The evolution of social networks in a group-based mentoring program for vulnerable teens: What types of relationships matter most?

Neil D. Yetz, M.P.H., M.S. candidate

Colorado State University

Thesis Proposal

# ABSTRACT

# ACKNOWLEDGEMENTS

TABLE OF CONTENTS

[ABSTRACT 2](#_Toc33101591)

[ACKNOWLEDGEMENTS 3](#_Toc33101592)

[CHAPTER I: INTRODUCTION 5](#_Toc33101593)

[**Adolescent populations** 6](#_Toc33101594)

[**Mentorship Interventions** 7](#_Toc33101595)

[**Belongingness** 9](#_Toc33101596)

[**Social Network Analysis** 10](#_Toc33101597)

[*Social Network Analysis in Psychological Research* 12](#_Toc33101598)

[**Proposal** 14](#_Toc33101599)

[CHAPTER II: METHODS 15](#_Toc33101600)

[**Data** 15](#_Toc33101601)

[**Measures** 16](#_Toc33101602)

[*Belongingness* 16](#_Toc33101603)

[*Social Network* 17](#_Toc33101604)

[**Analysis Plan** 17](#_Toc33101605)

[References 19](#_Toc33101606)

# CHAPTER I: INTRODUCTION

When an adolescent is struggling to develop in a positive way, an adult mentor can be a catalyst for change (Wesely, Dzoba, Miller, & Rasche, 2017). As a result, numerous mentoring programs for at-risk adolescents have emerged, including Big Brothers Big Sisters of America, Partners Mentoring Youth, and MENTOR. Alongside these traditional dyadic mentoring programs (i.e., one mentor, one mentee), group-based mentoring programs are another common structure. In these programs, one mentor may be matched with multiple mentees or mentor-mentee pairs may participate in larger group settings. Examples of group-based mentorship programs include Campus Connections, Go Girls!, and the Youth Empowerment Program. While mentoring program of various types and styles are ubiquitous in communities across the US, findings from meta-analytic reviews indicate that the treatment effects of mentoring interventions vary widely across programs, structures, and outcomes (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). Thus, efforts to maximize treatment efficacy is needed, and this endeavor requires focused research.

The fundamental element of any mentoring program is the bond that the mentee forms with their mentor, in the case of a dyadic mentoring program, or, in the case of group-based mentoring programs, with mentors and other mentees. Thus, one approach to improving mentoring treatment effects is to optimize the bonds and friendships cultivated during the mentoring program. In this thesis, my focus is on enhancing the treatment effects of group-based mentoring programs in particular. In this setting, it is important to consider what types of bonds are most important for treatment effects to be realized. That is, what types of relationships with other members of the group are most associated with positive program outcomes? For example, is it most important for a mentee to develop a close bond with their primary mentor, and/or with a set of mentors, and/or with other mentees in the program? If clarity about the most important relationships for an adolescent to cultivate during a group-based mentoring program can be gained, then this information may be used to restructure programs to maximize positive treatment effects.

In this thesis, I will characterize the evolution of the social network of mentees participating in a 12-week, group-based mentoring program for at-risk adolescents. Characterization of each mentee’s social network over the course of the program will involve assessment of the number and strength of bonds with their primary mentor, with other mentors and adult staff, and with other mentees participating in the program. Measures of the social network will be collated and then used as predictors of a key program mediator (sense of belonging in the program) and several key program outcomes (i.e. Academic performance, depression, and delinquent behaviors). In this way, new insights into the types of relationships most salient for positive program outcomes may be discovered.

## **Adolescent populations**

The adolescent population goes beyond that of being older children or younger adults (Crosnoe & Johnson, 2011). They encompass a unique population that is subject to many biological changes (Steinberg, 2007). Adolescence is when individuals are at highest threat for risky health behaviors (Resnick et al., 1997) such as experimentation for use of legal and illegal drugs (Henry, Thornberry, & Huizinga, 2009), unsafe sexual practices, and risk-taking behaviors due to underestimations of invulnerability (Steinberg, 2007). These are just a subset of delinquent and problem behaviors that may be exhibited by youth (Arthur et al, 2002; Broidy et al, 2003). Other behaviors at high risk during adolescence include violence and aggressive tendencies (Resnick et al, 1997; Reiss & Roth, 1993). There are many factors that contribute to the likelihood of being vulnerable to these attitudes and risky habits.

