
How friends' involvement in crime affects the risk of offending and victimization

European Journal of Criminology

2017, Vol. 14(6) 697–719

© The Author(s) 2017



Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1477370816684150

journals.sagepub.com/home/euc



Josja J Rokven

Research and Documentation Centre (WODC), The Netherlands

Gijs de Boer

Statistics Netherlands, The Netherlands

Jochem Tolsma

Radboud University Nijmegen, The Netherlands

Stijn Ruiter

Netherlands Institute for the Study of Crime and Law Enforcement NSCR, The Netherlands; Utrecht University, The Netherlands

Abstract

This article examines how friends' involvement in crime influences such involvement in those around them, as offenders or victims, and the extent to which such friendship effects vary with contact frequency, friendship intimacy, and geographical proximity. To test our hypotheses we used four waves from the Dutch panel survey CrimeNL, which includes ego-centered network measures in each wave for respondents aged between 16 and 45. To test our hypotheses, fixed-effects panel models were employed. The results show that living in close proximity to delinquent friends increases people's own risk of offending, and daily interaction with these friends decreases the risk of victimization. Victimization is also communicated among friends in their daily interactions. These findings stress the need to consider factors that condition how friendships exert influence on the risk of crime involvement.

Keywords

Friendship, influence, offending, panel data, victimization

Corresponding author:

Josja Rokven, Research and Documentation Centre (WODC), PO Box 20301, 2500 EH The Hague, The Netherlands.

Email: j.j.rokven@minvenj.nl

Introduction

Friends exert a considerable influence on people's behavior. They may stimulate positive behaviors, but also negative ones. In criminology, influence processes related to crime have received considerable attention. Several decades of research consistently show that association with delinquent peers influences the criminal behaviors of individuals (Agnew, 1991; Matsueda and Anderson, 1998; Warr, 2002; Weerman, 2011). Given the major impact exerted by friends' behaviors and the established finding that offending and victimization are to a large extent explained by the same correlates (Jensen and Brownfield, 1986; Schreck et al., 2008), recent research has begun to assess whether peer delinquency also increases an individual's risk of victimization (Ousey et al., 2008; Schreck et al., 2004; Schreck et al., 2002; Shaffer, 2003). However, most studies about peer influence on criminal behavior have used samples of adolescents only. Because friends generally have more influence during adolescence than at any other point in life (Steinberg and Monahan, 2007), it remains to be seen whether friends' involvement in crime also influences people during (early) adulthood.

Although many criminological studies assess whether peers influence involvement in crime, Agnew (1991) called for further research on the conditions under which such peer influences vary. He demonstrated that the impact of delinquent peers on an individual's own likelihood of committing crime is stronger among those who are more deeply attached and who spend relatively more time with their peers. Several scholars responded to Agnew's call and showed differential delinquent friend effects (Haynie, 2002; Haynie and Osgood, 2005; Miller, 2010; Wright et al., 2001). For instance, the influence of delinquent peers is lower for people with high levels of self-control (Wright et al., 2001) and for those who belong to friendship networks that are composed of both delinquent and non-delinquent peers (Haynie, 2002). The current study extends this line of research by examining the extent to which influence on *both* offending and victimization varies according to the strength of ties (i.e., contact frequency, friendship intimacy, and geographical proximity).

While the influence of delinquent peers has been widely studied, little attention has been paid to whether the risk of victimization is also communicated among friends. This is understandable, as it is obviously the perpetrators of crime, not their victims, who decide on the targets. Nevertheless, literature on bullying shows that the friends of those who are bullied are also more likely to be bullied themselves (Sijtsema et al., 2012). Furthermore, the literature on the (near-)repeat phenomenon shows that, in the wake of an initial crime, the same and nearby targets are at higher risk of victimization, a risk that gradually declines over time to its original level (Johnson et al., 2007; Lammers et al., 2015). These bullying and (near-)repeat studies provide us with explanations of why friends of victims may also be faced with a higher risk of victimization. In the current study we will therefore investigate not only whether delinquent friends influence people's involvement in crime (as offender or victim), but also whether individuals with victimized friends run the risk of falling victim to crime themselves.

Whereas some studies on peer influence have used strong longitudinal social network models (Knecht, 2008; Weerman, 2011), others have relied on cross-sectional data (for example, Agnew, 1991; Haynie, 2002). However, the associations found in cross-sectional

models can easily be misinterpreted as causal, because it is impossible to disentangle cause and effect or to control for unmeasured heterogeneity. In this study we used four waves of CrimeNL (Tolsma et al., 2014), a longitudinal study of victimization, offending, and friendship networks among adults in the Netherlands. Our study was designed in such a way as to most effectively rule out the possibility that the observed relationships between friends' and respondents' involvement in crime were the result of friendship selection processes (reverse causal order) or unmeasured heterogeneity.

In sum, the current study contributes to previous research in four ways. First, it studies the influence of friendship in relation to both offending and victimization. Second, it assesses whether the influence of friendship varies with the strength of ties measured by contact frequency, friendship intimacy, and geographical proximity. Third, we employ a longitudinal research design that enables us to rule out friendship selection processes and all time-stable unmeasured heterogeneity as potential confounders. Finally, we investigate the influence of friendship in a sample consisting of mainly adults. Our research questions read: (1) To what extent does friends' involvement in crime affect an individual's own involvement in crime, and (2) to what extent is this influence contingent on the strength of the friendship?

Theoretical framework

A consistent finding in research on friendships is that the behaviors of individuals are remarkably similar to those of their friends (McPherson et al., 2001). This is also the case for delinquency (Matsueda and Anderson, 1998; Warr, 2002; Weerman, 2011). Although homogeneity with respect to criminal victimization has not yet been clearly demonstrated (Shaffer, 2003), recent research on bullying provides evidence that victims of bullying in schools tend to be friends with each other (Sente et al., 2013; Sijtsema et al., 2012).

Homophily theories suggest that the similarities between individuals and their friends are due to selection and influence processes (Brechwald and Prinstein, 2011). Individuals (intentionally) select friends on the basis of similarities (Glueck and Glueck, 1950; Hirschi, 1969) and friends influence each other (Akers, 1973; Sutherland, 1947). Research examining the relative importance of selection and influence processes with respect to involvement in crime suggests that it indeed works both ways (Reed and Rose, 1998; Warr, 2002). In the present study we zoom in on similarities between friends involved in crime due to influence processes – and the conditions under which these similarities are amplified or attenuated. We use the longitudinal design of our data to exclude the possibility that the observed homogeneity is due to selection processes.

