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Adolescents' Friendship Networks, Substance Use, and Prevention: The PROSPER Peers Study

D. Wayne Osgood

Pennsylvania State University

The PROSPER Peers Team

- Lead Investigators
 - Wayne Osgood, Mark Feinberg, Scott Gest, Jim Moody (Duke Univ.), Karen Bierman
- Other Investigators
 - Derek Kreager, Sonja Siennick (Florida State Univ.)
- Graduate Assistants
 - Wendy Brynildsen, Robin Gautier, Lauren Molloy, Dan Ragan, Kelly Rullison, Debra Temkin, April Woolnough
- PROSPER Study Lead Investigators
 - Dick Spoth, Mark Greenberg, Cleve Redmond, Mark Feinberg

Funders

- National Institute of Drug Abuse
 - Division of Epidemiology, Services and Prevention Research
 - Prevention Research Branch
- William T. Grant Foundation
 - Setting Level Intervention Initiative

The PROSPER Peers Project

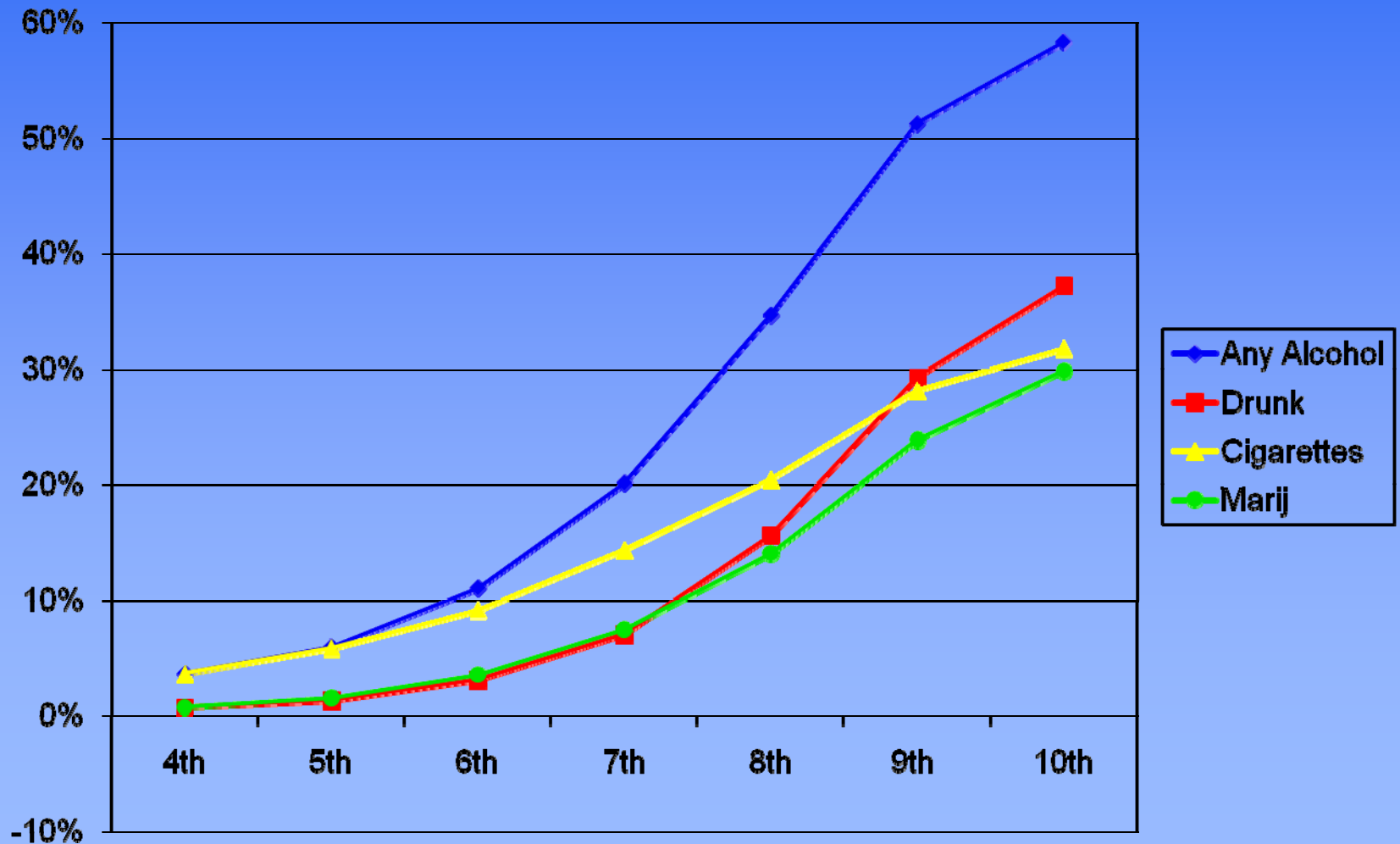
- A Study Addressing:
 - Role of friendship networks in the emergence of substance use
 - Contribution of friendship networks to the success of prevention programs
- Built around a multi-site prevention trial: PROSPER
- Interdisciplinary research team:
 - Social networks, prevention science, human development, criminology, child clinical psychology

