015).

One characteristic of a setting that may be particularly criminogenic is the level of disorder. According to the broken window perspective (Kelling & Wilson, 1982), higher levels of *physical disorder* (i.e., litter, graffiti, poorly maintained houses) lead to more disorder and criminal behavior. The presence of signs of physical disorder may communicate to potential offenders a lack of social control over a particular area, which might reduce the perceived risk of being caught when committing a crime

In addition, the type of activity that adolescents engage in can encourage or discourage involvement in delinquency. Weerman (2011), for example,

has shown that changes in time spent with peers were not related to delinquent behavior, but a measure of time spent with peers including publicly hanging out on the street was related to delinquent behavior. This indicates that *what* adolescents are doing with their peers and *where* they are doing it are two important factors that influence the likelihood of involvement in criminal behavior.

Osgood et al. (1996) applied the routine activity perspective (Cohen & Felson, 1979) on individual deviance and theorized that spending time unsupervised and unstructured with peers in the absence of adult authority increases the risk of offending. Although this perspective is not specifically aimed at explaining adolescent delinquency, unstructured socializing particularly applies during the period of adolescence. The idea is that the presence of peers makes criminal behavior easier to conduct and more rewarding, whereas the absence of adult supervision generates low social control. Furthermore, unstructured socializing leaves time available for crime involvement as it provides little constraints for how time is spent (Osgood et al., 2005; Osgood et al., 1996).

Several studies have shown that combinations of the presence of peers, absence of authority figures, and involvement in an unstructured activity are related to adolescents' offending (Haynie & Osgood, 2005; Maimon & Browning, 2010; Miller, 2013; Osgood & Anderson, 2004; Osgood et al., 1996; Riley, 1987; Wikström et al., 2010; Wikström et al., 2012). Moreover, recent studies have found that unstructured socializing at public locations and in areas with high levels of disorder and low levels of collective efficacy are most strongly related to higher levels of adolescent delinquency (Hoeben & Weerman, 2014; Weerman et al., 2013; Wikström et al., 2010). Following the ideas from previous studies, we assume that time that is spent unstructured and unsupervised with peers in settings with high levels of physical disorder is particularly conducive for criminal behavior.

Although scholars have increasingly recognized the role of time spent in criminogenic settings as cause of adolescent involvement of delinquency, the question that remains unanswered is why adolescents spent time in criminogenic settings. In the current study, we consider how parenting is directly and indirectly, through self-control and delinquent attitudes, related to the amount of time adolescents spend in criminogenic settings.

Parenting

Parents almost universally disapprove of delinquent behavior of their children. One primary way in which parents can prevent their children from getting into trouble is by attempting to restrict their exposure to opportunities for

delinquency (Warr, 1993). Three key constructs of parenting that have emerged as critical for adolescent development are *parental monitoring*, *parental limit-setting*, and *the quality of the parent–adolescent relationship* (Dishion & Patterson, 2006; Smetana, Campione-Barr, & Metzger, 2006; Wright & Cullen, 2001). A recent study has shown that adolescents who perceive more parental monitoring, more parental limit-setting, and a relationship of better quality with their parents spend less time in criminogenic settings (Janssen, Deković, & Bruinsma, 2014). Beyers, Bates, Pettit, and Dodge (2003) also found that less parental monitoring was associated with more unsupervised time out in the community. Persson, Kerr, and Stattin (2007) indicated that negative experiences of parent–child interactions predicted switching from structured leisure activities to hanging out in the street, supporting the idea that adolescents with negative experiences at home avoid adult-led, structured contexts.

However, parental influence on adolescent behavior can also operate indirectly (Simons, Simons, Chen, Brody, & Lin, 2007). In the present study, we examined the extent to which the associations between three parenting dimensions and time spent in criminogenic settings are mediated by the level of self-control and delinquent attitudes. It has been theorized, and empirically demonstrated, that both self-control and delinquent attitudes are affected by parenting behavior (Grusec, 2011; Pardini, Loeber, & Stouthamer-Loeber, 2005; Pratt, Turner, & Piquero, 2004). Children who perceive a better relationship with their parents, who are monitored by their parents, and who receive punishment for misbehavior are expected to develop self-control and internalize norms better than others (Gottfredson & Hirschi, 1990). Similarly, children who are securely attached to their parents will try to avoid parental disapproval or disappointment (Hirschi, 1969; Warr, 2005).

