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A dyadic analysis of social network stability before and after incarceration

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ABSTRACT

Purpose: To examine tie stability from pre- to post imprisonment among incarcerated people focusing on 1) ties with core discussion and criminal network members, 2) ties measured before and after imprisonment, and 3) dyadic (tie)-level determinants while accounting for important individual characteristics.
Methods: Our sample comprises 1180 network ties of 464 incarcerated males in the Netherlands participating in the Prison Project, interviewed three weeks upon entering prison and six months after release. Multilevel logistic regressions were used to examine which relationship characteristics (quantity, quality, and type) and individual characteristics impact tie stability.
Results: Relationship quantity (contact frequency), quality (trust, support), and type (family, partner) contribute to tie stability post-imprisonment. Having ties with criminal or delinquent alters did not affect tie stability. Moreover, after accounting for these tie-level variables, characteristics of the respondent (e.g., sentence length, agreeableness, employment) were not significant predictors of tie stability.
Conclusions: A tie level perspective adds new information to social network changes surrounding a period of imprisonment. Investing in factors (e.g., contact frequency) contributing to tie stability during imprisonment may facilitate reintegration policies, which should accommodate - through awareness and training - relationships that remain stable post-imprisonment and foster social support to facilitate successful reentry.

The importance of social relations for one's wellbeing has been consistently shown in a long tradition of psychological and sociological research (Baumeister & Leary, 1995; Durkheim, 1979). Against this background, the event of imprisonment is particularly interesting. Incarcerated persons are, by design, physically disconnected from regular contact with their community and family. While most incarcerated people are allowed to receive visitation, the restricted means and moments to communicate while being incarcerated poses practical challenges for maintaining social relationships outside of prison (Bronson, 2008). At the same time, one of the most critical factors for post-release success is the availability of social support, which reduces the chances to recidivate (Bahr, Harris, Fisher, & Harker Armstrong, 2010; Cochran, 2014), improves mental health during reentry (Wallace et al., 2016) and facilitates finding housing and employment (Berg & Huebner, 2011).

Given the importance of social support post-imprisonment, it is crucial to understand which, how, and why social ties of incarcerated people change. Research on social network change among a general population has indicated that core discussion networks, which engage network members with whom an individual discusses important personal matters, are the more salient and lengthier relationships that provide a basis for trust, familiarity, and social support (McPherson, Smith-Lovin, & Brashears, 2006, 2009; Morgan, Neal, & Carder, 1997; Small, Pamphile, & McMahan, 2015). However, substantial changes in social settings can alter the stability of even those relationships (Mollenhorst, Volker, & Flap, 2014; Small et al., 2015). Imprisonment and reentry into the community are prime examples of large and sudden changes in social settings (Fahmy, 2021).

Moreover, although social relations can provide emotional, instrumental, or other forms of social support that are related to a range of positive outcomes (Baumeister & Leary, 1995), they can also foster negative behaviors and attitudes including delinquency and criminality via socialization processes (Veenstra, Dijkstra, Steglich, & Van Zalk, 2013; Weerman, 2011). As such, the stability of social ties with criminal network members after a period of imprisonment can impede desistance and resocialization processes. Therefore, it is especially vital to get insight into the extent and stability of criminality within social networks of incarcerated people.

This study examines tie stability among incarcerated people in the Netherlands by 1) focusing on their ties with both core discussion and criminal network members, 2) measuring the existence of these ties at

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two crucial time points, six months before and after imprisonment, and 3) explaining tie stability at the dyadic (i.e., relationship) level while also accounting for important ego (incarcerated person) and alter (network member) characteristics. To this end, we utilize unique longitudinal data from the Prison Project a nationwide panel study on the consequences of imprisonment in the Netherlands (Dirkzwager et al., 2018),. We specifically focus on tie stability as a function of the quantity (e.g., frequency of contact), quality (e.g., levels of trust), and type (e.g., family, friendship, and/or criminal ties) of relationships. Before further outlining our empirical approach, we begin with a discussion of prior literature on the social networks of incarcerated people and the general social network literature on tie stability.

1.1. Prior research on social network ties before and after imprisonment

Few studies have empirically investigated the extent to which incarcerated persons are able to maintain pre-existing social network ties throughout a period of imprisonment. Extant research draws from the visitation literature because the extent to which incarcerated people are allowed to receive visitors may be both an explanatory mechanism as well as a proxy for tie stability over a period of imprisonment. The visitation literature broadly focuses on two aspects: the consequences of visitation, for instance how it relates to behavioral adjustment both during and after imprisonment (Cochran, 2012; Mitchell, Spooner, Jia, & Zhang, 2016); and the determinants of visitation, for instance the practical, relational, and experiential factors surrounding visitation (Berghuis, Palmen, Cochran, & Nieuwbeerta, 2022). Factors such as traveling distance and costs appear to be important determinants for receiving visits, as are individual characteristics such as age, nationality, and length of the prison stay. In addition, individuals who had strong relationships prior to incarceration, especially with family and partners, were also more likely to receive visits in prison (Arditti, 2003; Atkin-Plunk & Armstrong, 2018; Hickert, Palmen, Dirkzwager, & Nieuwbeerta, 2019; La Vigne, Naser, Brooks, & Castro, 2005). Although informative, conclusions on which ties remain stable and why over the course of imprisonment – whether or not it is via visitation – cannot be drawn.

Even though previous studies on tie stability among incarcerated people are scant, recent research has made great progress in applying a social network perspective to the *in-prison* social relations among incarcerated persons (Kreager et al., 2016; Schaefer, Bouchard, Young, & Kreager, 2017; Sentse, Kreager, Bosma, Nieuwbeerta, & Palmen, 2021). Nonetheless, very few studies have addressed the stability of social network ties from before to after imprisonment. In fact, only three studies – to our knowledge – used data that concern changes in the social networks of incarcerated people from before to after imprisonment. We discuss these three studies below.

First, a recent study on adult incarcerated males in Ohio provides a detailed description of social networks before they entered prison (Bellair, Light, & Sutton, 2019). With regards to the type of ties, this study demonstrated that pre-prison networks primarily consisted of family members and romantic partners. In addition, the majority of incarcerated persons were exposed to criminality in their pre-prison social network, measured as alters with a criminal history or with whom respondents had committed crime or used drugs with. Although it was not rare to have criminal alters in the pre-prison social network, it was rare to have a social network primarily consisting of such alters (Bellair et al., 2019). This study, however, did not measure the social networks post imprisonment so it is unclear whether these tie characteristics explain network stability.