Those that have a higher likelihood of engaging in risky behaviors are referred to as *at-risk adolescents*. Although at-risk status varies by definition, it generally includes demographic features, home and community factors, and individual skill deficits which can negatively contribute to an individual’s ability to thrive academically, socially, emotionally, and physically (Mcdaniel & Yarbrough, 2016). These behaviors can often escalate into more serious behavior, such as drug abuse, and subsequent consequences such as incarceration (Mcdaniel & Yarbrough, 2016). Given these considerations, preventive efforts are needed to minimize behavioral difficulties amongst at-risk adolescents.

Adolescence serves as an important timepoint to intervene and prevent delinquent behaviors. This critical timepoint is in part due to the increased neuroplasticity in adolescent brains – Thus indicating the sensitive period to intervene on adolescents (Fuhrmann, Knoll, & Blakemore, 2015). In fact, research indicates that a strong predictor of adulthood criminal outcomes is youth delinquency (Makarios, Cullen, & Piquero, 2017). The importance of intervening at this critical timepoint during an individual’s life cannot be emphasized enough. Furthermore, targeting the adolescent period is an efficient way to promote better health behaviors while youth are more likely to live in controlled environments with adult influences.

## **Mentorship Interventions**

One promising intervention to promote positive adolescent outcomes is mentorship. Mentorship intervention programs provide adolescents with a role model straight from the community they both reside. It is suggested that creating a dyadic relationship between an adult mentor and youth mentee can improve outcomes (Rhodes, 2004). Mentors are encouraged to enhance coping strategies, reduce stressors and create an attachment to the youth mentee (DeWit et al, 2016). Meta-analytic reviews have shown that adolescents in mentorship programs show improvements in behavioral and psychosocial outcomes as compared to their non-mentored counterparts (DuBois et al., 2011; Tolan, Henry, Schoeny, Lovegrove, & Nichols, 2014).

However, results from mentorship interventions for adolescents are not always positive. For example, Wood and Mayo-Wilson (2012) conducted a meta-analysis on school-based mentoring programs for adolescents and found negative or small (non-significant) effect sizes on outcomes of academic achievement, attendance, attitude, and negative behavior (i.e., school misconduct, drug use). Several hypotheses have been proposed to explain this phenomena such as value conflict hypothesis, dependency hypothesis, labelling hypothesis, and the failed expectations hypothesis(McCord, 1978; Zane, Welsh, & Zimmerman, 2016). These hypotheses encompass a wide variety of reasons that interventions focused on adolescents, including mentorship interventions, have failed in past years.

One aspect of mentorship programs that may increase their efficacy is taking a group-based approach. Group-based mentoring allows programs to serve a larger number of youths at once and may increase the positive impact on youth by providing youth to a larger support system. In fact, these types of mentoring programs have been shown to promote resiliency among youth and prosocial attitudes (Kuperminc, Chan, Hale, Joseph, & Delbasso, 2019; Weiler et al., 2015). Campus Connections, a group-based mentorship program, has been shown to have several positive effects for the youth they serve (Weiler et al., 2015). Unfortunately, at-risk youth in group-based mentorship programs are at risk to learn negative behaviors from each other - otherwise known as social deviancy (Dishion & Tipsord, 2011). There is a large amount of evidence that problem behavior is embedded within their friendship networks (Dishion & Tipsord, 2011; Poulin, Dishion, & Haas, 1999). Therefore, group-based mentorship interventions need to be aware of such consequences.

## **Belongingness**

An important aspect of any community program, such as a group mentorship program, is perceived belongingness to the program. Belongingness is the need to gain acceptance within a community (Malone, Pillow, & Osman, 2012). A longitudinal analysis by Choenarom and colleagues (2005) showed that low levels of belonging are directly associated with higher levels of depression and anxiety among depressed adults. Furthermore, a sense of belonging has a negative correlation with stress and depression in the general population (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992)

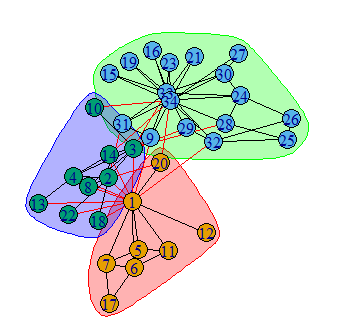
Belongingness has been studied for decades in adolescent research (Slaten, Rose, Bonifay, & Ferguson, 2018) and is, furthermore, an essential psychological need (Galliher, Rostosky, & Hughes, 2004). Prior evidence suggests that youth who report greater sense of belonging in a program are more likely to have higher levels of expressed satisfaction with their relationships (Marsh & Evans, 2009). Baumeister & Leary (1995) have discussed the importance of belongingness during the adolescent time period and explain that it is a fundamental part of forming relationships with adolescent peers. Moreover, Knifsend and colleagues (2018) found that the link between participation in extracurricular activities and formed friendships was mediated by feelings of belongingness in the extracurricular activity. A group-based intervention, such as Campus Connections, serves as an extracurricular activity and the youth that participate it may benefit greatly from enhanced feelings of belongingness.

