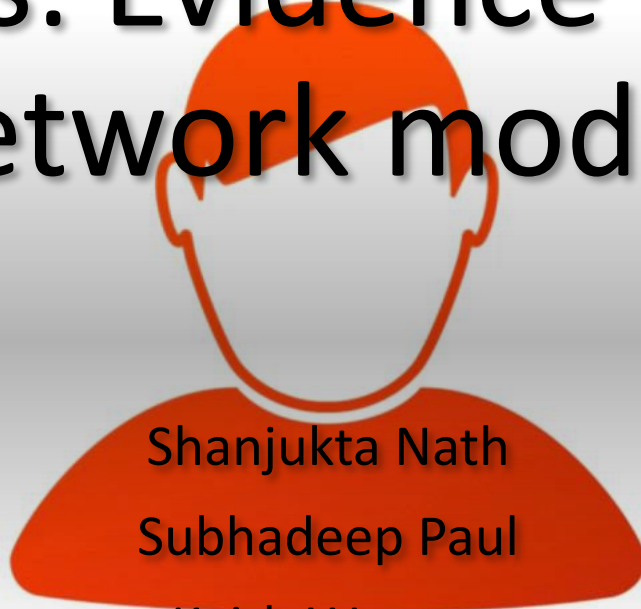# Peer influence in therapeutic communities: Evidence from a social network model.