Second, a study among Dutch incarcerated men that was partly based on the same data as the current study, examined changes in the core discussion network composition from pre- to post-imprisonment (Volker et al., 2016). In line with the previous study, they also highlighted the importance of family members. In addition, they found that the core discussion network members who were *also* involved in criminal activities and/or with whom also criminal activities were discussed were consistently present both pre- and post-imprisonment though only to a limited extent (around 15% of the core discussion network members). Finally, networks after imprisonment had changed composition particularly among those participants who served a longer prison spell, did not return to the same place of residence, or were sentenced for a violent or sexual offense. Although this study is one of the few that examined changes in social networks of incarcerated individuals, it did not account for the complete level of criminality in the network, which would also engage criminal network ties that are not necessarily part of the core discussion network. Moreover, the explanatory mechanisms examined for network change and tie stability were mostly measured at the incarcerated individual level, while few concerned the dyadic level (e.g., indicators for relationship quality were missing).

Lastly, another study that examined changes in the social networks of incarcerated people from before to after imprisonment is the Returning Home Project, a study on the process of reentry in Maryland with a focus on experiences from both the incarcerated persons and their family members (Visher, LaVigne, & Travis, 2004). This research shows that respondents reported close family relationships before, during, and after prison; only a small group of 10 % of respondents reported no close family relationships after release from prison. Moreover, over half of the respondents received financial support from these family members after release and about 80% reported to have received some overall family support, be it emotional or financial. Although this project provides information on changes in the social networks of incarcerated persons with regards to relationship quality, it only includes family ties and does not inform about the changes at the dyadic (alter) level.

1.2. Extant research on the stability of social ties

The broader literature on the stability of general social ties highlights that tie stability depends on the broader structure of a social network, individual characteristics, and relationship characteristics (Kossinets & Watts, 2006; Marin & Hampton, 2019; Wellman, Wong, Tindall, & Nazer, 1997). For example, smaller networks are more likely to remain stable as there are fewer ties to maintain (see Hampton & Ling, 2013), and networks with embedded mechanisms for trust, familiarity, and ease in communication increase the probability of tie formation and stability (Schaefer & Marcum, 2017; Wasserman & Faust, 1994). Although the required network information to identify such network characteristics is often difficult to obtain, most research corroborates the importance of factors that are more easily known. Examples are individual characteristics such as socio-demographics (e.g., age, education, and employment) or a person's character traits such as agreeableness, likability, and popularity, which can affect the probability of attracting and maintaining social ties (e.g., Selfhout et al., 2010).

Most importantly, once a relationship exists, its characteristics can determine its stability (Marin & Hampton, 2019). Extant prior research suggests a set of three explanations for tie stability among a general population: The quantity of relationships (e.g., contact frequency); the quality of relationships (e.g., trust); and the type of relationships (e.g., kinship). Below we will discuss how each of these relationship characteristics can impact the stability of network ties.

1.2.1. *Quantity of relationships*

The quantity of a relationship can be assessed through its duration, contact frequency, and the opportunities to connect (Burt, 2000; Marin & Hampton, 2019; Morgan et al., 1997). In particular, people tend to build relationships with others who are spatially proximate, in part because of increased opportunities to interact without much additional effort (Blau, 1977; Zipf, 1949). Social relationships may then dilute as a result of events that change opportunities to connect, such as a residential move, which can impede one's ability to maintain frequent

contact (Feld, 1981, 1982). The opportunity to connect may also be impacted by individual characteristics, such as socioeconomic status as this could relate to resources to travel and invest in relationships (Campbell, Marsden, & Hurlbert, 1986). The quantity and quality of relationships are often interrelated: Lengthier relationships and frequent contact (i.e. quantity) provide a basis for strong ties through trust, familiarity, and intimacy (i.e., quality), supporting the stability of those ties (Burt, 2000; Marin & Hampton, 2019; Morgan et al., 1997).

1.2.2. Quality of relationships

When a period of imprisonment reduces the quantity of possible interactions, the quality of a pre-established connection may become a particularly important factor that contributes to the stability of ties pre and post imprisonment. The quality of relationships can be further assessed through the resources and support a relationship brings along. In particular, individuals may evaluate the strength of a relationship to weigh the anticipated outcomes (e.g., social capital and resources) of being connected to someone against the costs and efforts associated with its formation and maintenance (Flap, 1999; Lin, 2001). Therefore, although relationships are more likely to dissolve when it becomes more difficult to maintain frequent contact, they are more likely to remain stable when they provide access to valuable resources (e.g., emotional or instrumental support). Besides emotional or instrumental support, most of the empirical literature suggests that ties are likely to form or remain stable when they provide a sense of familiarity or similarity. As such, the quality of relationships can be nurtured by homophily, which refers to the increased probability for individuals to form and maintain relationships to similar others (e.g., in terms of age, race/ethnicity, and ideology, see Kossinets & Watts, 2009; McPherson, Smith-Lovin, & Cook, 2001). Although homophily may have different origins (e.g., via preference or structural opportunities; see McPherson & Smith-Lovin, 1987), it tends to be at the basis of close and strong ties via built-in mechanisms of trust and familiarity that nurture the perceived quality of relationships (McPherson et al., 2001).

1.2.3. Types of relationships

Besides quantity and quality of relationships, tie stability also depends on the type of ties. Changes to social settings seem to have a more profound impact on the instability of friendship ties than family ties. Friendship ties tend to rely on micro-interactions, which are subject to change, and fewer micro-interactions might ultimately result into the dissolution of a friendship tie (Morgan et al., 1997). Although some individuals may cope with changes and stressors due to major life events by mobilizing relationships that offer social or instrumental support (Cutrona, 1990; Thoits, 1995), kinship ties are less dependent on micro-interactions and more likely to remain stable throughout the life span (see Wrzus, Hänel, Wagner, & Neyer, 2013). For incarcerated persons, one could argue that friendship ties are more likely to dissolve than family ties, considering that incarceration reduces the opportunity for micro-interactions. The stability of ties may also be influenced by the extent to which incarcerated people received visitation from specific people, with familial and partner visits being the most common (Arditti, 2003; La Vigne et al., 2005). Although certain family members, especially mothers and grandmothers, offer emotional and instrumental support during incarceration, which could also drive tie stability (Tasca, Mulvey, & Rodriguez, 2016), research has also reported negative experiences with visits from family members, which may drive tie dissolution (Turanovic & Tasca, 2019). Prior research has also suggested that incarcerated people who burned bridges prior to incarceration have difficulty with the transition from prison to community (Visher & Travis, 2003).