Prosocial bonds between youth are theoretically and empirically implicated in the development of delinquent behavior (Hirschi, 2017), which may characterize the behavior of youth who participate in mentorship interventions. As such, it is important to examine both youth’s feeling of belongingness and the social bonds they form while participating in a social program focused on building positive friendships with peers. Measuring belongingness in an intervention program is clearly an important part of understanding the true effect of such programs. Social network analysis is one such way to understand belongingness.

## **Social Network Analysis**

Understanding what contributes to the development of deep relationships, which may lead to an increased sense of belonging, is a key component to this thesis. Social network analysis (SNA) is a path to understand that. For my thesis, I plan to apply a novel SNA approach to incorporate a youth’s social network to further evaluate the effectiveness of a mentorship intervention. An SNA approach will help to understand how an adolescent in a group-based intervention program can feel an enhanced sense of belonging. Using an SNA approach, I can help to identify what aspects of bonds formed in a mentorship intervention may contribute the most to an adolescent’s sense of belonging. In this section I describe SNA in greater detail and how this thesis may benefit from an SNA approach.

A social network is defined as a set of relationships between people and how are mapped within a social structure. Every network consists of a set of actors with defining characteristics (nodes) and lines to represent the connection between them (known as ties or edges). A node is a person with defining characteristics to be analyzed within a network of other nodes with similar, or differing, characteristics (Luke, 2015). Social network analysis quantitatively measures the connection of nodes through edges by counting the number of relationships formed between each node and the probability of a relationship being formed between the nodes (Kadushin, 2012). Nodes may have several attributes such as, but not limited to, personality characteristics, gender, and age. The connection of these nodes through edges help understand how many connections a node may possess and from where those connections come. Social networks can also be viewed from an ecological standpoint to identify clusters of nodes and the commonalities between them such as family members, friends, and acquaintances (see Leskovec & Mcauley (2012) for an example of clustered networks). A visual display of nodes with attributes, edges, and clustering effects can be seen in *Figure 1*.



*Figure 1.* A social network from the *Zachary’s karate club network* (Gfeller, 2007). This network displays a university karate class’ connections and the clustering between them. The nodes (circles) have differing colors to represent attributes about the actor displayed. The edges (lines) show the connections between these nodes with certain attributes. Furthermore, the edges may be colored to characterize an attribute of the connection. Lastly, the surrounding colors identify how nodes are clustered into groups.

To study the organization of these nodes and edges that make up a social network, I will use SNA which helps to define and measure the connections among people, organizations, and/or other individual units (T. W. Valente, 2010). More specifically, SNA is the process of understanding social structures quantitatively through network theory and graph theory (Butts, 2008). A wide array of statistics can be derived from social network analysis – often called network statistics. Network statistics allow researchers to quantitatively measure all levels of a social structure (Krause, Croft, & James, 2007).

### *Social Network Analysis in Psychological Research*

Psychological research often relies on self-report surveys to answer research questions. In response, social network survey methodologies have been created. Survey research with a social network component consists of questionnaires that ask about relationships among a specified target group (Serrat, 2017). Social network survey questionnaire data is otherwise known as egocentric data, in which the actor is responsible for identifying their own network (Mccarty, Bernard, Killworth, Shelley, & Johnsen, 1997). These questionnaires require careful thought. There are two common approaches to collecting social network data in survey research:

1. *Social Cognitive Mapping/Roster:* Originally developed by Cairns, Perrin, & Cairns (1985), this method shows survey responders a list of names of individuals within the network. Respondents are requested to select all others that they have a relationship with. Roster methods require the use of a stem question such as, “To whom do you report to at work?” or “Please select individuals you have a friendship with…”.
2. *Name Generator/Nomination method:* This method allows participants to name any one or several individuals within a network. The names that may be generated are arbitrary and limitless. A common prompt a participant may see is, “Please indicate five individuals that you would seek advice from within your office…”.

