SEGREGATED WORLDS?

The Level of Overlap Between Dutch Offenders' Criminal and Core Discussion Networks

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We examine the level of overlap between offenders' criminal networks (i.e., those with whom they discuss criminal activities and exchange criminal knowledge and skills) and offenders' core discussion networks (i.e., those with whom they discuss important personal matters). We formulate four hypotheses based on social capital and focus theory. Empirical data from 1,904 Dutch pretrial detainees reveal that one third of the criminal network members also function as core discussion partners and that half of the criminal network members know at least one core discussion partner. This implies that offenders do not completely separate their criminal network from their core discussion network. Multilevel analyses show that this network overlap is larger if criminal network members live close to the offender and/or if they share multiple social settings. Our findings have implications for policies regarding the prevention of recidivism and the reintegration of offenders into society.

Keywords: offenders; social bonds; prisoners; social support

INTRODUCTION

Criminal network members are important for the explanation of crime and delinquency (Carrington, 2011; Hochstetler, 2013; McGloin & Nguyen, 2014; Reiss, 1988; Smångs, 2010). Sutherland (1947) argued that crime is primarily learned through the transference of criminal skills and knowledge. Criminal information plays a key role in the planning and

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execution of an offense. The literature shows that criminals often receive information on suitable victims or appropriate locations to commit a crime (see, for example, Jacobs, Topalli, & Wright, 2003; Mullins & Wright, 2003; Wright & Decker, 1994, 1997). For example, network members help burglars by indicating which houses contain a substantial loot (Wright & Decker, 1994) or point out to armed robbers which victims are most vulnerable (Wright & Decker, 1997). McCarthy and Hagan (1995) combined social capital theory with Sutherland's theory of differential association and showed that crime is not the result of an impulsive act but that learning, embeddedness in relationships, and exposure to criminal capital each play an important role.

The research on the relationships among criminals and their network members has provided mixed evidence regarding the question whether criminal ties can also be trustful and confiding relationships. Some studies suggest a prevailing attitude of distrust and a real risk of betrayal among offenders (Anderson, 1999; Rosenfeld, Jacobs, & Wright, 2003; Wright & Decker, 1994). Other studies emphasize the importance of criminal embeddedness, relationships, and "criminal capital" (McCarthy & Hagan, 1995) for committing crimes, suggesting that ties among criminals are strong. These two different perspectives lead to the question we address in this study of whether offenders actually have networks that provide different types of resources, including a "criminal network," which transmits knowledge about criminal capabilities, and a "network of confidants," which is a core discussion network that provides identity confirmation, support, and friendship, and to what degree these networks overlap. A high overlap between the two network parts may be a criminogenic risk factor for unsuccessful resocialization after confinement (see, for example, Andrews & Bonta, 2010): In that case, the network is highly integrated and criminal network members are also confidants for the focal actor. However, if segregation exists, an offender has a noncriminal part of social life that can be important for a successful resocialization and reintegration in society after an incarceration (cf. Atkin-Plunk & Armstrong, 2018; Krohn, Massey, & Zielinski, 1988; Pettus-Davis, Eggleston Doherty, Veeh, & Drymon, 2017; Shivy et al., 2007; Volker et al., 2016).

In this study, we focus on the two network parts: (a) the network important for discussing criminal activities and exchanging criminal knowledge (hereafter "criminal network"), and (b) the network important for discussing personal matters (hereafter "core discussion network"). Our research questions are as follows:

1. **Research Question 1:** To what extent do offenders' criminal networks overlap with their core discussion networks?
2. **Research Question 2:** How do differences in network overlap relate to characteristics of the offenders and their (criminal) network members?

To answer these questions, we use unique and rich ego-centered network data on 1,904 male prisoners who were asked about both network parts prior to imprisonment (Dirkzwager et al., 2018). Answering these research questions is an important step toward understanding how criminals organize their networks, whether there is a "division of labor" therein, or whether the criminal network and the core discussion network are entangled.

THEORETICAL BACKGROUND AND HYPOTHESES

Based on social capital and focus theory, we formulate four hypotheses on how differences in the overlap between offenders' criminal network and their core discussion network

members relate to the characteristics of the offender and of the (criminal) network members. We distinguish between functional and structural network overlap. Functional overlap is the extent to which criminal network members are also core discussion partners. Functional overlap is also referred to as "multiplexity" or "multistrandedness." Structural overlap is the extent to which criminal network members have contact with core discussion network members. Structural overlap is also referred to as network density (Haynie, 2001; Krohn et al., 1988).