Self-Control and Delinquent Attitudes

In accordance with recent studies (Bernburg & Thorlindsson, 2001; Simons et al., 2014; Wikström et al., 2012), we assume that individuals develop personal characteristics and preferences that influence their participation in criminogenic settings. We hypothesize that two prominent individual predictors of crime involvement, *self-control* and *delinquent attitudes*, also predict time spent in criminogenic settings. As adolescents with low self-control and delinquent attitudes are more prone to breaking rules, we expect that they are also more likely to spend time in settings where delinquent behavior is more likely to occur. Adolescents with lower levels of self-control are expected to spend more time in criminogenic settings as they have a greater tendency to seek risks and fail to consider the consequences that their behavior may bring

than adolescents with higher levels of self-control (Gottfredson & Hirschi, 1990; Grasmick, Tittle, Bursik, & Arneklev, 1993). Furthermore, adolescents high in impulsiveness and thrill seeking are likely to choose leisure contexts that are characterized by the absence of adults (Persson, Kerr, & Stattin, 2004). Delinquent attitudes refer to an individual's beliefs about whether delinquent acts constitute acceptable or unacceptable behavior (Pardini et al., 2005). Adolescents who consider delinquent behavior as acceptable are expected to spend more time in settings that offer opportunities to engage in delinquency (Simons et al., 2014). Adolescents with low self-control and delinquent attitudes tend to dislike settings that involve discipline, adult supervision, or other constraints on their behavior, and tend to like to participate in risky activities and environments (Gottfredson & Hirschi, 1990; Turanovic & Pratt, 2014).

The selection of individuals into settings is often viewed as a potential source of bias (Simons et al., 2014; Wikström et al., 2010; Wikström et al., 2012). If individuals with low self-control and delinquent attitudes select themselves into criminogenic settings, an effect of time spent in criminogenic settings on delinquent behavior might be confounded. However, in the present study, the processes by which individuals come to take part in criminogenic settings, in accordance with previous work, are viewed as an important mechanism of substantive interest instead of as a potential source of bias (Bernburg & Thorlindsson, 2001; Sampson, 2012; Simons et al., 2014; Wikström et al., 2012).

Present Study

It has been theorized and empirically demonstrated that time spent in certain settings is related to adolescents' offending. However, there is little research that focuses on the determinants of time spent in criminogenic settings. The present study attempts to fill this gap by examining (a) the extent to which (changes in) parenting are directly related to (change in) time spent in criminogenic settings and (b) the extent to which (changes in) self-control and delinquent attitudes can explain the associations between (change in) parenting and (change in) time spent in criminogenic settings. A conceptual model representing these relations is presented in Figure 1.

The current study contributes to the existing literature in several ways. First, whereas most previous studies used general questionnaires about how many hours per week of unsupervised time adolescents spend with peers away from home (Osgood & Anderson, 2004; Osgood et al., 2005; Osgood et al., 1996; Siennick & Osgood, 2012), we used space-time budget data to measure time spent specifically in criminogenic settings. This has the advantage of providing

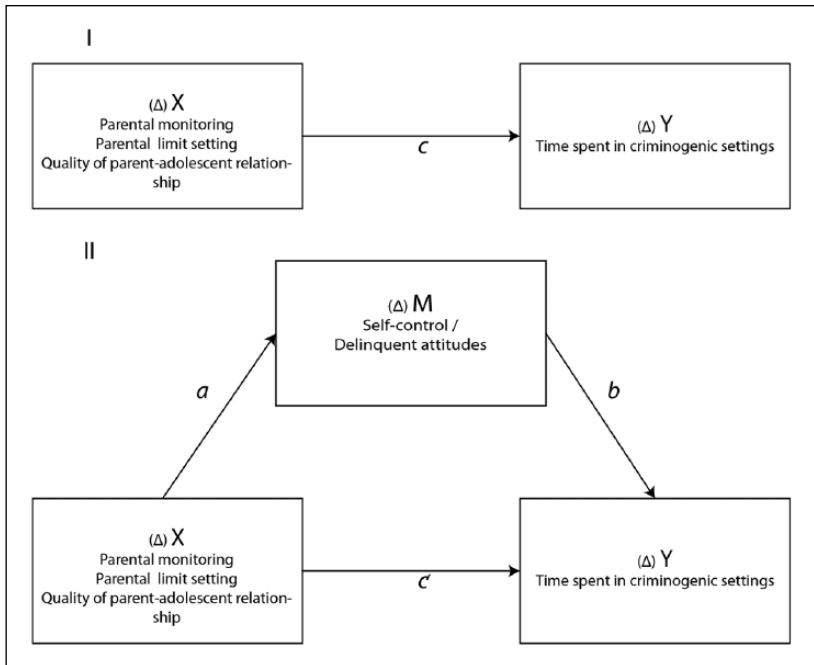


Figure I. Conceptual model for (I) the effect of parenting on time spent in criminogenic settings and (II) for the mediation effects by self-control and delinquent attitudes.

a comprehensive measure of respondents' activities. Measuring respondents' activities using questionnaire items might be problematic as respondents may find it difficult to estimate how long they were engaged in an activity across the day (Hoeben, Bernasco, Weerman, Pauwels, & Van Halem, 2014). The space-time budget method, as used in the present study, provides detailed information about where, when, and what respondents were doing with whom for every hour during 4 days of the week before the interview (Wikström et al., 2010; Wikström et al., 2012). Second, unique to the space-time budget data, compared with questionnaire items asking "how often" a person spends time in a setting, is that the geographical location for each hour is recorded. Therefore, these data can be geographically matched to data about characteristics of the settings, providing more detail on the setting where unstructured socializing occurs. To achieve this, the space-time budget data were combined with data from *systematic social observation* (Sampson & Raudenbush, 1999) about the level of physical disorder of the small geographical units.

