

# Gender Differences in Delinquency and Situational Action Theory: A Partial Test

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This paper investigates to what extent a recent perspective in criminology, Situational Action Theory, is valid for both males and females and to what extent elements from the theory explain gender differences in delinquency. Data are used from the first ( $N = 843$ ) and second ( $N = 616$ ) wave of the Study of Peers, Activities, and Neighborhoods, which included detailed data about core elements of Situational Action Theory (morality, self-control, unsupervised peer activity and peer deviancy), proposed indirect causes (bonds with parents and school, parental monitoring) and self-reported delinquency. Cross-sectional and lagged Tobit regression analyses show that the core relations with delinquency are not significantly different between boys and girls and that the elements of Situational Action Theory are able to explain gender differences in delinquency for a substantial part. However, there is still a remaining independent effect of gender on current and lagged delinquency.

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The association between gender (or sex<sup>1</sup>) and delinquency is one of the most basic findings in criminology, already established in the early nineteenth century (Guerry, 1833; Quételet, 1833). Since then, a multitude of studies have reported that males are, on average, more involved in offending than females, a phenomenon that is referred to as “the gender gap in crime” (e.g. De Coster, Heimer, & Cumley, 2014; Heimer, 2000; Mears, Ploeger, & Warr, 1998; Steffensmeier & Allan, 1996). This association has led to fundamental debate and research in criminology. Two major issues can be distinguished. The *first* issue is the question of whether it is possible to explain delinquency in the same way and with the same etiological theories for males and females. Some scholars have posited that it is necessary to formulate specific explanations for females and males (e.g. Belknap, 1996; Chesney-Lind, 1989; Messerschmidt, 1986). Other scholars argued that etiological theories should offer universal explanations of offending, valid for different groups of the population, including males and females (e.g. Gottfredson & Hirschi, 1990; Sutherland, 1947; Tittle, 1995). The *second* issue is the question *how* the association between offending and gender can be explained (see Hoyt & Scherer, 1998; Mears et al., 1998; Moffitt, Caspi, Rutter, & Silva, 2001). Again, scholars disagree on this issue. In the past, biological, psychological and sociological explanations have been offered to explain the gender difference in crime and delinquency; but also general etiological theories in criminology have been applied (see for overviews Agnew, 2009; Zahn, 2009).

A recent perspective that offers an explicit point of view on both issues is Situational Action Theory (e.g. Wikström, 2004, 2010a; Wikström, Oberwittler, Treiber, & Hardie, 2012). This ambitious theory is aimed at illuminating “what causal processes move an individual to intentionally break a rule of law” (Wikström, 2004, p. 2), and “intends to be a general theory of moral action and the causes of crime” (Wikström, 2010b, p. 216). This implies that the theory should be valid for males as well as for females.

The fundamental nature of the theory also implies that it may be helpful in explaining the association between gender and offending. Wikström does not regard gender as a genuine cause, which he defines as “something that initiates a process that brings about a particular effect.” Instead, he states that “... attributes, such sex and age, cannot be causes ...” (Wikström, 2007, p. 123). However, he does acknowledge the need to explain the correlation

1. Researchers disagree whether one should use the word “gender” or “sex” in reference to differences in delinquency between males and females. Those who use “sex” prefer a neutral term, indicating that the variable itself does not explain anything; those who use “gender” refer to cultural prescriptions that are adhered to being a male or female. We do not have a preference but chose to use “gender” in this paper because this word seems to be most commonly used in studies in this area, and because we include variables on which boys and girls may differ because of cultural prescriptions (e.g. parental monitoring).

between crime and gender, suggesting that attributes can be related to “characteristics or experiences that are relevant in crime causation” (Wikström, 2011, p. 53).

In this paper, we contribute to the longstanding criminological debate about the relation between gender and crime by testing two major implications of Situational Action Theory. We investigate whether core variables of the theory are associated with delinquency for boys as well as for girls, and to what extent these variables account for the gender gap in delinquency. We use data from the Study of Peers, Activities, and Neighborhoods (SPAN), in which 843 adolescents participated in the first wave and 616 in the second wave. This two-wave panel study, conducted in the city area of The Hague in the Netherlands, included a survey that was explicitly designed to measure core elements of Situational Action Theory (based on the PADS+ study; see Wikström et al. [2012]). It is therefore well equipped to investigate the value of this theory in explaining differences in delinquent behavior between boys and girls.

### Previous Studies on Gender and Delinquency

Studies in various countries confirmed the gender gap in juvenile delinquency. In the United States, the arrest rate among boys appeared to be two times higher than the arrest rate among girls for crimes in general, and more than four times higher for violent crimes (Puzzanchera, Adams, & Sickmund, 2011; Snyder & Sickmund, 2006). In the Netherlands, the country where the current study was conducted, the arrest rate among boys was found to be about four times that of girls for offenses in general, and more than four times that of girls for violent crimes (Van der Laan & Blom, 2011; Wong, 2012). Self-report studies also revealed that boys are more often involved in delinquency than girls, though the difference is smaller than in official registrations. The International Self Report Delinquency study reported that in thirty countries, including the United States and the Netherlands, the prevalence of any delinquency in the previous year among boys is about twice that of girls (Junger-Tas, 2012). This difference was more pronounced for violent and serious offenses.

Many studies have compared correlates of delinquent behavior among girls and boys. Recent reviews from studies in the United States (Hubbard & Pratt, 2002; Zahn, 2009; Zahn et al., 2010; see also Slotboom, Wong, Swier, & Van der Broek, 2011) and from Europe (Wong, Slotboom, & Bijleveld, 2010) showed that many correlates of delinquency are shared by boys and girls, in particular personal characteristics (e.g. self-control) and social bonds (e.g. family, school and peer related factors). But these studies also showed that some factors are solely related to delinquent behavior of girls and not for boys, or stronger for girls than for boys. These include early maturing, mental health variables, and quality of relationships with mothers or teachers.

A number of studies have investigated whether etiological theories (e.g. social or self-control theory, strain, and social learning) are valid for boys as

well as girls.<sup>2</sup> The majority of these studies reported that etiological theories seem to be valid for both sexes. Relatively similar effects were reported for social control variables (Junger-Tas, Ribeaud, & Cruyff, 2004), self-control (LaGrange & Silverman, 1999), strain (Broidy & Agnew, 1997), differential association / social learning (Hartjen & Priyadarsini, 2003), or combinations of explanatory variables (Smith & McAra, 2004). However, there are also studies that have reported considerable differences between boys and girls in the effects of variables from major etiological theories (Burton, Cullen, Evans, Alarid, & Dunaway, 1998).