SOCIAL CAPITAL THEORY

The basic idea of social capital theory is that resources that can be accessed and used through social relationships with others help people to achieve their goals in various domains of life (Lin, 2001). Importantly, the theory posits that (a) past investments are relevant for present and future actions, and (b) investments are goal-specific and therefore will vary among network members (Axelrod, 1984; Lin, 2001). According to Weerman (2003), offenders are more likely to invest in co-offending relationships if committing crimes together is easier and more rewarding than committing crimes alone (see also Hochstetler, 2013). The prospect of higher benefits (e.g., higher financial profits) and lower costs (e.g., as a result of committing crimes together) increases the likelihood that offenders will form co-offending relationships. Furthermore, relationships that have been beneficial and reliable in the past are expected to remain beneficial in the future, and they are likely to become strong and trustful relationships. The strength of the relationship, in turn, not only increases the likelihood that the criminal network member is also part of the offender's inner social circle with whom personal, noncriminal matters are discussed, but it also increases the chance that the criminal network member knows and associates with other members of the offender's network. This process can be explained by the tendency of stronger relationships to become more closely associated with one another, which leads to network closure (Granovetter, 1973). Assuming that offenders with a longer criminal history and a longer criminal record have more reliable and stronger relationships with other criminals, we formulate the *shadow of the past hypothesis*:

> **Hypothesis 1:** The criminal network members of an offender who has been more criminally active for a longer period of time are more likely to also be core discussion partners and to know more of the offender's core discussion partners.

The particular capabilities that are needed for committing a crime also influence relationships. Some offenses require highly specialized knowledge. For example, a burglary is generally more complicated than shoplifting. We expect that criminal specialists are more likely to invest in specific relationships with other criminals. Specialists commit a relatively higher number of crimes of the same type, whereas generalists commit more different types of crimes. Committing different types of crimes requires more diverse information and knowledge than committing the same type of crime. Such diversity in information is likely to be provided by weaker ties and ties that bridge across structural holes (Burt, 2001). In line with this, we argue that criminal specialists are more likely to develop strong and overlapping criminal relationships: Because specialists are involved in crimes of the same type, they can use the same sources of criminal knowledge and skills repeatedly (McGloin & Piquero, 2010), which will strengthen the relationships with their criminal network

members and increase the likelihood of overlap with the core discussion network. Below, we formulate the *differential investment hypothesis*:

Hypothesis 2: The criminal network members of a criminal specialist (as compared with a criminal generalist) are more likely to also be core discussion partners and to know more of the offender's core discussion partners.

FOCUS THEORY

According to the focus theory (Feld, 1981), contact opportunities affect the composition and structure of personal networks (cf. Mollenhorst, Volker, & Flap, 2011). The repeated interactions that occur in the "foci of activity" make it more likely that people associate with one another and form clusters of relationships (Feld, 1981). When individuals share more foci of activity, they are likely to have "multifaceted exchange relationships" (Feld, 1981, p. 1025). Accordingly, if an offender meets a criminal contact in numerous social settings (or foci of activity), the likelihood will be greater that the criminal contact will become more important and obtain multiple functions in the network. Furthermore, the sharing of multiple foci of activity with network members increases the likelihood of network density. That is, network members who share many foci with the focal actor have a higher probability of knowing one another and being connected (Feld, 1981; Mollenhorst et al., 2011).We formulate the *shared settings hypothesis*:

Hypothesis 3: The criminal network members whom the offender meets in multiple social settings are more likely to also be core discussion partners and to know more of the offender's core discussion partners.

Another hypothesis that follows from the focus theory relates to the residential proximity of the criminal network members. Previous studies have indicated that offenders are more likely to associate with other criminals who live closer to their homes (Reiss, 1988; Sarnecki, 2001; Schaefer, 2012; Schaefer, Rodriguez, & Decker, 2014). Residential proximity increases the likelihood that they meet regularly and in multiple social settings (Feld, 1981; Mollenhorst et al., 2011), which enhances not only functional overlap, as it may increase the likelihood that the offender also discusses noncriminal matters with the criminal network member, but also structural overlap, as it increases the likelihood that the offender's criminal associates will meet and become connected to the noncriminal core discussion partners of the offender. Hence, we formulate the *residential proximity hypothesis*:

Hypothesis 4: The criminal network members who live closer to the offender are more likely to also be core discussion partners and to know more of the offender's core discussion partners.

PRIOR STUDIES ON THE OVERLAP OF CRIMINAL AND NONCRIMINAL RELATIONSHIPS

The studies on the overlap between the criminal and legitimate spheres in criminal organizations indicate that the criminal and noncriminal social worlds often overlap, such that legitimate actors help to organize the criminal organization (Block & Chambliss, 1981; Morselli & Giguere, 2006; Papachristos & Smith, 2013; Zhang & Chin, 2002). However,

regarding offenders' personal networks, only a very limited number of empirical studies have addressed the extent to which criminal relationships overlap with networks of more intimate ties. The few existing studies have primarily focused on the quality of the (criminal) relationships in offenders' personal networks (e.g., Brownfield & Thompson, 1991; Giordano, Cernkovich, & Pugh, 1986) and are, importantly, not conclusive (see also Marcus, 1996; Young & Rees, 2013). Although some of the studies have found that the friendships among offenders are as strong as the friendships among nonoffenders (Baerveldt, Van Rossem, Vermande, & Weerman, 2004; Giordano et al., 1986; Kandel & Davies, 1991), other studies have found that offenders' friendships are less strong in the sense that there is greater conflict, less respect, and less mutual trust in criminal relationships (Brownfield & Thompson, 1991; Hirschi, 1969; see also Marcus, 1996). Our study aims to fill this knowledge gap by examining the overlap between offenders' criminal and core discussion networks, considering that core discussion partners facilitate expressive actions such as emotional support (Lin, 2001; Marsden, 1987) as opposed to instrumental support, which is usually addressed in studies on the overlap between criminal and legitimate spheres (e.g., Morselli & Giguere, 2006).