Delinquent friends

The influence of delinquent friends on people's own engagement in criminal activities is generally explained by differential association theory (Sutherland, 1947; Sutherland and Cressey, 1978). According to this theory, friends shape each other's behavior primarily through the transmission of values, behavioral models, and social reinforcement. Akers' (1973) elaborated on Sutherland's theory by stating that individuals learn behavior by

observing and imitating that of others and people become offenders via social interaction with others already involved in crime. Previous research among adolescents supports this by showing that delinquent peers indeed increase individuals' own risk of offending (Matsueda and Anderson, 1998; Warr, 2002; Weerman, 2011). Yet this research has generally approached the influence processes as if all individuals are equally likely to be influenced. Sutherland and Cressey (1978) have specified that the influence of delinquent friends is stronger the earlier the association is made, the longer the duration of the association, the more frequently the association occurs, and the closer the association. As such, the more frequently people engage in activities with delinquent friends and the more intimate these associations are, the more these friends will transmit delinquent values and act as role models, and the higher the likelihood that individuals adapt their behaviors to those of their friends. Although Agnew (1991) has already shown that the association between delinquent friends and individuals' own delinquency is stronger the more time they spend together and the more intimate these associations are, he could not rule out selection processes in his cross-sectional study. In our longitudinal study we test the following hypothesis more rigorously:

Associating with friends who commit crime increases the risk of also committing crime (Hypothesis 1a) and this process is stronger for individuals who interact with these friends daily than for those who interact less frequently (Hypothesis 1b) and for individuals who are more closely attached to these friends compared with those who are less closely attached (Hypothesis 1c).

The few studies that have examined whether peer delinquency is related to victimization show that adolescents who associate with delinquent friends are at higher risk of victimization (Schreck et al., 2004). Victimization risk is often explained using lifestyle and routine activity theories (Cohen and Felson, 1979; Hindelang et al., 1978). The essential proposition of these theories is that crime occurs when motivated offenders come into contact with suitable targets in the absence of capable guardianship. As such, people who more often encounter potential offenders (*ceteris paribus*) would have an increased risk of victimization. Given that delinquent peer contact makes exposure to motivated offenders a more frequent occurrence, it is to be expected that those who frequently associate with criminal others have an increased risk of becoming victimized themselves. Moreover, because offenders have a general tendency to associate with other offenders (Weerman, 2011), people who associate with offenders need not necessarily fear victimization by their own delinquent friends (although that also occurs), but they are at increased risk of being victimized by friends of friends. Spending time with delinquent friends also carries the risk of experiencing retaliation at the hands of delinquent foes of their friends (Singer, 1981), because they may be present when retaliation takes place and may be considered a substitute retaliation target (Shaffer, 2003). The risk from delinquent friends of friends and delinquent foes of friends is especially high if an individual's own friend is the perpetrator of a crime, because delinquent friends may not act as capable guardians willing to intervene – the reasoning being that many offenders pursue their own self-interest and are less likely to sacrifice or accept risks on behalf of others (Schreck et al., 2004). So, whereas conventional friends may act as capable

guardians, effectively protecting individuals from victimization, this may be less true for delinquent friends. Not only are friends who interact on a daily basis or who are closely attached to each other more likely to serve as an example, transmit values, and reinforce each other's behavior, they are also more likely to meet the friends and foes of their friends. We thus hypothesize that:

Associating with friends who commit crime increases people's risk of victimization (Hypothesis 2a), and this influence is stronger for individuals who interact with these friends daily than for those who interact less frequently (Hypothesis 2b) and for individuals who are more closely attached to these friends compared with those who are less closely attached (Hypothesis 2c).

Victimized friends

Recent studies of bullying provide evidence for contagion effects in victimization. When adolescents befriend peers who are bullied, their own odds of becoming victims of bullying rise (Sijtsema et al., 2012). Friends of victims are probably more likely to be rejected and viewed negatively by the peer group. They may also signal to potential bullies that they are an attractive target (Shaffer, 2003). Although these contagion effects of bullying victimization were shown using strong research designs, it is unclear to what extent they can be generalized outside the school context and whether similar processes occur for victimization of crime.

According to routine activity theory, offenders would most likely go after people who are (1) worth attacking, (2) visible, and (3) accessible. This process is facilitated by the social and/or geographical proximity between offenders and victims of crime. People who know each other argue and gossip, inciting and sustaining grievance (Tedeschi and Felson, 1994) and pulling one another into disputes, which may produce a contagion effect of victimization. Moreover, from the (near-)repeat victimization literature (Bowers and Johnson, 2005; Townsley et al., 2003) and two recent studies on crime location choice (Bernasco et al., 2015; Lammers et al., 2015), we can derive an alternative explanation as to why friends of victims have an elevated risk of becoming targets themselves. The near-repeat burglary research shows that, after an initial burglary, not only the same property but also properties nearby are at a temporarily elevated risk of burglary, which decays over time (Johnson et al., 2007; Townsley et al., 2003). Similar processes have been found in studies on shootings (Ratcliffe and Rengert, 2008) and vehicle crime (Johnson et al., 2006). This spatiotemporal clustering of victimization is the result of the way offenders search for potential targets. Offenders often return to their initial target or to targets nearby (Bernasco, 2008; Bernasco et al., 2015; Johnson et al., 2009; Lammers et al., 2015), because this provides the advantage of knowing the potential risks and rewards specific to that area. This especially applies shortly after the initial crime, because the offender's knowledge is most accurate at that point. In the current study we argue that the near-repeat phenomenon also provides an explanation as to why friends of victims have an elevated risk of becoming targets themselves. Because the likelihood of people's engagement in friendship also decays rapidly in space (Arentze et al., 2012), most friends live close to each other, and if one is targeted by an offender then the other might also be at increased risk. This argument is in line with

Bernasco (2008: 412), who argued that ‘patterns of risk communication might also operate in social networks, so that family members, friends, classmates or colleagues of victims are “infected” with a temporarily elevated risk of victimization’. We will therefore test the following hypothesis:

Associating with friends who get victimized increases an individual’s risk of being victimized (Hypothesis 3a) and this relationship is stronger for those who live in close proximity to their friends than for those who live further away (Hypothesis 3b).

Data and methods

To answer our research questions and test our hypotheses, we used data from the CrimeNL panel study. CrimeNL is a collaborative effort of the Department of Sociology of Radboud University Nijmegen and Statistics Netherlands, involving a longitudinal study of individuals’ experiences of crime and their social networks (Tolsma et al., 2014). The sample population consists of people living in the 10 largest municipalities of the Netherlands with a minimum age of 16 and a maximum age of 45, a group with an increased risk of involvement in crime (both as victim and as offender) as compared with the general Dutch population. Statistics Netherlands used the municipal population registers to draw a random sample. Respondents are interviewed once a year and each year a fresh sample is included to compensate for panel attrition. So far, respondents have been interviewed in 2012 ($N = 982$), 2013 ($N = 741$), 2014 ($N = 831$) and 2015 ($N = 883$). A mixed-mode design was used: both computer-assisted web interviews (CAWI) and computer-assisted telephone interviews (CATI) were conducted. We did not offer our potential respondents any incentives to participate in our study. The fresh samples are to a large extent representative of the target population. Of the respondents who participated in Wave 1, 44 percent also participated in one or more of the subsequent waves, and the reapproach rate increased with each subsequent wave.

