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FINAL SUMMARY OVERVIEW

Understanding Incarceration and Re-Entry Experiences of Female Inmates and their

Children: The Women's Prison Inmate Networks Study (WO-PINS)

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PURPOSE

The U.S. incarceration rate over the past 40 years reached "historically unprecedented and internationally unique" levels (National Academy of Sciences, 2014:2). Rising imprisonment was even more expansive for women compared to men, with the female incarceration rate rising twice as rapidly as the male incarceration rate (Carson & Sabol, 2012). Growing numbers of incarcerated women may be particularly consequential for child well-being, as female prisoners are much more likely than their male counterparts to have been primary caregivers of minor children at the time of their imprisonment (Glaze & Maruschak, 2008). Moreover, for both men and women, mass incarceration has disproportionately affected black, young, and disadvantaged populations. The current era of hyper-incarceration has unequivocally contributed to rising social inequality and negative health outcomes. Simultaneously, academic studies of incarceration and post-incarceration experiences, particularly among women, have remained relatively infrequent.

This project, the Women's Prison Inmate Network Study (WO-PINS), applied an innovative mixed-methods design focused on the conditions of confinement and community re-entry experiences of women incarcerated in two Pennsylvania women's prisons. It extends a prior study, the Prison Inmate Networks Study (PINS), focused on the social organization within a men's prison unit and permits gender comparisons to elucidate potential differences and similarities in prison social structure and health across men's and women's prison contexts.[1] The current project unfolded in three phases. In **Phase 1**, we designed and implemented a network

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[1] PINS was funded by the National Science Foundation (1457193) and measured the network structure and health of approximately 200 men incarcerated in a "good behavior" unit of a Pennsylvania medium-security men's prison (Kreager et al., 2016; 2017; Whichard, Wakefield, and Kreager, 2020).

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and health survey administered to residents in three women's units in two prisons (one minimum-security prison and one maximum-security prison). The emphasis of this phase was to understand the informal social structures within the prison units and prisoners' positions within those structures.

In **Phase 2**, we identified and recruited participants in Phase 1 who were release-eligible within one year of the baseline survey. The incarcerated women were administered semi-structured interviews prior to release to understand their future concerns and expectations about reentry. Of particular interest were incarcerated mothers' plans and expectations for child reunification. While respondents with children remained incarcerated, we interviewed primary caregivers of incarcerated mothers' children and at least one child. Caregiver interviews examined the burdens imposed on caregivers by the mother's incarceration and the caregivers support plans (or lack thereof) for returning incarcerated mothers (Turnanovic, Rodriguez, & Pratt, 2012). The child interviews measured retrospective experiences prior to their mother's incarceration, current health and adjustment, and children's expectations and fears related to the reunification process

In **Phase 3,** we followed paroled prisoners and their children for follow-up interviews after prison release. One year after all interviewed women are released, we also gathered administrative data on post-release arrests and potential reincarceration. The primary purpose of this phase was to understand, from the perspective of the released women, their children and caregivers, the challenges and opportunities faced upon leaving prison, particularly related to family reunification and well-being.

SUBJECTS

Phase 1. We collected survey data from incarcerated women in three units in two Pennsylvania women's prisons. Data from the first women's unit were collected in the summer of 2017 in a Pennsylvania state minimum-security women's prison. Data from the second- and third-women's units were collected in a state maximum-security women's prison approximately one year after the first unit. The first and second units were classified as "good behavior" (i.e., residents were required to be misconduct-free for up to 12 months prior to entry and remain misconduct-free during their residence), whereas the third unit was a general population unit adjacent to the second "good behavior" unit in the maximum-security prison. The first unit held 131 prisoners housed in a stand-alone building where residents freely associated with one another at most times throughout the day. Housing in this unit consisted of a single story of six-occupancy rooms arranged along a single corridor with a dayroom and guard desk at the midpoint. The second and third units held a maximum of 76 prisoners each in an open bay format, where bunks were arranged in cubicles holding four women in tight quarters, such that the women easily communicated with those around them and elsewhere in the unit.

Researchers administered Computer-Assisted Personal Interview (CAPI) surveys to respondents in face-to-face interviews over approximately one hour on internet-disabled laptop computers using Qualtrics software. Along with the survey, respondents completed informed consent and capacity to consent processes. Across units, the response rate ranged from 74-82%, with a total sample size of 222 women. Three women were excluded from analyses because they failed to meet the capacity to consent threshold. Table 1 lists sample demographic descriptive statistics. Participation at all phases of this study was voluntary, and no records were shared with

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prison staff. No participation incentives were offered in accordance with Pennsylvania policy (Smoyer et al., 2009).

Phases 2 and 3. Participants eligible for parole within one year of completing the Phase 1 survey were recruited into the reentry portion of the study. Phase 2 consisted of 22 respondents from the first prison and 63 respondents from the second prison completing pre-release prison interviews. Phase 3 consisted of 56 total community interviews of 14 formerly incarcerated women, 14 caregivers, and 18 children before interviewing was halted due to the COVID-19 pandemic.

DESIGN AND METHODS

Phase 1. Central to this project was understanding the social system within prison through the collection of social network data of unit status, friendship, and trust ties in the three women's prison units. The networks measures replicate those administered in the earlier PINS project focused on a men's prison unit. To measure unit status, respondents were asked: "Who are the unit residents you feel are the most powerful and influential?" Each respondent nominated as many peers as they wished from up-to-date unit rosters. On a subsequent survey screen, respondents ranked their nominations. For the top three nominations, respondents were also asked the open-ended question, "Why is she powerful and influential?" Narrative responses to this question were qualitatively coded to identify the sources for status on the units. Top three nominations were also used to create matrices of directed ties suitable for network analysis. Standard deviations for incoming status ties were substantially larger than their means, indicating skewed distributions where most unit residents received few or no nominations, but a handful received a relatively large amount. This pattern offered evidence of a status hierarchy, with residents generally agreeing on their most powerful and influential peers. To measure unit friendships, respondents were asked, "Who do you get along with most?" on the unit. We used

the top-10 list to create "get along with" matrices for network analysis. To measure peer trust, survey respondents were asked, "Who are the [unit] residents that you trust to support you during an argument or dispute with another inmate?" As expected, the number of trust nominations was similar to, but less than, the number of "get along with most" ties. For example, on unit 1, the average residents nominated on average 4.08 peers as those they trusted but 4.96 peers that they got along with most on the unit. This finding suggests that trust is present in the women's units but that there are peers who incarcerated women get along with but simultaneously do not trust.

Table 1. WO-PINS Demographic Descriptive Statistics

Variables	Unit 1[a] (N = 131) Mean (%)	SD	Unit 2[b] (N = 76) Mean (%)	SD	Unit 3[c] (N = 76) Mean (%)	SD	Pre-Release (N = 86) Mean (%)	SD	Post-Release (N = 14) Mean (%)	SD
Total survey participation	103	---	63	---	56	---	86	---	14	---
Race/ethnicity										
White[d]	58.01%	---	67.10%	---	78.94%	---	75.58%	---	78.57%	---
Black	33.60%	---	25.00%	---	17.10%	---	20.93%	---	21.43%	---
Hispanic	8.40%	---	7.89%	---	3.94%	---	3.49%	---	0.00%	---
Religion										
Muslim	7.60%	---	3.95%	---	0.00%	---	0.00%	---	0.00%	---
Catholic	22.90%	---	25.00%	---	22.37%	---	27.91%	---	14.29%	---
Protestant	58.80%	---	36.84%	---	44.74%	---	45.32%	---	42.86%	---
Other	3.05%	---	13.16%	---	9.21%	---	8.14%	---	21.43%	---
None	6.87%	---	7.89%	---	13.16%	---	6.98%	---	0.00%	---
Missing	0.00%	---	13.16%	---	10.53%	---	11.63%	---	21.43%	---
Offense gravity score	12.29	4.3	8.8	4.55	6.94	4.08	7.51	4.13	5.57	2.62
Age (years)	47.08	12	43.74	11.3	37.82	9.95	42.45	10.7	43.53	9.33
Time in prison (years)	11.2	11	4.34	5.87	3.16	6.71	4.49	6.66	1.47	1.87
Time on unit (years)	3.71	3.9	1.34	1.99	0.36	1.09	1.44	2.82	0.43	0.5

Notes: [a] Good Behavior-Minimum Prison, [b] Good Behavior-Maximum Prison, [c] General Population-Maximum Prison, [d] Includes residents of "Other" race: N(unit 1)=0, N(unit 2)=1, N(unit 3)=1

We applied graph visualizations and exponential-family random graph models (ERGMs) to examine each unit's status, friendship, and trust networks. ERGMs formulate the probability

of observing a network given a set of nodes (e.g., individuals) and their attributes (Hunter et al., 2008). A powerful feature of ERGMs is their ability to account for the endogenous and mutually dependent nature of ties. This means that predictors can include not only individual attributes, but also properties of connected pairs (dyads) and groups of three individuals (triads).

To complement the formal network analyses, we used inductive thematic coding to examine the status narratives in the women's units. Open-ended responses for powerful and influential peers were disaggregated into narrative elements (i.e., distinct ideas embedded in each response) before thematic coding. In the first women's unit, there were 253 top-three power and influence nominations sent to 50 women with 561 elements. The second women's unit had 115 top-three power and influence nominations sent to 28 women with 177 elements. Finally, the third women's unit had 90 top-three nominations sent to 30 women with 136 elements. Interrater reliabilities for all four units were in the acceptable range (Krippendorf Alpha = .70 [unit 1], .75 [unit 2], .68 [unit 3], .69 [men]).

To supplement the survey data collected in phase 1, we requested an array of administrative data from the Pennsylvania Department of Corrections (PADOC) that capture static traits or demographic characteristics, such as age and religious affiliation. This permitted us to shorten the survey and alleviate respondent burden. Also, we used administrative records to generate several longitudinal measures, such as visitation in the six months preceding survey collection and time spent in PADOC facilities. PADOC visitation lists also permitted us to determine if a respondent's child visited her during a specified period, such as the 6-month period prior to the survey administration.