METHOD

THE PRISON PROJECT DATA

We used data from the Prison Project (Dirkzwager et al., 2018), a longitudinal panel study that examines the consequences of detention on reoffending and (ex-)prisoners' life circumstances such as employment, health, and social relationships. Between October 2010 and April 2011, all male prisoners between 18 and 65 years of age, born in the Netherlands, and who entered confinement in pretrial detention were asked to participate in the survey. For this article, we use data from the first wave of that panel study.

During the 6 months of sampling, a total of 3,981 prisoners met the selection criteria, of which 2,837 prisoners could be approached. Those who could not be approached were mostly already released or not allowed to have contact with others. Eventually, 1,904 prisoners were willing to participate in the interview (67%). Details about those who refused to participate are discussed in Dirkzwager et al. (2018). In addition to the interview data, we used officially registered data from the Research and Policy Database for Judicial Documentation (OBJD) and from the registration system of the Ministry of Justice (TULP). These data include information concerning the criminal histories of the prisoners and the types of offenses with which that have been charged.

NETWORKS AND DEPENDENT VARIABLES

To identify the core discussion network, we used the following name generator: "With whom did you discuss important personal matters during the 6 months prior to your arrest?" (see McCallister & Fischer, 1978). To identify the criminal network, we used the following name generator: "In the 6 months prior to your arrest, with whom did you discuss criminal activities and exchange knowledge and skills that could be used by you to commit a crime?" The respondents were allowed to name a maximum of five persons at each of these two questions. Respondents who did not want to give the real names of their network members could provide nicknames or initials.[1]

Altogether, 1,832 respondents (i.e., 96.2%) provided valid answers on both name generators. A total of 571 respondents (i.e., 30.0% of all respondents) named one or more criminal network members, whereas 1,261 respondents (i.e., 66.2% of all respondents) reported no criminal network members (265 of them reported no network at all, whereas 996 of them named only core discussion partners; see Table 1). Because we examine the likelihood that relationships with criminal network overlap with the core discussion network, our main analyses focus on the networks of the subset of the 571 respondents who named at least one criminal network member. Of this group, 509 respondents named at least one core discussion partner and at least one criminal network member. Compared with all 1,505 respondents who reported one or more core discussion network members, the set of 571 respondents who reported one or more criminal network members consists of offenders who are relatively less likely to be convicted for the first time, who are more likely to be accused of property crime and less likely to be accused of violent crime, and who are more likely to be "criminal generalists" (figures are available upon request from the authors).

Functional network overlap pertains to the question of whether a criminal network member was also a core discussion partner. In this study, we focus on the criminal networks of offenders and therefore selected the 1,160 criminal network members who were mentioned by the 571 respondents. These include 815 network members who were only mentioned in relation to the criminal network question and 345 network members who were mentioned regarding both name generators (see Figure 1).

Structural network overlap concerns the relative number of relationships between the members of an offender's criminal network and his core discussion network. The respondents with two or more network members were asked to indicate whether their network members knew one another well and got along well. For the 1,160 criminal network members, we counted the number of relationships that they had with the respondents' core discussion network members. Then, we divided this number of existing relationships by the total number of core discussion network members with whom they could be related. We could not calculate the structural network overlap for 211 criminal network members because the respondent did not mention any core discussion network members with whom they could be related.

INDEPENDENT VARIABLES

We measured an offender's criminal activity by using official register data on the number of committed offenses, the number of times in prison, and the registered length of the criminal career (number of years between the day of the interview and the date of the prisoner's first registered offense). To avoid multicollinearity problems, we combined the three variables in one scale using their *z*-standardized values (Cronbach's α was .89). A higher score indicates that the offender was more criminally active.

Criminal specialization refers to the various offenses that have been committed by the offender in the past as they were officially registered. We distinguished three types of offenders: (a) specialists, which refers to the offenders who in the past have been convicted of committing multiple offenses of the same type[2]; (b) generalists, which refers to the offenders who in the past have been convicted of committing different types of offenses; and (c) one offense only, which refers to the offenders who were officially accused of committing a crime for the first time.

To determine the residential proximity of the criminal network members, the respondents were asked to report for each network member whether he or she (1) lived with the respondent, (2) lived in the same neighborhood, (3) lived in the same city or village, or (4) lived in another city or village. If a network member lived in another city or village, the respondent was asked to report the place of residence. For these network members, we calculated the shortest travel distance between the places of residence of the network member and the respondent. Next, we distinguished the following categories: (4a) lived in another city/village: maximum 25 km away; (4b) lived in another city/village: >25 km, but maximum 100 km away; and (4c) lived in another city/village: >100 km away.