Until now, only three studies explicitly tested whether propositions from Situational Action Theory are valid for boys as well as for girls (Pauwels, 2012a, 2012b; Schils & Pauwels, 2014). Two of these studies employed data from almost 2,500 adolescents, mostly between 12 and 14 years old, from 23 schools in Antwerp. These data included measures for two core concepts from Situational Action Theory: propensity and exposure (the meaning of these concepts will be explained later). Regression analyses showed that these two core concepts in Situational Action Theory were significantly related to delinquency within subgroups of boys and girls from native and migrant backgrounds. Also interaction effects that are predicted by the theory were found in all subgroups. A third study conducted in 2012 (Schils & Pauwels, 2014) tested to what extent self-reported violent extremism could be explained by the key mechanisms of Situational Action Theory (propensity and exposure to extremist moral settings). The results indicated that the same pattern was found in all subgroups by gender and immigrant background. The PADS+ study, in which Wikström and colleagues have tested Situational Action Theory did provide evidence for the generality of the theory with regard to age (see e.g. Wikström et al., 2012), but differences between boys and girls have not been investigated yet with data from this study.

Several studies investigated the extent to which etiological theories can explain gender differences in delinquency. Most of these studies reported substantial or even complete reduction of the gender gap when controlling for social control (Jensen & Eve, 1976), self-control (LaGrange & Silverman, 1999; Tittle, Ward, & Grasmick, 2003), strain (Broidy & Agnew, 1997), moral values (Mears et al., 1998), peer related variables (Mears et al., 1998; Weerman & Hoeve, 2012; but see Haynie & Osgood, 2005), or combinations of variables (Smith & McAra, 2004). In most studies, a small but substantial (standardized effects of more than .1) unexplained effect of gender on delinquency remained. Until now, no study has investigated to what extent core elements

2. Apart from studies based on theoretical perspectives, there are also studies that try to explain gender differences in crime, without adhering to a particular theory. Wong (2012) for example, attempted to explain the "gender gap" in crime by analyzing differential exposure and vulnerability to a set of risk and protective factors, and by analyzing potential differential thresholds for delinquency. She found support that girls are differentially exposed to a set of risk factors, but not for differences in vulnerability or thresholds.



from Situational Action Theory can explain gender differences in delinquency, and which of these elements contributes most to this.

### Situational Action Theory, Gender, and Delinquency

Situational Action Theory is a general theory of offending, aimed at providing fundamental insights in the causal processes leading to criminal actions, or more generally, moral rule-breaking (e.g. Wikström, 2004; Wikström et al., 2012). It is formulated as an “action theory,” an abstract account of what moves people to action in certain circumstances or situations. The theory is integrative, combining elements from various etiological theories about criminal behavior with ecological perspectives on the distribution of crime. Recent studies offered empirical evidence for important elements of the theory (Antonaccio & Tittle, 2008; Bruinsma, Pauwels, Weerman, & Bernasco, *in press*; Svensson & Oberwittler, 2010; Wikström, 2009; Wikström & Butterworth, 2006; Wikström, Ceccato, Hardie, & Treiber, 2010; Wikström et al., 2012; Wikström & Svensson, 2008).

The basic arguments of the theory are as follows. First, the theory argues that crimes are *moral actions*, guided by what is right or wrong behavior in a particular situation. Thus, crime is defined as “an act of breaking a moral rule defined in criminal law” (Wikström, 2004, p. 63). Crimes are thus a special case of moral rule-breaking. Wikström argues that the moral act of crime is always the result of a *perception-choice process*, based on the action alternatives a person perceives and the (moral) choices a person makes. Criminal acts are only possible when somebody is in a situation that offers temptations or provocations for crime and when this person is actually tempted or provoked and perceives crime as a possible action alternative.<sup>3</sup>

The theory further posits that the likelihood that a person will commit offenses depends on the interplay between his or her *propensity* towards crime and *exposure* to criminogenic settings (e.g. Wikström, 2010a, p. 1001). The construct of *propensity* is defined as the general tendency for persons to perceive and choose crime as an action alternative. Primarily, this is determined by a person’s moral rules and emotions and secondarily, by a person’s ability to exercise self-control to act in accordance with moral rules and emotions. Self-control is supposed to be less relevant when someone’s morality prohibits offending completely, but becomes more important when the level of morality is low. The overall construct of *exposure* can be characterized as the degree to which someone is exposed to criminogenic settings (amount of time as well

3. The perception choice process may have two forms according to Wikström: habitual (when a person routinely either takes the opportunity to commit an offense or refrains from it) or deliberately (when a person actively considers the pros and cons of an offense). When people choose deliberately, their choices depend on the extent to which they are able to exercise self-control, and on the external controls they perceive in a setting (deterrence).

as the degree to which settings are conducive to crime. The latter is determined by the amount of temptations and provocations in these settings, and by the moral context of the setting. Moral context refers to the moral rules that apply to a setting, which can be law-conforming but also law-deviating, and to their enforcement. Criminogenic moral contexts are those who encourage, or at least do not discourage crime involvement. Further, the theory states that propensity and exposure interact with each other: the moral context of a setting combined with a person's morality and ability to exercise self-control determines whether a person will act upon perceived temptations or provocations in a particular situation.

In Situational Action Theory, the constructs of propensity towards crime and exposure to criminogenic settings (and their interaction) are regarded as the proximate causes of delinquent behavior. However, the theory recognizes that other variables may also be causally relevant. These variables are supposed to operate indirectly, mainly through their influence on propensity and exposure. Therefore, they are characterized as "causes of the causes." According to Wikström, relevant causes of the causes are social conditions and aspects of individual life histories that can influence the development of an individual's propensity to crime and their exposure to criminogenic settings (Wikström, 2010a, p. 1001). Examples include disadvantaged circumstances, childrearing practices and weak attachments to parents and teachers.

As previously discussed, Wikström does not regard gender as a genuine cause, or even one of the causes of the causes, but only as a personal attribute. Nevertheless, Situational Action Theory may well provide an explanation for the "gender gap" in delinquency. Wikström offers a clue for this by stating that gender (and other attributes) may be *related* to causally relevant variables (Wikström, 2011). In essence, this implies that there are three ways to find an explanation for the association between gender and delinquency within Situational Action Theory. First, it is possible that boys and girls differ in their "propensity towards crime"; second, it is possible that they differ in their "exposure to criminogenic settings"; third, it is possible that they differ in relevant causes of the causes, which eventually lead to differences in propensity and exposure.

With regard to propensity, various studies have reported that girls have stronger moral beliefs than boys (e.g. Mears et al., 1998; see also Stams et al., 2006), have higher levels of internalized shame (Svensson, 2004), use neutralization techniques less often (Esbensen, Peterson, Taylor, & Freng, 2010), and tend to reject harming others more than boys do (Eisenberg, Fabes, & Shea, 1989; Jaffee & Hyde, 2000). It has been suggested that these differences are related to a stronger orientation towards personal relationships for females versus males (Gilligan, 1982). Various studies also reported that girls have higher levels of self-control (Gavray, Vettenburg, Pauwels, & Brondeel, 2013; Gottfredson & Hirschi, 1990; LaGrange & Silverman, 1999; see also Chapple, Vaske, & Hope, 2010), have lower levels of impulsivity and risk seeking

(Esbensen et al., 2010), and are better in performing tasks that involve planning and attention compared with boys (Naglieri & Rojahn, 2001).