Phases 2 and 3. Phase 2 (pre-release) interviews were transcribed and thematically coded using NVivo software. Each Phase 2 interview was broadly coded by at least two coders and coding

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procedures were revised until a high interrater reliability rate was achieved. Initial coding of Phase 3 interviews was also recently completed. Interviews were recorded and uploaded to a third-party transcriber. Transcripts were then redacted of participant-identifying information and imported into the NVivo software package. Within this software, interview statements and responses were selected and categorized by undergraduate coders (Phase 2) and graduate student coders (Phase 3) into themes and sub themes. Examples of these themes include, but are not limited to, health, relationships, expectations, prison programming, childhood experiences, and past offenses. Initial broad coding followed flexible coding methods (e.g., Detering and Waters 2018), an approach best suited for research projects with multiple researchers and a fairly structured interview guide. Themes were selected by investigators to include sociological phenomena that may be uncovered within the interviews and broadly follow the structure of the interview guide. Further themes were then added holistically after an initial exploratory coding session to uncover what further coding themes would be prudent to include. Statements and responses were coded in an "all that apply" approach to account for the variety of themes a single statement might fit. For Phase 2 (pre-release interviews), undergraduate interns were hired and trained by the Pennsylvania State University Criminal Justice Research Center and their coding was overseen by a lab supervisor. Each transcript was coded by no fewer than two interns for the purpose of measuring interrater reliability. Coding designations from each respective coder were then merged into a single file and provided to investigators for further analysis. Phase 3 interviews were coded in much the same way by a graduate student coder at Rutgers University, supervised by Co-Principal Investigator (PI) Wakefield.

Co-PI Wakefield and consultant Soyer have begun a more in-depth coding and analysis of all pre-release and community interviews, using the broad code summaries as a baseline, and

comparing across case characteristics (prison unit, crime type, demographics, etc.) and sample type (incarcerated women, caregivers, and children), and wave (pre-release relative to community). See final section regarding forthcoming analyses and publication plans.

Phase 3 of the study (post-release interview) encountered several logistical challenges. First, relative to our previous work on incarcerated men, formerly incarcerated women were more likely to complete pre-release interviews but much more difficult to locate once released. We encountered a high incidence of invalid contact information and/or family members who were disinclined to help in contacting the respondent. Additionally, we experienced a relatively high cancellation rate of scheduled interviews and more variability in release dates, substantially lengthening the data collection period for this portion of the study. Finally, and most consequentially, just as we were experiencing greater success in locating and securing interviews, the COVID-19 pandemic halted data collection. The study needed to close before follow-up interviews could be completed, resulting in a total of 56 total community interviews of 14 formerly incarcerated women, 14 caregivers, and 18 children before interviewing was halted due to the COVID-19 pandemic.

Many reentry studies of formerly incarcerated women involve small samples, few prospective studies initiate recruitment with the incarcerated mother (as opposed to children or caregivers), and many longitudinal reentry studies are focused on men. It is thus difficult to clearly know whether our retention difficulties result from gender differences in reentry experiences (and thus require different retention methods), how differently our retention rates might look if not for the Covid-19 pandemic and other logistical challenges notes above, or whether there are large differences in the experiences of those we retained in the study relative to those we were unable to interview in the community. It is likely that these differences are large

(e.g., Western, Braga, Hureau, and Sirois 2016). As a result, we assume that the retained sample is likely skewed towards formerly incarcerated women with more stable reentry experiences and towards more stable families. As noted below, differences in recidivism rates offer one window for assessing these issues but may not be capable of illuminating more subtle reasons for losing subjects once they enter the community and we plan to assess the pre-release qualitative interviews for insights that may guide future research.

To accompany the qualitative re-entry experience, we queried two administrative data sources to generate a measure of recidivism for all women from the three units who were released after the survey was completed. We estimated Cox proportional hazard models of the risk of recidivism. Cox models are one way of modelling a hazard or survival function, where a sampled group is at risk of experiencing a given outcome. Cox models are useful for events that occur over time, and when the observation window is necessarily truncated. The Cox proportional hazard model assumes that participants are at equal risk for the event, net of differences that are included as covariates whose coefficients describe proportional changes to the slope of the hazard function. In our case, recidivism is a dichotomous measure, coded as 1 for either reincarceration or rearrest, with the former primarily reflecting reincarceration on technical parole violations of parole, and 0 if that member of the sample was not observed to experience a recidivism event.

The Pennsylvania Department of Corrections (PADOC) supplied inmate movement records for our full sample (N = 283), which enabled identification of instances in which an individual was released and then returned to the state prison system for a parole violation. This reincarceration data was provided in November 2020, which provided a post-release observation window ranging in length from zero days (release occurred on the day data was provided) to

nearly 3.5 years, depending on the release date of the individual. Cox models are useful for handling data such as these because of the way data are used in the survivor function – counting as an event if member of the sample is observed recidivating but counting as a censored data point if they do not recidivate before the data was collected. The Administrative Office of Pennsylvania Courts (AOPC), the administrative arm of the Supreme Court of Pennsylvania, provides publicly accessible court dockets for the entire state of Pennsylvania. With personally identifying information, such as full name and date of birth, all court records for a specific individual can be accessed through AOPC. In addition to the reincarceration data provided from PADOC, AOPC was queried for all individuals from the sample who had been released from prison after the interview (n = 173). The first name, last name, and date of birth of each individual was entered into AOPC's search system, and all court dockets after the individual's release from this stint of incarceration were examined. The first arrest incident, as indicated by the first arrest date listed in the court docket, was recorded as the individual's date of first rearrest post-prison release. Descriptive statistics for the recidivism sample can be found below in Table 2 with columns for the full sample, those released from prison, and those who were observed recidivating.

Table 2. Recidivism Descriptive Statistics

Variables	Full Sample (N = 283)		Released from Prison (N = 173)		Recidivated (N = 13)	
	Mean (%)	SD	Mean (%)	SD	Mean (%)	SD
Total survey participation	222	---	130	---	9	---
Race/ethnicity						
White[a]	66.08%	---	73.41%	---	84.62%	---
Black	26.86%	---	18.50%	---	7.69%	---
Hispanic	7.07%	---	8.09%	---	7.69%	---
Religion						
Muslim	4.59%	---	3.47%	---	0.00%	---
Catholic	23.32%	---	23.12%	---	7.69%	---
Protestant	49.12%	---	48.55%	---	46.15%	---
Other	7.70%	---	7.52%	---	7.69%	---
None	8.83%	---	10.40%	---	23.08%	---
Missing	6.36%	---	6.94%	---	15.38%	---
Offense gravity score	9.91	4.88	7.60	3.76	5.23	3.11
Age (years)	43.7	12.1	41.89	11.04	31.23	5.14
Time in prison (years)	7.2	9.36	4.21	6.30	2.23	1.45
Time on unit (years)	2.18	3.27	1.38	2.64	0.13	0.16

Notes: [a]Includes residents of "Other" race: n=2;

DATA ANALYSIS AND PROJECT FINDINGS

The results and analyses from this project are dependent on the data drawn from the consecutive phases of this project. Results from empirical investigations correspond with the three phases of data collection. Phase 1 findings rely on the survey and administrative data collected in the three prison units. Phase 2 findings are drawn from semi-structured qualitative interviews administered to a subsample of the survey population just prior to prison release. Phase 3 findings are drawn from in-community interviews of Phase 2 respondents and recidivism analyses of Phase 1 respondents.

PHASE 1 RESULTS

Phase 1 results focus on the structure and context of the three women's prison units. In a published manuscript, we analyzed the status networks across the three women's units and compared these to the previously collected PINS data from a men's unit (Kreager et al., 2021). Additionally, we published a paper that analyzed the trust network in unit 1 to understand individual and structural determinants of trust (Young & Haynie, forthcoming). We summarize findings from these manuscripts below.

We also summarize several ongoing projects: (1) we explore the prevalence of prison pseudo-family membership and the connection between biological motherhood and pseudo-motherhood in two prison units, (2) we use administrative visitation data and qualitative responses to investigate the complicated feelings incarcerated women have toward visitation, and (3) we investigate the correlation between prison friendship networks and women's prior victimization experiences.

The Structure and Meaning of Prison Status

We approached status in the prison units using an abductive approach, where theoretical contributions emerge through iterative investigation revised hypotheses, rather than deductive tests of specific hypotheses or an inductive, "grounded theory," approach where theory and hypotheses are outcomes of qualitative analysis (Kreager et al., 2017; 2021). From participant narratives, we identified themes of age, time in prison, and accrued prison wisdom (often coalescing in "lifer" residents) for higher status peers across the women's and men's (i.e., PINS) correctional settings. We also found that incarcerated women were more likely than men to describe status in affective versus instrumental terms. For example, incarcerated women commonly defined powerful peers as nurturing, caring, and maternal, whereas similar narratives