In this study we are interested in how changes in friends’ involvement in crime affect that of our respondents. We therefore selected respondents who participated at least twice ($N = 717$). In each wave, respondents could name a maximum of five important network members. Because we wanted to eliminate possible biases caused by friendship selection, we investigated the impact only of stable network members – friends who were nominated in at least two waves. In total, 470 respondents provided information about 711 different friends on at least two occasions (469 were nominated twice, 165 were nominated three times, and 77 were nominated four times).¹ Respondents may be influenced by any of their friends, so we treated each respondent–friend combination as a unique (and independent) case ($N = 711$; level 2). There were 1741 unique respondent–friend–time observations over all panel waves ($N = 469*2 + 165*3 + 77*4 = 1741$; level 1). We removed 172 observations from the sample due to missing values (for more details, see below). This resulted in a working sample of 646 cases (that is, unique respondent–friend combinations; level 2) and 1569 observations (unique respondent–friend–time observations; level 1). By disaggregating the individual-level outcome variable (that is, individuals’ involvement in crime) to the respondent–friend level, we are able to investigate whether the influence of friendship varies according to the strength of

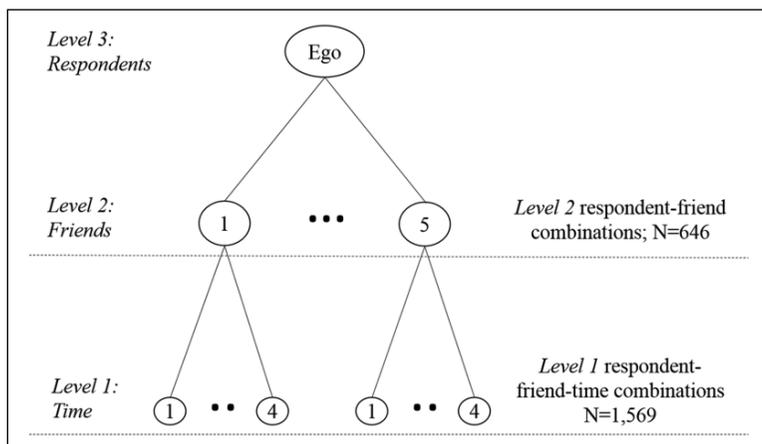


Figure 1. Schematic overview of multilevel structure.

each specific tie. An extra nesting of respondent–friend combinations within individual respondents is not necessary. See Figure 1 for a schematic overview of the nesting structure.

Dependent variables

For each wave we created variables that indicated whether respondents had been involved in crime as offenders and as victims. A self-reported delinquency measure of 10 items was used to determine whether a respondent had committed any of the following crime types in the 12 months prior to the interview: theft, burglary, fencing, tax fraud, insurance fraud, vandalism, threat, weapon use, violence, and the use of hard drugs. Respondents who had engaged in at least one type of crime in the 12 months prior to the interview were coded as offenders. In line with previous research, women were less likely to report offending than men ($\chi^2 = 27.2, p = .000$), as were the employed versus the unemployed ($\chi^2 = 6.3, p = .012$) and respondents over 30 years of age versus younger respondents ($\chi^2 = 54.5, p = .000$). Of all respondents who participated in the CrimeNL surveys (for the first time), 13.4 percent reported some form of offending. We found no evidence for a trend in offending over the four waves ($\chi^2 = 1.5, p = .67$). The use of hard drugs was most often reported (6.2 percent), followed by violent crimes (4.2 percent). Respondents were least likely to report involvement in a burglary (0.2 percent).

Victimization was measured by eight items that asked whether the respondents had experienced any of the following incidents in the 12 months prior to the interview: attempted burglary, burglary, bicycle theft, other theft, vandalism, threats, violence, and a category of ‘other’ crimes. Respondents were coded as victims if they indicated any victimization experience in the 12 months prior to the interview. In line with previous research, people over 30 years of age were less likely to report victimization than younger people ($\chi^2 = 22.0, p = .000$). We found no differences in relation to gender ($\chi^2 = 0.02, p = .881$) or employment ($\chi^2 = 1.52, p = .217$). In total, 36.4 percent

of the respondents reported some form of victimization. Victimization was stable across the four waves ($\chi^2 = 1.8, p = .614$). Property theft was most prevalent (22.3 percent), followed by vandalism (12.8 percent). Violent crimes (8.5 percent) and other forms of victimization (2.5 percent) were reported much less frequently.

Independent variables

Respondents were asked to nominate up to five significant network members with whom they discussed important matters, using the name generator/interpreter method (McCallister and Fischer, 1978). For each network member, respondents provided information about the nature of the relationship, the member's educational level, the geographical distance between their places of residence, the frequency of contact, and whether, according to the respondent, the network member was involved in crime, either as victim or as offender. The network members could be partners, friends, parents, other relatives, colleagues, classmates, or members of the same association or club. We excluded parents from our analysis and refer in the remainder of this study to the remaining network members as *friends*.

Respondents were asked to indicate whether any of their friends had been engaged in criminal activities and/or had been victimized in the 12 months prior to the interview. Based on the answers to these questions, we classified each friend as offender (0/1) and/or as victim (0/1). For 103 (5.9 percent) friends, respondents provided no information on offending and for 36 (2.1 percent) none for victimization. Observations with missing data on either offending or victimization were removed ($N_{\text{level1}} = 125$). As a consequence, for some cases we were left with only one observation and, given our analytical strategy, these also had to be removed from our sample ($N_{\text{level2}}/N_{\text{level1}} = 47$). All in all this resulted in a loss of 172 level-1 observations and 65 level-2 cases.²

Contact frequency was measured by asking respondents how often they were in contact with each friend. The answering categories ranged from (1) (almost) every day to (7) never. The distribution of this variable was very skewed: in 64 percent of cases, the respondent indicated having almost daily contact with the nominated friend. Given the low number of observations in the higher categories, which precluded the possibility of using multiple dummy variables, we decided to dichotomize this variable: *daily contact* was coded (1) if respondents indicated having had (almost) daily contact with their friend and (0) otherwise.

Intimacy or attachment was based on the friends' position within the network. We distinguished between the 'closest friend' and the remaining friends. In line with previous research, we coded *closest friend* as (1) if the friend was the person listed first and (0) if the friend was nominated for any of the remaining positions (Fuijimoto and Valente, 2012; Mounts and Steinberg, 1995).