With regard to exposure to criminogenic settings, several studies have reported that girls have less deviant and delinquent friends than boys (Mears et al., 1998; O'Donnell, Richards, Pearce, & Romero, 2012; Weerman & Hoeve, 2012). This may be a reflection of the tendency among adolescents to become friends with someone from the same gender (Benenson, 1990). For girls, this means that they will have more friendships with girls, who are generally less delinquent than boys. Studies also have reported that boys spend more time hanging out with their peers than girls (Mears et al., 1998; Osgood & Anderson, 2005; Svensson, 2004), that they are generally more oriented towards unstructured leisure activities than girls (Mauldin & Meeks, 1990), and that they spend more time in "risky settings" than girls, in particular with peers only and on streets and squares (Wikström & Butterworth, 2006).<sup>4</sup>

With regard to potential causes of the causes, studies have indicated that girls may be more strongly oriented towards parents and school during adolescence, resulting in stronger bonds with parents and school (Agnew, 2009; Cernkovich & Giordano, 1992; Esbensen et al., 2010; Jensen & Eve, 1976; Junger-Tas et al., 2004). Further, several studies have found that parents are more inclined to control and monitor the behavior of their daughters than that of their sons (Block, 1984; O'Donnell et al., 2012; Svensson, 2004). These differences are seen as a result of gendered societal expectations about how to behave in public and of relative stronger parental concerns about the safety and (sexual) reputation of girls.

### Current Paper and Research Questions

In the current paper, we put two main implications of Situational Action Theory regarding gender and delinquency to the test. We investigate whether variables representing the theory's core elements (morality, self-control, unsupervised peer activity, deviance of peers) are similarly associated with delinquency for boys and girls, and whether these major variables of the theory, together with three potential causes of the causes (bond with parents, parental monitoring, bond with school)<sup>5</sup> are helpful in explaining differences in delinquency between boys and girls. We regard this as a partial test, since we do not investigate the interaction effects that are posited in the theory.

Only a few studies have tested aspects of Situational Action Theory separately for boys and girls (Pauwels, 2012a, 2012b; Schils & Pauwels, 2014),

4. It is also possible that girls are less exposed to criminogenic settings because of their lower propensity towards criminal behavior. Because of their higher levels of self-control and morality, girls may be less inclined to spend time in risky settings and/or with risky or delinquent friends.

5. We did not have measures for other important potential causes of the causes that are mentioned in the theory, such as socioeconomic status and family adversity.

and to our knowledge, no study has yet applied Situational Action Theory to explicitly *explain* gender differences in delinquency. We acknowledge that there is already a vast body of literature that has linked separate variables mentioned in Situational Action Theory to gender differences in delinquency. However, the current paper is the first to investigate whether the combination of major variables from Situational Action Theory can explain gender differences in crime, and to test the extent to which this part of the theory is generally valid with regard to gender, that is whether the variables have significant relations with delinquency for boys as well as for girls.

We use data from the first (843 respondents) and second (616 respondents) wave of the Dutch SPAN study, in which adolescents completed an extensive survey focused on delinquent behavior and its causes. This is a different study than those that were addressed above (the Antwerp Study conducted by Pauwels and the PADS+ study conducted by Wikström and colleagues). The questionnaire of the SPAN study was specifically designed to measure core concepts of Situational Action Theory among Dutch youths, and the sample includes an even distribution of boys and girls. Therefore, the data are very well suited to evaluate the theory with regard to gender differences in delinquency among adolescents. With these data, we aim to answer the following questions:

- (1) To what extent do boys and girls differ in their average levels of delinquency, core indicators of criminogenic propensity (morality and self-control), core indicators of exposure to criminogenic moral settings (unsupervised activities and rule-breaking peers), and several potential causes of the causes (bond with parents, parental monitoring, bond with school)?
- (2) To what extent are the core indicators of propensity and exposure related to delinquency among boys and among girls?
- (3) To what extent is the relation between gender and delinquency mediated by the core indicators of propensity and exposure, and by the variables that can be labeled as causes of these causes in Situational Action Theory?

### Methods and Sample

The SPAN study is a longitudinal (panel) study of adolescents, conducted in The Hague and its suburbs, currently spanning two waves of data collection. The Hague is the third largest city of the Netherlands, with 486,000 inhabitants in 2009. The first wave of data collection took place between October 2008 and May 2009 (843 respondents); the second wave was conducted between November 2010 and June 2011 (616 respondents). The study included a survey questionnaire, which was self-administered in groups of four adolescents, supervised by a research assistant during a school hour of about 45–50 min. This relatively intensive procedure assured that adolescents were closely monitored, supported and stimulated, and that any questions or concerns about the questionnaire were

addressed immediately. Respondents received an incentive for their participation (a voucher for the movies). The questionnaire is based on that of the PADS+ study (Peterborough Adolescent and Young Adult Development Study) conducted by Wikström and colleagues (Wikström & Butterworth, 2006; Wikström et al., 2010, 2012).

In the first wave of the study, forty schools for secondary education were approached, representing about one third of all the secondary schools in the city region of The Hague. This restriction was the result of an agreement with the city councilor who supported our study with a letter to the school directors. Because the municipality was conducting a study on health and welfare issues during the same period among more than half of the secondary schools in The Hague, these schools were excluded from our sample. The 40 schools were approached with a letter and later in person. Ten schools agreed to participate in the study, allowing students to be surveyed and interviewed during school hours. The primary reasons why schools refused to participate in the study were participation in other research/receiving too many requests to participate in studies (many academic studies in the Netherlands rely on school samples), and concerns about disturbing lessons. Parents were informed about the study and could easily refuse participation in both waves (passive consent).

The study was conducted among two cohorts of secondary school students: one cohort of students who were 1st graders in the first wave (mainly aged 12 and 13) and one cohort of students who were 4th graders in the first wave (aged 15 and 16). In the second wave, most respondents of the younger cohort were in the 3rd grade of secondary school (mainly aged 14 and 15), while respondents from the older cohort were either in the highest (6th) grade of the highest form of secondary education, in the 1st or 2nd grade of tertiary vocational education, were working part time or full time, or were unemployed (ages 17 and 18).

In total, 843 respondents participated fully in the first wave of the study.<sup>6</sup> Of these 843 respondents, 616 respondents participated again in the second wave of the study. An important reason why we had lost part of the respondents in the second wave was that many of them had left the school they attended in the first wave.<sup>7</sup> In total, the retrieval rate in the second wave is

6. In total, there were 942 adolescents in the 1st and 4th grades of the participating schools. From this population, 27 adolescents were not approached because the school was too busy at the moment of data collection; 15 did not participate in the study because parents withdrew them from the study; 13 did not show up at the moment of data collection; 6 appeared to have moved to another school; and 3 were ill during the data collection period. From the remaining 878 adolescents, 35 did not complete all research instruments of the study.