Context for Our Work in Relation to Prior Research, Theory, and Practice

The Emergence of Substance Use

Lifetime Prevalence

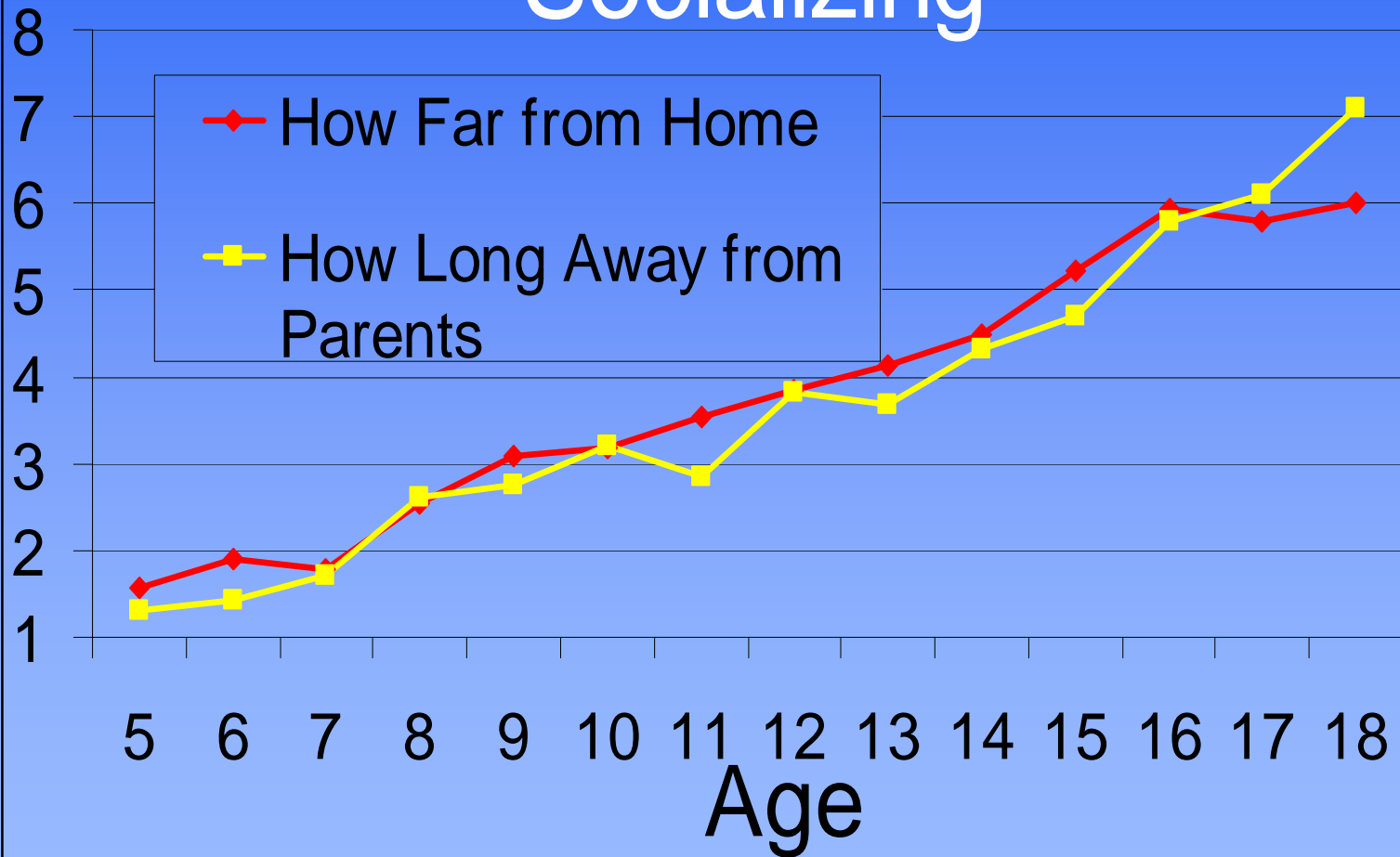
Monitoring the Future, 2008



Changes in Peer Relations in Early Adolescence

- Increasing time with peers, decreasing time with family
- Greater pool of potential friends
- Growth in relevant skills (e.g., perspective taking)
- Adolescence assumed period of greatest peer influence

Parent's Limits on Socializing



Prominence of Peer Influence

- Theory
 - Prominent in major explanations of deviance
 - Differential association, social learning, problem behavior theory, peer cluster theory
- Research
 - Friends' deviance highly reliable predictor
 - Often strongest correlate
- Prevention/Intervention Practice
 - Emphases on refusal skills, friendship choice, parent monitoring about friends

Limits of Prior, Non-Network Research on Peer Influence

- Overreliance on perceptual measures
 - How many of your friends
 - Versus, who are your friends
- Individual level focus
 - Lack of attention to network implications of dyadic processes
 - Diffusion, reciprocal influence
- Potential in viewing networks as setting-level intervention target

The Prosper Peers Study

The PROSPER Study

- 27 communities, 2 grade cohorts, 5 waves
 - Iowa & Pennsylvania, Small towns
 - 11,000+ Students per wave; 15,000+ total
 - 368 school/cohort/wave networks
- Questionnaires assess friendships
 - Fall of 6th grade & Spring of 6th, 7th, 8th, & 9th
 - Also assess variety of attitudes and behaviors
- Programming targeting substance use:
 - Random assignment of communities