were unmentioned by incarcerated men. Women were also more likely than men to focus on negative interpersonal behaviors or attributes – such as bullying, selfishness, manipulation, and intimidation – as sources of prison status.
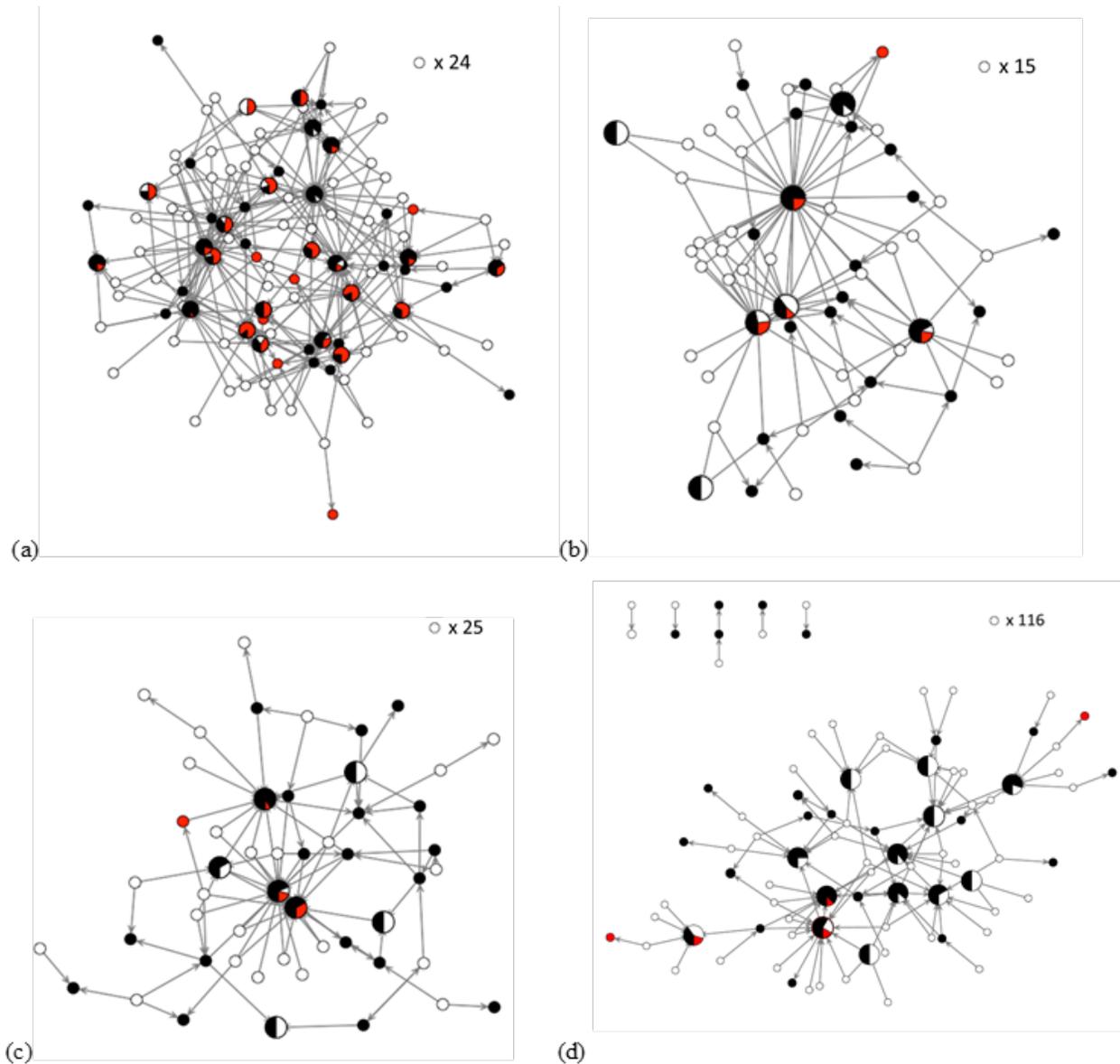
Figure 1. Balance of Positive, Neutral and Negative Ties in the Status Networks of (a) Unit 1, (b) Unit 2, (c) Unit 3, and (d) Men's (PINS) Unit

The qualitative results informed network analyses by distinguishing status ties based on their affective content. After coding women's status nominations as either "positive/neutral" or

"negative" and visualizing these in network graphs, it was apparent that powerful and influential women were simultaneously perceived positively by some peers and negatively by others (see Figure 1). In these graphs, nodes are unit residents and arrows represent (directed) status nominations. The size of each node corresponds to the number of status nominations received by other unit residents (i.e., indegree) and the pie charts reflect the proportion of incoming nominations that are positive (black), neutral (black), and negative (red) in affect. The frequencies of isolated nodes (i.e., those residents who did not send or receive a status nomination) are listed in the top-right of each graph. Looking across the graphs, a consistent pattern is that those unit residents who received negative nominations were equally likely to receive positive nominations, suggesting that perceptions of status depend on who is doing the nominating.

Additionally, ERGM analyses suggested that, for the most part, correlates of status tended to be similar in the women's and men's prison contexts (e.g., older inmates and those in prison longer). However, friendship was a more important correlate of status for women than men, pointing to informal affective groups as important sources of status in women's prison.

Prison Trust Networks

Knowing whether and how incarcerated women establish relationships of trust with one another is crucial for understanding how individuals adjust to conditions of confinement, yet we know very little about the informal organization of trust between incarcerated peers.[2] This dearth

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[2] Another research question relates to trust (or other) relationships between prisoners and correctional staff. It is challenging to simultaneously collect network information from prisoners and staff given the polarized nature of the prison environment, but future research should investigate the feasibility of such a study.

of knowledge stems from a lack of conceptual work on the concept of trust in corrections, specifically and criminology in general. In seeking to contribute to the growing area of research that Kreager et al. (2016) refer to as the "Criminology of Inmate Networks", we (Young & Haynie, forthcoming) utilized a social network approach and measures to examine the relationship of trust ties among incarcerated women housed in unit 1. We did so by examining the role of individual and structural determinants of trust in this prison unit. The strength of a network approach over past work examining trust in carceral and other settings is that it allows for much more precise operational measures of our trust-related hypotheses. Just as important, the precise specification of context allows our findings to be replicated in other settings, something that has not been possible in past research (Kreager, Schaefer, et al., 2016).

During the CAPI administration, interview respondents were shown a roster of all women on the unit and asked to indicate, "Who are the residents that you trust to support you during an argument or dispute with another inmate?" Each respondent was allowed to nominate as many others as they wished from a unit roster. This measure of trust reflects Hardin's (2002) three-part conceptualization, where A trusts B to do X. In this case, i trusts j to support i during an argument or dispute. In addition, this measure captures a salient feature of confinement for women as research demonstrates that verbal and emotional aggression occurs with regularity (see Kreager & Kruttschnitt, 2018, p. 270). There were a total of 515 trust nominations made by the 103 women in the unit, resulting in a density of 0.07, meaning that 7% of all possible nominations were present in the network. Trust nominations are directed, meaning that a trust nomination from i to j does not necessarily reflect a trust nomination from j to i. The number of trust nominations that an individual receives measures their relative trustworthiness, and the number of trust nominations that an individual sends measures their relative trust in others.

We began our analysis by describing the prevalence of trust in the unit. The average respondent received (i.e., indegree) 3.93 trust nominations (sd = 3.02), whereas the average ties sent (i.e., outdegree) among the 103 eligible survey respondents was 4.08 (sd = 6.14). This indicates that, on average, a woman was viewed as trustworthy (in the context of providing support to another woman involved in an argument or dispute) by nearly 4 people on the unit. Both trustworthiness and trust varied considerably among women. For example, 13 individuals received 0 trust nominations, suggesting that nearly 10% of the unit was not trusted by anyone to support them during a dispute. Of those who could make nominations, 22 (21%) indicated that they did not trust anyone to support them, whereas 2 women indicated that they trusted as many as 35 women to support them during a dispute. Keeping in mind that respondents were allowed to nominate as many other women as they wished, the descriptive statistics indicate that trust is fairly low on this unit with respect to the context of support during a dispute, , particularly given that the average woman resided on the unit for over 3.5 years. For a unit with 131 women, the average person only trusted about 3% of the unit.

A visualization of the trust network is shown in Figure 2. In this figure, nodes are colored by race/ethnicity (White=Red; African American=Blue; Hispanic=Green), shaped by religious affiliation (Triangle=Christian; Muslim=Square; None=Pentagon; Circle=Other), and sized proportional to indegree centrality. Six isolated nodes are excluded from the graph. The graph supports patterns observed in (unlisted) descriptive statistics. Beginning with indegree, or nominations of who is trustworthy, older individuals who have spent more time in prison and who have spent more time on the unit were seen as relatively more trustworthy. For religion, those who indicated no religious affiliation have lower trustworthiness, and those who indicated a religious affiliation other than Christian or Muslim have higher trustworthiness. For race, white
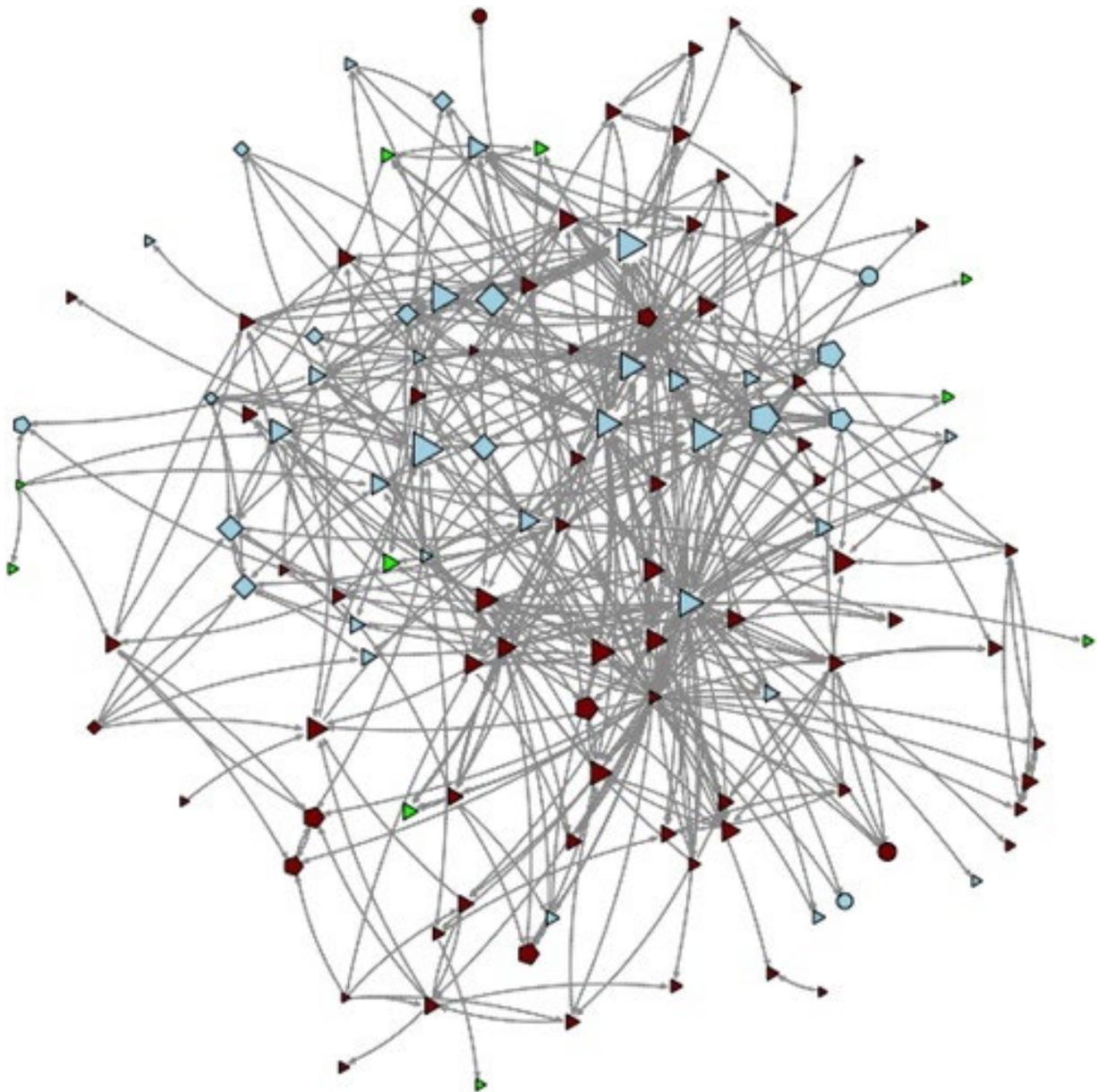
Figure 2. Trust Network in Unit 1.