7. The reasons why 227 respondents exited the study varied: 33 respondents could not be contacted at all; 147 respondents refused participation; 16 respondents repeatedly did not show up at an appointment; 12 parents of respondents refused permission; and 18 respondents reported other reasons for not participating (e.g. stress or problems at home). One respondent was left out of the sample because the answering pattern revealed strange answering tendencies and internal inconsistencies.



73%. Analyses showed that boys and older respondents had relatively higher attrition rates. There was also a significant difference in the average frequency of delinquency between those who exited the study and those who remained in the second wave. This means that we have less variation in our dependent variable in analyses using data from the second wave, which implies that we may have a relatively conservative estimate of the expected relations. However, we do not have reasons to believe that the existence and direction of the relations would be biased by this selective attrition, nor the differences between boys and girls.

Because the sample was drawn from a selection of schools in the city area of The Hague, it is not a representative sample of Dutch youth. A relatively large portion of the sample consists of youths from ethnic minorities (45.0% in the first wave).<sup>8</sup> Relatively many adolescents come from lower forms of secondary education: 17.9% of the respondents in the first wave were recruited in schools for "practice education," the lowest level of secondary education, and 47.7% of the respondents were following vocational education in the first wave of the study, the most common form of secondary education. The remaining respondents were recruited at medium level schools (10.5%) or the highest level of secondary education (23.8%).<sup>9</sup> With regard to gender, the demographic variable of interest in this study, the sample is quite balanced. The first wave sample consists of 464 boys (55.0%) and 379 girls (45.0%); in the second wave, there were 324 boys (52.6%) and 292 girls (47.4%).

### Measurements

The dependent variable, *total delinquency frequency*, was measured by a scale comprised of 20 items that tap into how often the respondent has committed various types of crime during the past year. The offense types ranged from

8. In 2008, about 10% of the total Dutch population had one or two parents who were not born in the Netherlands (source: [www.statline.cbs.nl](http://www.statline.cbs.nl)). No specific figures were available for the 12/13 and 15/16 year olds however, and the percentage will probably higher among these categories of the population.

9. These figures depart from the total Dutch youth population. The website of the Dutch national statistics office CBS ([statline.cbs.nl](http://statline.cbs.nl)) provides figures for students of 15/16 year old (for the younger cohort, school levels are often combined and no exact information is available). This reveals that in the SPAN sample students from practice education are very strongly overrepresented (only 3% of the total population follows this type of education), vocational education is slightly underrepresented (about two thirds in the total population), medium level is underrepresented (about a quarter in the total population) but high level education is slightly overrepresented (about 20% in the total population).

minor offenses (e.g. vandalism) to very serious offenses (e.g. robbery).<sup>10</sup> We used the following answering codes for each item: 0 times (value 0); 1 time (1); 2 times (2); 3–5 times (3); 6–10 times (4); more than 10 times (5). The total delinquency score is the summation of all ordinal item scores.<sup>11</sup> We analyzed delinquency in both the first and second wave as the dependent variable; Cronbach's  $\alpha$  of this scale was .90 in the first wave and .85 in the second.

The central concepts of Situational Action Theory are measured by summative multiple-item scales. As main indicators for the construct of propensity, we included the measurements of morality and self-control. As indicators for the construct of exposure we used the measurements for unsupervised activities with peers and the presence of rule-breaking peers. These variables are similar to the ones that are used in recent empirical tests of the theory (e.g. Wikström et al., 2012). Further, we used three variables that represent potential causes of the causes. Two of these variables refer to the family: bond with parents and parental monitoring; and one refers to the bond with school.

*Morality* indicates the respondent's moral rejection of offending. It consists of five items asking how bad the respondent thinks it is if someone is involved in acts of graffiti, vandalism, stealing, breaking and entering, and robbing someone (answering categories were: very bad, bad, a little bad, not bad at all). The  $\alpha$  for this scale is .84.<sup>12</sup>

The *self-control* measure is an additive index based on the measurement developed by Grasmick, Tittle, Bursik, and Arneklev (1993), but shortened to a more concise index of ten items (with answering categories ranging from totally agree to totally disagree). This measure is based on the measure used in the PADS+ study (see Wikström et al., 2012) as a measure of the conceptualization of self-control that is employed in Situational Action Theory ("ability to exert self-control"). We reversed the scale so that high scores indicate high levels of self-control. The items are: "I always say what I think, even if it is not nice or smart," "If I want to do something, I do it immediately," "When I have an argument with someone, I can talk calmly about it," "I lose my

10. The 20 offense types are: scratch on objects with paint, pen or spray paint; destroy or damage something; set fire; steal something worth less than five euro from a shop; steal something worth more than five euro from a shop; buy stolen goods; bicycle theft; moped theft; theft from a house; theft from a car; theft from elsewhere; robbery; steal from someone covertly; threaten someone; kick or hit someone on the street; injuring someone by kicking or hitting; sell soft drugs; sell hard drugs; carry a weapon; use a weapon.

11. In the SPAN study, we chose to use a frequency scale, in line with previous studies on Situational Action Theory. An alternative scale for delinquency is a variety scale, consisting of the number of different offense types. It appears that in our data, the frequency and variety scale are highly correlated ( $r = .923$  at T1 and  $r = .913$  at T2), and analyses using a variety scale results in similar findings as those that are presented here.

12. Some previous studies of Situational Action Theory employed more extensive scales for morality that also included items about drug use and non-criminal forms of rule breaking (e.g. Wikström et al., 2012). The scale that is used in the current study is a subscale explicitly focused on the breaking of moral rules that are laid down in the law. It was constructed on the basis of factor analysis on all items of the more extensive measure.

temper easily,” “When I am really angry, other people better stay away from me,” “I sometimes find it exciting to do things that may be dangerous,” “I often try to avoid things that I know will be difficult,” “I get bored easily,” “I often do things without thinking of the consequences,” and “Sometimes I will take a risk just for the fun of it.” This scale has an  $\alpha$  of .75.

*Unsupervised peer activity* indicates the amount of time that adolescents spend with their peers in circumstances where there is usually no supervision of adults. It is measured by three questions: “How often do you spend time with your friends in the street, on squares or parks (for example hanging around or just talking)?”, “How often do you spend time with your friends in shopping malls or the city shopping center?”, and “How often do you spend time in the evenings with your friends in the center of The Hague?”. For each item, there were four answer categories: (almost) never, once or twice a week, several (3–5) days a week, (almost) every day. The  $\alpha$  for this scale is .63.

*Rule-breaking peers* measures the amount of delinquent and deviant behavior of peers, as perceived by the adolescent. It is measured by an index of six questions about how often ones friends play truant, get drunk, use drugs, steal something, destroy things and beat up or fight with someone (answering categories: never, sometimes, often). The  $\alpha$  for this scale is .82.