This transition may be further challenged due to stigma and shame towards (previously) imprisoned people, which can drive tie dissolution in two important ways. First, stigmatization by the alter can result into the dissolution of ties when an alter no longer wants to be associated with someone due to prejudices around gender, sexual orientations (Goffman, 1963), or – more pertinent to the present study – crimes committed (Volker et al., 2016). Second, people who experience stigmatization may discontinue their relationships with others who stigmatize, perhaps because of shame, anticipated negative interactions, mistrust or a sense of inferiority (Braithwaite, 1989). It is also possible that incarcerated people purposefully break with criminal ties upon reentry in society when they seek to disassociate with their criminal past (Jetten et al., 2015; Jetten, Haslam, Cruwys, & Branscombe, 2017; Rose & Clear, 2003). This makes that the level of criminality of an alter should be considered as potential factors explaining tie dissolution or tie stability upon post-imprisonment. Considering that selection and socialization processes via criminal ties may drive delinquent and criminal behavior (Veenstra et al., 2013; Weerman, 2011), reentry success may require breaking ties with criminal peers while investing in those ties that provide support post-imprisonment. While maintaining ties with criminal peers is generally considered a risk factor for recidivism, familial ties are frequently mentioned as key protective factors preventing recidivism upon reentry (e.g., Barrick, Lattimore, & Visher, 2014; Berg & Huebner, 2011; Boman IV & Mowen, 2017; Cobbina, Huebner, & Berg, 2012).

When integrating the literature on the impacts of incarceration and the stability of social networks, it follows that studies need to include data on the dyadic level measuring indicators of the quantity, the quality, and the type of the relationships, the level of criminality in the network, and longitudinal data on the existence of these social ties before and after imprisonment.

1.3. Current study

The present study advances prior work on the stability of social ties of incarcerated people in three important ways. First, we consider tie stability with core discussion network members *and* criminal network members. Second, we use longitudinal data to measure the existence and characteristics of social ties at two crucial points in time: six months prior to the arrest and six months after release. Third, we examine tie stability at the level of the dyad itself, highlighting the anticipated importance of relationship characteristics including the strength (quantity and quality) and type of the relationship, while controlling for important individual characteristics of the ego and alter.

Guided by prior literature that has illuminated how tie stability depends on the *quantity* of relationships (Burt, 2000; Marin & Hampton, 2019; Morgan et al., 1997), *quality* of relationships to mobilize social support post-imprisonment (Bahr et al., 2010; Berg & Huebner, 2011); and *type of relationships* (e.g., Morgan et al., 1997; Volker et al., 2016; Wrzus et al., 2013), we formulated the following hypotheses:

1) The relationships with whom incarcerated people have more frequent, lengthier or easier contact (because of residential proximity) are more likely to remain stable;
2) Higher-quality relationships are more likely to remain stable, specifically those that are based on positive interactions, trust, and affinity (e.g., because of sharing socio-demographic characteristics);
3) Ties with family and romantic partners are more likely to remain stable compared to friendships and other ties;
4) Ties with network members with a criminal affiliation are less likely to remain stable

While we focus on the role of relationship characteristics in tie stability in these hypotheses, we control for the effect of several individual characteristics included in prior social network and prison studies. This includes characteristics that are unique to imprisonment (e.g., recidivism, type of offense, and sentence length) and general individual characteristics of the ego (e.g., age, ethnicity, employment, agreeableness) and alter (e.g., employment, education).

2. Method

2.1. Study site

The Netherlands has one of the lowest detainee populations of Western Europe at around 51 detainees per 100,000 inhabitants, amounting to about 33,000 incarcerated adults (mostly male) each year (De Looff, Van de Haar, Van Gemmert, & Valstar, 2017). Dutch prisons run different regimes, the most common being pre-trial detention (for those who have not [yet] been sentenced) and prison (for those who have been sentenced) which are often mixed within facilities. Compared with other countries, prison sentences in the Netherlands are relatively short: Roughly 60 % of all offenders that enter the Dutch penitentiary system are detained for a period no longer than three months while over 70 % of them are released after having spent less than six months in a Dutch prison facility (De Looff et al., 2017). Prison layout in Dutch prisons is rather comparable with so-called new (or third/fourth)-generation jails in the United States, with open-plan living areas, in which prison staff members are not physically separated from prisoners and in which staff members and prisoners can interact freely with one another. The majority of the incarcerated people (around 80 %) is detained in single-cells. All prisoners (including those in pre-trial detention) remain in the same regime conditions, which provides for 43 h of out-of-cell time and activities per week and the right to one hour of visits a week.

Pretrial detainees account for a relatively large portion of the prison population in the Netherlands. Suspects can first be detained prior to conviction for a maximum period of 90 days, and this term can be extended twice by a maximum of 90 days. Pretrial detainees are put in detention centers that are in the region of their home (but note that since the Netherlands is relatively small each detention center is within a maximum of two hours driving distance from someone's residence). Suspects in pretrial detention can be released prior to their conviction if the grounds for pretrial detention are no longer valid or if the prison sentence is probably not going to exceed the time already served in pretrial detention. Courts in the Netherlands are legally required to take the term of pretrial-detention into account in sentencing decisions. When suspects are still held in pretrial detention when the sentence is imposed, judges may impose a less severe type of sanction, a "time served," or a prison sentence that exceeds the time served in pretrial detention. Around 98% of all persons put in pre-trial detention are found guilty by the sentencing court.

2.2. Sample

The data used in this study were collected as part of the nationwide Prison Project (Dirkzwager et al., 2018), a longitudinal study in which individuals entering pretrial detention in all 30 penitentiary institutions – regardless of security level - in the Netherlands were interviewed and followed over time. The project targeted all incarcerated males between 18 and 65 years of age, born in the Netherlands, who entered confinement in pretrial detention between October 2010 and April 2011. Of the 3981 individuals who met these selection criteria, 71% could be approached to participate in the first interview about three weeks after arrival at pre-trial detention (n = 2837). We were mainly unable to approach those individuals who were already released from custody before the interview was conducted. Of the approached persons, 1904 (67%) agreed to participate in the baseline computer-assisted personal interview that was held in private visiting rooms to guarantee respondents' privacy. Non-response analyses—based on official registration data—show that overall the characteristics of the respondents are almost identical to those of the total target population of the Prison Project (see the Prison Project's Cohort Profile: Dirkzwager et al., 2018). Respondents were subsequently interviewed several times during different stages of their confinement, up until 24 months after release. Participation was voluntary, and all participants signed an informed consent declaration. Details on attrition at each of the respective interview waves can be found in Dirkzwager et al. (2018).