Third, small geographical places of 200×200 meters (0.04 square kilometers) were used to measure the exact spatial setting. We followed the recent perspective in criminological literature studying small micro units instead of large geographical units of analysis such as neighborhoods (Weisburd, Bernasco, & Bruinsma, 2009; Weisburd, Groff, & Yang, 2012). These small units of analysis are a better approximation of behavioral settings than larger units as they are more likely to be homogeneous in physical and social characteristics (Oberwittler & Wikström, 2009).

Fourth, studies rarely examine multiple parenting dimensions simultaneously to determine their relative importance in explaining adolescent delinquency (Simons et al., 2007). The present study included three key constructs of parenting (i.e., parental monitoring, parental limit-setting, and the quality of the parent-adolescent relationship) that have emerged as critical for adolescent development to examine their relative contribution to explaining the amount of time spent in criminogenic settings.

Finally, it is important to take change into account when examining behavior during critical developmental phases, such as adolescence (Wikström & Treiber, 2009). Using two waves of panel data from the Study of Peers, Activities, and Neighborhoods (SPAN), we were able to examine change over time.

Method

Sample

The SPAN is a longitudinal study consisting of two waves of data collection, conducted by the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR). The first wave of data collection was conducted in 2008/2009 (T1) and the second wave was conducted 2 years later, in 2010/2011 (T2) among adolescents (11-17 years of age at T1) in The Hague and its neighboring suburbs in the Netherlands. Forty schools for secondary education were approached in the first wave, with 10 schools agreeing to participate in the study. Comparisons of the approached schools with the schools that agreed to participate do not show differences in school size or geographical location. However, the schools that participated were more often schools with vocational training (lower secondary education) or with pre-university (higher secondary education), and relatively fewer schools with higher general secondary education (middle category; see Bernasco, Ruiter, Bruinsma, Pauwels, & Weerman, 2013).

In total, 615 adolescents (52% boys) participated fully in both waves of the study and completed both the questionnaire and the space-time budget interview; the follow-up response rate at T2 was 73%. Those who exited the

study were more often male ($t = 2.383, p = .018$), older ($t = -8.099, p = .000$), and scored lower on parental monitoring ($t = 4.608, p = .000$) and parental limit-setting ($t = 3.686, p = .000$) than those who remained in the study. No significant differences were found for the quality of the parent–adolescent relationship ($t = 1.884, p = .060$), or the amount of time adolescents spent in criminogenic settings ($t = -1.659, p = .098$). The sample included a relatively high proportion of ethnic minority adolescents (47%), and a relatively high proportion of adolescents from lower forms of secondary education (see, for more details, Bernasco et al., 2013; Weerman et al., 2013).

The systematic social observations were only carried out in The Hague and its suburbs. Therefore, the level of disorder could not be determined for the hours spent outside this area. To retain comparability across the respondents, only those with complete information were included in the analyses. This resulted in a final sample of 603 respondents, where the amount of time spent in criminogenic settings was known for at least one of the two time points. Comparing the 12 respondents who were excluded from the final sample to the 603 respondents who remained in the sample indicates that these 12 respondents perceived significantly less parental monitoring ($t = 3.941, p = .000$), less parental control ($t = 2.370, p = .018$), and had more delinquent attitudes ($t = -2.729, p = .007$).

Dependent Variable

Two research instruments from the SPAN were used to measure time spent in criminogenic settings: a space-time budget interview and systematic social observation. The *space-time budget interview* is a structured personal interview, which was conducted individually and face-to-face with the respondents. The instrument was originally developed by Wikström and Butterworth (2006) in the Peterborough Youth Study and refined in its successor, the Peterborough Adolescent Delinquency Study (PADS+). During the interview, the activities of the adolescent during each hour of four recent days (always including the previous Friday and Saturday) were recorded, including the nature of the main activity (e.g., sports, learning), the function of the place (e.g., soccer field, school), persons present in the setting (e.g., teacher, parents), and the geographical location (see also Bernasco et al., 2013).

To record the geographical locations of the respondent, detailed colored maps of The Hague and its neighboring suburbs were used, on which the respondents indicated their geographical location during each hour. The maps were overlaid with a numbered grid of 200×200 meters (0.04 square kilometers), to assist respondents in communicating their whereabouts with greater precision.

In addition, to assess the level of the physical disorder of the settings, *systematic social observation* was carried out during the first half of 2012. The same grid of 200×200 meters that overlaid the maps of The Hague on which the respondents indicated their locations, was used to select the locations for the systematic social observation. With the address closest to the centroid of the grid cell as starting point, a street segment of 100 meters in each grid cell (200×200 meters) was observed.