The PROSPER Peer Network Data

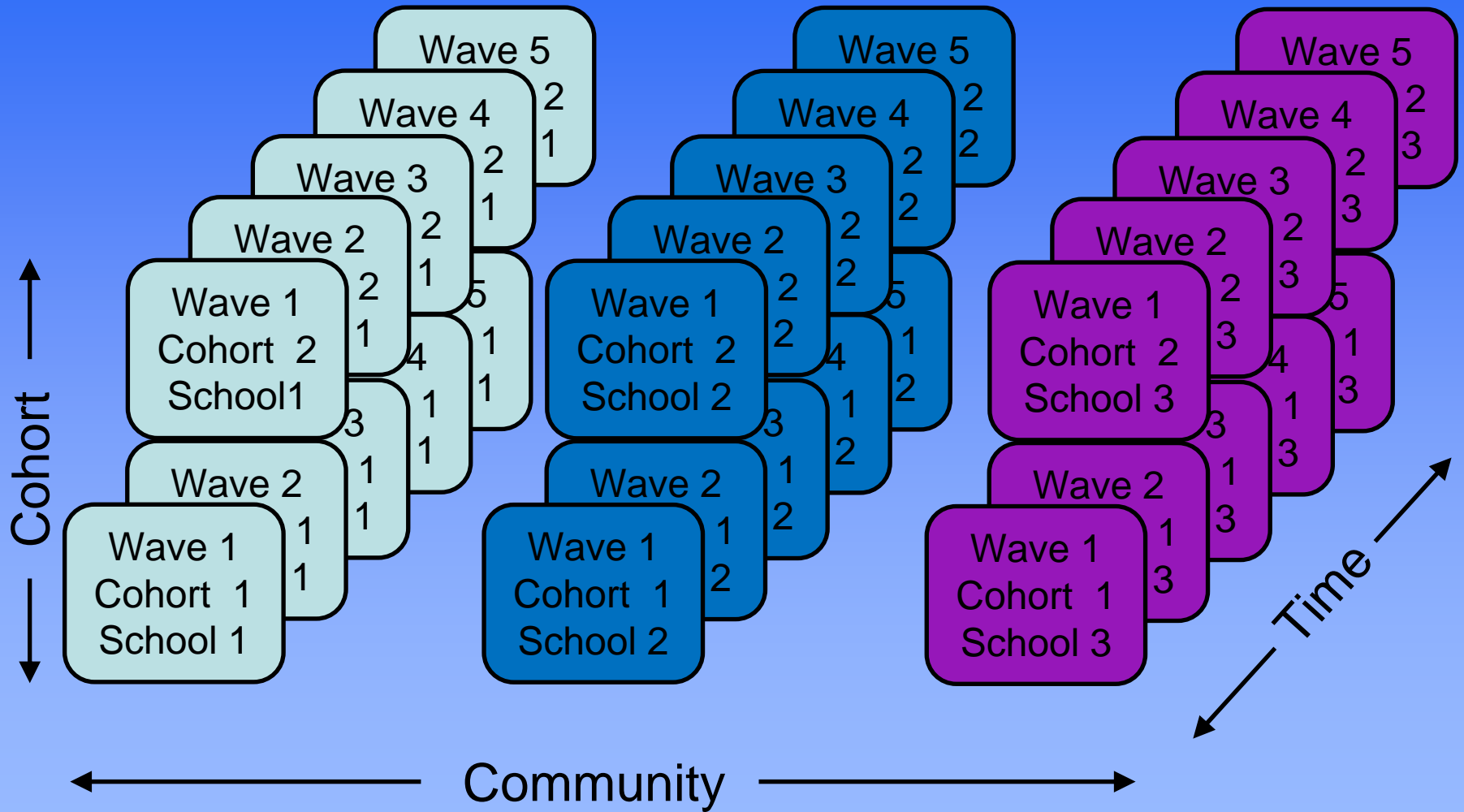
Who are your best and closest friends in your grade?

First name	Last Name (or if you don't know their last name, . . .)	How often do you “hang out” with this person outside of school, (without adults around)? 1) Never . . . 5) Almost Every Day
YOUR BEST FRIEND or FRIENDS		
OTHER CLOSE FRIENDS		

PROSPER Peers Data Quality

- Questionnaire response rate: 87.2%
- Valid nomination data, Overall: 81.9%
 - Of respondents: 93.9%
- Name matching, Overall: 81.5%
 - Inter-rater agreement, 98%
 - Non-matches primarily out of school
- Reciprocation rate
 - Overall: 48%,
 - 1st choice: 76%

PROSPER Peers Research Design



Design Enables Research on Variation across Networks

- Age/grade differences: developmental change
- Relationship to school & community characteristics
- Program effects
 - Community level random assignment