Shanjukta Nath

Subhadeep Paul
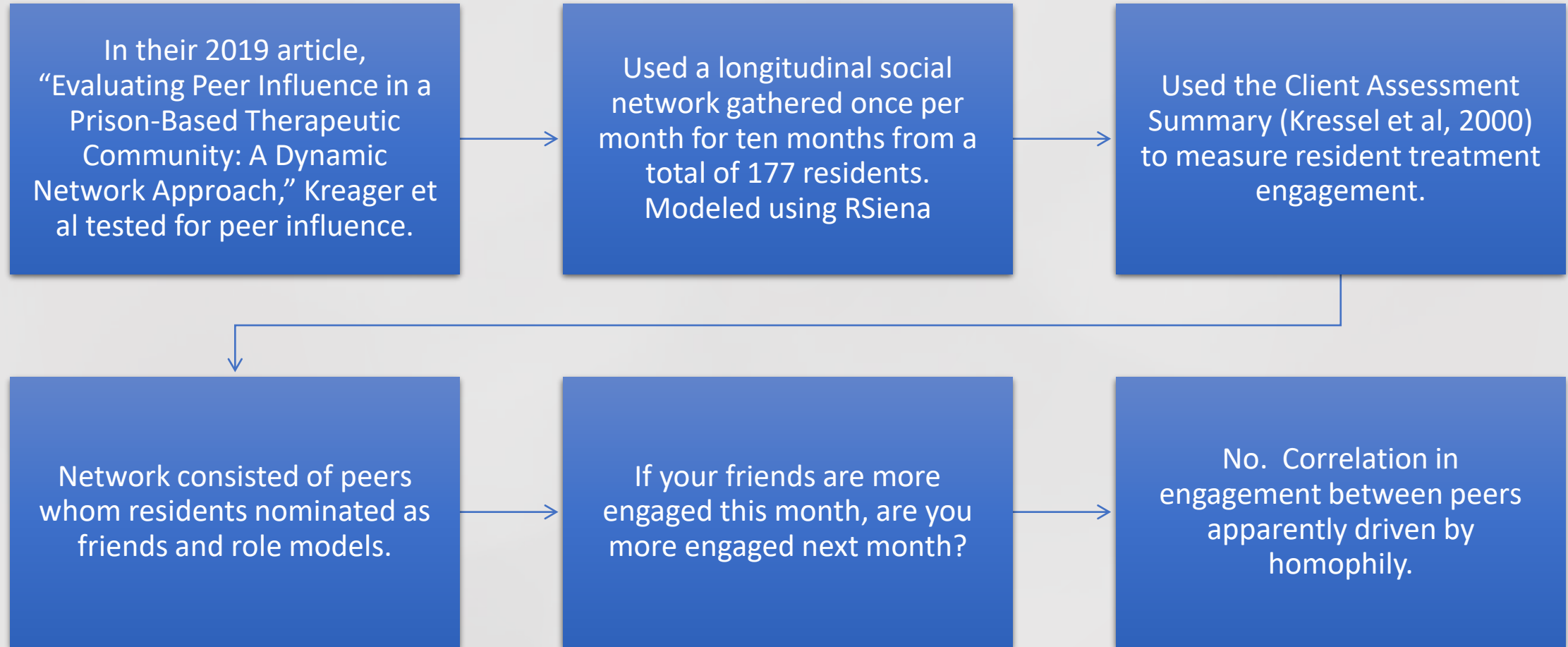
Keith Warren

# In TCs Community is the Method of Treatment

- We would therefore expect to see peer influence.
- Successful TC residents, defined as those who graduate, cluster together (Warren et al, 2020).
- This effect was found across three TCs, including both men and women, and so has some level of external validity.
- But do residents influence each other or do they find each other?
- This is known as peer influence vs. homophily.
- Classic chicken or egg, direction of causality problem.

# Directly testing peer influence

In their 2019 article, "Evaluating Peer Influence in a Prison-Based Therapeutic Community: A Dynamic Network Approach," Kreager et al tested for peer influence.

Used a longitudinal social network gathered once per month for ten months from a total of 177 residents. Modeled using RSiena

Used the Client Assessment Summary (Kressel et al, 2000) to measure resident treatment engagement.

Network consisted of peers whom residents nominated as friends and role models.

If your friends are more engaged this month, are you more engaged next month?

No. Correlation in engagement between peers apparently driven by homophily.

# Another way of testing for peer influence

- TC residents can either successfully graduate or prematurely terminate from the program.

- Peers can also either successfully graduate or prematurely terminate from the program.

- Residents exchange affirmations for prosocial behaviors.

- If a peer affirms a resident and then successfully graduates before that resident, we define the peer as a role model.

- A larger number of role models should make it more likely for a resident to successfully graduate.  That resident has seen others who have affirmed them graduate.

- But how do you know that it's not homophily?

# Homophily vs. Peer influence

- The direct pathway is Yij→Si, the effect of role model affirmations on a resident's likelihood of graduating. This is the causal pathway we would like to estimate.

- Aji→Si is the effect of covariates.

- But unobserved homophily factors Uj and Ui can influence the observed factors.

- We control for Uj and Ui by introducing a latent space model (See references).

- This yields a causal estimate of peer influence.

$$Y_j^i \longrightarrow S_i$$

$$U_j \qquad U_i$$

$$Aji$$
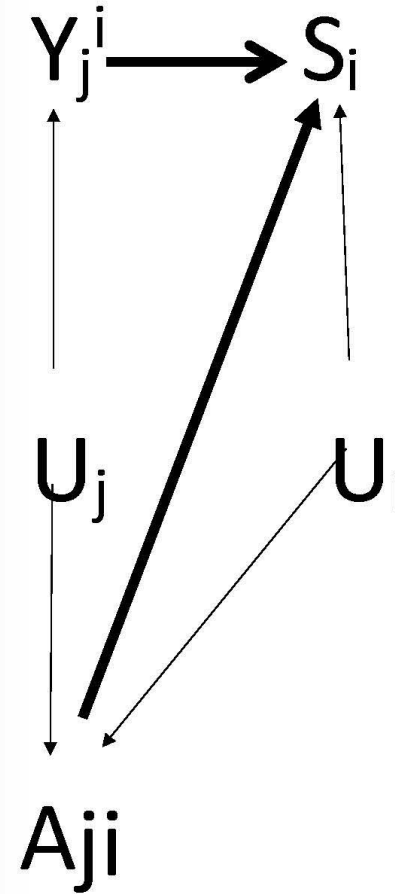
# Data

- Data gathered from residents of a TC in a Midwestern city that drew from a mixed urban, rural and suburban catchment area over a three year period.

- Two male units, one female unit, 80 beds each.

- Network consists of written affirmations and corrections exchanged between residents. Network is time stamped with the day of each affirmation and correction.

- Data includes entrance date of each resident, termination date of each resident and termination status of each resident.

- Data also includes race, age and score on the Level of Services Inventory-Revised.