*Bonds with parents* consists of seven items with different answering categories: “How often do you talk to your parents (or stepparents) about how you do in school or get along with your friends?” (answering codes: almost never; once or a few times a month; a few times a week; almost every day), “Do you talk to your parents if you have a problem or feel sad about something?” (no, almost never; sometimes; usually I do; yes, always), “How often do you do something nice or fun together with your parents?” (almost never; a few times a year; once or a few times a month; once or a few times a week), “How often do you eat evening meals together?” (almost never; a few times a week; several times a week; almost every day), “How often do you argue with or squabble with your parents?” (almost never; a few times a week; several times a week; almost every day), “I can notice that my parents love me” (no, almost never; sometimes; usually, yes; yes, always), and “I would rather be outside home or with someone else than with my parents” (no, almost never; sometimes; usually yes; yes, always). The  $\alpha$  for this scale is .68.

*Parental monitoring* indicates whether parents are actually actively keeping track of their children’s whereabouts. It consists of five items (with answering categories ranging from totally agree to totally disagree): “I can just go out at night (after 7 pm), without having to tell my parents,” “If I come back later than the agreed moment, my parents expect me to tell where I was and with whom,” “When I come home at night (after 7 pm) too late, my parents go out to find me,” “If I go away from home, my parents expect me to tell where I go, with whom and what I’m going to do,” and “My parents expect me to tell where I go to during weekends and what I’m going to do.” The  $\alpha$  is .77.

*Bond with school* measures attachment and commitment of the adolescent to school, teachers and classmates. It is measured by seven items (totally agree to totally disagree): “I like to go to school,” “I can get along well with most of my teachers,” “I can get along well with most of my classmates,” “Sometimes, I have stayed away from school during the last year because I was afraid of being beaten up or bullied,” “I get good grades at school,” “How much time do you spend each day on homework” and “If you could leave school tomorrow, would you do that?”  $\alpha$  is .65.

*Gender* was entered in the regression analyses as a dummy variable, with girls coded as one and boys as zero. Table 1 offers the descriptives of our measures. The independent variables were standardized in the analyses with a score of zero for the mean and one for the standard deviation. In the multivariate analyses, we square root transformed the dependent variable to account for skewness (this will be explained further below).

### Analytical Strategy

First, we explored differences between boys and girls in our sample by calculating mean scores for both genders on all the investigated variables (significance of the differences was tested with one-way ANOVAs). The standardized scores of these independent variables facilitate comparison of the differences between boys and girls among the variables.

Second, we analyzed the extent to which the core elements of Situational Action Theory were related to delinquency among boys and girls. To achieve this, we regressed the outcome variable on the two indicators of propensity

**Table 1** Descriptives ( $N = 843$  for first wave variables,  $N = 616$  for second wave)

Variable	Mean	SD	Range
Delinquency frequency T1	6.74	10.79	0–100
Square rooted delinquency frequency T1	1.90	1.77	0–10
Delinquency frequency T2	4.81	7.92	0–100
Square rooted delinquency frequency T2	1.55	1.55	0–10
Bond with parents T1	22.83	3.44	9–28
Parental monitoring T1	16.74	4.26	5–25
Bond with school T1	25.73	3.40	13–33
Self-control T1	29.43	6.32	10–45
Morality T1	30.17	9.49	0–48
Unsupervised activities with peers T1	5.76	2.02	3–12
Rule-breaking peers T1	9.04	3.44	5.92–23

(morality and self-control) and the two indicators of exposure (unsupervised activities and rule-breaking peers), and we conducted this analysis separately for both boys and girls. Wald tests were used to indicate whether or not the genders differed significantly with regard to the estimated effects.

Third, we conducted a stepwise regression analysis to see whether the effect of gender on delinquency decreases after inclusion of the core elements of the theory and the selected causes of the causes. Four models were estimated: model one is a baseline estimation of the univariate effect of gender on delinquency; model two adds the three indirect causes of delinquency to the gender effect (bond with parents and school, parental monitoring); model three adds the four proximate causes (low morality, low self-control, unsupervised activities and rule-breaking peers) to the gender effect; model four includes all proximate and indirect causes. The significance of differences between estimates across models was tested again with Wald tests. We did not add any additional control variables because we wanted to test the theory as purely as possible. Demographic control variables such as age and ethnicity were also not included because, like gender, they are not seen as genuine causes in Situational Action Theory. In fact, explaining why the demographic "control variable" gender is related to delinquency is one of the two core issues of this paper. Including unnecessary and non-theoretical control variables in this particular analysis might inflate estimates of the parameters of interest (see also Wikström, 2011).

For the regression analyses, we chose to use Tobit models with square root transformed dependent variables. Osgood, Finken, and McMorris (2002) proposed this kind of analysis for studies on self-reported delinquency, as an alternative to ordinary least squares regression analysis (OLS), which has important limitations with very skewed variables. The Tobit regression model is well equipped to handle the many zero-values in self-reported delinquency, because it models the dependent variable as a latent variable of which the values at and beyond a threshold (here, zero) are censored. Square-root transformation of the delinquency scores was chosen because the resulting distribution of values above 0 appeared to approach normality better than untransformed or logged values. The Tobit model also empirically appeared to fit our data better than other models, which was confirmed by a comparison of the Akaike Information Criterion (AIC) for "empty models" of OLS (with and without a transformed dependent variable), negative binomial and Tobit models (with a transformed dependent variable).

We performed diagnostic checks of multicollinearity for every regression analysis by calculating variance inflation factors and correlations between independent variables. All VIFs appeared to be two or lower, the highest correlation between any pair of independent variables was .53. These values are acceptable and do not indicate multicollinearity issues.

Before conducting the regression analyses, all independent variables were standardized (with an average of zero and a standard deviation of one) to facilitate comparison of estimates. The estimates indicate how much our



dependent variable (square root of delinquency frequency) changes with one standard deviation increase of the independent variable.

The Tobit regression analyses were conducted with cross-sectional (independent variables and delinquency measured at wave 1) as well as lagged data (with the dependent variable delinquency measured at wave 2), because both strategies have advantages and disadvantages. In essence, our aim is to investigate the extent to which the association between gender and delinquency can be explained by elements of Situational Action Theory, and cross-sectional data would suffice to do that. However, the delinquency variable is constructed by asking respondents to report about behavior in the school year previous to the measurement, which means that the dependent variable is placed in time before the independent variables (although most of these also represent the situation in the previous period). This implies that part of the association might be the result of an effect of delinquency on the independent variable so that the causal relationships in the cross-sectional regression analyses may be overestimated. In the lagged analyses, the dependent variable is placed in time after the independent variables. The disadvantage here is that there is a relatively long time lag between the two measurements in which a lot of change might have occurred within the independent variables. This implies that the results of the lagged analysis may result in an underestimation of the real effects.