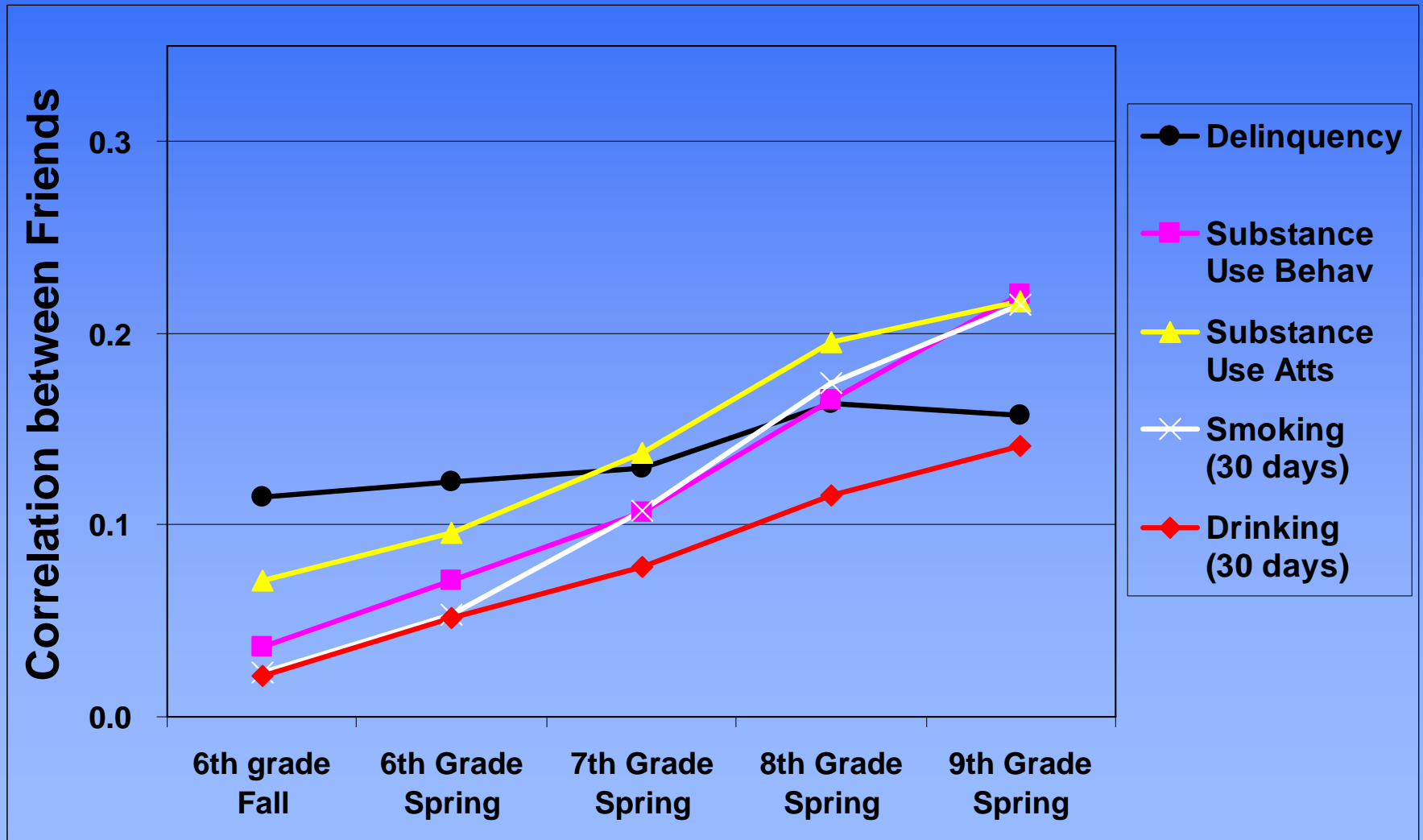
Illustrative Findings

- Friendship network dynamics in early adolescence
 - Similarity of friends across ages and attributes
- Prevention program effects
 - Impact on behavioral norms: association between network position and measures of deviance/problem behavior

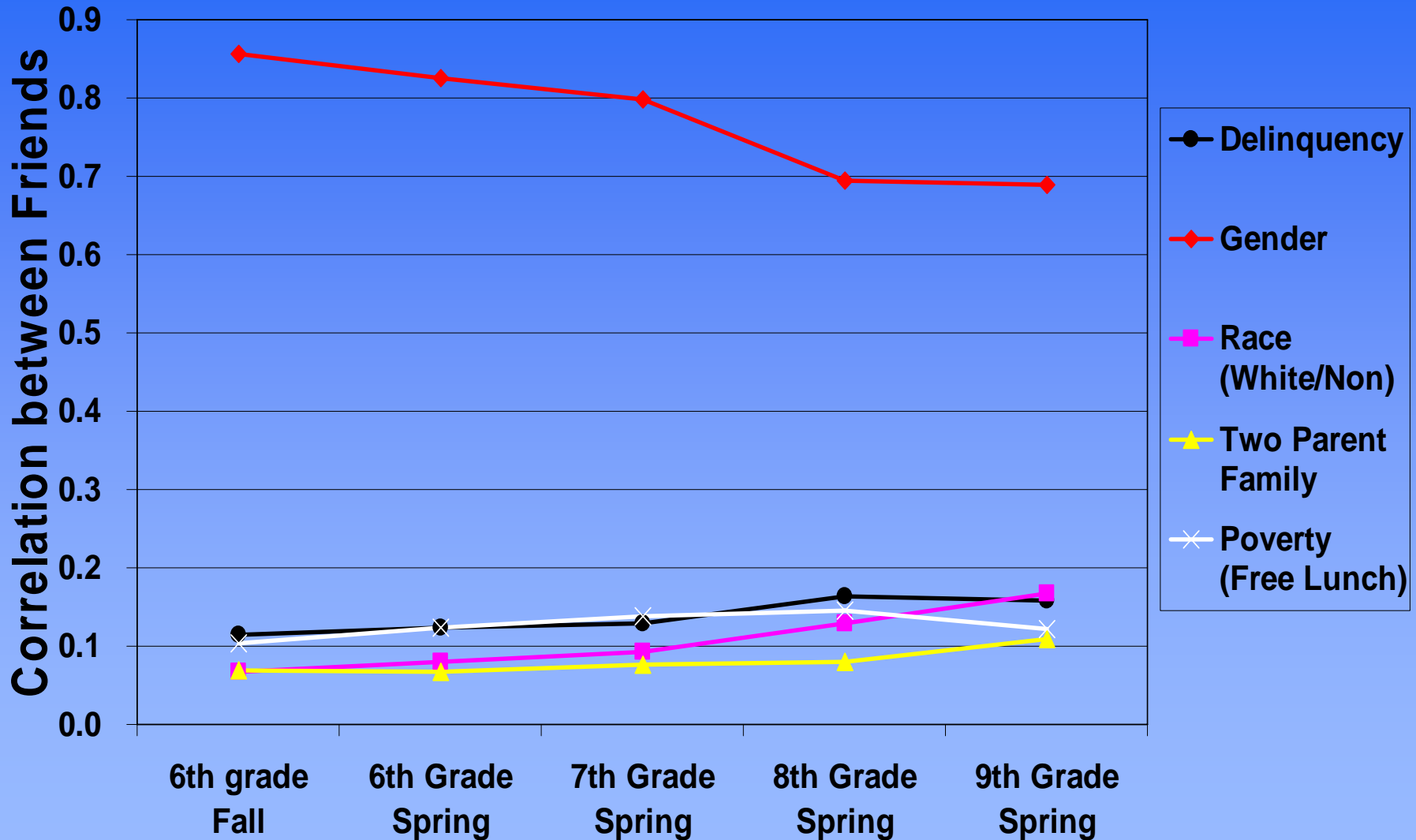
Why Similarity between Friends?

- Key descriptive statistic for connection between attribute and network structure
- Similarity is combined result of:
 - Social influence
 - Selection of friends
 - Opportunity / propinquity
 - Shared environmental influences
- Context for research on selection & influence
 - In progress (SIENA)