Physical disorder was measured by trained observers using a checklist based on the instrument used by Raudenbush and Sampson (1999) consisting of 13 items (e.g., “How much trash or broken glass is on the street or sidewalks?”) using a 3-point scale from 0 (*none*) to 2 (*more than one*). Internal consistency was moderate with a Cronbach’s alpha of .62. The scores on physical disorder ranged from 9 to 20.5 ($M = 13.67$, $SD = 2.12$). An area was indicated as highly disordered if it belonged to the top 25% of locations with the highest scores (>15) on physical disorder.

The research area consisted of 4,561 grid cells, of which a sample of 1,422 grid cells was selected for observation. We used the geostatistical method of kriging to interpolate the level of physical disorder at the unobserved locations. The level of physical disorder at an unmeasured location is estimated using observed values at surrounding locations weighted according to the spatial covariance structure in the data and the distance between points (Bivand, 2008).

Time spent in criminogenic settings was measured by the total number of hours (of the 4 days covered by the space-time budget interviews) spent in unstructured socializing with peers, without supervision in settings of high disorder. For each respondent, we summed the number of hours that met all the following conditions: Time was spent with at least one peer, in the absence of authority figures, included socializing or “hanging around” as the main activity, and was spent outside a residence in a setting with high physical disorder.

Independent Variables

The *self-report questionnaire* from the SPAN was used to measure perceived parenting, self-control, and delinquent attitudes. Table A1 in the appendix includes all the items included in the scales. The questionnaire was administered individually in groups of four adolescents, supervised by a research assistant during a school hour of approximately 45 to 50 minutes.

Parental monitoring was measured by a summary construct based on the scale developed by Kerr and Stattin (2000; Stattin & Kerr, 2000) consisting of five items asking whether the adolescent has to inform his parents about his

whereabouts (e.g., “If I go out, my parents want me to tell them where I go, with whom and what I’m going to do”) using a 5-point scale from 0 (*totally disagree*) to 4 (*totally agree*). Cronbach’s alpha was .77 at T1 and .82 at T2.

Parental limit-setting is a summary construct based on the scale developed by Wikström and Butterworth (2006) consisting of four items that reflect the extent to which parents intervene in rule-breaking behavior (e.g., “If you had been beating up or threatening somebody at school, your parents would tell you off or punish you”) using a 5-point scale from 0 (*totally disagree*) to 4 (*totally agree*). Cronbach’s alpha was .62 at T1 and .58 at T2.

The quality of the parent–adolescent relationship was based on the scale developed by Wikström and Butterworth (2006) and measured by seven items (e.g., “Do you talk to your parents when you have a problem or feel sad about something?”) using a 4-point scale from 0 (*never*) to 3 (*every day*). Cronbach’s alpha was .68 at T1 and .70 at T2.

Mediators

Self-control was a summary construct based on the scale developed by Grasmick et al. (1993) and consists of 10 items asking about the respondent’s general behavior (e.g., “I sometimes find it exciting to do things that may be dangerous”) using a 5-point scale from 0 (*totally agree*) to 4 (*totally disagree*). The scale ranged from 0 to 40 and higher scores indicated higher levels of self-control. Cronbach’s alpha was .75 at T1 and .72 at T2.

Delinquent attitudes indicated the adolescent’s beliefs about the acceptability of several delinquent acts. The construct was based on the scale that was developed by Loeber, Farrington, Stouthamer-Loeber, and Kammen (1998) and consisted of 16 items asking the respondent about how wrong it would be for someone his age to engage in the behavior (e.g., “Ride a bike through red light”) using a 4-point scale from 0 (*not wrong at all*) to 3 (*very wrong*). The scale ranged from 0 to 64 and was reversed so that higher scores indicated more delinquent attitudes. Cronbach’s alpha was .91 at T1 and .88 at T2.

Control Variables

Following the definition of Statistics Netherlands (2014), ethnicity was measured by two dummy variables with Dutch origin as reference category. Non-Western origin indicates that at least one parent is born in Africa, South America, Asia (excluding Indonesia and Japan), or Turkey. Western origin indicates that at least one parent is born in Europe (excluding Turkey), North America, Oceania, Indonesia, or Japan. Gender is measured with a dummy variable with girls as reference category, and age at T1 is measured in years.

In addition, we included a dummy variable that indicated whether the respondent was living in an area of high disorder, as for some adolescents, settings with high physical disorder may be all around their homes, whereas others have to travel some distance. In total 30.5% of the respondents lived in an area with high physical disorder.