The current study used data from the first interview (here: T1) that took place 3 weeks upon entering the detention facility, and the interview six months after release (here: T2), as only these two interviews included a social network module. Despite the difficulties of locating and contacting released individuals, at T2 a total of 946 individuals participated in the post-prison interview who were very similar to the baseline participants on important characteristics (see Dirkzwager et al., 2018). Since the current study focused on network stability, we selected those respondents who completed the social network module of the interviews at both T1 and T2 (n = 685), for whom we could successfully match their network ties at T2 to those at T1 (n = 580), and who reported at least one social network tie at T1, which resulted in a final sample of 464 incarcerated individuals with a total of 1180 network ties. In addition to the interview data, we used officially registered data from the registration system of the Ministry of Justice (TULP). Our subsample of 464 individuals did not significantly differ from the complete T2 sample (n = 946) on important (demographic) characteristics including age, ethnicity, employment post release, recidivism, sentence length, and agreeableness; the only exception being index offense, in that a higher proportion of our subsample was sentenced for a violent or sexual offense than in the total sample (M = 0.45 versus M = 0.36, $p < 0.01$).

2.3. Measures

2.3.1. Dependent variable (tie level)

Stability of network ties. The social network of incarcerated individuals was measured with a name generator method (McCallister & Fischer, 1978) through which the names, nicknames or initials of network members were identified. To get the most complete picture of incarcerated individuals' social network we measured two types of network ties. First, the so-called core discussion network ties were identified with the question: "With whom did you discuss important personal matters in the six months prior to your arrest (at T1)/the past six months (at T2)?". Second, the so-called criminal network ties were identified with the question: "In the 6 months prior to your arrest (at T1)/the past six months (at T2), 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 to each of these two questions, and as such could have a maximum of 10 network ties in total. At T2 we asked an additional question to determine the stability of network ties. Respondents were presented with a list of names of the persons they had mentioned as network members at T1 (i.e., pre-imprisonment) and were asked: "Could you tell us whether the persons presented on this list are the same as those just mentioned? Who are the same persons?" Based on this additional question at T2, we categorized each network tie as stable (network members who were mentioned both prior to imprisonment and after release) or dissolved (network members who were no longer mentioned after release).

After the name generator questions in the interview at T1, follow-up questions were asked that tapped into characteristics of the network members and the relationships with these network members. The following measures were taken from these follow-up questions.

2.3.2. Independent variables (tie level)

Relationship quantity. Indicators for relationship quantity were measured with relationship duration (0 = less than one year, 1 = one to five years, 2 = more than five years), residential proximity which was coded as whether the network member lived in the same house as the respondent (1 = yes, 0 = no), and contact frequency ranging from 1 (less than once per year) through 6 (every day).

Relationship quality. Indicators for relationship quality included the extent to which respondent trusted alter, ranging from 1 (not at all) through 5 (very much), and whether respondent would be able to

borrow money from alter (1 = yes, 0 = no). We consider homophily as a potential factor contributing to the stability of ties by nurturing the perceived quality of these ties via built-in mechanisms of trust, familiarity, and affinity. Homophily measures included same ethnicity, measured as similarity in ethnicity (categorized in Dutch or non-Dutch) of ego and alter, and age difference, which was measured as the absolute age difference in years between the respondent and the network member.

Relationship types. The role of the network member was categorized into being a family member (1 = yes, 0 = no), romantic partner (1 = yes, 0 = no), or friends and others (reference category). To measure the level of criminality in the social network we included whether the tie was listed as a criminal network tie (= 1), or only mentioned as a core network tie (= 0). In addition, we tapped into delinquent behavior of the network member by using four dummy variables that, due to high intercorrelations, were combined into one scale variable that represents the sum of engaging in the following types of delinquent behaviors (α = 0.82; coded 0 through 4): "Used drugs in the last year", "Has ever been in detention", "Was involved in criminal activities in the last year", and "Having committed a crime together with".

Alter control variables. We included employment status of the network member (1 = yes, 0 = no) and alters highest completed education (recoded consistent with the categorization of the Statistics Netherlands into 1 = low, 2 = middle, 3 = high).

2.3.3. Covariates (respondent level)

Ego control variables. At the level of the incarcerated individual we controlled for the following demographic characteristics: age (in years), ethnicity (1 = Dutch, 0 = non-Dutch), and employment status after release (1 = employed, 0 = unemployed). Next, using official registration data we controlled for the length of the prison sentence (in months), the type of offense the respondent was sentenced for, by contrasting a violent or sexual offense (= 1) to all other offenses (= 0), and whether the respondent had been in prison again since the first interview (1 = yes, 0 = no). Last, respondents' level of agreeableness was measured with the Big Five Inventory (BFI), a 44-item inventory that measures the Big Five Factors of personality (Goldberg, 1993). The subscale Agreeableness consists of nine items, asking: "I am someone who" (e.g., "….is helpful and unselfish with others", "…is generally trusting"), answered on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The mean score of the nine items was used (α = 0.70).

2.4. Analyses

We will start by providing the descriptive statistics of the study variables, both on the level of the respondent (ego, level 2) and, more relevant to the current study, on the level of the network ties (alter, level 1). The main question of this study concerns whether and which network ties of incarcerated people remain stable or dissolve from pre- to post-imprisonment. To this end, we first explored univariate statistics via mean differences in study variables between stable and dissolved ties and via bivariate correlations. Next, we performed a logistic regression analysis with the stability of the network tie (1 = yes/stable, 0 = no/dissolved) as the outcome variable. Because we utilize hierarchically structured data (i.e., network ties are nested within respondents), we used a multilevel model (see van Duijn, van Busschbach, & Snijders, 1999). This model accounts for the nested structure of the data and overcomes the problem of underestimated standard errors and spurious significant effects. The first level in the multilevel model is defined by the network ties and their characteristics (alter), and the second level is defined by the incarcerated individuals and their characteristics (ego). We ruled out the existence of multicollinearity in the model by examining inter-item correlations. The model was conducted using Mplus 8.1 (Muthén & Muthén, 1998) using full information maximum likelihood with robust standard errors (MLR) estimation. MLR does not delete any observations with missing data nor imputes any data, but rather uses all available data per case to compute maximum likelihood estimates. The likelihood is computed separately for those cases with complete data on some variables and those with complete data on all variables. These two likelihoods are then maximized together to find the estimates. This method gives unbiased parameter estimates and standard errors and is preferred over, for example, multiple imputation (Allison, 2012).