Both methodologies have pros and cons and particularly are notorious for creating enormous datasets that are hard to sift through without a systematic and methodical approach. Roster methodology requires high participation to produce valid data (Wasserman & Faust, 1994). Additionally, a roster methodology may only be incorporated when all sets of potential connections are known (Butts, 2008). On the other hand, studies utilizing nomination methods have shown that subjects are likely to produce false negatives due to forgetting and/or fatigue (Butts, 2008). Errors especially occur in instances where the ego (an individual node in the network) has many connections (Brewer, 2000).

Despite such drawbacks, these collection methods for social network analysis have been shown to have a useful place in community interventions. For example, Klovdahl (1985) created a social network intervention to identify and prevent HIV outbreaks within a men who have sex with men (MSM) population. Further, DeLay and colleagues (2016) used adolescent friendship networks to evaluate the Family Check-up model within adolescent populations, finding that controlling friend selection may lead to less deviant friend groups. And, Kornienko, Dishion, & Ha (2018) used social network interventions to reduce antisocial and violent behaviors within an adolescent population. Finally, experimental research by Valente (2003) found differences in tobacco intervention programs that identified group leaders in network analysis, which carries important public health implications by reducing tobacco use. In summary, measurement and analysis of social networks can directly improve existing interventions and inform understanding.

Adolescents are often a population of interest in social network research, particularly in the study of mentorship and its effects. Years of research have established the influence of peer networks on several health behaviors such as rates of cigarette smoking (Ennett et al., 1993; Ennet et al., 2008). Additionally, recent studies have shown that adolescent alcohol consumption is directly mediated by the peer groups with which youth are associated (Quiroga et al., 2018). More specifically, the dyadic nature of the mentor-mentee relationship is highly conducive to employing social network approaches in mentorship research.

## **Proposal**

The purpose of this study is to examine the role of adolescent belongingness and social network principles in an adolescent mentorship program. The reasoning for this approach is to understand which relationships matter most in an adolescent mentorship program. I aim to find out if the relationships formed between other youth, mentors, or all individuals in the program are of the most importance. Based on the connection between the concepts of social networks and belongingness, I hypothesize that a youth’s social network and score on a belongingness measure will grow at a similar trajectory during a 12-week mentorship intervention. However, which relationships are best at characterizing the similar growth trajectories between the social network and belongingness scale will be exploratory.

# CHAPTER II: METHODS

## **Data**

Data for this project will be collected from youth who participated in the Campus Connections (CC) mentoring intervention at Colorado State University (CSU). Campus Connections at CSU is a mentoring program for youth at heightened risk for poor developmental outcomes, such as behavioral and emotional problems. It is flexibly designed to respond to the needs of a heterogeneous group of youth with varying risk levels and is grounded in theoretical and empirical research on positive youth development settings (Eccles & Appleton Gootman, 2002; Kelly, Ryan, Altman, & Stelzner, 2000; Tseng & Seidman, 2007) and Rhodes’ model of youth mentoring (Rhodes, 2005). See Haddock et al. (2013) and Weiler et al. (2015) for complete information on the program model.

Data were collected as part of a three-year grant funded by the William T. Grant (WTG) foundation to study two versions of a youth mentoring program. The first involved traditional dyadic mentoring, in which one mentor was assigned to one mentee to experience the 12-week program together. The second involved nesting 4 mentor-mentee pairs which were called mentor families. As a result, mentees were exposed to both a mentor of their own, as well as to 3 other mentor-mentee pairs in their mentor family over the course of the 12-week program. More information of the youth mentor family approach may be read in Haddock et al. (2013).

Campus Connections typically occurred four nights per week (Monday – Thursday) during a regular academic semester, with each mentee assigned to one night. Twenty-eight mentees are assigned to each night. Mentees were randomly assigned to either the experimental mentor family condition or the treatment-as-usual dyadic pairing mentorship condition. Study inclusion criteria included: Youth aged 11-18 years of age, reported experience of at least one risk factor from the risk screening tool (Herrera, Dubois, & Grossman, 2013), and available to participate during the CC operating hours. Participants could not have participated in previous CC sessions to be eligible for this study.

Youth (mentees) were referred to the CC program through several community agencies including the local school district, juvenile justice system, Department of Human Services, and various youth and family agencies. Upon receipt of the referral, trained CC staff contacted potential participants and conducted intake appointments to determine program eligibility and obtain youth assent and parental consent.