and Hispanic individuals were seen as more trustworthy relative to black individuals. Regarding the effects of the get along with network, individuals who brokered relationships in the get along with network are more likely to receive trust nominations. Additionally, individuals who sent more trust nominations are more likely to receive trust nominations. Moving on to outdegree, or who is more likely to trust, individuals are more likely to send a trust nomination if they indicate a religious affiliation other than Christian, Muslim, or None, if they are Hispanic, if they

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brokered more positions in the friendship network and received more trust nominations. Finally, the measures of homophily indicated that there is some evidence that homophily occurs for age, time in prison, religion, and race/ethnicity.

In multivariate ERGM results, which simultaneously estimated network, dyadic, and individual characteristics, we found several interesting results. First, we found no support for the idea that trust mainly varies by individual characteristics such as age, prison tenure, and time on the unit. We found that these characteristics did not play a role in shaping who was viewed as trustworthy for providing support during a dispute. We did, however, find modest evidence that these characteristics played a role in shaping whether individuals report trusting others (i.e. outdegree behavior). Nevertheless, these characteristics do not appear to be the main drivers of decisions about whom to trust for providing support during a dispute with another prisoner. Overall, our findings show that trust, at least in terms of views about who will support you during a dispute, is more complex and goes beyond variation in the individual characteristics we identified.

Second, religious similarity between connected individuals (i.e., homophily) appeared to play a mixed role in shaping who one trusts to support her during a dispute. Specifically, we found that Muslim women and women who indicated no religious affiliation were more likely to trust each other when they shared these religious affiliations as opposed to someone of a different religious affiliation. In contrast, women who identified as Christian (either Catholic or Protestant) did not show any preference for trusting others of a particular faith. It is important to note that this lack of homophily among women who identified as Christian held if separate effects were estimated for Catholic and Protestant religious affiliation. The effects for differential homophily we observed also reflected the disproportionate representation of those who identified

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as Christian in the unit. As shown in Table 1, 82% of the women in the unit identified as Christian, and the effects for the two other groups (i.e. Muslim [7%] and None [6%]) may reflect the small size of these groups. That is, in situations where one is a minority, this characteristic may be particularly salient and drive one's beliefs about whom to trust in a specific context. In addition to the findings for religious affiliation, we found no evidence of racial homophily. Although studies suggest that race significantly structures interaction among incarcerated men, there is much less evidence that it does so in women's prisons (Kreager & Kruttschnitt, 2018), and our results support prior research in this regard.

Third, our findings regarding network structural properties were, for the most part, quite strong. Specifically, our results suggested that the "get along with" network (our proxy for "friendship") is entrained with the trust network and that, additionally, trust relations are embedded (in both dyadic and network forms). These results make sense when one considers the context for making inferences about who will support you during a dispute. In situations in which individuals know each other, relationships that form and influence trust are said to be embedded, and we show evidence of a close correspondence between the get along with network and the trust network.

Our findings also contradicted existing work on brokerage in networks. For instance, we found that individuals were less likely to trust others when they brokered positions in the friendship network. While existing work points to the differences in potential gains for brokers (e.g. Burt, 2017), our results appeared to highlight the difficulty prisoners face in choosing who is trustworthy when an individual brokers between groups. From the perspective of the broker, individuals who are interstitial between groups may not know who would support them during a dispute as a consequence of their position in the get along with network. Put differently, the mere

nature of being in this brokerage position may make such a decision quite difficult and littered with uncertainty. However, while individuals in a brokerage position do not gain the trust of others, they may be strategically positioned to gain access to resources. That is, some individuals may seek to develop relationships for instrumental purposes such that these connections provide individual utility. Decisions based on expected utility may inherently conflict with others' beliefs about the trustworthiness of that individual.

Pseudo-Families and Motherhood

We have examined the prevalence and impact of pseudo-families in women's prisons. From the outset, scholars suggested that incarcerated women form prison pseudo-families as substitutes for functional or dysfunctional pre-prison family relationships. In his seminal study of a girl's reformatory school, Selling (1931) found that many delinquent girls were organized in stable family groupings. Several more recent studies challenged earlier conceptions of pseudo-families as common and palliative in modern women's prisons. For example, Greer (2000: 463) interviewed 35 women incarcerated in a Midwest prison and found that kinship networks were "virtually nonexistent" in the facility.

We use nomination data from study participants to identify women who were members of prison pseudo-families and focus particular attention on those self-identifying or nominated as prison mothers (or grandmothers). We then examine pseudo-mothers' relationships with their biological children and compare these to other mothers' relationships on the units. We create two competing hypotheses for the association between pseudo-motherhood and biological motherhood. According to the substitution argument, pseudo-mothers should have weaker relationships with their biological children than do other incarcerated mothers. Alternatively, the reproduction hypothesis predicts a null or positive association between pseudo-motherhood and

relationships with biological children. We then apply a mixed methods analysis to understand both the *prevalence* and *meaning* of prison pseudo-families in a contemporary women's prison, along with the connection between mother-child relationships inside and outside of prison.

For this analysis, the research sample was restricted to women from units 2 and 3 due to slight changes made to the prison family nominations section of the survey instrument between sites one and two. A survey item was used to identify membership in pseudo-families. Nearly two-thirds (76 of 119) of survey respondents agreed they were part of a prison pseudo-family. If respondents self-identified as a pseudo-family member, they were asked to nominate other family members and their pseudo-family roles. We then restricted our analytical sample to those women identified as biological mothers. The survey inquired directly about biological children, yielding 99 self-reported biological mothers in the two units. Administrative visitation records were then used to identify an additional 33 women with biological children who did not complete the survey, totaling a sample of 132 women with biological children. Of the 132 women, 28 (21%) were identified as pseudo-mothers by a self or peer nomination. The other 104 women (79%) were not considered pseudo-mothers.

Contrary to recent studies, we found that the majority of our study participants reported pseudo-family membership. In the two prison units we sampled, the pseudo-family appeared alive and well. To explore the role of biological motherhood in prison pseudo-families, we used two predictive models, first predicting the role of 'pseudo mother', and second predicting difference in relationship quality with biological children of pseudo-mothers and non-pseudo-mothers measured two ways. First, relationship quality with biological children was measured with a survey item asking respondents how they perceived their relationship with their youngest biological child. This was scored on a 5-point scale where 1 indicates "poor" and 5 is

"excellent." Second, relationship quality was measured with visitation of the mother by her biological children. Due to the nature of the sample (i.e., that includes both survey and non-survey respondents), we can consider missingness in two ways—overall missingness and item non-response. The former refers to missingness resulting from a portion of unit residents not taking the survey while the latter refers to survey questions respondents refused to answer. Overall missingness ranged from 0% for administrative measures and the marker of biological motherhood to 27% for certain survey responses. Item non-response ranges from 0% to 14.14% (n=14).

We conducted t-tests comparing demographic and sentencing characteristics provided by PADOC of surveyed and non-surveyed mothers. None of the means of these measures were significantly different, suggesting that resulting missingness was randomly distributed. We thus retained mothers who did not take the survey and multiply imputed (m=20) missing values using the "mi estimate" command in Stata 15 (Rubin, 1987; StataCorp, 2017).

Table 3. Logistic Regression of Prison Pseudo-Motherhood[1]

	B		SE
Age	0.126	***	0.033
White	0.192		0.709
Education	-0.167		0.165
Time in DOC	0.034		0.046
General Population	-1.071	†	0.614
Number of Children	0.039		0.200
Offense Type (Reference = Drug Offense)			
Violent	-0.924		0.802
Property/Other	-0.138		0.673
Instability Index	-0.367		0.303
Substance Use Disorder	-0.172		0.635
Social Integration	1.669	*	0.734

† $p < .10$, * $p < .05$, *** $p < .001$
1. Table presents multiply imputed (m = 20) data, N = 132

Table 3 presents results from a multivariate logistic regression predicting pseudo-motherhood. On average, pseudo-mothers were significantly older ($p < .001$) than women in the sample with biological children but not identified as pseudo-mothers. The magnitude of the age coefficient was quite large, with each additional year of age increasing the odds of pseudo-motherhood by 14% (exp(.13)). Social integration was also a significant ($p < .05$) correlate of pseudo-motherhood. The more integrated a respondent felt in her unit, the greater her chances of being identified as a pseudo-mother. In fact, each additional point on the social integration score led to a five-fold increase in the odds of pseudo-motherhood (exp(1.67)).