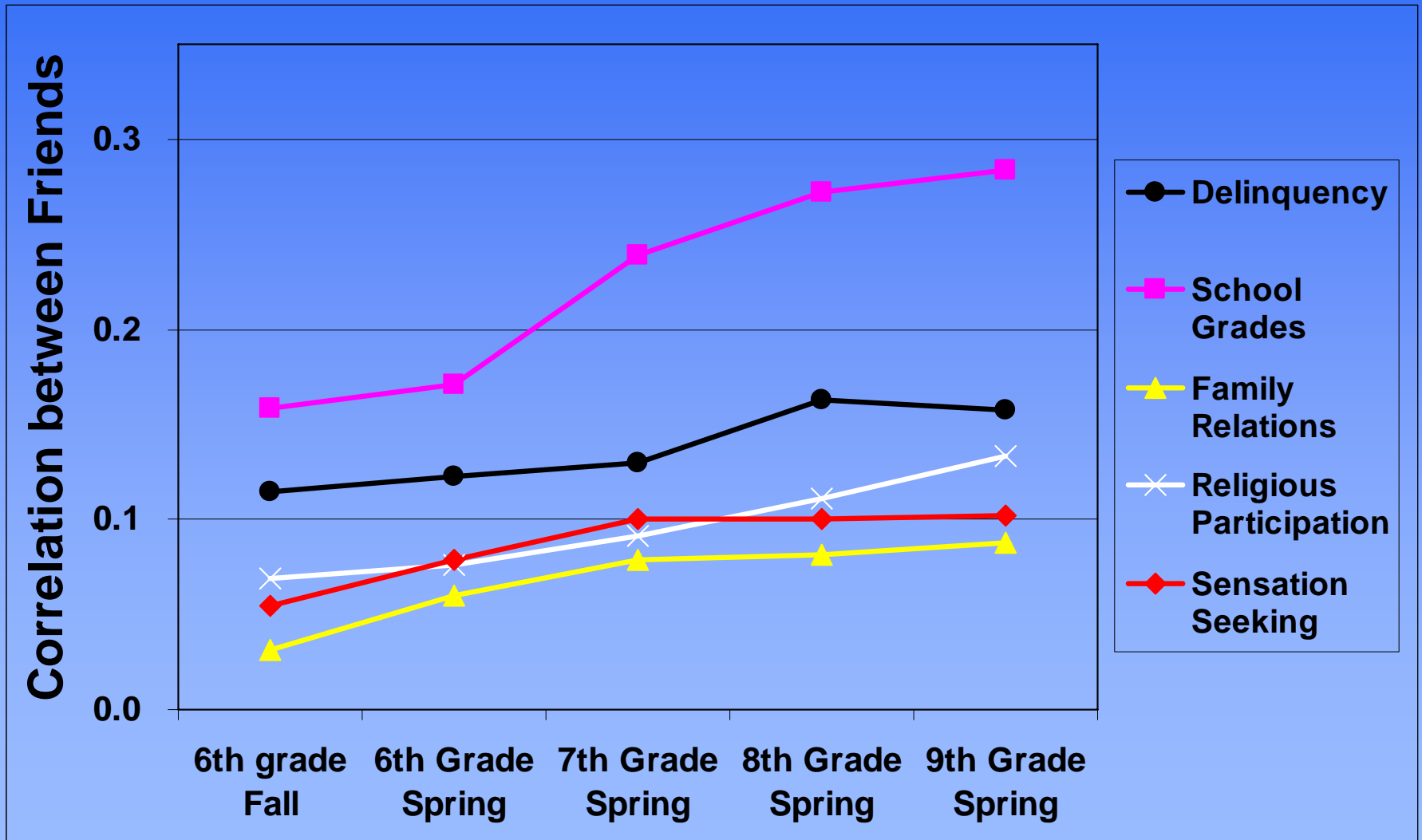
Similarity for Substance Use and Delinquency