## **Measures**

In the proposed investigation, data were drawn from multiple time-points. If eligible and willing to participate in the CC program, mentees were provided 5 surveys during their time at CC. Surveys were provided at week 1 (Baseline; wave 1), week 3 (wave 2), week 6 (wave 3), week 9 (wave 4), and week 11 (wave 5) of the 12-week program. Surveys were completed using Qualtrics, a web-based survey software. The Institutional Review Board at Colorado State University approved all the described procedures.

### *Belongingness*

Campus Connection mentees responded to a five-item scale that inquired about their sense of belongingness at CC via an adaption of the belonginess measure created by Youth Development strategies, Inc. This measure was distributed at all five waves. At wave 1, youth participants were asked about their expectations to belong (i.e. “I feel like I will belong at Campus Connections”). For all other weeks, youth were asked about their present feelings of belongingness in the program (i.e. “I belong at Campus Connections”). All five time points showed stable and great internal consistency (α = .88 - .92).

### *Social Network*

Youth were asked to indicate their relationships with other youth, mentors, and staff in the program during wave 1-5 of the program. Youth were shown pictures of other youth, mentors, and program staff within the program and were asked to select all that they had a relationship with. Youth were then asked to rate the relationship on a scale of 1-10 with the other youth in the program.

From these data I was able to extract important information regarding two kinds of relationships:

1. **Inbound relationships:** A point in which an individual in the program reported being in a relationship with the youth answering the survey.
2. **Outbound relationships:** A point in which the youth answering the survey indicated a relationship with another individual in the program.

## **Analysis Plan**

Latent growth modeling using Mplus Version 8 (Muthén & Muthén, 1998) will be implemented to model the growth of belongingness and the youth social network across the five timepoints of CC. Latent growth modeling has been used in previous studies to analyze behavior changes in adolescent populations (Barnes, Reifman, Farrell, & Dintcheff, 2000). The growth curve models will be used to analyze the changes of the belongingness scale and the social network across the five CC timepoints. Timepoint one will be used as a baseline measure and used to model the fixed and random intercept of the growth curve model. Next, the changes in the belongingness measure and social network scale across the rest of the time points will be analyzed (i.e. the slopes).

The social network component will be split into three sub-analyses of youth inbound, outbound, and all (inbound + outbound) connections formed throughout the course of the program. Additionally, those sub analyses will be split further into 1.) connections specifically with other youth, 2.) connections with other mentors in the program and 3.) connections with all youth, mentors, and staff in the program. This will make for a total of nine analyses within the social network component of the study. Each subcomponent is necessary to understand which relationships matter most in a group mentorship intervention such as CC.

All models will control for age, sex, ethnicity, SES (parent report) and youth social emotional skills (parent report). Furthermore, analyses will only be conducted on the control group of the study. The decision to utilize only the control group was based on the control groups’ ability to generalize better to other group mentorship programs that incorporate a dyadic mentorship approach. Youth were randomly assigned to the control condition.

After the two growth models are estimated, a correlation between each social network component growth model and belongingness growth model will be run to assess if the growth trajectory is similar. By correlating the belongingness growth model with each subcomponent of the social network growth models, we will be able to understand which relationships are most important in building a sense of belongingness in the program.

# References

Barnes, G. M., Reifman, A. S., Farrell, M. P., & Dintcheff, B. A. (2000). The Effects of Parenting on the Development of Adolescent Alcohol Misuse: A Six-Wave Latent Growth Model. *Journal of Marriage and Family*, *62*(1), 175–186. https://doi.org/10.1111/j.1741-3737.2000.00175.x

Baumeister, R. F., & Leary, M. R. (1995). The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation. In *Psychological Bulletin* (Vol. 117).

Brewer, J. D. (2000). *Ethnography*. Retrieved from www.openup.co.uk

Butts, C. T. (2008). *Social network analysis: A methodological introduction*. https://doi.org/10.1111/j.1467-839X.2007.00241.x

Cairns, R. B., Perrin, J. E., & Cairns, B. D. (1985). Social Structure and Social Cognition in Early Adolescence: Affiliative Patterns. *The Journal of Early Adolescence*, *5*(3), 339–355. https://doi.org/10.1177/0272431685053007

Choenarom, C., Williams, R. A., & Hagerty, B. M. (2005). The role of sense of belonging and social support on stress and depression in individuals with depression. *Archives of Psychiatric Nursing*, *19*(1), 18–29. https://doi.org/10.1016/j.apnu.2004.11.003

Crosnoe, R., & Johnson, M. K. (2011). Research on Adolescence in the Twenty-First Century. *Annual Review of Sociology*, *37*(1), 439–460. https://doi.org/10.1146/annurev-soc-081309-150008