Table 4 displays results from bivariate and multivariate OLS regression models predicting respondents' perceived relationship quality with their youngest biological child. In the bivariate model, pseudo-motherhood had a positive and nonsignificant ($p > .10$) correlation with perceived relationship quality. In the multivariate model, this association reversed signs but remained statistically indistinguishable from zero.

Table 4. OLS Regressions of Relationship Quality with Youngest Biological Child[a]

| | Model 1 | | Model 2 | | |
	B	SE	B		SE
Pseudo-Family Mother	0.483	0.363	-0.022		0.409
Age			0.035	*	0.016
White			-0.477		0.412
Education			-0.080		0.099
Time in DOC			-0.021		0.027
General Population			0.311		0.330
Number of Children			-0.156		0.106
Offense Type (Reference = Drug Offense)					
Violent			-0.067		0.414
Property/Other			-0.032		0.369
Instability Index			-0.250		0.146
Substance Use Disorder			-0.706	†	0.338
Social Integration			0.455		0.306

† p < .10, * p < .05

a. Table presents multiply imputed (m = 20) data, N = 132

Table 5. Logistic Regression Models of Biological Child Visitation[a]

	Model 1		Model 2	
	B	SE	*B*		SE
Pseudo-Family Mother	0.276	0.500	0.082		0.105
Age			0.0005		0.0042
White			0.044		0.096
Education			-0.021		0.024
Time in DOC			-0.014	*	0.007
General Population			-0.015		0.079
Number of Children			0.006		0.026
Offense Type (Reference = Drug Offense)					
Violent			0.214	*	0.102
Property/Other			0.018		0.091
Instability Index			-0.048	†	0.037
Substance Use Disorder			-0.045		0.079
Social Integration			-0.027		0.081

† $p < .10$, * $p < .05$

a. Table presents multiply imputed (m = 20) data, N = 132

Table 5 presents results from bivariate and multivariate logistic regression models predicting child visitation. Similar to the bivariate results in Table 4, pseudo-motherhood was a positive and nonsignificant ($p > .10$) correlate of visitation by any child in the past six months. The introduction of covariates reduced the pseudo-motherhood coefficient even further. Of the controls, women who were incarcerated longer were significantly ($p < .05$) less likely to receive visits from children. Additionally, those imprisoned for violent, compared to drug crimes, were significantly ($p < .05$) more likely to receive visits from children.

We investigated the association between pseudo-motherhood and relationships with biological children, operationalized as self-reported relationship quality and child visitation in the past six months. Our analyses supported the reproduction hypothesis, in that pseudo-mothers' relationships with their biological children appeared no different from those of other incarcerated mothers on the units. In other words, there appeared no evidence that women who assume pseudo-mother roles in prison *turn away from* their biological children. We did find evidence that pseudo-mothers tended to be older, in prison longer, and more integrated into their unit's

social organization than their peers. They also tended to be nominated as powerful and influential on their respective units. These findings suggested that pseudo-mothers are more likely to be "prisonized" (Clemmer, 1958) and separated from their outside lives for extended periods. However, the role of pseudo-motherhood did not appear to translate into weakened relationships with biological children compared to other incarcerated women. Other characteristics, such as age, substance use, and previous material hardship appeared stronger predictors of such parent-child relationships.

Visitation in Women's Prison

Using data from all 222 Phase 1 survey respondents, we explored the nuanced feelings surrounding visitation while in prison. Motivated by narratives provided by Owen (1998) suggesting complicated and sometimes negative feelings regarding visitation, a small subset of questions in the survey instrument explored respondents' feelings about visitation. When visitation has been studied, it has been typically considered as an element of the inmate experience that precedes other outcomes; such as misconduct and potential for success or recidivism upon re-entry (see Siennick, Mears, & Bales, 2013). The little research in which visitation is the outcome has been primarily descriptive (Casey-Acevedo & Bakken, 2002), or it has focused on structural deprivation, such as the distance a visitor must travel to see the prison (Clark & Duwe, 2017). While structural impediments undoubtedly play a substantial role in the prevention of visitation, those who are incarcerated can exercise some agency in the visitation they experience, i.e. adding or withholding names to their visitation lists (Boudin, Stutz, & Littman, 2013). Furthermore, some evidence exists supporting the idea that people in prison may wish to shield themselves from being seen by their loved ones while incarcerated (Owen, 1998). To supplement a theoretical explanation for visitation patterns provided by the deprivation theory

of incarceration (Sykes, 1958), we described how stigma theory (Goffman, 1963) can help explain why an incarcerated person might choose to forego visitation that would otherwise be seen to bring them comfort. In sum, this portion of our research expanded the current understanding of prison visitation in two ways.[3] First, by combining data from the Pennsylvania Department of Corrections (PADOC) and unique survey data, we both qualitatively analyzed open ended responses, and modeled overall sentiment regarding visitation. Second, we showed the nuance in the individual experience of visitation, challenging the assumption that visitation is innately comforting and desirable with narratives provide by incarcerated women.

The overall coding of visitation perceptions was drawn from a single stem question of *"What are your feelings about people visiting you in prison?"* Responses were then coded as generally positive, mixed between positive and negative, generally negative, or coded as a response about *not receiving* visitation, e.g., "…*I'm like 8 hours away. And it's just too far away for them to come up here*". The fourth category was included as some respondents had not received any visits close to the time of data collection, and some respondents primarily considered visitation in its absence, even if they had been recently visited. The coding of any preference against visitation was drawn from the same item stem, but also a leaf question inquiring about any different feelings about visitation for children, or close family members for

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[3] While virtual (i.e., video) visitation has played a significant role during the COVID-19 pandemic, at the time of survey collection for sites 2 (units 2 and 3), virtual visitation was infrequent and limited to mothers of young children. As such, no data was collected regarding virtual visitation, and its occurrence cannot be accounted for in our models.

those with no children. Table 6 shows descriptive statistics for the outcome measures, as well as the independent predictors and covariates.

The four chief independent variables were (1) hours of travel between the respondents' committing county and the prison, (2) respondent's perception of visitation as difficult for visitors, (3) the number of recent visits and (4) the number of 'prison family' nominations the respondent received as measures of external and internal social support of the respondent. The two quantitative outcomes of predicted sentiment about visitation and preference against being visited were modeled to discern the correlation between structural and social support measures on stigmatized and avoidant outcomes.

Table 6 provides descriptive statistics for the control variables entered in each model. Age is measured in years at the time of interview, calculated using date of birth taken from administrative records. Respondent race is also drawn from administrative records and collapses race into non-white and non-Hispanic white respondents due to low cell counts of non-white unit residents. The controlling offense gravity score (OGS) is a level of severity assigned to the top-charge of the sentence the respondent is serving. This measure is defined by the Pennsylvania Sentencing Guidelines and ranges from 1-18. It is included as a proxy for severity of crime. Years spent in PADOC is derived for institution movement records recording entrances and exits from the state prison system. Offense type is a simple classification distilled from the state penal code for the top-charge on the respondent's sentence. Finally, the unit indicator identifies the unit that respondents resided in at the time of the survey administration and.

Table 7 presents exponentiated coefficients from the fully-constrained multinomial logistic model which included all four predictor variables and the covariates for sample demographics and criminal justice controls. Perceived difficulty for visitors was associated with

a 2.8 factor increase in the likelihood of giving a mixed response relative to a positive response while holding the remaining variables constant, and again a 10 factor increase in giving a response about not receiving visitation relative to giving a positive response, net of the effect of other covariates. So, net of the influence of other covariates in the model, when a respondent held the view that it was difficult for her visitors to come and see her, she was 2.8 times more likely to give a response that was coded as having a mixed positive and negative sentiment, compared to a response that was coded as positive. An additional visit in the full model was associated with a 0.93 factor reduction in risk of giving a negative response relative to a positive response, and a 0.83 factor reduction in the risk of giving a response about not receiving visitation.

Table 8 shows the exponentiated logistic coefficients of a full model predicating a preference against visitation. Of the four predictors, the number of recent visits was the only measure statistically significantly associated with the preference for not being visited. Each additional visit received was associate with a 16% reduction in the odds of not wanting to be visited, when holding all other covariates constant.

Results suggesting visitation was sometimes seen as negative or with mixed feelings was shown both in individual narratives and coded sentiments. Sampled women gave wide-ranging descriptions of their feelings about being visited in prison. Some valued it above all else, and others found it profoundly uncomfortable for themselves and for their visitors. Approximately one-third of respondents gave a positive overall answer about being visited, while approximately 50 percent gave a mixed or negative response.

The second research question focused on structural factors, such as the distance needed to travel or the difficulty faced by visitors, and our results lend support to a deprivation explanation

of visitation sentiment. Perceptions of a prison visits as difficult experiences for the visitor were associated with an elevated chance that respondents thought of visits negatively or with mixed emotions.

The final research question is focused on how social support impacts the experience of visitation. Here, social support from inside the prison in the form of pseudo-family membership showed a positive association in the bivariate analysis but was attenuated in the full model (Table 7). Evidence of continued support from outside the prison – measured in counts of recent visitation – remained significant in the full model, with recent visits reducing the likelihood of having an overall negative sentiment about visitation. Through a stigma lens, the receipt of social support from visitors may improve the *identity* of the woman in prison, but the qualitative examples of mixed and negative sentiments make it clear that being seen in prison can be a difficult and uncomfortable experience.