The number of shared social settings was measured by asking the respondents where they usually met their network members prior to imprisonment. For each network member, the respondent had to indicate whether they met each other in each of the following 16 settings/foci of activity: "at school," "at a sports club," "at a voluntary association," "at another association/organization," "at work," "with/via family," "with/via friends," "at my home," "at his or her home," "in the neighborhood," "at a public place of entertainment," "at church," "on a vacation," "at a party," "on the Internet," and "somewhere else."

CONTROL VARIABLES

We controlled for the following characteristics of the network members and relationships: role, gender similarity, and age similarity. The role of the network member indicates the type of relationship using three categories: (a) family member, (b) friend, and (c) other. Given that all the respondents are male, gender similarity indicates whether the network member is male (= 1) or female (= 0). We measured age similarity as the negative absolute age difference between the respondent and the network member. In addition, we controlled for the following characteristics of the offender: type of crime, size of the core discussion network, and age. The type of crime concerns the most serious offense for which the offender has been charged and was obtained from register data. We distinguished six types of offenses: (a) violence (excluding sexual and property crimes with violence), (b) sexual, (c) property, (d) vandalism and public order, (e) drugs, and (f) other crimes. The size of the core discussion network is the sum of all the network members with whom the respondent discussed important personal matters. The descriptive statistics of all variables are presented in the appendix.

ANALYTICAL STRATEGY

We tested our hypotheses by performing logistic multilevel models to examine functional overlap and linear multilevel models to examine structural overlap. As we have hierarchically structured data (i.e., network members are nested within respondents), we used multilevel models (see Van Duijn, Van Busschbach, & Snijders, 1999). These models consider the nested structure of the data and overcome the problem that standard errors are underestimated, and spurious significant effects are found (Snijders & Bosker, 1999).[3]

FINDINGS

DESCRIPTIVE RESULTS: THE SIZE AND COMPOSITION OF THE CRIMINAL NETWORK

Table 1 presents the descriptive findings on the criminal networks. The offenders named on average 0.63 network members with whom they exchanged criminal knowledge. However, in fact, only 30% of the offenders mentioned one or more criminal alters. For these 30%, the criminal network on average consisted of 2.03 alters with whom they exchanged criminal knowledge. More than 70% of the offenders with a criminal network reported having one or two criminal network members.

TABLE 1: Size of the Criminal Network

Variable	*N*	%	*M*	*SD*
All offenders (*N* = 1,904 respondents)				
Offenders without a criminal network	1,261	66.2		
Offenders with one or more criminal alters	571	30.0		
No valid network data provided	72	3.8		
Criminal network size (*N* = 1,832 offenders who provided valid network data)			0.63	1.18
Offenders with one or more criminal alters (*N* = 571)				
Criminal network size			2.03	1.28
1	267	46.8		
2	154	27.0		
3	68	11.9		
4	29	5.1		
5	53	9.3		

Our first research question focuses on the extent to which the criminal network of an offender overlaps with his core discussion network. Figure 1 shows that 345 (29.7%) of the 1,160 criminal network members were also core discussion partners, indicating functional network overlap. In Table 2, the characteristics of the criminal network members are presented, separated for those who do and for those who do not overlap with the core discussion network (Part A) and separated by the level of structural network overlap (Part B). Part A shows that criminal network members were mainly friends (54.5% and 58.4%, respectively) and men (74.9% and 95.6%, respectively). However, there were relatively many family members and women among the criminal network members who were core discussion partners (only 4.4% of the criminal network members who were not core discussion partners were female). This finding indicates that women in the criminal networks of the (male) offenders generally have multiple functions, that of confidants and of "partners in crime."

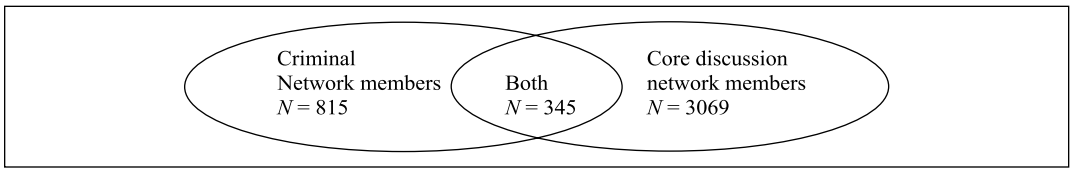

Figure 1: Functional Overlap Between Offenders' Criminal Network and Their Core Discussion Network

TABLE 2: Characteristics of the Criminal Network Members

	Separated for those who were and were not named as core discussion partners							
	Core discussion partners (N = 345)				Not core discussion partners (N = 815)			
Part A	%	*M*	*SD*	*N*	%	*M*	*SD*	*N*
Role				332				788
Family members	32.8				9.0			
Friends	54.5				58.4			
Other	12.7				32.6			
Gender				339				779
Females	25.1				4.4			
Males	74.9				95.6			
Age similarity		–6.86	8.28	286		–5.52	7.37	649
	Separated for those who had relationships with more or with less than 50% of the core discussion network members							
	Had relationships with more than 50% (N = 472)				Had relationships with 50% or less (N = 477)			
Part B	%	*M*	*SD*	*N*	%	*M*	*SD*	*N*
Role				466				470
Family members	23.8				7.2			
Friends	61.4				53.8			
Other	14.8				38.9			
Gender				465				462
Females	14.6				5.6			
Males	85.4				94.4			
Age similarity		–5.90	7.97	412		–6.09	7.66	361