DeLay, D., Ha, T., Van Ryzin, M., Winter, C., & Dishion, T. J. (2016). Changing Friend Selection in Middle School: A Social Network Analysis of a Randomized Intervention Study Designed to Prevent Adolescent Problem Behavior. *Prevention Science : The Official Journal of the Society for Prevention Research*, *17*(3), 285–294. https://doi.org/10.1007/s11121-015-0605-4

Dishion, T. J., & Tipsord, J. M. (2011). Peer Contagion in Child and Adolescent Social and Emotional Development. *Annual Review of Psychology*, *62*(1), 189–214. https://doi.org/10.1146/annurev.psych.093008.100412

DuBois, D. L., Portillo, N., Rhodes, J. E., Silverthorn, N., & Valentine, J. C. (2011). How Effective Are Mentoring Programs for Youth? A Systematic Assessment of the Evidence. *Psychological Science in the Public Interest*. https://doi.org/10.1177/1529100611414806

Eccles, J., & Appleton Gootman, J. (2002). *Community Programs to Promote Youth Development*. https://doi.org/10.17226/10022

Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., Cai, L., & Durant, R. H. (1993). The Peer Context of Adolescent Substance Use: Findings from Social Network Analysis. *JOURNAL OF RESEARCH ON ADOLESCENCE Kobus*, *16*(2), 159–186.

Fuhrmann, D., Knoll, L. J., & Blakemore, S. J. (2015, October 1). Adolescence as a Sensitive Period of Brain Development. *Trends in Cognitive Sciences*, Vol. 19, pp. 558–566. https://doi.org/10.1016/j.tics.2015.07.008

Galliher, R. V., Rostosky, S. S., & Hughes, H. K. (2004). School belonging, self-esteem, and depressive symptoms in adolescents: An examination of sex, sexual attraction status, and urbanicity. *Journal of Youth and Adolescence*, *33*(3), 235–245. https://doi.org/10.1023/B:JOYO.0000025322.11510.9d

Gfeller, D. (2007). *Simplifying complex networks: from a clustering to a coarse graining strategy*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.362.5275&rep=rep1&type=pdf

Haddock, S., Weiler, L., Krafchick, J., Zimmerman, T. S., Mclure, M., & Rudisill, S. (2013). Campus Corps Therapeutic Mentoring: Making a Difference for Mentors. In *Journal of Higher Education Outreach and Engagement* (Vol. 17). Retrieved from http://openjournals.libs.uga.edu/index.php/jheoe/article/viewFile/1115/720

Hagerty, B. M. K., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). *Sense of Belonging: A Vital Mental Health Concept*.

Henry, K. L., Thornberry, T. P., & Huizinga, D. H. (2009). A discrete-time survival analysis of the relationship between truancy and the onset of marijuana use. *Journal of Studies on Alcohol and Drugs*, *70*(1), 5–15. https://doi.org/10.15288/jsad.2009.70.5

Herrera, C., Dubois, D. L., & Grossman, J. B. (2013). *The Role of Risk Mentoring experiences and outcomes for Youth with Varying Risk Profiles*. Retrieved from https://www.mdrc.org/sites/default/files/Role of Risk\_Final-web PDF.pdf

Hirschi, T. (2017). *Causes of delinquency*. Retrieved from https://content.taylorfrancis.com/books/download?dac=C2017-0-50434-3&isbn=9781351529723&format=googlePreviewPdf

Kadushin, C. (2012). *Understanding social networks: Theories, concepts, and findings*. Retrieved from https://books.google.com/books?hl=en&lr=&id=ALOhpMgkW\_cC&oi=fnd&pg=PP2&dq=Kadushin,+C.+(2012).+Understanding+social+networks:+Theories,+concepts,+and+findings.+Oup+Usa.&ots=7Q06cxqXqO&sig=rQbi342gYoMXdwr4qU7tolnjtd8

Kelly, J. G., Ryan, A. M., Altman, B. E., & Stelzner, S. P. (2000). Understanding and Changing Social Systems. In *Handbook of Community Psychology* (pp. 133–159). https://doi.org/10.1007/978-1-4615-4193-6\_7

Klovdahl, A. S. (1985). Social networks and the spread of infectious diseases: The AIDS example. *Social Science & Medicine*, *21*(11), 1203–1216. https://doi.org/10.1016/0277-9536(85)90269-2