3. Results

3.1. Descriptive statistics

Tables 1 and 2 summarize the relevant descriptive statistics for our study variables, both on the respondent (ego) level (Table 1) and on the network tie (alter) level (Table 2). Starting with individual characteristics of the incarcerated persons in our sample, we see from Table 1 that respondents were on average 30 years old at the first interview and predominantly Dutch, and reported moderate levels of agreeableness (M = 3.46 on a 5 points scale). Respondents had spent on average 6.5 months in prison and almost half of them were sentenced for a violent or sexual offense. Six months after release (at T2), about 76% were employed and 24% of the respondents had been in prison again.

With respect to their social network, the 464 incarcerated individuals reported on average 2.54 network ties (*range* 1 to 8), of which on average 1.01 ties were stable into post-imprisonment (*range* 0 to 5) and 0.60 ties were criminal network ties (*range* 0 to 5). Respondents reported on average 0.17 stable criminal ties (*range* 0 to 4). Among the individuals who reported at least one criminal network tie (n = 153), the average stable criminal ties was 0.51 (*range* 0 to 4). In total, respondents reported on average 1.53 ties (*range* 0 to 7) that had dissolved after imprisonment.

Table 2 provides more detailed information on the existence and stability of the relationships of the incarcerated persons. Taken together, our sample of 464 respondents reported 1180 network ties pre-imprisonment, of which 469 ties (40%) were stable and 711 ties (60%) dissolved over the period of imprisonment. Respondents reported to have frequent (daily or weekly) contact and long-lasting (more than five years) relationships with the majority of their network ties pre-imprisonment, and about one fifth of the network ties were labeled as residentially proximate ties (i.e., alter lived at the same house as respondent). They also reported relatively high levels of trust in the network members and the anticipated financial support from alter was high (85% of all ties). Affinity and homophily indicators showed an average age difference of about 11.5 years between ego and alter, and three quarters of alters had the same ethnicity as ego. As for the type of

Table 1
Descriptive statistics of the individual level variables for the incarcerated individuals (n = 464).

	n	Min	Max	*M*	*SD*
Ties					
Total network ties pre-imprisonment	464	1	8	2.54	1.44
Criminal network ties pre-imprisonment	464	0	5	0.60	1.08
Stable ties post imprisonment	464	0	5	1.01	0.98
Stable criminal ties post imprisonment	464	0	4	0.17	0.50
Dissolved ties post imprisonment	464	0	7	1.53	1.04
Ego controls					
Age	464	18.00	65.00	30.45	10.80
Dutch ethnicity	463	0	1	0.66	0.47
Employed post-release	464	0	1	0.76	0.43
Recidivated post release	464	0	1	0.24	0.43
Violent or sexual (vs. other) offense	464	0	1	0.45	0.50
Sentence length (in months)	464	0.15	40.59	6.48	6.85
Agreeableness	425	1.56	5.00	3.46	0.55

Note. The mean of dichotomous variables should be interpreted as the proportion individuals with score 1.

Table 2
Descriptive statistics of the tie level variables for all reported network ties before imprisonment (n = 1180), and separately for dissolved and stable network ties after imprisonment.

	Total ties (n = 1180)					Dissolved ties (n = 711)			Stable ties (n = 469)			Difference
	n	Min	Max	M	SD	n	M	SD	n	M	SD	T value
Stable (vs. dissolved) tie	1180	0	1	0.40	0.49							
Tie Quantity												
Relationship duration	844	0	2	1.53	0.66	546	1.57	0.58	298	1.45	0.77	2.34*
Contact frequency	1112	1	6	5.39	0.88	664	5.27	0.96	448	5.57	0.72	−5.85***
Residential proximity	1081	0	1	0.20	0.40	646	0.16	0.37	435	0.27	0.44	−4.26***
Tie Quality												
Trust in alter	1110	1	5	4.42	0.94	663	4.27	1.04	447	4.65	0.72	−7.28***
Able to borrow money from	915	0	1	0.85	0.36	571	0.80	0.40	344	0.94	0.25	−6.36***
Age difference (in years)	1027	0	52	11.62	11.60	600	10.21	10.97	427	13.60	12.19	−4.57***
Same ethnicity	735	0	1	0.76	0.43	518	0.76	0.43	217	0.74	0.44	0.59
Tie Type												
Family member	1180	0	1	0.36	0.48	711	0.28	0.45	469	0.49	0.50	−7.27***
Romantic partner	1180	0	1	0.14	0.35	711	0.10	0.30	469	0.20	0.40	−4.81***
Criminal (vs. core) network	1173	0	1	0.24	0.43	705	0.28	0.45	468	0.17	0.37	4.83***
Delinquent behavior of alter	1110	0	4	0.93	1.31	664	1.07	1.35	446	0.71	1.21	4.74***
Alter Controls												
Employment	1097	0	1	0.53	0.50	647	0.54	0.50	450	0.52	0.50	0.68
Educational level	754	1	3	1.65	0.74	429	1.61	0.73	325	1.70	0.75	−1.76

Note. The mean of dichotomous variables should be interpreted as the proportion of ties with score 1. For example, a mean of 0.40 on stable ties corresponds to 40% of all ties being stable over time and, hence, 60% being dissolved.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

network ties, about 36% were family members and 14% of the network ties were romantic partners. In addition, 24% of ties were listed as criminal network members whereas the other 76% of ties were only listed as core discussion network members. Overall, network ties have relatively low levels of delinquent behavior ($M = 0.93$, ranging from 0 to 4).

t-tests of mean differences between stable and dissolved ties demonstrated significant differences regarding all but one (i.e. ethnicity) measures that represent the quantity, quality, or type of relationships (see last column of Table 2). Compared to dissolved ties, stable network ties were on average higher in contact frequency, residential proximity, trust, and anticipated financial support. Stable ties also more often involved family or romantic partners and less frequently engaged a criminal network member and displayed lower levels of delinquent behavior. Table 3 corroborates these bivariate associations while simultaneously ruling out multicollinearity, since the majority of correlations were statistically significant but small to medium sized. There was one exception, which was the relatively high correlation between a criminal tie and delinquent behavior of alter. Therefore, we will add these two variables both simultaneously and separately to the regression model to ensure that their effects are not distorted by this correlation.