Residential proximity was measured by asking respondents to report on the distance between their own home and those of their friends. The original answering categories were: (1) in the same house, (2) in the same neighborhood or street, (3) in the same city or town but not in the same neighborhood, (4) elsewhere in the Netherlands less than 20km away, (5) elsewhere in the Netherlands more than 20km away, and (6) abroad. The near-repeat phenomenon shows strong distance decay, with most repeating events

occurring within the same neighborhood (Bernasco, 2008). We therefore coded *same neighborhood* as (1) if the friend scored at most (2), and (0) otherwise.

Analytical strategy

In this study we are interested in how changes in the characteristics of network members affect our respondents' involvement in crime. To minimize the potential confounding effects of time-stable unobserved variables and given our dichotomous dependent variables, we estimated fixed-effects logit models. In these models only individuals who experienced a change in the dependent variable are included in the analyses. This aspect of the procedure results in reduced sample sizes ($N_{\text{level2}} = 105$ for offending and $N_{\text{level2}} = 289$ for victimization; see also Table 4 in the Appendix).³ Hybrid models that are more flexible in dealing with more complex nesting structures (that is, that ego–alter combinations are nested in ego's) led to similar results.

Results

Offending

The main objective of this article is to examine whether changes in friends' involvement in crime affect the involvement of those around them. In Table 2 we present the results of our fixed-effects models for offending. We expected that associating with friends who commit crime would increase individuals' risk of also committing crime (Hypothesis 1a). Model 1 corroborates this expectation as it shows that peer delinquency is positively related to individuals' own engagement in criminal behaviors ($b = 1.305$). When peers become delinquent, the odds of individuals engaging in criminal activities themselves multiply by 3.7 ($e^{1.305}$).

Model 2 shows that the positive influence of friends engaging in crime on people's own likelihood of doing so is stronger for those who interact with those friends on a daily basis ($b = 0.146 + 1.841$). Interestingly, by adding the interaction term, the main effect of peer delinquency on individuals' own risk of committing crime becomes statistically insignificant ($b = 0.146$). This indicates that delinquent friends influence people's risk of offending only when they interact with these friends frequently. Overall, these findings thus corroborate our Hypothesis 1b.

The results of Model 3 indicate that the influence of friends' engagement in criminal activities on people's own risk of offending is also stronger when the association is more intimate ($0.556 + 1.124$). Again, after adding the interaction term, the main effect of peer delinquency becomes insignificant ($b = 0.556$). This indicates that only close friends increase the risk of offending, which supports our expectation.

In Model 4 we additionally examine whether the geographical distance between friends conditions the influence of delinquent peers on individuals' own risk of offending. The results indicate that the influence of friends' engagement in criminal activities is stronger for those who live in close proximity to these friends ($-0.261 + 2.746$). When delinquent peers live in the same neighborhood, the odds of offending multiply by 16.4 ($e^{-0.261+2.746}$). The main effect is no longer statistically significant ($b = -0.261$). We

Table 1. Descriptive statistics of variables used in our analyses.

	All observations			W1			W2			W3			W4		
	N	Mean / Percent	SD	N	Mean / Percent	SD	N	Mean / Percent	SD	N	Mean / Percent	SD	N	Mean / Percent	SD
<i>Dependent variables</i>															
Ego: offender	1569	15.4%	0.36	350	15.4%	0.36	430	14.2%	0.35	436	15.1%	0.36	353	17.0%	0.38
Ego: victim	1569	41.3%	0.49	350	43.7%	0.50	430	45.3%	0.50	436	39.2%	0.49	353	36.5%	0.48
<i>Independent variables</i>															
Alter: offender	1569	13.1%	0.34	350	13.4%	0.34	430	12.8%	0.33	436	13.5%	0.34	353	12.7%	0.33
Alter: victim	1569	14.7%	0.35	350	16.6%	0.37	430	17.7%	0.38	436	12.8%	0.33	353	11.6%	0.32
Daily contact	1569	0.64	0.48	350	0.66	0.47	430	0.64	0.48	436	0.63	0.48	353	0.63	0.48
Same neighborhood	1569	0.59	0.49	350	0.61	0.49	430	0.59	0.49	436	0.58	0.49	353	0.58	0.49
Best friend	1569	0.65	0.48	350	0.65	0.48	430	0.66	0.48	436	0.65	0.48	353	0.65	0.48

Table 2. Fixed-effects models for the risk of offending ($N_{level1} = 105$; $N_{level2} = 271$).

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6								
	b	SE	exp(B)	b	SE	exp(B)	b	SE	exp(B)	b	SE	exp(B)							
Alter: Offender	1.305***	0.442	3.686	0.146	0.701	1.157	0.566	0.684	1.761	-0.261	0.681	0.770	-0.836	0.899	0.433	-1.094	1.047	0.335	
Alter: Victim																			
Aoffender*Daily contact				1.841**	0.917	6.305							1.047	1.058	2.850	0.564	1.279	1.759	
Aoffender*Closest friend							1.124*	0.855	3.078				0.210	1.050	1.234	-0.246	1.204	0.782	
Aoffender*Same neighborhood										2.746***	1.002	15.583	2.397**	1.049	10.986	3.595***	1.406	36.404	
Avictim*Daily contact																3.360**	1.570	28.795	
Avictim*Closest friend																-0.112	1.088	0.894	
Avictim*Same neighborhood																-1.864	1.458	0.155	
	184.206			179.825			182.469						173.839						

Source: CrimeNL.

*** $p < .01$; ** $p < .05$; * $p < .1$ (one-tailed).

therefore conclude that delinquent friends influence people's risk of criminal offending only when they live nearby.

In Model 5, we included the interaction terms of contact frequency, friendship intimacy (that is, closest friend), and geographical distance (that is, same neighborhood). After adding the interaction terms simultaneously, the interaction effects with contact frequency ($b = 1.047$) as well as friendship intimacy ($b = 0.210$) are no longer statistically significant. Only the interaction term of same neighborhood remains statistically significant ($b = 2.397$). This suggests that geographical proximity, rather than frequency of contact and the level of closeness, explains why friends of offenders have an elevated risk of engaging in criminal activities themselves. These findings thus refute both Hypothesis 1b and Hypothesis 1c.

Because offending and victimization are often predicted by the same correlates, we additionally examined the influence of victimized friends on people's risk of committing crime (Model 6). Although the estimated interaction effect of contact frequency is positive and statistically significant ($b = 3.360$), additional analysis suggests that daily interaction with victimized friends is not statistically significant when it comes to individuals' likelihood of committing crime ($b = -1.288 + 3.360$). The interaction terms of close friends ($b = -0.112$) and of geographic proximity ($b = -1.864$) are also not statistically significant.