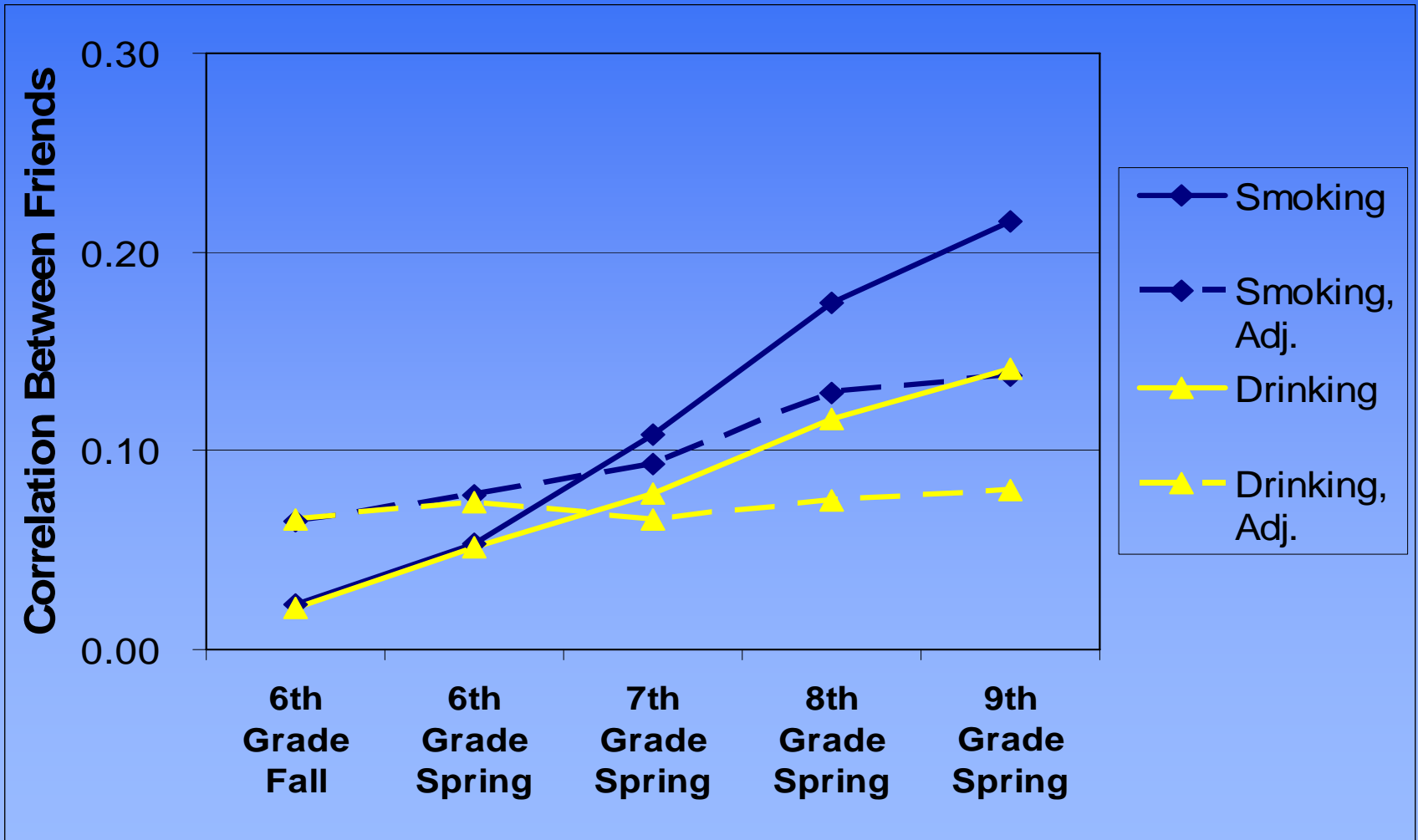
Similarity for Demographics



Similarity for Other Attributes



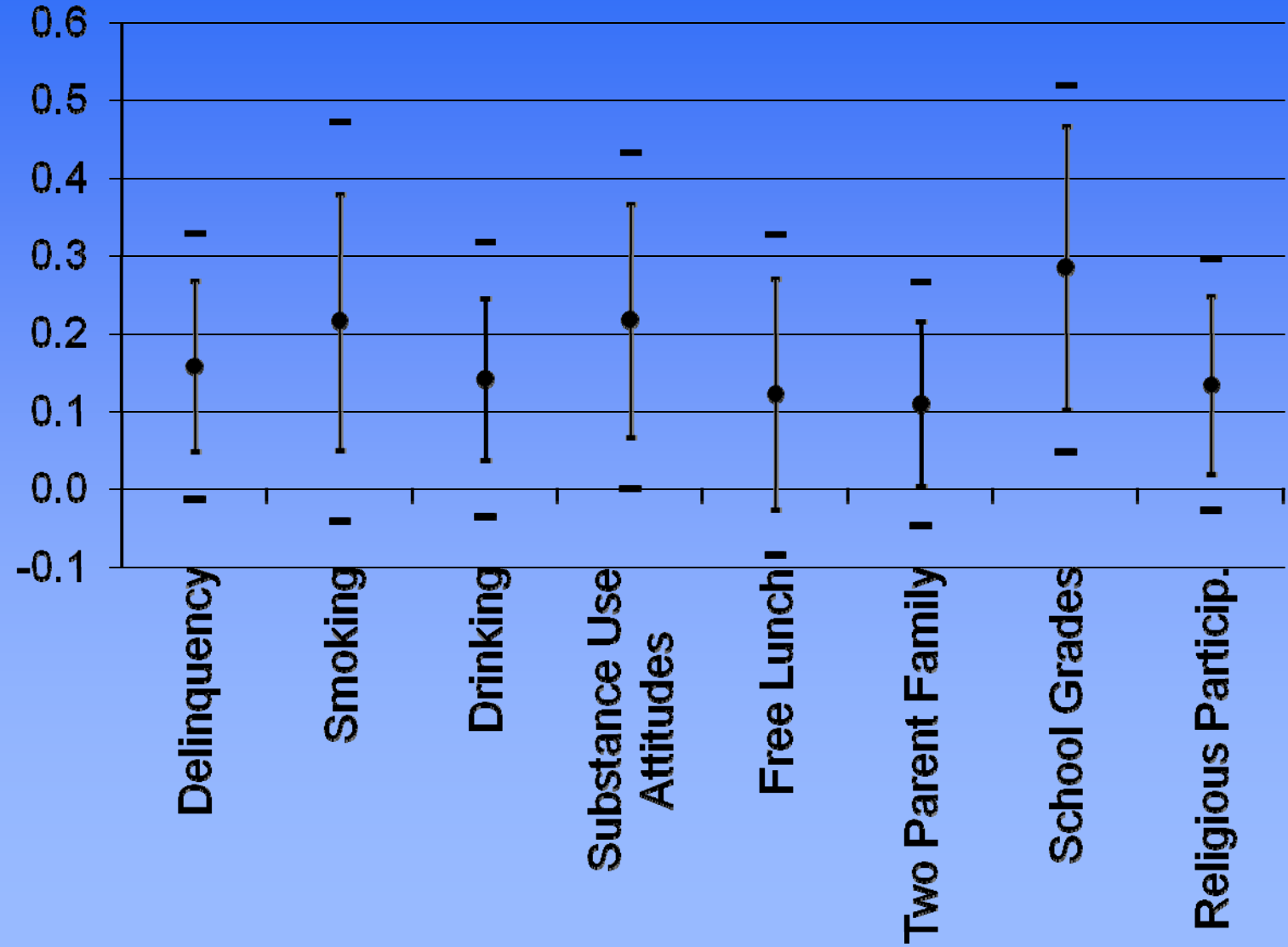
Correlation for Subs Use Highly Dependent on Variability (& Mean)



Similarity Profile Varies Across Schools

9th Grade, 95% Confidence Bands, Total and Systematic

Correlation between Friends



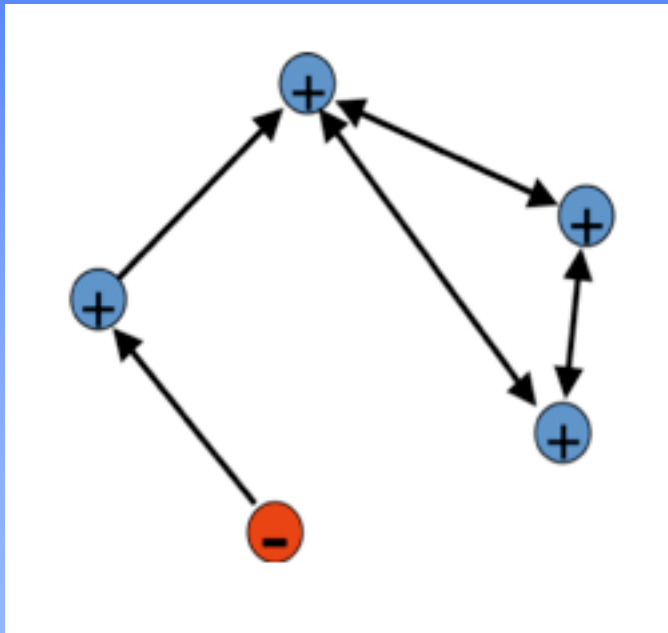
Prevention Programs
& Friendship Network
Dynamics: An Analysis of
Impact on Behavioral Norms