3.2. Multilevel logistic regression analysis

Results from the multilevel model, predicting tie stability from pre- to post imprisonment containing all explanatory variables at the network tie level (level 1) and ego level (level 2), are reported in Table 4. We reported the unstandardized coefficients as well as the odds ratios.

We start with the results for indicators of ego-alter closeness, measured through several proxy variables for relationship quantity and quality. In line with our first hypothesis on tie quantity, greater contact frequency predicted tie stability to a moderate extent (OR = 1.31). However, relationship duration or living in the same house pre-imprisonment was not significantly related to tie stability. Then, corresponding to our second hypothesis on tie quality, the level of trust respondents reported to have in alter as well as the anticipated financial support from alter, were relatively strong predictors of tie stability. More trust in or support from alter increased the odds of a tie being stable by 1.37 and 3.13 times, respectively. However, the role of affinity or homophily was not corroborated in our results: Age difference between alter and ego nor same ethnicity were significantly related to tie

Table 3
Correlations between study variables at the tie level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Stable (vs. dissolved)	–													
2. Relationship duration	−0.09*	–												
3. Contact frequency	0.16*	−0.15*	–											
4. Residential proximity	0.13*	−0.20*	0.32*	–										
5. Trust in alter	0.20*	0.10*	0.27*	0.17*	–									
6. Able to borrow money from	0.19*	0.23*	0.23*	0.08*	0.26*	–								
7. Age difference	0.14*	0.06	0.11*	0.20*	0.16	0.04	–							
8. Same ethnicity	−0.02	−0.01	−0.01	0.10*	0.08*	0.01	0.07	–						
9. Family member	0.21*	0.30*	0.06*	0.18*	0.27*	0.13*	0.63*	0.03	–					
10. Romantic partner	0.15*	−0.44*	0.25*	0.35*	0.07*	c	−0.25*	c	−0.31*	–				
11. Criminal (vs. core) network	−0.14*	0.02	−0.13*	−0.22*	−0.39*	−0.06	−0.20*	−0.01	−0.25*	−0.17*	–			
12. Delinquent behavior	−0.14*	0.05	−0.02	−0.20*	−0.31*	−0.02	−0.28*	0.01	−0.32*	−0.15*	0.65*	–		
13. Employment alter	−0.02	0.12*	−0.10*	−0.06	0.10	0.00	−0.11*	0.02	−0.08*	−0.09*	−0.22*	−0.23*	–	
14. Educational level	0.06	0.01	−0.09*	−0.02	0.10*	−0.05	−0.02	−0.03	−0.06	0.03	−0.17*	−0.24*	0.25*	–

Note. *$p < 0.05$. c. Correlation could not be computed due to empty cells in combined categories of the binary variables.

Table 4
Unstandardized parameter estimates and odds ratios for tie stability from a multilevel logistic regression analysis on 1180 ties nested in 464 incarcerated individuals.

	Network tie stability		
	Coefficient	SE	OR
Tie Quantity			
Relationship duration	−0.188	0.172	0.83
Contact frequency	0.268*	0.118	1.31
Residential proximity	−0.194	0.227	0.82
Tie Quality			
Trust in alter	−0.311**	0.114	1.37
Able to borrow money from	1.142***	0.321	3.13
Age difference (in years)	0.005	0.009	1.01
Same ethnicity	−0.410	0.304	0.66
Tie Type			
Family member (vs. other)	1.308***	0.252	3.70
Romantic partner (vs. other)	1.436***	0.293	4.21
Criminal network (vs. core network)	0.085	0.294	1.09
Delinquent behavior of alter	−0.008	0.093	0.99
Alter Controls			
Employment	0.036	0.171	1.04
Educational level	0.293*	0.131	1.34
Ego controls (level 2)			
Age	−0.001	0.009	0.99
Dutch ethnicity	0.324	0.337	1.38
Employment post-release	0.203	0.216	1.23
Recidivated post release	0.228	0.206	1.26
Violent or sexual (vs. other) offense	−0.169	0.192	0.84
Sentence length (in months)	−0.018	0.013	0.98
Agreeableness	0.040	0.161	1.04
Constant	2.222***	0.445	

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

stability.

Next, we turn to the effects of the relationship type variables. In line with our third hypothesis, the results show that being a family member or a romantic partner increased the likelihood of tie stability by great amounts. The odds ratios show that tie stability was 3.70 times more likely for family members and even 4.21 times more likely for romantic partners (friends or others being the reference category). Interestingly, indicators of criminality of alter did not predict tie stability, in contrast to our fourth and final hypothesis. That is, a criminal network tie (as opposed to a core discussion network tie) and levels of delinquent behavior displayed by alter (e.g., using drugs or having been in prison) were not related to the likelihood of a tie being stable from pre- to post imprisonment. Results for these variables (and all others) were identical when we ran the model with each of these two criminality indicators separately. Lastly, with respect to demographic characteristics of alter, we observe that a higher educational level significantly increased the likelihood of tie stability (OR = 1.34) although employment status was not related to stability of network ties.

We also controlled for some important characteristics on the level of ego. The results in the lower part of Table 4 show that none of these control variables, including respondents' age, ethnicity, employment status, their level of agreeableness, the length of the prison sentence, the type of offense respondents were sentenced for, or whether they recidivated, contributed to tie stability. Thus, in a multilevel model where both alter and ego measures are accounted for, stability of network ties from pre- to post-imprisonment are mainly predicted by characteristics of the network ties instead of characteristics of the respondent.

4. Discussion

The current study set out to examine the stability of social ties of incarcerated people through a longitudinal research design that included both core discussion and criminal network members. Using data from a nationwide panel study about the conditions and consequences of imprisonment in the Netherlands, we examined tie stability among the social networks of 464 incarcerated individuals from before to after imprisonment. The central goal was to better understand the stability of social ties that could offer the social support that is essential after a period of imprisonment to improve mental health, reintegrate into the community, and prevent recidivism (Berg & Huebner, 2011; Wallace et al., 2016), as opposed to ties that may foster criminal behaviors and impede desistance and resocialization processes (Veenstra et al., 2013; Weerman, 2011). As such, we focused on tie level factors that capture these relationship characteristics in the form of relationship quantity (e.g., contact frequency), quality (e.g., trust), and type (e.g., kinship, criminality) indicators, in line with the prior literature on general tie stability and network disruption. Overall, our study shows that these explanatory factors found among a general population are also applicable to explain tie stability pre- and post-imprisonment. Once these tie level factors are accounted for, the more commonly used individual level factors are not related to network stability. A tie level perspective thus adds new and valid information to the complex puzzle of social network changes surrounding a period of imprisonment.