# Descriptive Statistics—Data gathered between 2005 and 2008

| Variable | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| A. Male Facility 1 | | | | | |
| Graduation status | 337 | 0.884 | 0.320 | 0 | 1 |
| Age | 337 | 27.665 | 8.945 | 18 | 61 |
| White dummy | 337 | 0.475 | 0.500 | 0 | 1 |
| Black dummy | 337 | 0.522 | 0.500 | 0 | 1 |
| LSI | 337 | 25.727 | 5.215 | 9 | 44 |
| Peer Graduation | 337 | 0.415 | 0.200 | 0.000 | 1.000 |
| | | | | | |
| B. Male Facility 2 | | | | | |
| Graduation status | 339 | 0.894 | 0.309 | 0 | 1 |
| Age | 339 | 31.746 | 9.360 | 18 | 60 |
| White dummy | 339 | 0.776 | 0.418 | 0 | 1 |
| Black dummy | 339 | 0.224 | 0.418 | 0 | 1 |
| LSI | 339 | 25.661 | 6.046 | 14 | 45 |
| Peer Graduation | 339 | 0.425 | 0.178 | 0.000 | 1.000 |
| | | | | | |
| C. Female facility | | | | | |
| Graduation status | 472 | 0.797 | 0.403 | 0 | 1 |
| Age | 472 | 30.358 | 8.203 | 18 | 60 |
| White | 472 | 0.799 | 0.401 | 0 | 1 |
| Black | 472 | 0.199 | 0.400 | 0 | 1 |
| LSI | 472 | 25.862 | 8.378 | 0 | 57 |
| Peer Graduation | 472 | 0.381 | 0.159 | 0.000 | 0.868 |

# Estimating Causal Influence of Role Model Affirmations on Graduation

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Variable | OLS | Homophily and Bias Adj. | OLS | Homophily and Bias Adj. | OLS | Homophily and Bias Adj. |
| | a. Male Unit 1 | | b. Male Unit 2 | | c. Female Unit | |
| Peer Graduation | 0.483 | 0.481 | 0.500 | 0.494 | 0.940 | 0.766 |
| | (0.073) | (0.074) | (0.082) | (0.082) | (0.099) | (0.108) |
| Age | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| White | -0.074 | -0.077 | 0.015 | 0.019 | 0.079 | 0.068 |
| | (0.030) | (0.031) | (0.035) | (0.035) | (0.039) | (0.038) |
| LSI | -0.028 | -0.028 | -0.021 | -0.021 | -0.016 | -0.016 |
| | (0.003) | (0.003) | (0.002) | (0.002) | (0.002) | (0.002) |
| Intercept | 1.423 | 1.429 | 1.189 | 1.198 | 0.740 | 0.675 |
| | (0.103) | (0.109) | (0.098) | (0.099) | (0.101) | (0.100) |
| N | 337 | 337 | 339 | 339 | 472 | 472 |

# Estimating Causal influence of Role Model Corrections on Graduation

| Variable | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | OLS | Homophily and Bias Adj. | OLS | Homophily and Bias Adj. | OLS | Homophily and Bias Adj. |
| | a. Male Unit 1 | | b. Male Unit 2 | | c. Female Unit | |
| Peer Graduation | 0.359 | 0.339 | 0.723 | 0.722 | 0.544 | 0.523 |
| | (0.054) | (0.056) | (0.077) | (0.077) | (0.056) | (0.056) |
| Age | 0.001 | 0.001 | -0.000 | -0.001 | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| White | -0.035 | -0.035 | 0.004 | 0.009 | 0.071 | 0.074 |
| | (0.020) | (0.021) | (0.032) | (0.032) | (0.022) | (0.022) |
| LSI | -0.025 | -0.025 | -0.023 | -0.024 | -0.016 | -0.016 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.001) | (0.001) |
| Intercept | 1.374 | 1.371 | 1.204 | 1.188 | 0.977 | 0.998 |
| | (0.071) | (0.076) | (0.087) | (0.089) | (0.060) | (0.060) |
| N | 774 | 774 | 391 | 391 | 1046 | 1046 |

# What does this mean?

- The model supports the causal influence of peers on graduation.

- Residents who receive feedback from a larger number of role models—peers who graduate before them—are more likely to graduate themselves.

- This is true when controlling for known covariates and when adjusting for unknown homophily through a latent space model.

- The effect extends to both affirmations and corrections, but is somewhat stronger for affirmations.

- Success in TCs can cascade; the graduation of one resident can help others to graduate.

- Role models who give feedback to a larger number of peers will have more influence.

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