Table 6. Descriptive Statistics for Visitation Analyses (N=222)

Variable	Mean (n)	SD (%)	Min	Max
Overall tone on visitation				
Positive tone (reference)	83	37.39%		
Mixed tone	71	32.98%		
Negative tone	41	18.47%		
No visit response	27	12.16%		
Prefer not to be visited				
No (reference)	188	84.68%		
Yes	34	15.32%		
Hours of travel between counties	3.204	1.666	.480	6.110
Visiting is difficult for visitors				
No (reference)	65	29.28%		
Yes	157	70.72%		
Number of recent visits	4.698	8.909	0	60
'Prison Family' Nominations	2.171	2.171	0	11
Respondent age	43.840	11.809	22.448	77.197
Respondent Race				
Non-white (reference)	71	31.98%		
Non-Hispanic white	151	68.02%		
Controlling OGS	10.135	4.960	1	18
Serving life sentence				
No (reference)	194	87.39%		
Yes	28	12.61%		
Years spent in PADOC	7.015	8.921	.162	43.159
Offence Type				
Violent (reference)	120	54.05%		
Drug	41	18.47%		
Property	35	15.77%		
Other	26	11.71%		
Unit of residence				
Unit 1 (reference)	103	46.40%		
Unit 2	63	28.38%		
Unit 3	56	25.23%		

Table 7. Overall Sentiment Regarding Visitation (Reference = Positive Tone) (N=222)

	Mixed Tone		Negative Tone		No Visit Response	
Hours of travel between counties	0.972	(0.146)	0.872	(0.159)	0.889	(0.208)
Difficult for Visitors	2.776[*]	(1.169)	2.231	(1.072)	10.011[**]	(8.123)
Number recent visits	0.974	(0.021)	0.929[*]	(0.034)	0.829[*]	(0.069)
Number of 'Prison Family' nominations	0.884	(0.081)	0.979	(0.109)	0.984	(0.128)
Respondent age	0.989	(0.018)	0.984	(0.022)	1.021	(0.026)
Respondent white	1.910	(0.864)	0.782	(0.400)	1.703	(1.056)
Controlling OGS	0.966	(0.065)	0.979	(0.077)	1.085	(0.103)
Serving life sentence	0.232	(0.198)	1.262	(1.277)	0.227	(0.352)
Years spent in PADOC	1.032	(0.036)	0.963	(0.047)	0.948	(0.062)
Unit of Residence (ref. Unit 1)						
Unit 2	2.491	(1.386)	1.525	(1.007)	3.937	(3.311)
Unit 3	1.021	(0.577)	0.743	(0.512)	2.560	(2.253)
Controlling Offence Type (ref. Violent)						
Drug	1.015	(0.648)	2.732	(2.067)	1.378	(1.260)
Property	0.759	(0.511)	2.067	(1.682)	0.906	(0.922)
Other type	0.323	(0.257)	2.230	(1.891)	0.760	(0.811)

Exponentiated coefficients; Standard errors in parentheses
[*] $p < 0.05$, [**] $p < 0.01$

Table 8. Odds Ratios of choosing 'Prefer not to be visited' (N=222)

Hours of travel between counties	1.333	(0.274)
Difficult for Visitors	1.016	(0.502)
Number recent visits	0.844[*]	(0.067)
Number of 'Get Along' nominations	0.919	(0.112)
Respondent age	1.017	(0.022)
Respondent white	1.032	(0.516)
Controlling OGS	1.042	(0.081)
Serving life sentence	2.120	(2.402)
Years spent in PADOC	0.934	(0.050)
Unit of Residence (ref. Unit 1)		
Unit 2	1.645	(1.203)
Unit 3	2.747	(1.990)
Controlling Offence Type (ref. Violent)		
Drug	3.094	(2.305)
Property	1.897	(1.606)
Other type	3.144	(2.685)

Exponentiated coefficients; Standard errors in parentheses
[*] $p < 0.05$

Friendship Networks and Correlates of Women's Incarceration

Social organization and experiences of imprisoned women have traditionally been studied using ethnographic and descriptive methods. Research in this vein has been foundational to understanding the reality of imprisonment for women, which is often fundamentally distinct from the experience of their male counterparts. Feminist scholarship finds that women often engage in offending behavior related to comorbid mental health conditions, traumatic experiences, co-offending partners, homelessness, and other traumatic lived experiences. Justice-involved women have higher rates of mental illness, substance use disorder, and interpersonal violence and victimization—experiences that are widely considered the correlates of women's imprisonment—than the general population and imprisoned men (Dehart, 2018; Daly, 1992; Daly and Chesney-Lind, 1988). Such challenges are likely to damage trust and comfort navigating social situations. Recent work has connected prior experiences of victimization to the current wellbeing of imprisoned women. But while ethnographic approaches are crucial to understanding the deeply impactful, emotional, and traumatic experience of imprisoned women, they lack the ability to conduct deductive tests or operationalize and measure prison social structure (Kreager et al., 2017).

Utilizing social network analysis, we looked at the common experiences of childhood victimization, mental illness, and substance use disorders that often characterize women's incarceration and how they shaped social structures in the units. These other factors are consistent with the pains of imprisonment and the emergent nature of prison society. The networks in this study show friendship ties sent and received among residents of two of the sampled women's prison units. We utilized the Exponential Random Graph Model (ERGM/p*) to estimate the probability of the network as it is observed compared to a collection of simulated

networks with similar structures (Hunter et al., 2008). We explored the likelihood that ties between actors exist due to theoretically relevant factors beyond random chance. This approach allowed us to relax the assumption of independence that is necessary for common regression techniques and explore the social structures that have inherent dependencies between actors. To estimate these networks, examine the associations between (1) childhood victimization, mental illness, and substance use experiences, (2) factors indigenous to the prison context (e.g., time imprisoned), and (3) connectedness to other residents, operationalized using social ties.

During survey administration, respondents were presented with a complete unit roster and asked to identify others they "get along with most." Respondents were able to pick as many others as they wished to. This phrasing is preferable to asking, "Who are you friends with?" as prior literature indicates, imprisoned individuals may be reluctant to label other prisoners as "friends" and a similar measure has been used in other prison network studies (Kreager et al., 2017; Schaefer et al., 2017).

This relation is directed, meaning if respondent i sends a tie to respondent j, j may or may not send a tie back to i. Having an asymmetric network means we can test hypotheses related to incoming and outgoing tie formation, which are theoretically and substantively distinct. Incoming ties indicate a prisoner is identified as a person that others get along with. This shows a perceived level of time socializing and investment in friendship. It also may imply availability for social support. Outgoing ties indicate an individual's subjective perception of social integration. The more peers a respondent indicates are friends, the more we can assume the respondent feels integrated or embedded in the social setting. Also, it could indicate a perception of social support among fellow residents.

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Together, incoming, and outgoing ties create a complementary understanding of the social integration of an individual on the unit. Incoming ties indicate an external perception of friendship and, on the aggregate, social embeddedness. Outgoing ties indicate a personal perception of friendship and a more general feeling of social integration of the individual.

During the survey, respondents were asked to respond to a battery of questions about their experiences of victimization. The questions asked the respondent if they had been victimized or threatened in one of three ways-- physically, sexually, and with a weapon—during their childhood. From their responses, participants were assigned a 0 for *Victimization* if they answered no to the entire battery of questions and a 1 if they reported a yes to any of those questions. As shown in Table 1, 56% of all respondents reported experiencing victimization during childhood.

The survey included an abbreviated form of Radloff's (1977) CES-D scale. Shortened forms of the CES-D have been validated by Grzywacz et al. (2006), among others. Respondents were asked to respond to a series of 7 statements by indicating how often (1. *Rarely or none of the time (< 1 day),* 2. *Some or a little of the time (1-2 days),* 3. *Occasionally (3-4 days),* 4. *Most or all of the time (5-7 days)*) they agreed. Statements included "my appetite was poor", "My sleep was restless", "I felt depressed," and others. Respondents' scores were averaged to create a scale (Alpha = 0.78), *Mental Health,* which indicates the approximate severity of mental health challenges. Respondents' mean score on the scale was 3.13 indicating occasional to most of the time agreeing with the presented statements. While this measure only captures respondents' experiences in the week prior to survey administration, it has the potential to represent long standing mental health issues and the present pains of imprisonment, which are highly distressing and could lead to depressive symptoms.

Upon intake, individuals incarcerated by PADOC are screened for substance use disorders using the Texas Christian University drug screen instrument (Knight, 2007; Institute of Behavioral Research, 2007). Respondents receive a score indicating drug and alcohol dependence between 0 and 9, with higher scores indicating greater levels of dependence. *Substance Use* identifies respondents who meet the DSM-IV clinical threshold for a substance use disorder, which is a score of 6 or greater. 44% of respondents meet these criteria.

To move past the shortcomings of regression-based analysis techniques for network data, we utilized Exponential Random Graph Models (ERGMs) to examine each unit's friendship network (Frank & Strauss, 1986; Holland & Leinhardt; 1981). Using Markov chain Monte Carlo (MCMC), ERGMs are fitted by a random algorithm that takes a sample of all possible networks drawn from a probability distribution and uses this sample to approximate the true likelihood of the observed network. In other words, these models estimate the chances that observed network properties can be predicted by a hypothetically meaningful actor, tie, or structural attribute compared to what might occur randomly. ERGMs help to account for endogenous network processes that can affect network structure but are not accounted for in classical analytical techniques. For example, ERGMs can take into account the propensity for individuals to send network ties back to those who send ties to them (i.e. reciprocity). Without these considerations, modeling procedures can result in artificially inflated estimations of the effects of predictors. Also, ERGMs allow analyses at the dyad level without violating assumptions of dependence (Robins et al., 2007).

ERGM models utilized respondent attributes (e.g., victimization experiences, time served, and race) and structural properties (e.g., density, reciprocity, friendship skew) to estimate the probability of the observed network compared to random chance. Table 9 presents results of

ERGM estimations of the likelihood of friendship ties between residents living on the same prison unit. ERGM coefficients may be interpreted similar to that of a binary logistic regression. Coefficients represent changes in the log odds of ties existing while holding the rest of the network constant. Thus, exponentiating a coefficient estimates the change in predicted probability of a tie for the attribute in question (Hunter et al., 2008).

In both units, victimization is significantly associated with tie formation but in different directions depending on the origin of the tie (i.e., sending or receiving a tie). Across both units, victimization is positively correlated with sending ties but negatively correlated with receiving ties. Survivors of victimization have a 31% (exp(.269)) greater likelihood of sending a tie compared to others on the unit in Unit 2 and a 48% (exp(.395)) greater likelihood of sending ties in Unit 3. The opposite pattern occurs for receiving ties, though the association only reached statistical significance in Unit 3. In that unit, victims of childhood abuse were 46% (exp(-.624)) less likely to receive a friendship tie.