In Part B of Table 2, the criminal network members who had social relationships with more than 50% of the core discussion network members are compared with the criminal network members who had social relationships with 50% or less of the core discussion network members. The results shows that 472 of the 949 criminal network members[4] had social relationships with more than 50% of the core discussion network members (49.7%), indicating structural network overlap. Furthermore, Part B shows a similar pattern as that observed in Part A. Although the majority of the criminal network members are friends and men, there are relatively more family members and women among the criminal network members who had social relationships with more than 50% of the core discussion network.

EXPLANATORY RESULTS: MULTILEVEL ANALYSIS ON FUNCTIONAL AND STRUCTURAL NETWORK OVERLAP

Our second research question focuses on how the differences in network overlap relate to the characteristics of the offender and the (criminal) network members. In this section, we present and interpret the results of two multilevel analyses that give answers to this research question regarding functional overlap (Table 3) and structural overlap (Table 4). In all models, we have controlled for the role, gender similarity, age similarity, type of crime,

TABLE 3: Logistic Multilevel Analyses on Functional Overlap

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE*	OR	*B*	*SE*	OR	*B*	*SE*	OR	*B*	*SE*	OR
Offender was more criminally active	–0.22	0.22	0.81	–0.21	0.22	0.81	–0.26	0.22	0.77	–0.24	0.23	0.79
Criminal specialization												
Generalist	Ref.		Ref.	Ref.		Ref.	Ref.		Ref.	Ref.		Ref.
Specialist	–0.09	0.23	0.92	–0.02	0.24	0.98	–0.08	0.23	0.92	–0.03	0.24	0.98
One offense only[a]	–0.07	0.30	0.93	–0.09	0.30	0.92	–0.08	0.30	0.93	–0.07	0.31	0.93
The number of shared social settings												
1 focus				Ref.		Ref.				Ref.		Ref.
2 foci				0.01	0.47	1.01				0.09	0.47	1.09
3 foci				0.39	0.45	1.47				0.39	0.45	1.47
4 foci				0.14	0.45	1.15				0.07	0.46	1.08
5 foci				0.33	0.45	1.39				0.22	0.46	1.25
6 foci				–0.01	0.46	0.99				–0.10	0.47	0.91
7 foci				0.22	0.48	1.25				0.10	0.49	1.10
8 foci				–0.17	0.50	0.85				–0.30	0.51	0.74
9 foci				0.87	0.52	2.39				0.72	0.53	2.06
10 or more foci				0.99	0.53	2.69				0.81	0.54	2.24
Unknown				1.05	0.54	2.84				1.04	0.56	2.83
Residential proximity												
Lived with the respondent							–0.03	0.43	0.97	–0.20	0.45	0.82
Lived in the same neighborhood							Ref.		Ref.	Ref.		Ref.
Lived in the same city/village							–0.39	0.24	0.68	–0.32	0.25	0.72
Lived in another city/village												
Maximum 25 km away							–0.42	0.30	0.66	–0.37	0.31	0.69
>25, but maximum 100 km away							–0.52	0.36	0.59	–0.48	0.37	0.62
>100 km away							–1.49	0.58**	0.23	–1.43	0.60*	0.24
Unknown							–0.61	0.33	0.54	–0.71	0.35*	0.49
N network members	1,160			1,160			1,160			1,160		
N respondents	571			571			571			571		

Note. All models are controlled for role relationship (i.e., family member, friend, other), gender similarity, age similarity, type of crime, size of the core discussion network, and age of the respondent (full models are available upon request from the authors). OR = odds ratio.

[a]Three respondents with a missing value on this variable are included in this category.

*$p < .05$. **$p < .01$. ***$p < .001$.

size of the core discussion network, and age of the respondent. The model specifications in Tables 3 and 4 are the same and specified to optimally test the formulated hypotheses.

First, we hypothesized that the offenders who were more criminally active were more likely to have overlap between their criminal network and their core discussion network (Hypothesis 1). Tables 3 and 4 show that the degree to which an offender was criminally active is not significantly related to functional and structural overlap. We also observe no significant difference in network overlap between specialists and generalists. This is not in line with Hypothesis 2 that when compared with generalists, specialists are more likely to