Knifsend, C. A., Camacho-Thompson, D. E., Juvonen, J., & Graham, S. (2018). Friends in Activities, School-related Affect, and Academic Outcomes in Diverse Middle Schools. *Journal of Youth and Adolescence*, *47*(6), 1208–1220. https://doi.org/10.1007/s10964-018-0817-6

Kornienko, O., Dishion, T. J., & Ha, T. (2018). Peer Network Dynamics and the Amplification of Antisocial to Violent Behavior Among Young Adolescents in Public Middle Schools. *Journal of Emotional and Behavioral Disorders*, *26*(1), 21–30. https://doi.org/10.1177/1063426617742345

Krause, J., Croft, D. P., & James, R. (2007). Social network theory in the behavioural sciences: potential applications. *Behavioral Ecology and Sociobiology*, *62*(1), 15–27. https://doi.org/10.1007/s00265-007-0445-8

Kuperminc, G. P., Chan, W. Y., Hale, K. E., Joseph, H. L., & Delbasso, C. A. (2019). The Role of School-based Group Mentoring in Promoting Resilience among Vulnerable High School Students. *American Journal of Community Psychology*, ajcp.12347. https://doi.org/10.1002/ajcp.12347

Leskovec, J., & Mcauley, J. J. (2012). *Learning to Discover Social Circles in Ego Networks* (pp. 539–547). pp. 539–547. Retrieved from https://papers.nips.cc/paper/4532-learning-to-discover-social-circles-in-ego-networks

Luke, D. (2015). *A User’s Guide to Network Analysis in R*. In *Use R!* https://doi.org/10.1007/978-3-319-23883-8

Makarios, M., Cullen, F. T., & Piquero, A. R. (2017). Adolescent Criminal Behavior, Population Heterogeneity, and Cumulative Disadvantage: Untangling the Relationship Between Adolescent Delinquency and Negative Outcomes in Emerging Adulthood. *Crime & Delinquency*, *63*(6), 683–707. https://doi.org/10.1177/0011128715572094

Malone, G. P., Pillow, D. R., & Osman, A. (2012). The general belongingness scale (gbs): Assessing achieved belongingness. *Personality and Individual Differences*, *52*(3), 311–316. https://doi.org/10.1016/j.paid.2011.10.027

Marsh, S. C., & Evans, W. P. (2009). Youth Perspectives on Their Relationships With Staff in Juvenile Correction Settings and Perceived Likelihood of Success on Release. *Youth Violence and Juvenile Justice*, *7*(1), 46–67. https://doi.org/10.1177/1541204008324484

Mccarty, C., Bernard, H. R., Killworth, P. D., Shelley, G. A., & Johnsen, E. C. (1997). Eliciting representative samples of personal networks. In *N ELSEVIER Social Networks* (Vol. 19). Retrieved from https://pdfs.semanticscholar.org/21d2/38bb05cc8ed0b30ef00915618f4e790002bf.pdf

McCord, J. (1978). A thirty-year follow-up of treatment effects. *American Psychologist*, *33*(3), 284–289. https://doi.org/10.1037/0003-066X.33.3.284

Mcdaniel, S., & Yarbrough, A.-M. (n.d.). *A Literature Review of Afterschool Mentoring Programs for Children At Risk*.

Muthén, L. K., & Muthén, B. O. (1998). *Statistical Analysis With Latent Variables User’s Guide*. Retrieved from www.StatModel.com

Poulin, F., Dishion, T. J., & Haas, E. (1999). The peer influence paradox: Friendship quality and deviancy training within male adolescent friendships. *Merrill-Palmer Quarterly*, *45*(1), 42–61. Retrieved from https://colostate.primo.exlibrisgroup.com/discovery/openurl?institution=01COLSU\_INST&vid=01COLSU\_INST:01COLSU&volume=45&date=1999&aulast=Poulin&issue=1&issn=0272-930X&spage=42&auinit=F&title=Merrill-Palmer quarterly.&atitle=The Peer Influence Paradox: Fri

Quiroga, E., Pinto-Carral, A., García, I., Molina, A. J., Fernández-Villa, T., & Martín, V. (2018). The Influence of Adolescents’ Social Networks on Alcohol Consumption: A Descriptive Study of Spanish Adolescents Using Social Network Analysis. *Int. J. Environ. Res. Public Health*, *15*(1795), 1–12. https://doi.org/10.3390/ijerph15091795