In both units, substance use appears positively associated with friendship tie formation. Senders and receivers reporting past substance use were both more likely to send and receive friendship ties, and ties were more likely to be sent between unit residents who both have substance use. While most of the coefficients for substance use are small in magnitude and statistically non-significant, there is a significant association between substance use and sending friendship ties in Unit 3 that indicates individuals with past substance use were 45% (exp(.376)) more likely to send a tie.

The relationship between mental health and friendship tie formation varies across both units. The mental health scale is coded so that higher scores indicate worse mental health. In Unit 2, for each additional unit on the mental health scale, residents were 30% (exp(.263)) more likely

to send ties, so worse mental health was predictive of unit residents sending friendship ties. And the greater the difference in two residents' mental health scores, the less likely they were to share a tie. In Unit 3, none of the coefficients were statistically significant. The receiver effect was positive and similar in magnitude to that in the Unit 2 unit.

Residents of both units were more likely to be friends with others in the same racial categories, and white residents in both units were less likely to send or receive ties. The longer an individual has lived on the unit, the more likely they are to receive ties. The greater the difference in time on unit, the less likely two individuals are to share a friendship tie. Individuals with greater offense gravity scores were more likely to send ties and less likely to receive ties. Residents with a greater age difference were less likely to share a tie. In Unit 2, residents with a high school diploma were more likely to send ties and less likely to receive them while the opposite was true in Unit 3. The positive estimate for mutuality suggests ties were more likely to be reciprocated than expected by chance, which would imply that friendship was more commonly reciprocated than not. The negative estimate of the gwidegree and gwodegree effect controls for the skewed nature of the in and out degree distributions.

To summarize, using social network analytic methods, we examined how known correlates of women's imprisonment relate to informal prison social organization. Mental illness, addiction, and victimization are experiences that may both increase women's risk of incarceration and marginalize them in prison through withdrawal or exclusion processes (Schaefer, et al. 2011; Van Zalk et al., 2010; Perry, 2013). However, if such experiences are highly prevalent in a community, they may compel connection and solidarity among those experiencing similar deprivations. And in fact, instead of causing withdrawal from the networks

in question, these experiences predicted participants sending more ties to peers, though they were

not necessarily reciprocated.

Table 9. Friendship Network Exponential Random Graph Models

	Unit 2		Unit 3	
	b (SE)		b (SE)	
Structural				
Edges	-4.086***	(0.575)	-3.949***	(0.551)
Mutuality	1.986***	(0.196)	2.593***	(0.237)
Gwidegree	-2.707***	(0.908)	-3.173***	(0.558)
Gwodegree	-2.179**	(1.078)	-0.541	(1.021)
Childhood Victimization				
Sender	0.269**	(0.109)	0.395***	(0.150)
Receiver	-0.173	(0.106)	-0.624***	(0.136)
Homophily	-0.098	(0.088)	0.076	(0.107)
Substance Use Disorder				
Sender	0.098	(0.114)	0.376**	(0.156)
Receiver	0.148	(0.112)	0.116	(0.130)
Homophily	0.130	(0.091)	0.094	(0.103)
Mental Health				
Sender	0.263***	(0.099)	-0.008	(0.110)
Receiver	0.097	(0.087)	0.114	(0.084)
Homophily	-0.179**	(0.090)	0.011	(0.087)
White				
Sender	-0.366***	(0.124)	0.051	(0.224)
Receiver	-0.007	(0.119)	-0.454**	(0.182)
Homophily	0.412***	(0.097)	0.499***	(0.155)
Time on Unit				
Sender	-0.062	(0.039)	0.904***	(0.158)
Receiver	0.328***	(0.040)	1.180***	(0.156)
Homophily	-0.293***	(0.037)	-1.046***	(0.161)
Offense Gravity Score				
Sender	0.001	(0.014)	0.082***	(0.020)
Receiver	-0.0003	(0.013)	-0.038**	(0.016)
Homophily	-0.007	(0.012)	-0.009	(0.016)
High School				
Sender	0.298*	(0.159)	-0.585***	(0.151)
Receiver	-0.230	(0.157)	0.278**	(0.123)
Homophily	0.052	(0.139)	0.100	(0.113)
Age				
Sender	0.012**	(0.005)	0.012	(0.008)
Receiver	-0.001	(0.005)	-0.007	(0.007)
Homophily	-0.01*	(0.005)	-0.021***	(0.007)

* $p <0.1$; ** $p <0.05$; *** $p <0.01$; *gwidegree and gwodegree decay factor = .05*

Individuals in treatment or recovery may seek out support, potentially from others with similar experiences to share in challenges they face. In the prison setting it is possible that individuals with similar histories may participate in similar programming and thus spend more time together, although the evidence for homophily in this sample was not universal. This aligns with prior ethnographic works which suggest one way that imprisoned women navigate the pains o imprisonment is through supportive relationships with other prisoners and connecting over shared hardship. But how these relationships are perceived by both members in a dyad appears to be less universal.

These findings underscore the benefit of exploring the experience and social organization of incarcerated individuals using social networks methods. Traditional regressive techniques can predict feelings of social integration, instances of misconduct, or counts of perceived friendships. But social network analysis allows the researcher to operationalize social structures using an aggregation of relational data collected from individual respondents. With this, we can then draw on prior literature and test hypotheses about social structures and tie formation to further understand how and why network members adapt to imprisonment and organize themselves.

A finding that is difficult to uncover without the use of social network analysis relates to the reciprocity of friendship ties. The reciprocity parameter indicated ties were more likely to be reciprocated in the observed network than by chance. However, women in both units who survived victimization in childhood were significantly more likely to send friendship ties but were less likely to receive them. This pattern indicates a mismatch in the relationships perceived or experienced by these individuals. One explanation is that early experiences of victimization affect the psychosocial development of children, often diminishing their capacity to regulate emotions, control impulses, conform to social norms, and develop healthy relationships with

others. Women who experienced childhood victimization may perceive certain interactions as indicative of friendship that were of lesser importance to those around them. Another explanation is that women who did not experience victimization during childhood are perceiving survivors as harder to relate to.

PHASE 2 RESULTS

Phase 2 consisted of 22 respondents from the first prison and 63 respondents from the second prison completing pre-release prison interviews. Qualitative analysis of Phase 2 data is ongoing; all interviews have been broadly coded following a flexible coding technique by two coders and in-depth analysis is currently underway. Our first pass at coding followed major themes from the structured interview and additional codes were added following an initial review of the interview transcripts. The pre-release interview codes covered three broad topics: 1) Pathways to prison and early life experiences, 2) In-prison experiences, and 3) Expectations for release. Each broad theme was further coded into sub-themes, generated from the structured interview and developed inductively by coders. After initial coding, each interview was broadly summarized by theme and sub-theme, allowing comparisons across respondents to facilitate axial coding and further in-depth analysis. Figure 3 below offers an example of summary codes for sub-themes in the "Expectations for Reentry" theme; the scale of each section in the figure corresponds to the portion of interviews devoted to each topic. Among women about to be released from prison, for example, expectations for reentry broadly centered on concerns related to social relationships; reuniting with children and navigating romantic relationships and former partners. As a salient comparison, relatively few respondents mentioned educational engagement in their plans for reentry.

Figure 3. Theme Hierarchy Chart: Expectations for Reentry
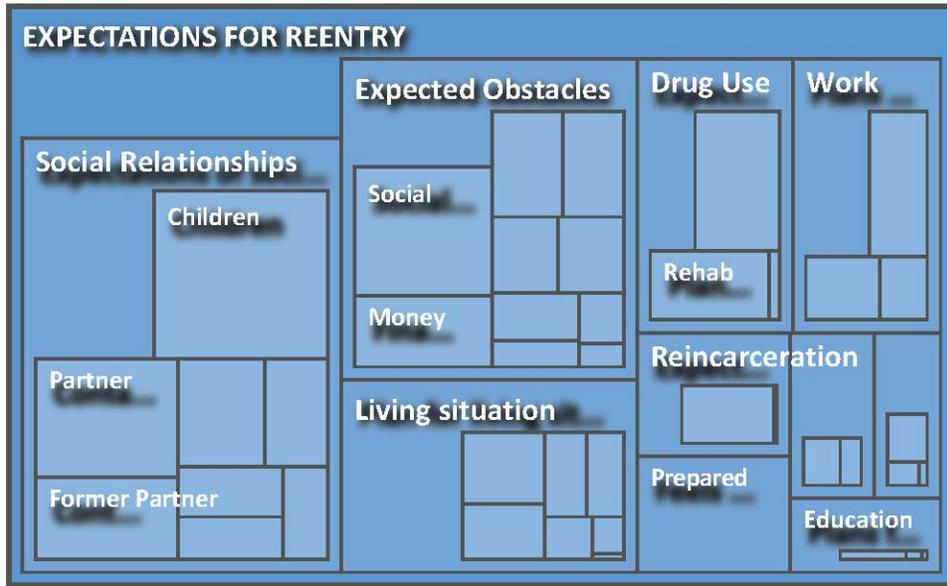
PHASE 3 RESULTS

Phase 3 consisted of 56 total community interviews of 14 formerly incarcerated women, 14 caregivers, and 18 children before interviewing was halted due to the COVID-19 pandemic. As noted in the introduction of this report, we encountered more difficulty recruiting respondents in the community and we've learned several lessons thus far. First, while incarcerated mothers were enthusiastic about offering their children an opportunity to share their experiences with researchers, we found this was often not the case when we contacted the children or their caregivers. These findings offer a useful contrast to prior research on children of incarcerated parents. Prior studies of children of incarcerated mothers tend to recruit primarily from caregivers; such a strategy often yields larger numbers but tends to select only those caregivers who are in contact with the incarcerated mother or perhaps have more cohesive relationships. Our project, using incarcerated mothers as the first point of contact, found that many family members actively or passively refused to participate. We suggest that this may be instructive for

future researchers and our ongoing analytic strategy now includes a comparison of the reentry experiences of mothers who indicated family members might participate (and did) with mothers who indicated the same (but their families did not).