Further, we decided to refrain from analyzing composite indices for propensity and exposure. By analyzing the constituent variables of these constructs, we obtain more detail about what exactly is different between boys and girls, how the effects of these variables differ between the genders and which variables may mediate the effect of gender on delinquency. Because we did not include these latent constructs, we also refrained from analyzing interaction effects between the constructs of propensity and exposure. An additional reason for ignoring these is that it is difficult to interpret interaction effects when using Tobit regression on transformed dependent variables; additional analyses would be needed that are outside the scope of this paper.<sup>13</sup>

We did not include control variables such as age and ethnicity in the presented analyses. Like gender, age and ethnicity can be regarded as attributes that are not genuine causes (Wikström, 2011). We also wanted to stay as close as possible to a test of the theory as formulated with Situational Action Theory. Nevertheless, we conducted a robustness check to see whether age and ethnicity could affect our results and reran the analyses with inclusion of these variables. The results of these analyses were substantially in line with the findings and conclusions we present in this paper.

13. A different strategy was followed in the studies by Pauwels (2012a, 2012b). These studies focused on the interaction effects, employed OLS regression models but also did robustness checks by investigating nonlinear effects and negative binomial models. These studies reported that the interaction terms as predicted by the theory were related to offending among boys as well as girls.

## Findings

Table 2 offers a comparison between boys and girls with regard to delinquency and the proposed causes and “causes of the causes” in Situational Action Theory.

The first two rows of Table 2 confirm the “gender gap” in delinquency for the respondents of this study. On average, the delinquency score of boys is almost three times higher as that of girls.<sup>14</sup> This is the case in the first wave as well as in the second, where the general level of delinquency has become somewhat lower. Not surprisingly, this large difference is also statistically significant.<sup>15</sup>

The next three rows of Table 2 show that there are also significant differences between boys and girls regarding the three selected causes of the causes. Boys and girls appear to differ substantially with regard to the variable of “parental monitoring.” This means that parents are monitoring the activities of their daughters more actively than the activities of their sons. The difference between the means totals up to .6 standard deviations. The differences with regard to the bond with parents and school are less dramatic but also in the expected direction. On average, girls have slightly stronger bonds to parents and school than boys (the difference in means is .13 and .25 standard deviations, respectively).<sup>16</sup>

The last four rows indicate that boys and girls are also significantly different in their average score on core elements of Situational Action Theory. Again, all the differences are in the expected direction. Girls appear to have, on average, substantially more self-control than boys (mean difference of .42 standard deviations) and higher morality than boys (mean difference of .36 standard deviations). On average, girls also appear to spend less time in unsupervised peer activities than boys (mean difference of .24 standard deviations) and have less rule-breaking peers (mean difference of .38 standard deviations).<sup>17</sup>

14. This relates to the score on the delinquency frequency scale. Because the delinquency frequency score is based on ordinal item responses, the difference in the actual number of offenses committed by boys and girls is probably higher.

15. Additional analyses indicate that also the prevalence of any offending is significantly higher among boys (80% in the first wave and 73% in the second) than among girls (62% in the first wave, 56% in the second). With regard to offense types, it appears that boys and girls differ most apparently in their involvement in more serious and violent offenses. For example, in the first wave, 5% of the boys reported a burglary, compared to only .3% of the girls. Similarly, 10% of the boys used a weapon compared to 3% of the girls. The differences between boys and girls are much smaller for minor property crimes, and even non-significant for minor shoplifting and graffiti.

16. Translated to actual values on the response categories, the difference in parental monitoring between boys and girls is .5 per item. This actual value difference per item is less impressive for bond with parents (.06) and bond with school (.12).

17. Translated to actual values on the response categories, the difference between boys and girls in morality is most impressive: .68 per item. For self-control, this actual value difference per item is .27; for unsupervised activities with peers .16; and for rule-breaking peers .22.

**Table 2** Differences in mean scores (normalized except for total delinquency) between boys and girls, ANOVA-test for differences between subgroups

Variable	Boys	Girls	Significance
Total delinquency T1	9.15	3.79	*
Total delinquency T2	6.75	2.67	*
Bond with parents	-.06	.07	*
Parental monitoring	-.27	.33	*
Bond with school	-.11	.14	*
Self-control	-.19	.23	*
Morality	-.16	.20	*
Unsupervised activities	.11	-.13	*
Rule-breaking peers	.17	-.21	*

\* $p < .05$ .

Table 3 shows the results of Tobit regression analyses estimating multivariate effects of the core elements of Situational Action Theory on delinquent behavior among boys and girls.

The first two columns refer to the cross-sectional regression of delinquency in the first wave. The results show that all four core elements are related to delinquency, independently from each other. For boys as well as for girls, all effects are significant and substantial. Further, the magnitudes of the effects

**Table 3** Comparison between subgroups of the effects of SAT core elements on delinquency (square rooted) at T1 ( $N = 843$ ) and T2 ( $N = 616$ ); Tobit regression analysis with robust standard errors adjusted for clustering in schools

Variables	Delinquency T1		Delinquency T2	
	Boys	Girls	Boys	Girls
	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)	Coefficient (SE)
Self-control	-.48 (.07)*	-.52 (.08)*	-.47 (.10)*	-.52 (.11)*
Morality	-.56 (.09)*	-.34 (.14)*	-.23 (.06)*	-.12 (.10) ns
Unsupervised activities	.32 (.13)*	.54 (.10)*	.35 (.20)+	.51 (.10)*
Rule-breaking peers	.54 (.11)*	.68 (.09)*	.08 (.09) ns	.06 (.24) ns
Constant	1.84 (.13)*	1.32 (.08)*	1.51 (.10)*	.81 (.12)*
Sigma	1.60 (.11)	1.44 (.07)	2.02 (.11)	1.69 (.07)
Log likelihood	-790.26	-524.55	-582.09	-411.88

\* $p < .05$ ; + $p < .10$ .

are strikingly similar among the boys and girls, and none of the effects appear to differ significantly from each other.

The last two columns refer to the lagged regression of delinquency in wave 2 on the independent variables from wave 1. Here, the results are mixed and not all effects are statistically significant. The effect of rule-breaking peers on delinquency almost disappeared, and the effect of morality on later offending decreased substantially (and appears to be non-significant for girls). Interestingly, the effects of self-control and unsupervised activities remain strong in the lagged analyses (the effect of unsupervised activities is one-sided significant for boys, but did not change much in size). More importantly, the differences between boys and girls in the magnitudes of the effects are not very different from that in the cross-sectional analysis, despite the fact that some are statistically significant and others not. This is confirmed by Wald-tests that reveal that neither of the differences in effects between boys and girls is statistically significant.

Table 4 presents the results of our stepwise regression analyses on potential mediators of the association between gender and delinquent behavior. The left part of the table refers to the cross-sectional analysis with delinquency in the first wave as the dependent, the right part of the table to the lagged regression of delinquency in wave 2.