4.1. Reflection on main findings

On a descriptive level, our data demonstrated subtle changes in the social networks of incarcerated people. After a period of imprisonment, more ties dissolved (60%) than remained stable (40%). Stable network ties were characterized by their higher contact frequency, residential proximity between the ego and alter, trust, and anticipated financial support. While characterizing stable ties, not all of these features were significant predictors for tie stability in our multi-level model. Our multilevel analysis on the stability of ties pre- and post-imprisonment produced a set of three main conclusions. First, relationship characteristics matter for the stability of social ties more so than individual characteristics. Prior research has demonstrated how tie formation and network evolution also depend on individual characteristics, in addition to relationship characteristics and the broader structure of a social network (Kossinets & Watts, 2006; Marin & Hampton, 2019; Wellman et al., 1997). Our findings, however, indicated that individual characteristics of incarcerated persons (i.e. age, ethnicity, agreeableness, employment, recidivism, offense type, and sentence length) do not significantly influence the stability of ties once relationship characteristics are accounted for. It is important to underscore that by applying a social network perspective, with a focus on dyadic characteristics, previously assumed associations between individual characteristics and social network measures should be carefully reviewed. By aggregating social network information to the individual level, which in essence is done in studies that treat the social network of incarcerated persons as one global measure (e.g., Visher et al., 2004), important information on the dyadic level might get lost. As a result, outcomes of such analyses may lack details that distort the overall conclusions.

Second, as largely hypothesized, the quantity, quality, and the type of relationships determine whether or not a tie remained stable. We argued that individuals may strategically evaluate the strength of a relationship to weigh the anticipated outcomes of being connected to someone against the costs and efforts associated with its formation and maintenance (Flap, 1999; Lin, 2001). Those relationships that are more frequent in contact are easier to maintain and this should facilitate tie stability. Prior positive interactions and mutually reinforcing relationships that provide access to valuable resources (e.g., emotional or instrumental support) are also more likely to remain stable as opposed to relationships with individuals with whom no trust relationship was built or that cannot be called upon for social support. In line with our first hypothesis, tie quantity is indeed an important predictor as far as it concerns contact frequency. However, relationship duration and residential proximity that prior research has linked to tie stability among a general population (Burt, 2000; Marin & Hampton, 2019; Morgan et al., 1997), did not contribute to tie stability among our sample of incarcerated individuals.

In addition, trust and anticipated (financial) support mattered for tie stability (hypothesis 2), which extends prior work that had not assessed the quality of relationships for the stability of ties among incarcerated people (Volker et al., 2016). As compared to a general population, these two relationship characteristics may be especially important for individuals who reenter society after a period of imprisonment and who are in need of practical support such as housing and income, and emotional support. Furthermore, we found no evidence of homophily based on affinity contributing to tie stability. It is possible that the demographic indicators in this study (i.e., age and ethnicity) also stimulate the experience of stigma, shame, and signaling concerning the imprisonment and crimes committed, which may increase the likelihood of tie dissolution (Braithwaite, 1989; Goffman, 1956). Alternatively, visitation by family members of different age ranges may drive the stability of these types of ties (Arditti, 2003; La Vigne et al., 2005), which could also explain why tie stability for incarcerated people does not depend on age similarities. Finally, in line with our third hypothesis, relationships with family and romantic partners were more likely to remain stable, supporting the broader literature on the stability of kinship ties (see Wrzus et al., 2013), and findings in the visitation literature (Arditti, 2003; Atkin-Plunk & Armstrong, 2018; Hickert et al., 2019; La Vigne et al., 2005). The types of ties for which the stability tends to rely on frequent micro-interactions, such as friendship ties, were less likely to remain stable than kinship ties and relationships with romantic partners.

Third, contradictory to our last hypothesis, the stability of ties did not significantly depend on ties with criminal network members or ties with alters that engaged in delinquent behavior. Criminal ties might be less stable when incarcerated people explicitly seek to disassociate with their criminal past and, therefore, break with criminal ties upon their reentry in society (Jetten et al., 2015, 2017; Rose & Clear, 2003). However, our findings do not support our hypothesis that individuals have less criminality or delinquent behavior in their network after imprisonment compared to before imprisonment. This finding extends prior work that also found no impact of the level of criminality on tie stability within a smaller group of core discussion network members (Volker et al., 2016). It may also be explained by the generic importance of the quantity and quality of ties. Despite discussing criminal activities with alters, criminal ties may also foster social support or bring some other form of social capital, and if not, they are likely to dissolve just as much as non-criminal ties would. In other words, the stability of criminal ties may depend on the more generic social functionality of these ties. This is in line with friendship studies on delinquent youth that concluded that their criminal friendships were not necessarily different in strength or quality than those of non-criminal youth (Baerveldt, Rossem, Ronan, Marjolijn, & Weerman, 2004; Giordano, Cernkovich, & Pugh, 1986). Yet, we need to keep in mind that incarcerated individuals did not report many criminal ties to begin with, and statistical power might be another reason for why criminality of ties was not related to tie stability in the multivariate model.