Analytical Approach

As a first step, to examine how the assessed variables in general changed over time, we reported two different types of stability (Forehand & Jones, 2002; Loeber et al., 2000). Absolute stability is examined by comparing mean values across both waves. Relative stability was examined by stability coefficients, which represent correlations over time. Second, to examine between-person and within-person effects simultaneously, we applied multi-level structural equation modeling in Mplus (Version 7, Muthén & Muthén, 1998-2012). The multilevel structure consists of time (Level 1) nested in persons (Level 2). Because the dependent variable of time spent in criminogenic settings was a highly right skewed count variable, negative binomial models were estimated using maximum likelihood estimation with robust standard errors (Hox, Maas, & Brinkhuis, 2010; Yuan & Bentler, 1998). To estimate the indirect effects, we followed the approach of Hayes (2009), which goes beyond the approach of Baron and Kenny (1986) by providing statistical tests of mediation. The indirect effects are estimated in Mplus by multiplying the coefficients of path *a* and path *b*. The standard errors of the indirect effects are estimated using the multivariate delta method (Bollen, 1987).

For each independent variable, two variables were constructed: a between-person variable and a within-person variable. The between-person variables were computed by averaging the scores across both waves for each respondent (Hoffman & Stawski, 2009; Snijders & Bosker, 1999). The within-person variables specify the deviation from the score at T1 (Snijders & Bosker, 1999). Thus, the Level 1 model addressed within-person change in the amount of time spent in criminogenic settings, whereas the Level 2 model explains time-stable differences between individuals.

Three separate multilevel path models were analyzed. In Model 1, we examined the extent to which (change in) parenting predicts (change in) time spent in criminogenic settings (path *c* in Figure 1). To disentangle the individual mediating effects of self-control and delinquent attitudes, we estimated two separate mediation models. In Model 2, we examined the extent to which (change in) self-control mediated the relations between (change in) parenting and (change in) time spent in criminogenic settings. Finally, in Model 3 we examined the extent to which (change in) delinquent attitudes

mediated the relations between (change in) parenting and (change in) time spent in criminogenic settings.

The incidence rate ratio (IRR) was reported for the negative binomial analyses with time spent in criminogenic settings as the outcome variable (paths *b*, *c'*, and *c*). An IRR is the exponentiated value of the coefficient that can be interpreted as follows: An IRR of .95 indicates that for every one unit increase in the independent variable, the expected count of the dependent variable changes by .95 (Hilbe, 2011).

Results

Descriptive Statistics

A large proportion of the respondents (56%) did not spend any time in a criminogenic setting in either wave of data collection. At T1, respondents spent 0.2 hours on average per day in criminogenic settings, with a range from 0 to 5.5 hours. At T2, respondents spent 0.3 hours on average per day in criminogenic settings (which is a significant increase from T1 $t = -3.664$, $p < .001$), with a range from 0 to 5 hours per day.

Means, standard deviations, stability coefficients, and Spearman's rank correlations between all variables are reported in Table 1. The stability coefficients, which indicate relative stability, on the diagonal line in Table 1 indicate that on average, parenting, the level of self-control, and delinquent attitudes were relatively stable over time, ranging from .44 to .57. The stability coefficient of time spent in criminogenic settings was lower (.25). A comparison of mean levels of the assessed variables at both waves, to examine absolute stability, indicated that on average, parental monitoring decreased ($t = 3.866$, $p < .001$) and that delinquent attitudes ($t = 7.771$, $p < .001$) increased over time. In general, there were no significant differences over time in parental limit-setting ($t = 0.484$, $p = .629$), the quality of the parent-adolescent relationship ($t = 1.464$, $p = .143$), and self-control ($t = -1.662$, $p = .097$).

Parenting and Time Spent in Criminogenic Settings

Results of the multilevel path models are shown in Table 2. Model 1 corresponds with path *c* in Figure 1 and includes the parenting and control variables as predictors of the amount of time spent in criminogenic settings. The between-person results showed that adolescents who report more parental monitoring (IRR = .90) and more parental limit-setting (IRR = .80), and adolescents who had a better quality relationship with their parents (IRR = .94) spent less time in criminogenic settings. Older respondents and respondents

Table 1. Descriptives and Spearman's Correlations at T1 and T2.

	Parental monitoring	Parental limit-setting	Quality of relationship	Self-control	Delinquent attitudes	Time spent in criminogenic settings	M	SD
Parental monitoring	.440	.438	.323	.232	-.465	-.223	17.35	4.05
Parental limit-setting	.433	.458	.223	.219	-.353	-.192	16.86	2.66
Quality of relationship	.179	.193	.557	.286	-.372	-.111	23.05	3.30
Self-control	.183	.231	.310	.548	-.281	-.209	29.74	6.35
Delinquent attitudes	-.358	-.355	-.274	-.303	.567	.215	30.06	9.06
Time spent in criminogenic settings	-.232	-.251	-.186	-.142	.234	.254	.73	1.93
M	16.36	16.61	22.76	30.34	35.06	1.22	—	—
SD	4.56	2.25	3.42	5.76	8.17	2.43	—	—

Note. The values above the diagonal represent correlations and descriptive statistics at T1, the values below the diagonal represent correlations and descriptive statistics at T2, the values on the diagonal represent stability coefficients. All correlations are significant at $p < .01$.