Model 1 in the left part of the table shows the baseline univariate relation between gender and delinquency. The coefficient is  $-1.33$  which indicates that being a girl is related to a substantially lower level of delinquency. The second model adds the effects of the causes of the causes. It appears that all three variables are significantly related to delinquency. In model 2, the effect of gender has decreased to  $-.76$ , and Wald-tests reveal that this effect differs significantly from the coefficient in model 1. In model 3, the effect of gender is estimated together with the four core elements from Situational Action Theory. In line with the previous analysis, all four elements are significantly and independently related to the level of delinquency among the respondents. More importantly, the effect of gender is also reduced after inclusion of the core elements, and Wald tests again indicate that this reduction (to  $-.56$ ) is significant. These findings support the notion that the elements of Situational Action Theory account (at least partly) for the effect of gender on delinquency. Model 4 includes both the core elements and the informal controls as causes of the causes. In line with Situational Action Theory, the effects of the causes of the causes appear to be strongly reduced in this model. Wald tests indicate that their magnitude is significantly different from the ones in model 2. At the same time, the effects of the core elements remain substantive. This is consistent with the proposition that the effects of causes of the causes are mediated by the core variables of Situational Action Theory. The coefficient for the gender effect is further reduced to  $-.48$ , about one third of the baseline gender effect. Nevertheless, the remaining effect is still statistically significant.

**Table 4** Core SAT elements and causes of the causes as potential mediators of the association between gender and delinquent behavior (square rooted) at T1 and T2; Tobit Regression with robust standard errors adjusted for clustering in schools

Variables	Effects on delinquency of wave 1 (N = 843)				Effects on delinquency of wave 2 (N = 616)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Gender (girl = 1)	-1.33 (.16)*	<b>-0.76 (.15)*</b>	<b>-0.56 (.12)*</b>	<b>-0.48 (.12)*</b>	-1.20 (.18)*	<b>-0.96 (.18)*</b>	<b>-0.81 (.16)*</b>	<b>-0.78 (.17)*</b>
Bond with parents		-0.37 (.07)*		<b>-0.08 (.06) ns</b>		-0.22 (.10)*		<b>-0.03 (.09) ns</b>
Parental monitoring		-0.66 (.08)*		<b>-0.19 (.07)*</b>		-0.40 (.10)*		<b>-0.13 (.10) ns</b>
Bond with school		-0.39 (.07)*		<b>-0.14 (.06)*</b>		-0.05 (.10) ns		<b>.11 (.10) ns</b>
Self-control			-0.52 (.06)*	-0.48 (.06)*			-0.51 (.09)*	-0.52 (.10)*
Morality			-0.47 (.07)*	-0.36 (.07)*			-0.19 (.10)+	-0.18 (.11)+
Unsupervised activities			.38 (.06)*	.36 (.06)*			.41 (.10)*	.38 (.10)*
Rule-breaking peers			.59 (.08)*	.54 (.07)*			.07 (.10) ns	.05 (.11) ns
Constant	2.12 (.10)*	1.88 (.09)*	1.84 (.08)*	1.81 (.08)*	1.65 (.12)*	1.58 (.12)*	1.53 (.11)*	1.52 (.11)*
Sigma	2.21 (.07)	1.92 (.06)	1.54 (.05)	1.53 (.05)	2.11 (.08)	2.04 (.08)	1.90 (.07)	1.89 (.07)
Log likelihood	-1,562.02	-1,462.80	-1,319.81	-1,310.57	-1,051.98	-1,035.52	-997.31	-995.92

Note. Estimates in bold differ from estimates that were not bold in previous models (as indicated by Wald tests).

\* $p < .05$ ; + $p < .10$ .



The right side of the table shows a similar pattern, but less apparent. Model 1 shows a substantial effect of gender ( $-1.20$ ) on delinquent behavior in wave 2. Model 2 shows that the bond with parents and parental monitoring are significantly related to later delinquency, but the bond with school is not. The effect of gender ( $-.96$ ) is significantly reduced, but to a lesser extent than in the left part of the table. Model 3 shows that two core indicators of Situational Action Theory have a substantial and significant effect on delinquency in wave 2: self-control and unsupervised activities with peers. Morality has a relatively small and one-sided significant effect in this model, whereas rule-breaking peers does not have a significant effect. Again, in model 3, the effect of gender is significantly reduced in comparison to the baseline model (to  $-.81$ ). In model 4, all effects are included. Again, it appears that the effects of the causes of the causes become non-significant, once the core elements of Situational Action Theory are included. Wald tests confirm that these effects differ significantly from the ones in model 2. In model 4, the effect of gender is now  $-.76$ , about two thirds of the baseline effect from model 1, which is a smaller reduction than in the cross-sectional analysis. As a whole, the lagged findings indicate that the indicators of Situational Action Theory, in particular self-control and unsupervised activities, partly but not completely account for the effect of gender on later delinquency.

## Discussion

In the past, several studies have investigated whether general theories about offending are valid for males as well as for females and whether they can explain gender differences in delinquency. However, none of these studies have investigated these issues using the recently developed Situational Action Theory. This theory may be particularly interesting to understand gender differences in delinquency, because it aims to distinguish genuine and fundamental causes of delinquency from causes of these causes and from attributes that are merely markers for causes, including gender. The current study investigated whether core variables from Situational Action Theory are related similarly to delinquency among boys and girls, and to which extent the gender difference in delinquency is accounted for by the combination of these core variables. We used two-wave panel data from the SPAN study, in which adolescents from the Netherlands were surveyed with a questionnaire that was particularly designed to cover elements from Situational Action Theory.

Descriptive results confirmed the gender gap in delinquency, with the mean of boys' delinquency level being three times that of girls. Moreover, boys and girls also significantly differed with regard to the independent variables that potentially add to the explanation of the gender gap. In particular, girls appeared to be monitored by their parents much more than boys, they had on average, substantially higher levels of self-control and morality, and fewer rule-breaking peers.

Tobit regression analyses split by gender indicate that the effects of the core indicators of Situational Action Theory do not differ significantly between boys and girls. Using cross-sectional data, it appears that for boys as well as for girls, all of the four investigated core indicators are significantly related to delinquency. In the lagged analyses, boys and girls differ in which effects are statistically significant, but there are no significant differences between boys and girls in the magnitude of the effects. These findings indicate that Situational Action Theory is a general and universal theory of offending. This finding is in line with studies on other general theories (such as self-control, social control, and social learning theories) that reported similar effects of core variables on delinquency for boys as well as for girls.

The stepwise regression analyses showed that the effect of gender on delinquency is substantially reduced when core variables of Situational Action Theory and the causes of the causes are entered in the models. This was most apparent for the cross-sectional data, where the gender effect was reduced by two thirds, suggesting that association between gender and delinquency is largely accounted for by variables from Situational Action Theory. The reduction was less striking in the analysis on the lagged delinquency variable. Introduction of the core indicators and causes of the causes resulted in a reduction of about one third. However, both analyses support the conclusion that Situational Action Theory is able to contribute to the explanation of the gender gap in delinquency.