Victimization

In Table 3 we present the results of our fixed-effects panel models for victimization. In Model 1, we test whether changes in peers' involvement in crime increase people's likelihood of victimization. The estimates of Model 1 show that associating with victimized friends indeed increases an individual's risk of likewise becoming a victim ($b = 1.259$). When friends are victimized, the odds of also getting victimized multiply by 3.5 ($e^{1.259}$). This clearly provides support for Hypothesis 3a. We find no evidence that a change in friends' delinquency affects people's risk of victimization ($b = -0.254$). Accordingly, we have to reject Hypothesis 2a.

In line with the near-repeat hypothesis, the results of Model 2 indicate that individuals' risk of becoming victims is higher for those who live in close proximity to victimized friends ($b = 0.347 + 1.432$). When victimized friends live in the same neighborhood, the odds of becoming a victim multiply by 5.6 ($e^{0.347+1.432}$). Since the main effect is no longer statistically significant ($b = 0.347$), we conclude that victimized friends affect people's risk of being targeted *only* when they live nearby. Overall, these results are in line with the near-repeat phenomenon.

Next, we examine whether contact frequency conditions the influence of delinquent peers on victimization risk (Model 3). We hypothesized that the positive relationship between peer delinquency and an individual's risk of being targeted would be stronger for individuals who interact with delinquent friends daily (Hypothesis 2b). Surprisingly, the results indicate that those who interact daily with delinquent friends are less likely to become victims of crime ($b = 0.692 - 1.176$).⁴ It seems that delinquent friends with whom an individual has daily contact can provide some form of protection.

Table 3. Fixed-effects models for the risk of victimization ($N_{\text{level1}} = 289$; $N_{\text{level2}} = 755$).

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6							
	b	SE	exp(B)	b	SE	exp(B)	b	SE	exp(B)	b	SE	exp(B)						
Alter: Offender	-0.254	0.308	0.776	-0.248	0.312	0.780	0.692	0.635	1.998	0.228	0.586	1.255	-0.244	0.319	0.784	0.632	0.684	1.881
Alter: Victim	1.259***	0.268	3.523	0.347	0.419	1.415	1.258***	0.269	3.519	1.265***	0.269	3.543	-0.499	0.54	0.607	1.262***	0.269	3.531
Aoffender*Daily contact							-1.176**	0.684	0.308							-2.202**	1.196	0.111
Aoffender*Closest friend																0.122	0.962	1.129
Aoffender*Same neighborhood																1.129	0.947	3.094
Avictim*Daily contact																		
Avictim*Closest friend																1.688**	0.761	5.411
Avictim*Same neighborhood																0.571	0.649	1.77
-2LogLikelihood	522.361			1.432***	0.545	4.186	519.193	521.429		507.662						517.520		

Source: CrimeNL.
 *** $p < .01$; ** $p < .05$; * $p < .1$ (one-tailed).

In Model 4, we test whether friendship intimacy conditions the relationship between having delinquent peers and the risk of victimization (Hypothesis 2c). We expected the positive influence of having delinquent friends to be stronger for more intimate relationships. Yet the interaction term is negative ($b = -0.605$), and turns out to be statistically insignificant. These findings thus refute Hypothesis 2c.

In order to understand the possible influence processes more fully, we additionally examined the interactions between friends' victimization and contact frequency, and between friends' victimization and friendship intimacy simultaneously (Model 5). The results indicate that the effect of having victimized friends is stronger for individuals who interact with these friends on a daily basis ($b = -0.449 + 1.688$). Interestingly, when taking contact frequency into account, the relationship between peers' victimization and geographical distance ($b = 0.272$) is no longer statistically significant. We also found no evidence that the relationship between victimized friends and an individual's own risk of offending is conditional upon friendship intimacy ($b = 0.571$). This suggests that frequency of contact, rather than geographical distance (and friendship intimacy), explains why friends of victims are at greater risk of being targeted themselves. These findings thus refute Hypothesis 3b.

Finally, in Model 6 we examine whether the influence of delinquent peers is amplified by geographical proximity and the level of intimacy. The model provides no evidence that residing in the same neighborhood affects the influence of delinquent peers on people's risk of victimization ($b = 1.129$ n.s.). Furthermore, the interaction effect for closest friends ($b = 0.122$) also does not reach statistical significance. Hypothesis 2c is thus not supported. The negative interaction effect between delinquent peers and contact frequency remains negative and statistically significant ($b = -2.202$).

To summarize, our results show that peer involvement in crime indeed influences such involvement of the people around them. In addition, this influence is not identical for all individuals, but is stronger the more frequently people interact with their delinquent friends.

Robustness checks

We conducted several sensitivity analyses to determine the robustness of our findings. First, in order to make sure that the observed relationships were not related to a specific type of crime, we re-estimated Model 1 (from Tables 2 and 3) multiple times, each time removing one category of crime from the dependent variable. The results of the additional analyses for offending (see Table 5 in the Appendix) show that the odds ratios of friends' criminal behaviors affecting people's own risk of offending [1.116–1.442] were largely similar to the overall effect of 1.305, as presented in Table 2. Similarly, leaving each crime-type out of the analysis did not substantially alter the estimated impact of friends' involvement in victimization [2.525–4.099] or offending [0.652–1.072] on people's risk of being victimized (see Table 6 in the Appendix). Note that, even though the latter effect becomes larger than 1 when bicycle theft is left out, the effect of friends' offending on individuals' risk of victimization was always statistically non-significant. Overall, the sensitivity analyses thus reveal largely similar results, as presented in Tables 2 and 3, which indicates that they do not hinge on a single type of crime.

Second, although we hypothesized that people with crime-involved friends are more likely to commit crimes or be victimized themselves, the influencing processes may also operate the other way around. When friends stop being involved in crime either as offenders or as victims, according to the model this reduces individuals' risk of being involved in crime. To test whether the effects are indeed symmetric, we performed additional analyses in which we divided our sample into people who were not involved in crime at T1 but were at T2 (changed from 0 to 1 in the dependent variable) and people who were already involved in crime at T1 but were no longer involved at T2 (changed from 1 to 0 in the dependent variable). We then re-estimated Model 1 of Tables 2 and 3 for each subsample. The results of these additional analyses show that the influencing processes do indeed work both ways: friends influence both the initiation and termination of individuals' involvement in crime. In fact, the analyses demonstrate that there is a stronger relationship when it comes to termination of such involvement than there is for initiation. For example, when friends become delinquent, the odds of engaging in criminal activities multiply by 2.3 (initiation), whereas when friends stop being involved in crime (termination), the odds of ceasing criminal behavior multiply by 10.5. Similar results were obtained for victimization (see Table 7 in the Appendix).