TABLE 4: Linear Multilevel Analyses on Structural Overlap

	Model 1		Model 2		Model 3		Model 4	
Variable	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Offender was more criminally active	−0.06	0.04	−0.07	0.04	−0.07	0.04	−0.07	0.04
Criminal specialization								
Generalist	Ref.		Ref.		Ref.		Ref.	
Specialist	−0.03	0.04	−0.02	0.04	−0.03	0.04	−0.02	0.04
One offense only[a]	−0.05	0.06	−0.05	0.06	−0.04	0.06	−0.04	0.06
The number of shared social settings								
1 focus			Ref.				Ref.	
2 foci			−0.03	0.05			−0.03	0.05
3 foci			0.03	0.05			0.02	0.05
4 foci			0.10	0.06			0.08	0.05
5 foci			0.15	0.06**			0.13	0.06*
6 foci			0.10	0.06			0.07	0.06
7 foci			0.19	0.06**			0.14	0.06*
8 foci			0.26	0.06***			0.22	0.06***
9 foci			0.30	0.07***			0.25	0.07***
10 or more foci			0.32	0.07***			0.27	0.07***
Unknown			0.10	0.06			0.08	0.06
Lived with the respondent					0.08	0.05	0.09	0.05
Lived in the same neighborhood					Ref.		Ref.	
Lived in the same city/village					−0.05	0.03	−0.03	0.03
Lived in another city/village								
Maximum 25 km away					−0.09	0.04*	−0.06	0.04
>25, but maximum 100 km away					−0.14	0.04**	−0.10	0.04*
>100 km away					−0.26	0.06***	−0.20	0.06***
Unknown					−0.25	0.05***	−0.22	0.05***
N network members	949		949		949		949	
N respondents	459		459		459		459	
Log likelihood	−313.02		−288.05		−286.37		−267.47	
Deviance	626.04		576.11		572.74		534.94	

Note. All models are controlled for role relationship (i.e., family member; friend; other), gender similarity, age similarity, type of crime, size of the core discussion network, and age of the respondent (full models are available upon request from the authors).

[a]Three respondents with a missing value on this variable are included in this category.

*$p < .05$. **$p < .01$. ***$p < .001$.

have overlap between their criminal network and their core discussion network.[5] These two findings imply that we find no support for Hypotheses 1 and 2.

Furthermore, we expected that the offenders who meet their criminal network members in multiple social settings are more likely to have overlap between their criminal network and their core discussion network (Hypothesis 3). The results of Models 2 and 4 show that this hypothesis was supported for structural network overlap but not for functional overlap. Whereas Table 3 shows that the number of shared social settings is not significantly associated with the odds that a criminal network member was also a core discussion partner, Table 4 shows that when the offender shared multiple settings with a criminal network member, that network member was likely to be associated with a larger number of the offender's core discussion partners. More specifically, the number of core discussion partners who are known by a criminal network member is

significantly higher for criminal network members who share five, seven, or more social settings with the offender compared with criminal network members who share no more than three social settings with the offender (Model 4: $B = 0.13$ for five shared settings; $B = 0.14$ for seven shared settings; $B = 0.22$ for eight shared settings; $B = 0.25$ for nine shared settings; $B = 0.27$ for 10 or more shared settings). This means, for example, that criminal network members with whom the offender shares five settings on average know 13 percentage point more of the members of the offender's core discussion network compared with criminal network members with whom the offender shares only one setting. Additional analyses (not presented, but available upon request) indicated that the effect of the sharing of eight or more social settings is larger than the effect of five (and six) social contexts, whereas the effect of the sharing of nine or more settings is larger than the effect of seven social contexts.

Next, in Models 3 and 4, we considered residential proximity as we hypothesized that network overlap would be higher among criminal network members who live closer to the offender (Hypothesis 4). Table 3 shows that the likelihood that the offender discusses important personal matters with a criminal network member is significantly smaller if the criminal network member lives more than 100 km away from the offender compared with criminal network members who live close to the offender.[6] More specifically, the odds that the offender discusses important personal matters with the criminal network member is about 4 times higher for criminal network members who live in the same neighborhood than for criminal network members who live more than 100 km away from the offender (Model 4: odds ratio [OR] = 0.24).

Table 4 shows that the number of core discussion partners who are known by a criminal network member is significantly smaller for criminal network members who live more than 25 km away from the offender, compared with criminal network members who live in the same household or in the same neighborhood as the offender ($B = -0.10$ for those who live between 25 and 100 km away; $B = -0.20$ for those who live more than 100 km away, with those living in the same neighborhood as reference category).[7] Together, these findings support our hypothesis that offenders who live closer to their criminal network members are more likely to have overlap between their criminal network and their core discussion network (Hypothesis 4). Furthermore, if we compare Model 4, in which we included all our variables of interest with the previous models, we see that the results in Tables 3 and 4 are stable. Note, however, that the importance of residential proximity and shared foci of activity slightly decreases if both characteristics are considered. This decrease can be explained by the fact that people who live closer to one another are more likely to share multiple social settings.[8]

Finally, regarding the control variables (full models are available upon request from the authors), it appeared that the type of relationship to the network member is significantly related to both types of network overlap: Friends, but in particular the relatives among the criminal network members, are very likely to also be discussion partners and to know most other discussion partners of the offender. Furthermore, we found that male criminal network members are less likely to be core discussion partners than female criminal network members and that when an offender's core discussion network is larger, a criminal network member is also more likely to be a core discussion partner. The type of crime, age of the offender, and age similarity between the offender and criminal network members are not significantly related to network overlap.

