



The Effects of Individual Traits on the Formation of Social Networks Among First-Year College Students

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SoCS: Explorations on the Effects of Pervasive Networking on Social Relationships and Resource Planning



Research Issues & Questions

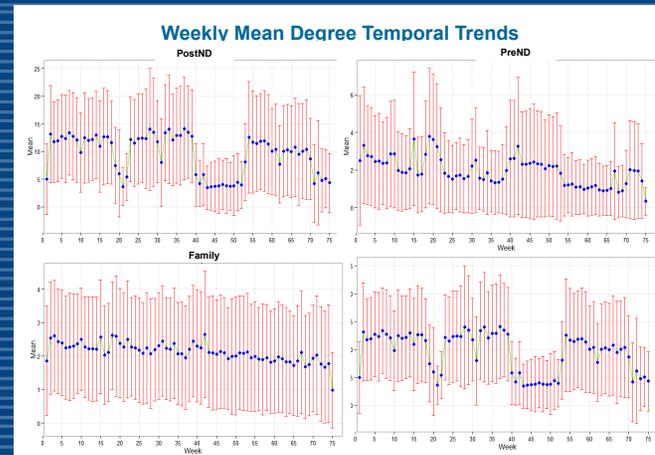
- Social Network Dynamics: Network ties form, dissolve and are re-negotiated in relatively narrow time windows
- Time Scales: If networks change at a faster rate than behaviors and traits, then we need to look at how traits affect network tie formation and maintenance
- Nodal (Vertex) Degree: Well know that there is heterogeneity (inequality) in degree
- Two Research Questions:
 - Why do some people have larger social networks? What individual traits predict network size?
 - How stable are people's social networks? Do the traits that predict network size also predict how networks grow or decline?

NetSense Study

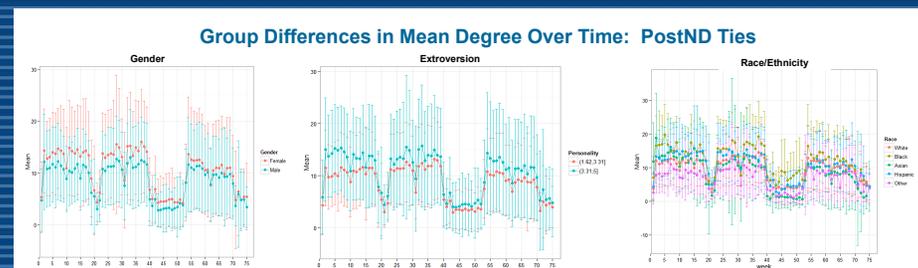
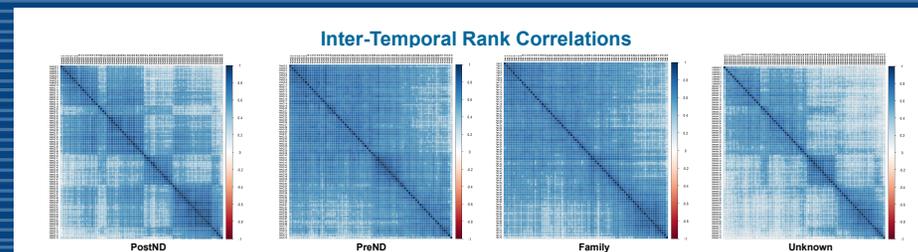
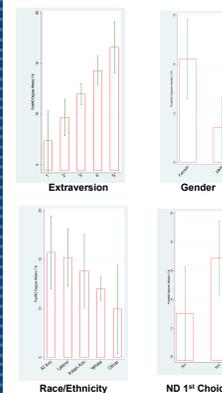
- Two-year data collection effort (now extended to 4), NSF-funded study subsidized by Sprint
- ~200 first-year students given a smartphone and free voice/text/data plans.
- Capture all communicative interactions: sender number, receiver number, time, date, communication form (voice, text). Not content.
- Random allocation of students to same-sex dorms.
- Survey data: Prior to arrival students completed two surveys (and then subsequently every 4 months)
 - Demographic/Attitudes/Tastes/Behaviors
 - Network Survey: Asked about their top 20 contacts

Communication Data

- 185 students
- 75 weeks: all of first year and first semester second year
- ~23 million communication events (voice or text)
- ~46,000 ties (weighted edges): communication between someone in the study and another person (possibly also in the study)
- Vast majority of ties and communication are with other people who are not in the NetSense study
- 4 types of ties: Ties formed prior to arrival at Notre Dame (PreND), after arrival (PostND), Family, and unknown (residual category).



Predicting Initial Degree (Weeks 7-9)



Vertex Degree: Multilevel Conceptualization

- We examine interactions between study participants (i) and their contacts (j) aggregated by week (t)

$$a_{ijt} = 1$$
 If we observe an interaction between i and j during time period t (mutual edges only)
- We assign neighbors to disjoint groups l (whether tie to j th person is a PreND, PostND, Family, or unknown)

$$a_{i(j \in l)t} = 1$$
 If we observe an interaction between i and j of type l during time period t
- k_{ilt} is the period-specific degree (network size) across each edge type

Findings

- Initial differences in degree are predictable:
 - Women and extroverts have ~3 more PostND ties by weeks 7-9
 - African-Americans, Latinos and Asian-American form more PostND ties than Whites.
- Stability of active degree (all types) over time
 - Diminishing stability with increasing time
 - Seasonality (period) effects for PostND ties indicated by low correlations between different time periods (on-campus, semester breaks, summer)
- Group differences in change in degree over time
 - Gender gap decreases as males experience some growth in degree
 - Extroversion effects persists
- Stability with change
 - Important process is initial time period (weeks 0-9) leading to initial degree.
 - After initial period, stability in degree
 - Catch-up and amplification processes
 - There can however be turnover in a person's contacts, so active degree indicative of a person's capacity

Graduate Research Assistants

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