Third, we examined whether the influence processes are different for different types of relationships. Given the limited number of cases in our study, we were able to distinguish only between partners and other mentioned network members (that is, friends, other relatives, colleagues, classmates, or members of the same association or club). The results of these additional analyses (not shown) indicate that the findings presented here are consistent for both partners and other mentioned network members.

Conclusion and discussion

In the current study, we examined whether friends' involvement in crime has an influence on people's own involvement. We contributed to the body of literature in four ways. First, we examined the influencing processes in terms of both offending and victimization. Second, we assessed whether the influence varies with the strength of ties by studying the impact of contact frequency, friendship intimacy, and geographical proximity. Third, we examined the influencing processes in a sample consisting mainly of adults. And, finally, we employed a longitudinal research model that enabled us to rule out friendship selection processes and all time-stable unmeasured heterogeneity as potential confounders.

We tested our hypotheses using four waves of CrimeNL, a longitudinal study of offending, victimization, and friendship networks in the Netherlands. The results of our study indicate that delinquent friend associations increase people's own risk of offending, but only when individuals live in close proximity to these friends. It is the residential proximity that also explains why individuals with regular contact and strong attachments to delinquent peers are more likely to become offenders themselves. This finding clearly supports the normative influence perspective, in which people learn behavior by observing and imitating the behaviors of others. The closer people live to delinquent friends, the more these friends will be able to transmit delinquent values and to act as role models. With more rigorous tests, our findings thus confirm the findings of Agnew (1991), who

already demonstrated using a cross-sectional model that the association between delinquent friends and adolescents' own delinquency is conditioned by peer interactions.

Peer relations have long been central to the study of crime and delinquency. Expanding on this idea, Schreck and colleagues (2002) were the first to study the role of peers in explaining adolescents' risk of victimization (see also Schreck et al., 2004). They showed that association with delinquent friends increases adolescents' own risk of being victimized. In the current study we found that individuals are less likely to become victims of crime when they often spend time with delinquent friends, which suggests that delinquent friends provide some form of protection. Although this finding thus differs from the work of Schreck and colleagues, it is in line with the study by Shaffer (2003). Shaffer demonstrated that individuals who have not been engaged in crime themselves, but who have delinquent peers, are less likely to be targeted. She posited that other studies did not find a negative association between peer delinquency and individuals' risk of victimization because they focused on relatively minor offenses, such as smoking and truancy, which presumably would not lower their friends' chances of becoming victims. This rationale is in line with gang-related research that suggests that individuals supposedly join gangs to gain protection from victimization (Sheldon et al., 2001). However, our respondents reported on whether or not their friends 'did something in the past that was not allowed', and we also found a negative relationship between delinquents and their friends' risk of victimization. We do not think the severity of offense can explain these inconsistent findings. Unlike Shaffer (2003), we examined the influencing processes in a sample that consisted mainly of adults. Perhaps the interpersonal bonds between friends are stronger in adulthood than in adolescence, so that potential offenders are more deterred from targeting individuals who have criminal friends in adulthood. Future research is warranted to test this interpretation.

Finally, we examined whether friends' experiences of victimization are related to individuals' own risk of becoming victims. We found that this influence is particularly strong when interaction with victimized friends is frequent. After controlling for frequency of contact, we found no evidence that level of intimacy or residential proximity are related to individuals' risk. At first sight, this finding seems to contradict the near-repeat phenomenon, which shows that crime clusters in both time and space, so that individuals in close proximity to an initial target are at greater risk of also being targeted (Johnson et al., 2007, 2009; Lammers et al., 2015). However, the near-repeat phenomenon not only applies to the area in which people live but also to other areas in which offenders have previously committed crime (Johnson et al., 2006). For instance, offenders may return to the same bar, street, or (unguarded) parking lot to repeat the same type of crime. Given that friends who often spend time together may frequently find themselves in the same places (for example, bars, stores, theaters), the near-repeat phenomenon may thus still be responsible for the observed victimization risk, so that friends of victims are at greater risk of becoming targets themselves. At the same time, other processes in the peer group (for example, social processes) might also be responsible for the increased risk of victimization (Sijtsema et al., 2012). More research is warranted to investigate which mechanism is at play.

With this in mind, we recommend future research to further disentangle the underlying mechanisms that can explain how friends' involvement in crime affects the risk of

offending and victimization. For instance, it may be that friends influence people's lifestyles, which are related to the risk of offending and victimization. Specifically, people who engage in risky lifestyles have a higher chance of becoming both offenders and victims of crime (Averdijk, 2011; Hindelang et al., 1978; Osgood et al., 1996; Sampson and Lauritsen, 1990). Because of the close link between lifestyle and crime involvement, people who often spend time with friends involved in crime may unintentionally place themselves in situations where the risk of victimization and offending is particularly high. Unfortunately, CrimeNL provides us with little information about the friends of our respondents except for their experiences with crime, how often the primary respondents met them, and how far away they lived. Investigating whether lifestyle affects social influence processes would require direct measures of both individuals' and friends' lifestyles.

Our study has several limitations. First, we measured peers' involvement in crime indirectly by asking respondents to report on their behaviors. Scholars in social network research have raised concerns about this method of measuring behavior, because people have a strong tendency to project their own behaviors onto others. The consequence of this would be that the actual influence effects are weaker than those reported in this study (Weerman, 2011). Although we acknowledge the potential problems of using ego-centered network data in which respondents report on the behavior of their friends, in the current study the levels of victimization, and to a lesser extent the levels of offending, were considerably higher among respondents than among their friends (see Table 1), which would not be expected were projection to pose a major problem. Previous research indicates that misinterpretations of friends' behaviors are in part attributable to individual characteristics, and that time-stable characteristics are among the most powerful predictors of these misinterpretations (Young et al., 2011). Because we employed fixed-effects panel models, we were able to rule out all time-stable unmeasured heterogeneity, including any characteristics of respondents that were related to the tendency to project behavior onto friends. Hence, we would argue that projection effects are limited in our study.

A second limitation of using ego-centered network data is that we were unable to assess whether friends influenced our respondents or whether our respondents influenced their friends. As such, it is unclear whether the influence processes depend on characteristics of the individual, on characteristics of the involved friend or on the specific combination of the two. Investigating who influences whom would require complete network data in which the characteristics of both individuals and their friends are known. For this study, however, it is important to stress that it does not really matter who influenced whom, because influence processes were studied either way.

Finally, the data and methods employed in this study did not allow us to investigate whether influence processes depend on the type of offense, although we were able to show that the results did not hinge entirely upon a specific type of crime. It is, however, likely that the influence processes are more pronounced for the same type of crime. For instance, when a friend engages in property crime, it is more likely that his/her friend will also engage in property crime, because people learn behaviors by observing and imitating those of others. In order to fully understand the influence processes, we recommend future research to take into account the different types of crime. This requires

larger samples as well as more detailed information on the types of crime friends were involved in.