DISCUSSION

The objective of this study was to examine the overlap between offenders' criminal network members, who are important for the discussion of criminal activities and the exchange of criminal knowledge and skills, and offenders' core discussion network members, with whom important personal matters are shared. Three main conclusions can be drawn. First, offenders do not completely separate their criminal network from their core discussion network but have considerable overlap between these networks. We found that almost one out of three criminal network members is also a core discussion partner, and almost half of all criminal network members know more than 50% of the offender's core discussion partners.[9] Second, network overlap is neither related to the frequency and length of criminal involvement nor to criminal specialism. These findings are not in line with our hypotheses derived from social capital theory (Hypotheses 1 and 2). Third, both functional and structural network overlap increase if the criminal network members live close to the offender (Hypothesis 4), whereas structural network overlap increases if the offenders share more social settings with their criminal network members (Hypothesis 3), which suggests that their criminal network members are more embedded in their personal network. These findings provide support for Feld's focus theory (Feld, 1981). Interestingly, we did not find a significant association between the number of shared social settings and functional network overlap. This indicates that the offenders who share multiple social settings with their criminal network members are not necessarily open with these network members about their personal issues.

Knowledge regarding the overlap in the personal networks of a criminal is important for a better understanding of criminal offenses, criminal careers, and the degree to which criminals live in segregated worlds. A better understanding of the extent of this segregation will help to refine measures to prevent crime and reintegrate criminals into society. Before discussing the implications of this study's results for crime prevention and future policy, it is important to first mention some of the limitations of our study and directions for future research.

First, our measurement of criminal networks provided a list of network members who are important for the discussion of criminal activities and exchange of criminal knowledge and skills. This question does not necessarily tap into co-offending relationships, nor does it capture the full criminal network; however, it does capture a very relevant and resourceful social relationship for offenders. We found that only 30% of the respondents mentioned at least one such criminal network member, whereas most other respondents (approximately 52%) mentioned only core discussion partners. The offenders generally reported a substantial core discussion network that was independent of their criminal network. Regarding the prosocial influence and monitoring role of noncriminal associates versus the role of having criminal or delinquent associates in criminal conduct (see, for example, Andrews & Bonta, 2010; Andrews, Bonta, & Wormith, 2011; Ward & Stewart, 2003), an interesting question for future research is what is the extent to which "independent core network members" (i.e., core network members who are not also criminal network members and/or who do not know the criminal network members of the offender) temper the influence of criminal network ties on the (future) behaviors of the offenders, for instance, their likelihood of recidivism.

Second, we acknowledge that offenders may generally be reluctant to share information about their criminal network members. Moreover, all of the respondents in our study were in pretrial detention such that a police investigation was still ongoing. Prisoners may be

reluctant to provide information to others during this period. Although confidentiality was guaranteed, and initials or nicknames could be used for indicating criminal network members, this may have led to their naming fewer criminal network members. As a result, the size of the criminal networks may be underestimated; however, this does not affect our main conclusions.

These issues notwithstanding, our study adds to the previous work on network overlap by extending its application to the overlapping networks of criminal and noncriminal relationships. In particular, our study adds to the discussion concerning the extent to which people keep networks and relational functions separated. We revealed that, in general, most of the offenders reported no criminal network members, which could indicate reluctance to "betray" their criminal friends or that these criminals planned and acted alone. If offenders did report a criminal network, overlap with their core discussion network was substantial.

The finding of substantial structural overlap between the criminal and noncriminal part of the offenders' social networks underscores that the inner core of noncriminal network members can play an important role in crime prevention because many of the criminal network members of offenders are also connected to a substantial part of the offenders' noncriminal core discussion network members. At the same time, previous studies have shown that returning to the same place of residence after incarceration is important for maintaining existing social networks (Volker et al., 2016), which enhances successful reintegration and decreases the likelihood of reoffending (Berg & Huebner, 2011; Hirschi, 1969; Laub & Sampson, 2003). Our finding that criminal network members are more likely to be part of the offender's core network if they live close to the offender implies that it can be effective to monitor and to be aware of criminals who live close to the offender and that an effort should be made to encourage the formation of positive, constructive social networks among former prisoners and to discourage the maintenance of criminal relationships in general and of local criminal relationships in particular.

These new insights into the extent to which offenders segregate their criminal and noncriminal networks are a first but important step in the understanding of the structure of the personal networks of criminals and their consequences. Future research should address questions on the consequences of this network overlap, for example, whether it is sufficient

APPENDIX

DESCRIPTIVE STATISTICS of All Variables Used in the Multivariate Analyses

Variable	%	*M*	*SD*	Minimum	Maximum	*N*
Respondent characteristics						
Number of committed offenses[a]		8.10	9.32	0	65	571
Number of times in prison[a]		3.77	6.94	0	48	571
Registered length of the criminal career[a]		11.37	9.27	0	41	571
Criminal specialization (last 5 years)						568
Generalist	50.4					
Specialist	30.6					
One offense only	19.0					
Type of crime						559
Property	61.2					
Violence (excluding sexual and property crimes with violence)	15.4					

(continued)