The results are further consistent with the theoretically proposed layering in causes between proximal "core elements" and distal "causes of the causes." The effects of the latter are significantly reduced and become non-significant or almost non-significant after inclusion of the four core indicators of the theory, which is in line with mediation as supposed by the theory. However, the results are mixed regarding the effects of the core elements on the lagged delinquency measure. It appears that two of these indicators, self-control and unsupervised activities, are equally related to delinquency that is measured in the first and second wave (the effects have nearly identical magnitudes). Two other indicators, however, morality and rule-breaking peers, have relatively strong effects on delinquency that is measured contemporaneously, but weak or non-significant effects on lagged delinquency.

The interpretation of finding no clear effects of morality and rule-breaking peers in the lagged analysis is uncertain. On the one hand, it may imply that the causal ordering of the relation is partly reversed to what the theory supposes: both variables may not only be causes of offending but additionally also consequences of offending. With regard to rule-breaking peers, offending may have led to selection of similar peers (Hirschi, 1969; Kandel, 1996) and to the projection of one's own behavior to that of peers (Jussim & Osgood, 1989; Young, Barnes, Meldrum, & Weerman, 2011). With regard to morality, offending may have led to a further adaptation of moral attitudes to reduce cognitive dissonance and some studies have suggested that the effects of delinquency on

later attitudes is substantial (Engels, Luijpers, Landsheer, & Meeus, 2004; Matsueda, 1989; Menard & Huizinga, 1994).

On the other hand, the absence of significant effects on lagged delinquency may also be explained by the strong dynamics of morality and peer relations during adolescence. Moral attitudes and peer relations may have changed strongly between the two waves of the study, so much that their measurement at wave 1 is not relevant anymore for behavior measured two years later. This explanation is in line with findings that indicate that about half of the friendships can change from one school year to another (Değirmencioğlu, Urberg, Tolson, & Richard, 1998; Weerman, 2011), and that moral attitudes and beliefs are strongly in development during this age period (Zhang, Loeber, & Stouthamer-Loeber, 1997). Wikström et al. (2012) also report that in the PADS+ study, the average level of morality decreased rapidly from age 13 to age 17.

In conclusion, the pattern of results suggests that core elements of the Situational Action Theory, and indirectly, the causes of the causes, are able to explain the gender gap in delinquent behavior to a substantial degree. Although previous research already provided evidence that separate variables mentioned in Situational Action Theory were related to delinquency and to the gender gap in delinquency, no study has yet established the general validity and reduction in the gender gap of these variables in combination. The generality and applicability with regard to gender places Situational Action Theory next to other main perspectives in criminology for which comparable results have been reported (e.g. social control theory, general strain, self-control theory, and peer perspectives). The results of this study are also in line with the more general position that etiological theories of delinquency are able to offer universal explanations of offending that are valid to explain delinquency for boys and girls, while we do not find evidence in this study that there is a strong need to formulate specific explanations for male and female involvement in adolescent delinquency.

Nevertheless, the results also show that there is still a substantial and statistically significant part of the "gender gap" that remains unexplained. This means that the elements of Situational Action Theory as they are operationalized in this study are not completely sufficient to understand why boys are relatively more delinquent than girls. It is possible that additional core elements of the theory that were not included in the analyses would further contribute to reducing the gender gap. Examples include the moral emotions shame and guilt, exposure to opportunities and provocations, and perceived apprehension risks. It is also possible that measurement error and incompleteness that is inherent to large scale empirical research has hampered a complete mediation of the gender effect. In particular, the measures for the elements of exposure (rule-breaking peers and unsupervised peer activities) should be regarded as merely proxies for the multidimensional nature of criminogenic settings that is implied in the elaboration of exposure in Situational Action Theory. The measures that were used in this paper are not only prone to projection bias or recall issues, but also cannot measure in exact detail the

extent to which an individual is exposed to temptations and provocations, criminogenic moral rules, and weak enforcements of moral rules. This is a general problem related to empirically testing the concept of exposure (see also Wikström et al., 2012). Finally, it is possible that part of the gender gap is related to additional mechanisms that may be regarded as causes of the causes, such as additional differences in peer influences, and hormonal or neurobiological differences between boys and girls. Continued research is needed to see which other variables or measurement strategies help to explain gender differences in delinquency, within or outside the framework of Situational Action Theory.

The current study has four important limitations. First, our test of Situational Action Theory was only partial. We included four indicators of the core elements of the theory, and three potential causes of the causes. Other elements of the theory might potentially contribute further to explaining gender differences in crime. Additionally, we refrained from analyzing the complex interaction effects that are paramount to the theory. Previous research (Pauwels, 2012a, 2012b) suggested that interaction effects are similar for boys and girls. If this is the case, including the interaction effects would not have contributed to explaining gender differences in delinquency. Nevertheless, we regard the current study as a relative conservative test of the contribution of Situational Action Theory to explain gender differences in delinquency. Future studies might improve on testing more elements of Situational Action Theory and their interaction in more detail.

A second limitation is that our sample is not completely random and that there was some attrition between the first and second wave of the study. Lower educated and ethnic minority adolescents in a highly urbanized region, probably from lower SES strata were overrepresented in our study. Those who dropped out from the sample after the first wave were on average older, more likely to be male, and had a higher delinquency score in the first wave than those who remained in the sample. However, we do not have reason to believe that our sample characteristics have biased the results. We were not interested in obtaining unbiased estimates of the population of adolescents, but wanted to analyze the relation between the core elements of the theory and delinquency for boys and girls. We do not expect this to be fundamentally different in the sample that we used than in the complete population of adolescents.

A third limitation is that there is a discrepancy between the period to which the dependent variable of this study refers to (delinquency during the school year that ended previous to the data collection) and to which the independent variables refer to (directly previous to or at the moment of the data collection). This may have affected the estimations of the effect sizes of the investigated parameters. We decided to analyze our data cross-sectionally and with a lagged dependent variable, but we are aware that both strategies may have led to biased estimations of the effect sizes. We are also aware that the period between the data collection waves are relatively long (2 years). During the

dynamic period of adolescence, meaningful changes can occur with regard to someone's morality, self-control, peer relations and/or lifestyle between two waves, and this may have suppressed the correlations between these variables and delinquent behavior. Future studies that employ smaller time lags would be very useful to shed more light on the magnitude of the effects, as well as on the exact causal ordering between the independent and the dependent variables.

The final limitation is that the supposed causes of the causes and the supposed direct causes of delinquency (the four variables representing propensity and exposure) are measured contemporaneously. While our results are in line with the proposition that the "causes of causes" precede the more proximate causes in time, they cannot be regarded as evidence for this temporal ordering. It is possible that current bonds with parents and school and parental monitoring are simply less predictive of delinquency than current morality and self-control in adolescence, while previous social bonds would still have an independent effect. To really capture the process in which more distal causes lead to changes in propensity and exposure, future studies are needed with more measurement waves, following children and adolescents over a longer period of time.

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### Disclosure statement

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