Table 2. Multilevel Structural Equation Models Predicting Time Spent in Criminogenic Settings ($N = 603$).

	Model 1		Model 2 M = Self-control		Model 3 M = Delinquent attitudes	
	Between	Within	Between	Within	Between	Within
Direct effects	path c		path c'		path c'	
Parental monitoring → Y	-.102*** (.028)	-.018 (.021)	-.094*** (.028)	-.012 (.021)	-.078*** (.025)	-.018 (.018)
Parental limit- setting → Y	-.112** (.040)	-.095** (.037)	-.094*** (.038)	-.098** (.037)	-.060 (.037)	-.051 (.032)
Quality of relationship → Y	-.057* (.027)	-.093** (.032)	-.044 (.027)	-.086** (.032)	-.025 (.026)	-.073** (.026)
Parental monitoring → M	—	—	path a		path a	
			.191** (.071)	.018 (.057)	-.703*** (.090)	-.266*** (.073)
Parental limit- setting → M	—	—	.315** (.116)	.223* (.100)	-.500** (.160)	-.721*** (.134)
Quality of relationship → M	—	—	.526*** (.071)	.358*** (.082)	-.523*** (.113)	-.460*** (.114)
M → Y	—	—	path b		path b	
			-.047** (.016)	.011 (.016)	-.058*** (.012)	-.043** (.013)
Indirect effects			path a × b		path a × b	
Parental monitoring → M → Y	—	—	-.009* (.004)	.000 (.001)	-.040*** (.010)	-.011* (.005)
Parental limit- setting → M → Y	—	—	-.015* (.007)	.002 (.004)	-.029** (.011)	-.031** (.010)
Quality of relationship → M → Y	—	—	-.025** (.009)	.004 (.006)	-.030*** (.008)	-.020* (.008)
Control variables						
Gender (reference = girl)	-.116 (.162)	—	-.201 (.160)	—	-.250 (.152)	—
Age TI	.288*** (.050)	—	.300*** (.048)	—	.292** (.049)	—
Ethnicity (reference = Dutch)						
Non-Western	.343 (.201)	—	.284 (.197)	—	.513** (.190)	—
Western	.014 (.275)	—	-.038 (.261)	—	-.059 (.242)	—
Residential area high disorder	.554** (.206)	—	.526** (.199)	—	.758*** (.202)	—

Note. Unstandardized coefficients. All coefficients of the direct paths to time spent in criminogenic settings represent changes in the expected log count. Robust standard errors in parentheses. Y = time spent in criminogenic settings. In Model 2, M = self-control. In Model 3, M = delinquent attitudes.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

who lived in an area with higher levels of physical disorder spent more time in criminogenic settings. The within-person estimates indicated that decreases in parental limit-setting ($IRR = .90$) and in the quality of the parent–adolescent relationship ($IRR = .91$) were related to increases in the amount of time spent in criminogenic settings. Changes in parental monitoring were not related to changes in the amount of time spent in criminogenic settings.

Model 2 included self-control as a mediator, whereas Model 3 included delinquent attitudes as a mediator of the associations between parenting and time spent in criminogenic settings. In both models, the remaining effects of parenting are very similar. The between- and within-person estimates of the parenting variables slightly changed in magnitude, but remained unchanged in direction and significance (corresponding with path c' in Figure 1).

Self-Control as Mediator

The between-person estimates representing path a in Figure 1 reveal that all parenting dimensions were related to self-control. Adolescents who reported more parental monitoring, more parental limit-setting, and a relationship of higher quality with their parents also reported higher levels of self-control. The within-person estimates showed that decreases in parental limit-setting and in the quality of the parent–adolescent relationship were related to decreases in self-control. A decrease in parental monitoring, however, was not related to a decrease in the level of self-control.

Adolescents with higher levels of self-control spent less time in criminogenic settings ($IRR = .95$) than those with lower levels of self-control, which corresponds with path b in Figure 1. However, the within-person estimates showed that change in self-control was not related to change in the amount of time spent in criminogenic settings.

As a final step, we estimated the indirect paths (path $a \times b$ in Figure 1) from parenting to time spent in criminogenic settings by self-control. The between-person results showed that self-control mediates the relations between parenting and time spent in criminogenic settings. This means that adolescents with more parental monitoring, more parental limit-setting, and a relationship of higher quality with their parents spent less time in criminogenic settings, and this could partially be explained by their higher levels of self-control. The within-person indirect effects were not statistically significant, meaning that changes in self-control could not explain the relations between changes in parental limit-settings and the quality of the parent–adolescent relationship, and time spent in criminogenic settings.

Delinquent Attitudes as Mediator

All parenting dimensions were related to delinquent attitudes (path *a* in Figure 1). Adolescents who reported less parental monitoring, less parental limit-setting, and a relationship with their parents of lower quality, reported to be more tolerant toward delinquent behavior. Furthermore, the within-person effects demonstrated that change in parenting is related to change in delinquent attitudes. Decreases in parental monitoring, parental limit-setting, and the quality of the parent–adolescent relationship over time were related to increases in tolerance toward delinquent behavior.