School-based Prevention Programs as Efforts to Modify Setting-Level Social Dynamics

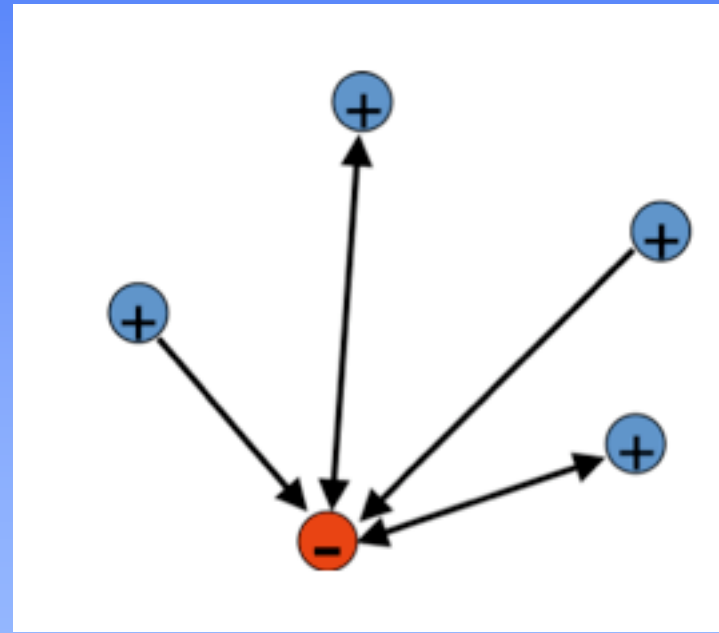
- Prevention programs often seek to reorganize social systems
 - Dividing schools into smaller sub-units
 - Cooperative learning
- Other programs attempt setting-level change via individual-level change
 - Seek to improve classroom climate by teaching individual social skills

Behavioral Norm as Association between Attribute and Network Position

Deviant behavior associated with **less central** position.

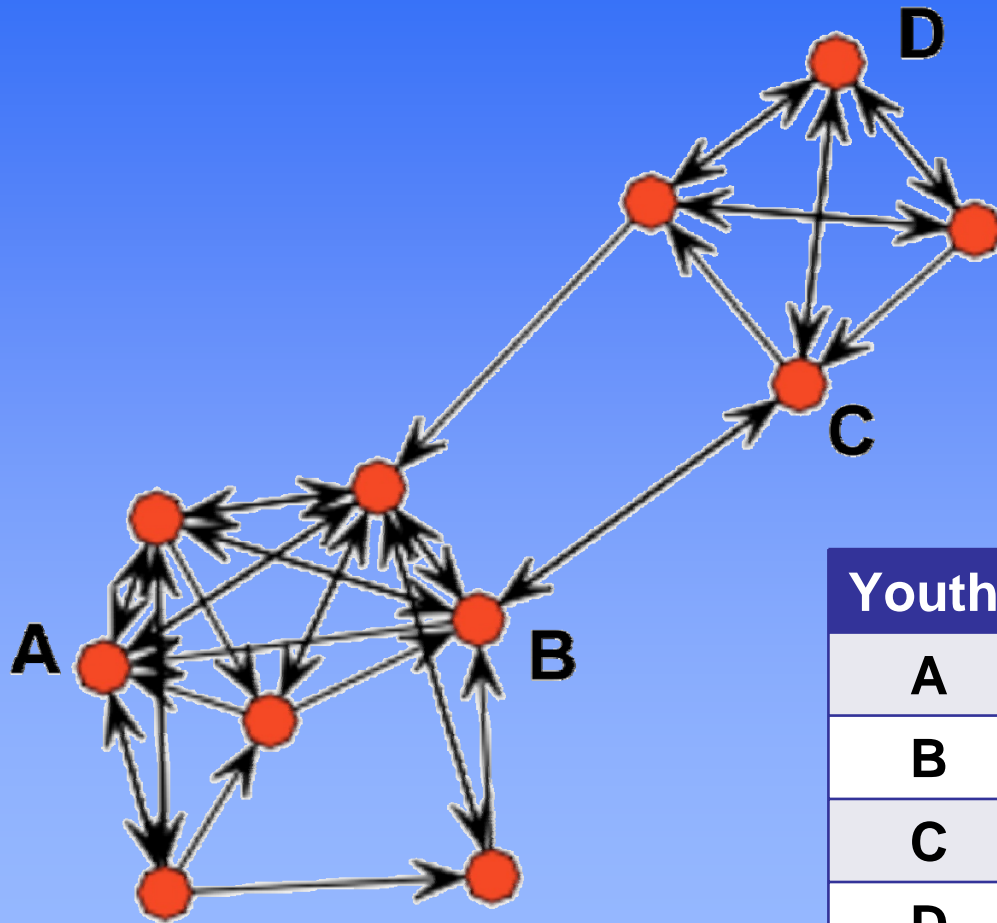


Deviant behavior associated with **more central** position.



Contrasts with norm as attribute mean over indivs.