APPENDIX (CONTINUED)

Variable	%	*M*	*SD*	Minimum	Maximum	*N*
Sexual	1.8					
Vandalism and public order	4.7					
Drugs	11.8					
Other crimes	5.2					
Size of core discussion network		2.15	1.44	0	5	572
Age (years)		28.98	10.07	18	63	572
Network and relational characteristics						
Residential proximity						1,160
Lived with the respondent (n/y)	5.3					
Lived in the same neighborhood (n/y)	26.9					
Lived in the same city/village (n/y)	25.7					
Lived in another city/village: maximum 25 km away (n/y)	13.6					
Lived in another city/village: maximum 100 km away (n/y)	8.7					
Lived in another city/village: >100 km away (n/y)	4.6					
Unknown	15.2					
The number of shared social settings						1,160
1 focus	8.0					
2 foci	10.4					
3 foci	11.8					
4 foci	11.2					
5 foci	11.7					
6 foci	12.0					
7 foci	7.8					
8 foci	7.8					
9 foci	5.0					
10 or more foci	4.4					
Unknown	9.8					
Role relationship						1,120
Family member	16.1					
Friend	57.2					
Other	26.7					
Gender similarity						1,118
Similar	89.4					
Dissimilar	10.6					
Age similarity (years)		–5.93	7.68	–58	0	935
Network overlap						
Functional	29.7					1,160
Structural		0.53	0.45	0	1	949

[a]Information on these variables is used to measure the degree to which an offender was criminally active.

for an offender to have just one overlapping relationship to reenter the criminal scene, whether a high level of overlap—indicating more embeddedness in crime—increases the likelihood of recidivism, or whether the noncriminal part of the network actually stabilizes or reduces criminal activities and stimulates the reintegration of offenders into society.

NOTES

1. The limit of five persons who could be mentioned when answering each of the name-generating questions hardly constrained the number of persons named by the respondents because (a) on average, the respondents who mentioned at least one criminal network member named only 2.0 criminal network members ($SD = 1.3$) and 2.2 core discussion network members ($SD = 1.4$); and (b) approximately 9% of these offenders reported having five criminal network members, and approximately 8% reported having five core discussion network members. We assume that recall bias is also limited in our study because (a) the offenders were interviewed only 2 or 3 weeks after being arrested and (b) because they were asked for the persons with whom they discussed important personal matters, namely, criminal activities, and knowledge during the 6 months prior to their arrest.

2. We distinguished the following types of offenses: (a) property,(b) violence, (c) sexual, (d) vandalism, (e) drug-related, (f) traffic, (g) other crimes, and (h) unknown. There may be variation among the offenses in the category "other crimes." However, the offenders who have been convicted of only committing other crimes in the past are labeled as specialists (which was the case for only nine offenders). Furthermore, the assignment of an offender to the categories of specialists, generalists, and first offenders is based on the offender's criminal career between the age of 12 and the time of the interview. Consequently, we were unable to consider (a) the potential short-term episodes of specialization in the criminal career of the offenders who we considered generalists and (b) the possibility that the offenders who are considered specialists in this study may commit different types of offenses in the future and thus become criminal generalists. Finally, Osgood and Schreck (2007) identified a number of important conditions that should be taken into consideration when measuring criminal specialization. We tried to take most of these conditions into account. For instance, and perhaps most importantly, we measure specialization on the individual level; we address the variety of offenses committed; and in the regression models we include variables addressing the individual's offense rate and the type of crime for which they were charged.

3. We found no evidence for multicollinearity in either our logistic model or our linear regression model.

4. We recall that structural overlap could not be calculated for 211 relationships with criminal network members because the respondent concerned did not mention any core discussion partner with whom they could be related.

5. Being frequently criminally active may result in offenders becoming generalists because they have more opportunities to commit different types of crime. We control for the number of committed offenses, which is part of the variable "offender was more criminally active."

6. Additional analyses (available upon request) indicated (a) that the effect of criminal network members who are living more than 100 km away is also significant compared with criminal network members who live in the same city or village as the respondent or who live at maximally 25 km away from the respondent, and (b) that the coefficients for living in the same household, the same neighborhood, the same city or village, and living at maximally 25 km are not significantly different. Furthermore, the effect of household members is largely covered by the control variable "role" (i.e., family members).

7. Additional analyses (available upon request) indicated that (a) the effect of criminal network members who live more than 100 km away is also significant compared with criminal network members who live in the same city or village as the respondent or who live at maximally 25 km away from the respondent, (b) that the number of core discussion partners known is also significantly smaller for those who live in the same city or village and who live at maximally 25 km away compared with household members, and (c) that the coefficients for living in the same household and living in the same neighborhood are not significantly different.

8. Additional analyses (available upon request) indicated that excluding the cases that had missing values on the number of foci and/or residential proximity does not yield different results.

9. Papachristos and Smith (2013) examined the level of overlap/multiplexity among the relationships in the bounded group of "Al Capone's 'Syndicate,'" and that 26.5% of all individuals in this group who have associations in the criminal sphere also have associations in the personal sphere.

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