Altogether, our findings support prior work on the importance of tie characteristics for the stability in social networks. Extant research has demonstrated that contact frequency, trust, familiarity, and intimacy are essential for the stability of social relationships among a general population (Burt, 2000; Marin & Hampton, 2019; Morgan et al., 1997). As our study thus illustrates, these tie characteristics also matter for the stability of ties in pre- and post-imprisonment networks, underscoring the importance of fostering these relationships during imprisonment and early involvement of these types of relationships in reintegration programs. For example, our findings suggest that allowing for frequent contact during imprisonment, especially with family members and romantic partners, may facilitate a successful reentry (see also Barrick et al., 2014; Berg & Huebner, 2011; Boman IV & Mowen, 2017; Cobbina et al., 2012), while at the same time friendships with noncriminal peers may require further investment during imprisonment too because these types of ties are more likely to dissolute compared to family ties when there are less frequent (micro-)interactions (Morgan et al., 1997). Furthermore, both the previously incarcerated person and their network members may face challenges post-imprisonment and appropriate awareness and training may allow network members to facilitate a successful reintegration (e.g., by facilitating the search for employment, provide financial support, or offer other support services; see e.g., Cobbina, 2010; Fahmy, 2021; Liem & Weggemans, 2018). Nonetheless, we have yet to explore further as to why it is that these type of ties are maintained. Although our data do not contain information about social network ties maintained during imprisonment, one of the reasons for tie stability might lie in visitation: When people are more invested in each other (e.g., had frequent contact before imprisonment or are family or romantic partners), the likelihood of visitation is greater (Arditti, 2003; La Vigne et al., 2005), which might in part explain why these ties remain also after imprisonment. However, there are also practical (traveling distance and costs; see Cochran, Mears, Bales, & Stewart, 2016) and experiential (stress and conflict during or after a visit or the conditions of the visit in the prison facility, see Turanovic & Tasca, 2019) reasons for why people do not visit, even though they may still be around after imprisonment. Future research should therefore aim to elucidate the explanatory mechanisms behind the found network stability determinants by including network information about visitation and other forms of contact during incarceration.

Moreover, it is important to recognize that incarcerated people differ from a general population as they have experienced a large network disruption twice due to being incarcerated and then reenter into society (Fahmy, 2021). Other research on tie stability after large network disruptions due to exogeneous events suggests that the stability of ties depends on their functionality and the extent to which the disruption alters the size, contact frequency, strength, and (perceived) supportiveness of someone's social network (Jo, Harrison, & Gray, 2021; Perry, 2006). We extend such work by indicating that after a period of imprisonment, individuals rely on ties that provide trust, familiarity, intimacy, and support, regardless of the level of criminality in a network.

4.2. Limitations and suggestions for future research

A few limitations may temper the conclusions and should encourage further research. In particular, data limitations impeded our ability to fully shed light on the mechanisms that explain the stability of social ties. Overall, we encourage further research to better understand *why* (not only which) ties remain stable pre- and post-imprisonment. As an illustration, while our work highlights which ties remained stable, future work should also assess the extent to which incarcerated people received visitation, which may be a mediating factor between the type of tie and the likelihood of tie stability – or alternatively visitation may function as a proxy for tie stability. Although our data did not permit us to also account for frequency or type of visitation, it is important to note that several of our covariates, such as residential proximity, length of the prison stay, individual characteristics (e.g., age and nationality), and type and quality prior to incarceration are correlates for receiving visits (Arditti, 2003; Atkin-Plunk & Armstrong, 2018; Hickert et al., 2019; La Vigne et al., 2005).

Furthermore, we were unable to assess the role of a broader network structure, which prior research has deemed to be important. For example, besides individual and relationship characteristics, research suggests that the formation and stability of social networks also depends on features that are endogenous to the network itself, such as network size (e.g., smaller networks are more likely to remain stable as there are fewer ties to maintain, see Hampton & Ling, 2013). In addition, networks with structurally embedded mechanisms for trust, familiarity, and ease in communication increase the probability of tie formation and stability (Schaefer & Marcum, 2017; Wasserman & Faust, 1994). Specifically, prior research has demonstrated that tie continuation between any two actors is more likely if they have a shared contact (Martin & Yeung, 2006). This concerns a process of transitivity that broadly is referred to as “the friend of a friend is also my friend” (Wasserman &

Faust, 1994). Considering the importance of trust, familiarity, intimacy and support for the stability of post-imprisonment ties, future research should examine the importance of transitivity or other within-network processes through data on whole social networks instead of ego networks. Researchers have begun to apply these methods on in-prison networks (Kreager et al., 2016; Schaefer et al., 2017; Sentse et al., 2021), but have yet to do so on (longitudinal) outside-prison networks (but see Bellair et al., 2019).

Next, given the few reported criminal ties among incarcerated persons, future research may also assess the level of criminality in post-imprisonment networks through larger sample sizes or different questions that gauge a more general exposure to delinquency (e.g., "how many friends, family, acquaintances or other people you know have committed crime in the past year?"). Even though we attempted to achieve this, it is important to have a complete picture of the level of criminality in the network given the anticipated consequences for reintegration and recidivism. Relatedly, although the use of self-report is needed to get at the social relations of individuals, there are some generic limitations with this method including the possibility that not all ties were reported. Lastly, we examined the stability of social ties until six months after release, which limits our conclusions to that specific timeframe. Future research may extend our work by examining if and how the social networks of incarcerated people have structurally changed from pre- to post-imprisonment by examining their networks a year or more later, or by examining more than two time points.

5. Conclusion

While inspiring further research, our findings contribute to the broader literature on the stability in social networks (Marin & Hampton, 2019; Wellman et al., 1997; Wrzus et al., 2013), by indicating how the quality, quantity, and type of ties determine the stability of those ties after large network disruptions. Our findings also advance prior work on the level of criminality and change in social networks pre- and post-imprisonment (Bellair et al., 2019; Visher et al., 2004; Volker et al., 2016), suggesting that imprisonment may not affect the stability or dissolution of ties with criminal network members specifically, but instead stability of these and other ties seems to be driven by more general quantity and quality relationship characteristics. With these findings, we hope to stimulate research, policy, and practice to identify means that further strengthen social support mechanisms post-imprisonment. For example, reintegration processes can actively engage network members such as family and romantic partners, who have an instrumental role in assisting formerly incarcerated people with reintegration processes such as finding employment and housing. In addition, socially supporting ties may help with recovering from potential trauma and prevent recidivism through informal social control mechanisms.

Overall, our work reveals the importance of extending reintegration assistance programs to creating awareness and expertise among network members with whom incarcerated people had more frequent contact or better contact (based upon their assessment of trust, the ability to borrow money and the closeness of a contact). These are the types of ties that incarcerated people are likely to return to and may call upon for social support post-imprisonment. By extension, it will be crucial to identify and engage these types of relationships during imprisonment (e.g., investing in frequent contact and offering awareness and training to an incarcerated person's stable network) in order to facilitate a successful post-imprisonment reintegration. To prevent recidivism, efforts should also be directed at detecting and preventing criminality and delinquency within a social network post-imprisonment. In conclusion, prison visitation and reintegration processes may need to be directed at those types of relationships that remain stable post-imprisonment and can foster social support and a sense of belonging.

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Declaration of Competing Interest

None.

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