Although future research is needed, the results presented here provide important improvement in understanding peer influence processes. First, we found that friends' involvement in crime influences people not only during adolescence but also at later stages in life, even after controlling for all time-stable population heterogeneity as potential confounders. Second, the results of this study show that the peer context is also important for understanding victimization: associating with delinquent peers decreases an individual's risk of becoming a victim, whereas associating with victimized peers increases the risk. As such, we provided an important first step in understanding the contagion effect of victimization outside the school context. Third, we showed that the influence processes are conditional upon friends' residential proximity and the frequency of contact between friends, and not on the quality of the friendship. In this regard, our work extends previous research, in that the findings underline the importance of considering the conditions under which peer delinquency does and does not affect the criminal behavior of those around them. We hope that future work will use these insights to expand the knowledge on influence processes in relation to crime.

Acknowledgements

The views expressed herein are those of the authors and do not necessarily reflect the policies of Statistics Netherlands.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1. Nominated parents were excluded from the analysis because parents are given not chosen and we are interested in friendship influence effects.
2. As a robustness check we performed three additional analyses in which we applied alternative strategies to deal with missing values. First we coded all missings on alter-offending and alter-victimization as '0'. Second we coded all missings as '1'. And finally we introduced an additional category 'missing'. These alternative strategies did not substantially alter our results.
3. In predicting offending, females, older persons, and higher educated people were more likely to drop out of the sample (chi-square and *t*-test). For victimization, this is not the case.
4. Additional analyses revealed that this effect is statistically different from zero.

References

- Agnew R (1991) The interactive effects of peer variables on delinquency. *Criminology*, 29: 47–72.
- Akers RL (1973) *Deviant Behavior: A Social Learning Approach*. Belmont, CA: Wadsworth Publishing.
- Arentze T, Van den Berg P and Timmermans H (2012) Modeling social networks in geographic space: Approach and empirical application. *Environment and Planning* 44: 1101–1120.

- Averdijk M (2011) Reciprocal effects between victimization and routine activities. *Journal of Quantitative Criminology* 27: 125–149.
- Bernasco W (2008) Them again? Same-offender involvement in repeat and near repeat burglaries. *European Journal of Criminology* 5: 411–431.
- Bernasco W, Johnson SD and Ruiter S (2015) Learning where to offend: Effects of past on future burglary locations. *Applied Geography* 60: 120–129.
- Bowers KJ and Johnson SD (2005) Domestic burglary repeats and space–time clusters: The dimensions of risk. *European Journal of Criminology* 2: 67–92.
- Brechwald WA and Prinstein MJ (2011) Beyond homophily: A decade of advances in understanding peer influence processes. *Journal of Research on Adolescence* 21: 166–179.
- Cohen LE and Felson M (1979) Social change and crime rate trends: A routine activity approach. *American Sociological Review* 44: 588–608.
- Glueck S and Glueck ET (1950) *Unraveling Juvenile Delinquency*. Cambridge, MA: Harvard University Press.
- Fuijimoto K and Valente TW (2012) Decomposing the components of friendship and friends' influence on adolescent drinking and smoking. *Journal of Adolescent Health* 51: 136–143.
- Haynie DL (2002) Friendship networks and delinquency: The relative nature of peer delinquency. *Journal of Quantitative Criminology* 18: 99–134.
- Haynie DL and Osgood WD (2005) Reconsidering peers and delinquency: How do peers matter? *Social Forces* 84: 1109–1130.
- Hindelang MJ, Gottfredson M and Garofalo J (1978) *Victims of Personal Crime: An Empirical Foundation for a Theory of Personal Victimization*. Cambridge, MA: Ballinger.
- Hirschi T (1969) *Causes of Delinquency*. Berkeley, CA: University of California Press.
- Jensen GF and Brownfield D (1986) Gender, lifestyles, and victimization: Beyond routine activity theory. *Violence and Victims* 1: 85–99.
- Johnson SD, Summers L and Pease K (2006) *Vehicle Crime: Communicating Spatial and Temporal Patterns*. London: UCL Jill Dando Institute of Crime Science.
- Johnson SD, Summers L and Pease K (2009) Offender as forager? A direct test of the boost account of victimization. *Journal of Quantitative Criminology* 25: 181–200.
- Johnson SD, Bernasco W, Bowkers K, Elffers H, Ratcliff JH, Rengert GF and Townsley M (2007) Space–time patterns of risk: A cross national assessment of residential burglary victimization. *Journal of Quantitative Criminology* 23: 201–219.
- Knecht A (2008) Friendship selection and friends' influence: Dynamics of networks and actor attributes in early adolescence. PhD dissertation, Utrecht University.
- Lammers M, Menting B, Ruiter S and Bernasco W (2015) Biting once, twice: The influence of prior on subsequent crime location choice. *Criminology* 53: 1–21.
- McCallister L and Fischer CS (1978) A procedure for surveying personal networks. *Sociological Methods Research* 7: 131–148.
- McPherson M, Smith-Lovin L and Cook JM (2001) Birds of a feather: Homophily in social networks. *Annual Review of Sociology* 27: 415–444.
- Matsueda RL and Anderson K (1998) The dynamics of delinquent peers and delinquent behavior. *Criminology* 36: 269–308.
- Miller HV (2010) If your friends jumped off of a bridge, would you do it too? Delinquent peers and susceptibility to peer influence. *Justice Quarterly* 27: 473–491.
- Mounts NS and Steinberg L (1995) An ecological analysis of peer influence on adolescent grade point average and drug use. *Developmental Psychology* 31: 915–922.
- Osgood WD, Wilson JK, O'Malley PM, Bachman JG and Johnston LD (1996) Routine activities and individual deviant behavior. *American Sociological Review* 61: 635–655.