Measures of “network centrality” emphasize different aspects of being in a position of potential influence



Youth	In-Degree	Reach
A	5	8
B	5	10
C	3	8
D	3	4

The PROSPER Interventions

- Family-focused intervention – 6th Grade
 - Strengthening Families Program
 - Seven 2-hr sessions
 - Overarching theme: “Love & Limits”
 - Prior results suggest diffusion of effects
- School-focused intervention – 7th grade
 - Life Skills Training, Project Alert, or All Stars
 - 11 to 18 sessions
 - Focus on: Selecting prosocial peers, helping peers make good choices, and resisting negative influence from peers

Potential Intervention Effects on Positions of Deviant Youth

- Reduced selection of deviant friends
 - Youth encouraged to select prosocial peers who will help them meet positive goals
 - Parents encouraged to monitor youth activities and associates
- Link to network structure
 - Altered selection will place antisocial youth in less influential structural positions

Index of Behavioral Norm: Association between Deviant Behavior and Social Position

- Pearson Correlation or Unstandardized Regression Coefficient
 - Within-school association across individuals
 - Between a measure of deviant behavior and a network measure of influence potential

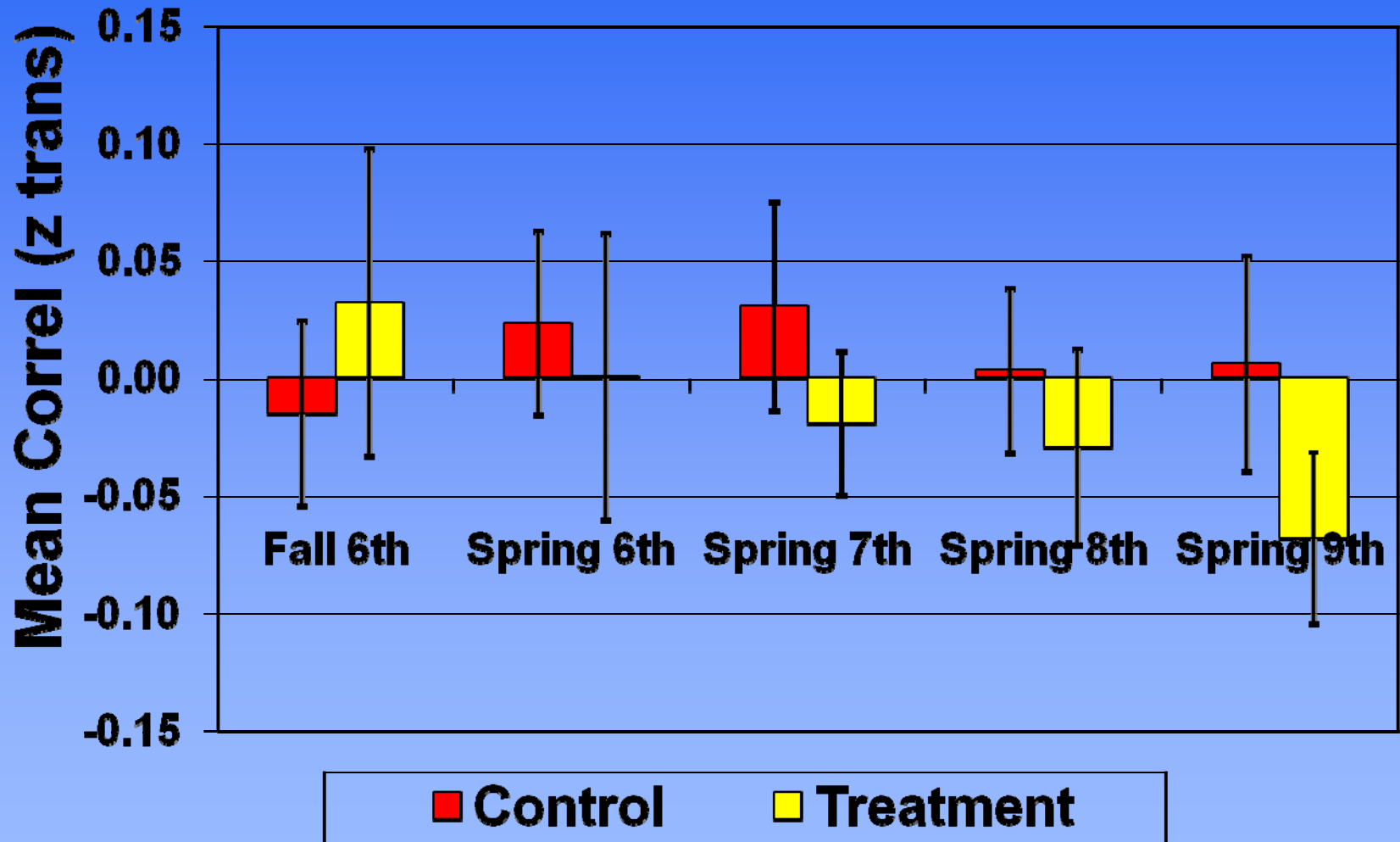
Intervention Effects on Association of Network Position & Deviance

(unstandardized b's, preliminary findings)

Measure of Social Position	Measure of Deviant Behavior		
	Substance Use Behavior	Substance Use Attitudes	Delinquency
In Degree (Popularity)	-.088 (.059)	-.111 (.068)	-.152* (.071)
Reach (# direct & indirect friends)	-.385* (.197)	-.370+ (.221)	-.616** (.220)
Bonacich Centrality	-.035+ (.020)	-.036+ (.022)	-.045* (.022)

+ p < .1 * p < .05 ** p < .01

Bonacich Centrality & Substance Use



Other Papers in Progress

- Popularity Trajectories and Substance Use
- Strengthening Prevention Theory and Practice with Social Network Analysis
- A Social Network Analysis of Who Participates in Parent Programs and the Potential for Diffusion of Impact
- Effects of School Transitions on Friendship Networks
- The Structure of Substance Using and Delinquent Groups
- Developmental Change in the Popularity of Persistently Deviant Youth: A Test of Moffitt's Hypothesis
- Substance Use and the Gender Composition of Friendship Groups
- With Whom Do Adolescents Hang Out Most? A Between Friends Analysis

Gaps & Opportunities

- Research on Prevention Programs
 - Development of programming explicitly based on network concepts and findings
 - Small scale and intensive study of network effects of elements of intervention strategies
 - Simulation studies of prevention implications of basic research on adolescent social networks

Gaps & Opportunities

- Basic research on social networks and substance use/deviance
 - Studies including non-school ties as well as diverse samples and settings
 - Studies of relationships other than friendship
 - Studies of multi-mode networks, including contexts of contact
 - Expanding the conception of peer influence beyond balance/similarity