Adolescents who were more tolerant toward delinquent behavior spent more time in criminogenic settings (IRR = .94) compared with adolescents who were less tolerant toward delinquent behavior, which corresponds with path *b* in Figure 1. Furthermore, change in delinquent attitudes over time was related to change in the amount of time spent in criminogenic settings (IRR = .96). Adolescents who became more tolerant toward delinquent behavior were spending more time in criminogenic settings compared with 2 years earlier.

The indirect effects were estimated to examine mediation effects of parenting on time spent in criminogenic settings by delinquent attitudes (path $a \times b$ in Figure 1). Both the between-person and within-person indirect effects were statistically significant ($p \leq .05$). This means that the associations between (change in) parenting and (change in) time spent in criminogenic settings can be partly explained by (change in) tolerance toward delinquent behavior.

In all models, age was related to time spent in criminogenic settings. Older respondents spent more time in criminogenic settings than younger respondents. In Model 3, ethnicity has a statistically significant effect, indicating that respondents from non-Western origin spend more time in criminogenic settings compared with adolescents from Western or Dutch origin. Gender was not related to time spent in criminogenic settings, which is in line with previous research (Wikström et al., 2012). Living in a setting with high levels of physical disorder was related to spending more time in criminogenic settings.

Discussion and Conclusion

In the current study, we examined the extent to which parenting (i.e., parental monitoring, parental limit-setting, and the quality of the parent–adolescent relationship) is directly related to time adolescents spend in criminogenic settings, and the extent to which self-control and delinquent attitudes mediates

the associations between parenting and the amount of time adolescents spend in criminogenic settings. It is important to understand the factors that increase the chances of spending time in criminogenic settings to reduce the risk of involvement in delinquency associated with this activity.

First, the findings of the present study indicated that parenting was directly related to the amount of time adolescents spent in criminogenic settings. Parental monitoring and parental limit-setting were directly negatively related to the amount of time adolescents spent in criminogenic settings. In addition, change in the quality of the parent–adolescent relationship was directly related to change in the amount of time spent in criminogenic settings. If conflicts at home increase, adolescents might prefer to spend time away from home and parents (Siennick & Osgood, 2012). Furthermore, changes over time in parental monitoring and in parental limit-setting were also directly related to change in the amount of time spent in criminogenic settings. These findings indicate that providing rules and consequences remains important to restrict the amount of time adolescents spend in criminogenic settings.

Second, the findings of the present study indicated that self-control and delinquent attitudes, two important individual predictors of crime, also predict the amount of time spent in criminogenic settings. Adolescents with lower levels of self-control and more delinquent attitudes have a greater tendency to spend time in criminogenic settings. Furthermore, increasing delinquent attitudes over time were related to increases in the amount of time spent in criminogenic settings. Decreases in self-control, however, were not related to increases in time spent in criminogenic settings. These findings only partially support our expectation that individual characteristics (i.e., self-control and delinquent attitudes) are associated with the amount of time spent in criminogenic settings.

Third, self-control and delinquent attitudes also partially mediated the associations between parenting and time spent in criminogenic settings. Adolescents who perceived positive parental control and a warm and supportive relationship with their parents have a higher level of self-control and beliefs that are less tolerant of delinquent behavior (Pardini et al., 2005). If parents discuss the impact of their children's behavior on others, children are more likely to internalize their prosocial norms (Pardini et al., 2005). Furthermore, if parents reduce demonstrating their disapproval of misbehavior, tolerance toward delinquent behavior increases. These findings are consistent with studies on delinquency that found that influences of parenting were partially indirect through attitudes, beliefs, and emotions that parents have fostered in their children (Simons et al., 2007; Unnever, Cullen, & Agnew, 2006).

As with any study, the present study has some limitations that need to be addressed. First, respondents who refused to participate in the second wave were more often male, older, less monitored by their parents, and perceived less parental limit-setting. We have no reason to believe that this somewhat selective dropout biased our results, other than providing relative conservative tests of the associations due to less variance in the assessed variables, and thus fewer chances to find significant associations. Second, it is uncertain whether the amount of time the respondents spent in criminogenic settings during the 4 days covered by the space-time budget interview are representative for the average amount of time they spent in criminogenic settings. However, these space-time budget data provide much more detailed information than questionnaire items used in previous studies (Osgood & Anderson, 2004; Osgood et al., 2005; Osgood et al., 1996; Siennick & Osgood, 2012). Third, parenting is a bidirectional and reciprocal process (Rubin, 2001). Although adolescents react to the behavior of their parents, parents also respond to the behavior of the adolescent (Gault-Sherman, 2012). The analyses in the present study did not take into account that the amount of time adolescents spend in criminogenic settings may affect the type of parenting they receive rather than the other way around. Fourth, when we consider the within-person association between delinquent attitudes and time spent in criminogenic settings, it cannot be ruled out that increased time in criminogenic settings may have affected adolescents' delinquent attitudes.