Resnick, M. D., Bearman, P. S., Robert, ;, Blum, W., Bauman, K. E., Harris, K. M., … Udry, ; J Richard. (n.d.). *Protecting Adolescents From Harm Findings From the National Longitudinal Study on Adolescent Health*. Retrieved from https://jamanetwork.com/

Rhodes, J. E. (2004). *Stand by me : the risks and rewards of mentoring today’s youth*. Retrieved from https://books.google.com/books?hl=en&lr=&id=SjgOh0F7O14C&oi=fnd&pg=PP8&dq=Rhodes,+J.+E.+(2002).+Stand+by+me:+The+risks+and+rewards+of+youth+mentoring+today’s+youth.+Cambridge,+MA:+Harvard+University+Press.&ots=ZToN1Tns6O&sig=kj\_NOFQx0Rsdhj\_uxVIskgnbQkY#v=onepage&q&f=false

Rhodes, J. E. (2005). A model for youth mentoring. In *Handbook of youth mentoring* (pp. 30–43).

Serrat, O. (2017). Social Network Analysis. In *Knowledge Solutions* (pp. 39–43). https://doi.org/10.1007/978-981-10-0983-9\_9

Slaten, C. D., Rose, C. A., Bonifay, W., & Ferguson, J. K. (2018). The Milwaukee Youth Belongingness Scale (MYBS): Development and Validation of the Scale Utilizing Item Response Theory. *School Psychology Quarterly*. https://doi.org/10.1037/spq0000299

Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science*, *16*(2), 55–59. https://doi.org/10.1111/j.1467-8721.2007.00475.x

Tolan, P. H., Henry, D. B., Schoeny, M. S., Lovegrove, P., & Nichols, E. (2014). Mentoring programs to affect delinquency and associated outcomes of youth at risk: A comprehensive meta-analytic review. *Journal of Experimental Criminology*. https://doi.org/10.1007/s11292-013-9181-4

Tseng, V., & Seidman, E. (2007). A systems framework for understanding social settings. *American Journal of Community Psychology*, *39*(3–4), 217–228. https://doi.org/10.1007/s10464-007-9101-8

Valente, T. (2003). *Social network influences on adolescent substance use: An introduction IDU Peer Recruitment Dynamics and Network Structure in Respondent Driven Sampling View project*. Retrieved from https://www.researchgate.net/publication/228688777

Valente, T. W. (2010). *Social Networks and Health: Models, Methods, and Applications - Thomas W. Valente - Google Books*. Retrieved from https://books.google.com/books?hl=en&lr=&id=xnMzd1-7iGgC&oi=fnd&pg=PR11&dq=Valente,+T.+W.+(2010).+Social+networks+and+health:+Models,+methods,+and+applications.+Oxford+University+Press.&ots=YrsR7jQ0\_E&sig=7VK2PHWqvd9qupqZPvR5b2msCrQ#v=onepage&q=Valente%2C

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications - Stanley Wasserman, Katherine Faust - Google Books*. Retrieved from https://books.google.com/books?id=wsMgAwAAQBAJ&printsec=frontcover&dq=Wasserman,+S.,+%26+Faust,+K.+(1994).+Social+network+analysis:+Methods+and+applications+(Vol.+8).+Cambridge+university+press.&hl=en&sa=X&ved=0ahUKEwi5lqWRrKDhAhWp7YMKHSU7DlUQ6AEIKjAA#v=o

Weiler, L. M., Haddock, S. A., Zimmerman, T. S., Henry, K. L., Krafchick, J. L., & Youngblade, L. M. (2015). Time-Limited, Structured Youth Mentoring and Adolescent Problem Behaviors. *Applied Developmental Science*, *19*(4), 196–205. https://doi.org/10.1080/10888691.2015.1014484

Wesely, J. K., Dzoba, N. P., Miller, H. V., & Rasche, C. E. (2017). Mentoring At-Risk Youth: an Examination of Strain and Mentor Response Strategies. *American Journal of Criminal Justice*, *42*(1), 198–217. https://doi.org/10.1007/s12103-016-9353-7

Wood, S., & Mayo-Wilson, E. (2012). School-Based Mentoring for Adolescents. *Research on Social Work Practice*, *22*(3), 257–269. https://doi.org/10.1177/1049731511430836

Zane, S. N., Welsh, B. C., & Zimmerman, G. M. (2016). Examining the Iatrogenic Effects of the Cambridge-Somerville Youth Study: Existing Explanations and New Appraisals. *British Journal of Criminology*, *56*(1), 141–160. https://doi.org/10.1093/bjc/azv033