In contrast, in families where we were able to complete interviews with incarcerated mothers and their families, we noted inconsistencies in the narratives and information offered by respondents within the same family. Pre-release interviews often suggested the reentry process is characterized by surprises – incarcerated mothers return home to information that may have been kept from them while they were incarcerated, and family members often have unrealistic expectations about familial reintegration. We were able to compare pre-release interviews with incarcerated mothers to interviews with their children and caregivers. Divergences in these interviews are instructive for reentry planning. Our interviews yielded cases of family members waiting for release to break bad news (for example, the death of a beloved aunt), concerns on the part of family members about disruptions associated with release, and high expectations on the part of young children relative to the more cautious trepidation expressed by older adolescents and adult children. While our sample is unfortunately small, our results suggest that greater integration of caregivers and children prior to release and through the reentry process may ease an already difficult transition.

Women's Recidivism Models

To accompany the narrative data about re-entry we also computed recidivism models for all women who were released from prison after the survey period. As described above, data were combined from The Pennsylvania Department of Corrections and the Administration of Pennsylvania Courts to find release dates and the first date of contact with the criminal justice system following release. If an individual was both rearrested and reincarcerated, the incident

that occurred first chronologically was kept in the data, as that indicates the first recidivism event post-release. A measure of duration was then created, which is the number of days the individual was out of prison prior to their first rearrest or reincarceration incident. Individuals who did not recidivate had an observation window ranging from less than a day to 998 days post-release. Those who were either rearrested or reincarcerated had their recidivism event as early as 15 days to 895 days post-release. Thirteen of the women who were released from prison were found to have recidivated.

PADOC also provided demographic and criminal history variables to use as covariates in these models. The demographic measures presented here are age (measured in years), and a dichotomous variable indicating if the respondent is white. Black and Hispanic respondents are collapsed due to low statistical power. Finally, we use a measure of offense severity, offense gravity score, which ranges from 1 to 18 and indicates the severity of the controlling offense.

Given how few women recidivated, only simple Cox proportional hazard models are presented to show the association between demographic characteristics and recidivism in this sample. First, the Kaplan-Meier (KM) survival estimates, and a smoothed hazard function, show a trend towards a greater hazard of recidivism as exposure time increases (see Figures 4 and 5). Kaplan-Meier survival estimates show the decline in survivorship of the sample over time, with each stair-step down representing a member of the sample who recidivated. A smoothed hazard function is plotted from the data in the KM estimate, and in volatile samples helps visualize how the trend changes over time. Here the smoothed hazard function shows slow increase in the hazard of recidivism as the individual is exposed to more time post-release.

Figure 4. Kaplan-Meier Survival Estimates of Recidivism in WO-PINS Sample

Kaplan-Meier survival estimate
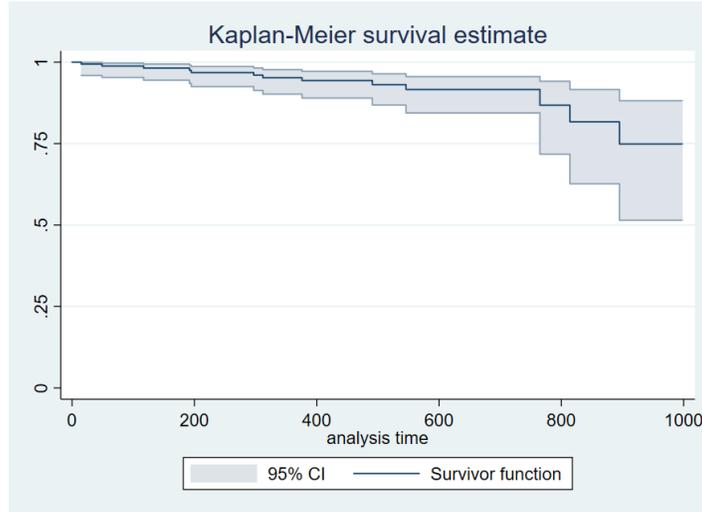
Figure 5. Smoothed Hazard Function of Recidivism in WO-PINS Sample

Smoothed hazard estimate
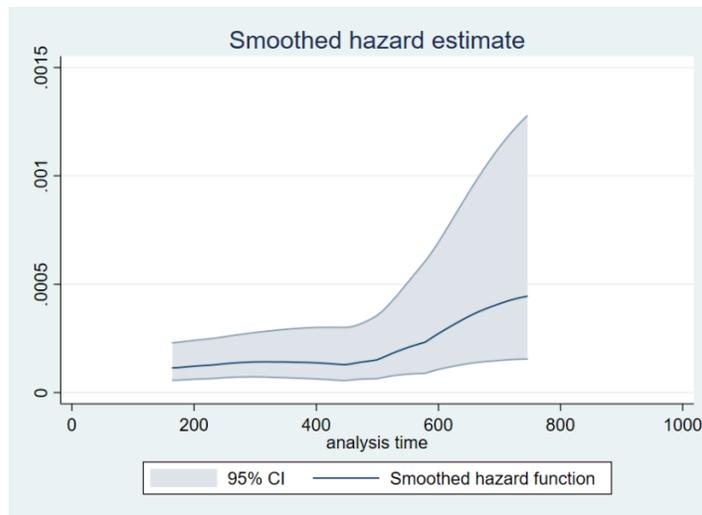
A Wilcoxon (Breslow) test for equality between stratifications of the sample shows a unit effect

for the general population unit of site 2 (unit 3) with a chi square p-value of less than 0.05

(p=0.02). Wilcoxon tests for equality in survivor function bias towards earlier events in the

survival curve, for recidivism, this focuses on differences in recidivism more temporal to release.

No difference was shown to be statistically significant between white and non-white individuals

in stratification test (p=0.16), however OGS was shown to have a significant difference between Kaplan- Meier survival curves (p=0.0001).

Age, race, and unit are included in a Cox Proportional Hazard model to predict the change in the hazard of recidivism by each of these characteristics. One observation is dropped because the duration is zero days resulting in 172 individuals with 77,257 days of combined exposure to the risk of recidivism. Age is shown to have a protective effect, lowering the hazard of recidivism with each additional year older the respondent was. Unit shows a greater risk of unit 3 members for recidivism as compared to unit 1 members, e.g., general population members are at greater risk for recidivism than good behavior unit members, net of both age and OGS. Offense Gravity Score is not shown to have a statistically significant predictive impact on the model when Age of the respondent and unit of data collection are accounted for.

IMPLICATIONS FOR POLICY AND PRACTICE

Sykes [1958/2007] long-ago argued that understanding prison informal social organization is essential for improving prison policy because those incarcerated far outnumber their captors and coercion alone is insufficient to secure safe and humane prison conditions. In this project, we designed and implemented a unique social network design in three women's prison settings of varying size, compositions, and security characteristics, demonstrating that this method is both feasible and capable of illuminating important characteristics of prison social order. Thus far, our findings highlight the complexity of women's prison social systems, with implications for correctional policy. Trust, friendship, and caregiving were clearly prevalent in the units we studied, but so was peer bullying and manipulative inmate-staff relationships. These results point to a more fluid social system in women's than men's prisons which would demand more daily attention from correctional staff and prisoners alike.

We also found that prison pseudo-families remained a strong presence on the units we studied, with over half of the sampled women self-identifying as members of a pseudo-family. Moreover, women identified as pseudo-mothers were generally perceived as supportive and caring by pseudo-family members, suggesting that these (typically older) women provided valuable emotional benefits and community support in the prison settings. Additionally, we found that pseudo-mothers' investments in their pseudo-families did not take away from their investments in their own biological children, compared to peers not involved in pseudo-families. This finding suggests that pseudo-motherhood reproduces, rather than substitutes for, pre-prison maternal roles. Although these findings paint a generally positive portrait of prison pseudo-families, we plan to conduct future research with the same data to focus on potential inter-family rivalries that may also explain the observed bullying and negative characteristics in the status analyses.

Our findings also suggested that visitation is often perceived as negative or with mixed feelings by incarcerated women. In particular, surveyed women reported that visitation was commonly perceived as difficult for the visitors and these perceptions contributed to a negative overall perception of visits. This is an important finding as visitation is often portrayed only in positive terms. It should be recognized by correctional staff and counselors that visitation can also be a fraught experience requiring additional efforts to assist both the visitor and visited prisoner.

We also found that incarcerated women who had previously experienced childhood or adult victimization were significantly more likely to seek friendship ties but less likely to receive such ties. In other words, contrary to expectations, incarcerated women with victimization experiences sought peer support but were unlikely to find it. There are important policy

considerations here, as it suggests that victimized women are likely to be socially marginalized and simultaneously frustrated by peer rejection, increasing the likelihood of poor mental health outcomes. This is a topic we hope to return to in future analyses.

Although our analyses of pre-release and post-release interviews remain underway, we learned important lessons in the data collection process. First, it was more difficult to convince women than men to continue with the study upon release, resulting in our losing touch with many of the women who were released from prison. Additionally, the perceptions provided by the incarcerated women of their children often conflicted with the children's own narratives, such that women often reported strong mother-child relationships that were inconsistent with the children's reports. This finding has implications for correctional efforts to ease post-prison family reintegration, as it suggests that caseworkers pay particular attention to children's perceptions of their mothers' incarceration and make sure that mothers and children share their perceptions and feelings prior to prison release. Although our interviews were also disrupted by COVID-19, we hope to glean additional insights from the interviews in future analyses.

Overall, our approach provides a roadmap for understanding the social worlds and relationships of incarcerated women. At its most basic, this study demonstrates the feasibility of network data collection in women's prison settings. We achieved over 70% response rates in all three of the sampled prison units. This project thus provides a template for successfully collecting social network data in carceral settings. We published methodological lessons learned in social network (Whichard, Schaefer, & Kreager, Forthcoming) and criminology outlets (Whichard, Wakefield, & Kreager, 2020). Moreover, a summary of a network approach for understanding prison informal social organization was published in the inaugural issue of The Annual Review of Criminology (Kreager & Kruttschnitt, 2018). Data from the current study and

future similar studies can thus help to diagnose problematic prison units and identify those incarcerated women at greatest risk of victimization or negative health outcomes.

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