Despite these limitations, the present study contributed to the literature in several ways. Although time spent in criminogenic settings is increasingly being recognized as an important cause of adolescent delinquency, little is known about its determinants. The present study addressed this gap in the literature by examining the extent to which parenting strategies could possibly prevent adolescents from spending time in criminogenic settings, directly and indirectly by affecting self-control and delinquent attitudes. Identifying and understanding the processes by which people come to take part in criminogenic settings are of prime criminological interest (Wikström et al., 2012). We showed that not only parenting is directly related to the time adolescents spend in criminogenic settings but self-control and delinquent attitudes are also related to the amount of time spent in criminogenic settings, and that these factors partially explain the effects of parenting. This is important information considering the fact that the period of adolescence involves changes in the parent-child interactions (Kreppner, 2001; Mulvey, 2014; Steinberg & Silk, 2002). Adolescents generally strive for more freedom and independence from their parents, which makes it more challenging for parents to control and monitor the adolescent's behavior and activities (Steinberg & Silk, 2002). We have shown in the present study that the role parents play remains of

importance during adolescence. They may function as access barriers by directly restricting adolescents from spending time in criminogenic settings on one hand, but also indirectly by fostering individual characteristics that prevent them from spending time in criminogenic settings on the other hand.

Appendix

Table A1. Constructs From the SPAN Questionnaire.

Parental monitoring

1. I can just go out at night (after 7:00 p.m.), without having to tell my parents.
2. If I come back *later* than an agreed moment, I have to tell my parents where I was and with whom.
3. When I come home at night (after 7:00 p.m.) too late, my parents go out to find me.
4. If I go out, my parents want me to tell them with whom and what I'm going to do.
5. I have to tell my parents where I go to during weekends and what I'm going to do.

All items had five answering categories, ranging from 0 (*totally disagree*) to 4 (*totally agree*).

Parental limit-setting

1. If you were skipping school, would your parents try to do something about it?
2. If you had spray painted graffiti on a wall, would your parents tell you off or punish you?
3. If you had been beating up or threatening somebody at school, would your parents tell you off or punish you?
4. If you showed any disrespect to one of your parents, would he or she tell you off or punish you?

All items had five answering categories, ranging from 0 (*totally disagree*) to 4 (*totally agree*).

Quality of parent-adolescent relationship

1. How often do you talk to your parents about how you do in school or get along with your friends?
2. Do you talk to your parents if you have a problem or feel sad about something?
3. How often do you something nice or fun together with your parents?
4. How often do you eat evening meals together?
5. How often do you argue with or squabble with your parents?
6. I can notice that my parents love me.
7. I rather be outside home or with someone else than with my parents.

All items had four answering categories, ranging from 0 (*never*) to 3 (*every day*).

(continued)

Table A1. (continued)

Self-control

1. I always say what I think, even if it is not nice or smart.
2. If I want something, I do it immediately.
3. When I have an argument with someone, I can talk calmly about it.
4. I get angry very fast.
5. When I am really angry, other people better stay away from me.
6. I sometimes find it exciting to do things that may be dangerous.
7. I often try to avoid things that I know will be difficult.
8. I get easily bored.
9. I often do things without thinking of the consequences.
10. Sometimes I will take a risk just for the fun of it.

All items had five answering categories, ranging from 0 (*totally agree*) to 4 (*totally disagree*).

Delinquent attitudes

How bad do you think it is when someone of your age does following thing?

1. Ride a bike through red light.
2. Skip doing homework for school.
3. Skip school or work without an excuse.
4. Lie, disobey, or talk back to teachers.
5. Go skateboarding in a place where skateboarding is not allowed.
6. Tease a classmate because of the way he or she dresses.
7. Smoke cigarettes.
8. Get drunk with friends on a Friday evening.
9. Hit another young person who makes a rude comment.
10. Steal a pencil from a classmate.
11. Paint graffiti on a house wall.
12. Smash a street light for fun.
13. Smoke cannabis.
14. Steal a CD from a shop.
15. Break into or try to break into a building to steal something.
16. Use a weapon or force to get money or things from another young person.

All items had four answering categories, ranging from 0 (*not wrong at all*) to 4 (*very wrong*). The scale was reversed so that a higher score indicated more delinquent attitudes.

Acknowledgments

The authors thank Per-Olof Wikström for sharing the questionnaire and the space-time budget interview developed in the Peterborough Adolescent and Young Adult Development Study (PADS+); Beth Hardie, Caroline Moul, and Neema Trivedi for helping train the interview staff; Kirsten Grandia, Evelien Hoeben, and Lieneke Spel

for coordinating the data collection and managing the SPAN fieldwork, and Holly Smallbone for improving the use of English in the article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by the Netherlands Organization for Scientific Research (NWO; Grant 431-09-021).

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