- Ousey GC, Wilcox P and Brummel S (2008) Déjà vu all over again: Investigating temporal continuity of adolescent victimization. *Journal of Quantitative Criminology* 24: 307–335.
- Ratcliffe JH and Rengert GF (2008) Near repeat patterns in Philadelphia shootings. *Security Journal* 21: 58–76.
- Reed MD and Rose DR (1998) Doing what simple Simon says? Estimating the underlying causal structures of delinquent associations, attitudes, and serious theft. *Criminal Justice Behavior* 25: 240–274.
- Sampson RJ and Lauritsen JL (1990) Deviant lifestyles, proximity to crime, and the offender–victim link in personal violence. *Journal of Research in Crime and Delinquency* 27: 110–139.
- Schreck CJ, Fisher BS and Miller JM (2004) The social context of violent victimization: A study of the delinquent peer effect. *Justice Quarterly* 21: 23–47.
- Schreck CJ, Stewart EA and Osgood WD (2008) A reappraisal of the overlap of violent offenders and victims. *Criminology* 46: 871–906.
- Schreck CJ, Wright RA and Miller JM (2002) A study of individual and situational antecedents of violent victimization. *Justice Quarterly* 19: 159–180.
- Sente M, Dijkstra JK, Salmivalli C and Cillessen AHN (2013) The dynamics of friendships and victimization in adolescence: A longitudinal social network perspective. *Aggressive Behavior* 39: 229–328.
- Shaffer JN (2003) The victim–offender overlap: Specifying the role of peer groups. PhD thesis, The Pennsylvania State University, University Park.
- Sheldon RG, Tracy SK and Brown WB (2001) *Youth Gangs in American Society*. Belmont, CA: Wadsworth.
- Sijtsema JJ, Rambaran AJ and Ojanen TJ (2012) Overt and relational victimization and adolescent friendships: Selection, de-selection, and social influence. *Social Influence* 8: 177–195.
- Singer SI (1981) Homogeneous victim–offender populations: A review and some research implications. *Journal of Criminal Law and Criminology* 72: 779–788.
- Steinberg L and Monahan KC (2007) Age differences in resistance to peers. *Developmental Psychology* 43: 1531–1543.
- Sutherland EH (1947) *Principles of Criminology*. Philadelphia: Lippincott.
- Sutherland EH and Cressey DR (1978) *Criminology*. Philadelphia: Lippincott.
- Tedeschi JT and Felson RB (1994) *Violence, Aggression, and Coercive Actions*. Washington, DC: American Psychological Association.
- Tolsma J, Rokven J, Groenestijn P, Gouweleeuw J and Goudriaan H (2014) *Data and Codebook CrimeNL*. Radboud University Nijmegen/Statistics Netherlands.
- Townsley M, Homel R and Chaseling J (2003) Infectious burglaries. A test of the near repeat hypothesis. *British Journal of Criminology* 43: 615–633.
- Warr M (2002) *Companions in Crime. The Social Aspects of Criminal Conduct*. Cambridge: Cambridge University Press.
- Weerman FM (2011) Delinquent peers in context: A longitudinal network analysis of selection and influence effects. *Criminology* 49: 253–286.
- Wright BRE, Caspi A, Moffit TE and Silva PA (2001) The effects of social ties on crime vary by criminal propensity: A life-course model of interdependence. *Criminology* 39: 321–352.
- Young JTN, Barne JC, Meldrum RC and Weerman FM (2011) Assessing and explaining misperceptions of peer delinquency. *Criminology* 49: 599–630.

Appendix

Table 4. Total number of transitions experienced by the individual.

Transitions	Offending		Victimization	
	N	Percent	N	Percent
0->1	39	6.04	71	10.99
1->0	21	3.25	80	12.38
0->1->0	7	1.08	19	2.94
0->1->1	3	0.46	11	1.70
0->0->1	10	1.55	20	3.10
1->0->0	5	0.77	25	3.87
1->0->1	1	0.15	5	0.77
1->1>0	3	0.46	19	2.94
0->1->0->0	2	0.31	4	0.62
0->1->0->1	0	0.00	1	0.15
0->1->1->0	2	0.31	4	0.62
0->1->1->1	0	0.00	2	0.31
0->0->1->0	3	0.46	4	0.62
0->0->1->1	0	0.00	1	0.15
0->0->0->1	2	0.31	4	0.62
1->0->0->0	3	0.46	6	0.93
1->0->0->1	1	0.15	1	0.15
1->1->0->0	0	0.00	7	1.08
1->1->0->1	0	0.00	1	0.15
1->0->1->0	1	0.15	2	0.31
1->0->1->1	1	0.15	1	0.15
1->1->1->0	1	0.15	1	0.15
0->0 / 0->0->0 / 0->0->0->0	484	74.92	221	34.21
1->1 / 1->1->1 / 1->1->1->1	57	8.82	136	21.05
Total transitions	105	16.21	289	44.70
Total no. transitions	541	83.74	357	55.26
Total	646	100.00	646	100.00

Note: 0= not offender/not victim.

1= offender/victim.

Table 5. Fixed-effects models for the risk of offending in which each time one crime-type (dependent variable) is left out of the analyses (replication of Model 1, Table 2).

Overall effect, Alter: offender	1.305	***
Effect when the following crime-type is left out:		
Theft	1.266	***
Burglary	1.305	***
Fencing	1.278	***
Tax fraud	1.125	**
Insurance fraud	1.442	***
Vandalism	1.116	***
Threat	1.327	***
Weapon use	1.206	***
Violence	1.305	***
Hard drug use	1.269	***

Source: CrimeNL.

*** $P < .01$; ** $P < .05$; * $P < .1$ (one-tailed).

Table 6. Fixed-effects model for the risk of victimization in which each time one crime-type (dependent variable) is left out of the analyses (replication of Model 1, Table 3).

Overall effect, Alter: victim	3.523	***
Effect when the following crime-type is left out:		
Attempted burglary	3.266	***
Burglary	3.362	***
Bicycle theft	2.525	***
Other thefts	3.828	***
Vandalism	2.624	***
Threats	4.099	***
Violence	3.235	***
Other crimes	3.136	***
Overall effect, Alter: offender	0.776	n.s.
Effect when the following crime-type is left out:		
Attempted burglary	0.840	n.s.
Burglary	0.778	n.s.
Bicycle theft	1.072	n.s.
Other thefts	0.652	n.s.
Vandalism	0.662	n.s.
Threats	0.906	n.s.
Violence	0.728	n.s.
Other crimes	0.818	n.s.

Source: CrimeNL.

*** $P < .01$; ** $P < .05$; * $P < .1$ (one-tailed).

Table 7. Fixed-effects models for the initiation and termination of crime involvement of individuals.

	Offending ^a			Victimization ^b		
	<i>b</i>	SE	exp(<i>B</i>)	<i>b</i>	SE	exp(<i>B</i>)
Initiation of crime involvement (Y: 0->1)						
Alter: Offender	0.827*	0.507	2.287	-0.298	0.454	0.742
Alter: Victim				0.828**	0.377	2.288
Termination of crime involvement (Y: 1->0)						
Alter: Offender	2.307***	1.046	10.512	-0.393	0.425	0.675
Alter: Victim				1.528***	0.395	4.610

Source: CrimeNL.

Notes:

a. Initiation: $N_{level1} = 72$; $N_{level2} = 162$; termination: $N_{level1} = 51$; $N_{level2} = 107$.

b. Initiation: $N_{level1} = 151$; $N_{level2} = 336$; termination: $N_{level1} = 180$; $N_{level2} = 391$.

0= not offender/not victim.

1= offender/ victim.

*** $p < .01$; ** $p < .05$; * $p < .1$ (one-tailed).