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

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Thesis Proposal

# ABSTRACT

# ACKNOWLEDGEMENTS

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# CHAPTER I: INTRODUCTION

Providing an adult mentor to an at-risk adolescent has large public health implications to improve the their lives on a large scale (Wesely, Dzoba, Miller, & Rasche, 2017). Consequently, providing group mentorship interventions to adolescents has become a popular area of study in the psychological literature. Despite their popularity, meta-analytic reviews that provide mentorship interventions may show mixed and even iatrogenic effects in relations to adolescent outcomes (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). More research is needed to maximize their efficacy. One such approach to understanding the mentorship interventions is studying the bonds and friendships obtained during the intervention. Relatedly, research has shown that having a sense of belongingness in a program may increase its efficacy (Marsh & Evans, 2009). Therefore, the aim of this thesis is to combine the aspect of friendships/bonds and feelings of belongingness in a mentorship intervention. Mentoring programs may utilize the findings from this thesis to develop better strategies for belonging in the program which, in turn, may improve mentee outcomes (e.g. improved well-being).

## **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. Furthermore, the transition from adolescence into adulthood can be a difficult one due to mental health issues and environmental influences. 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 unsafe risk-taking behaviors due to delusions of invulnerability (Steinberg, 2007). These are just a subset of delinquent and problem behaviors that may be elicited by youth (Arthur et al, 2002; Broidy et al, 2003). Other behaviors that have a high risk of being elicited 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 generating these risky behaviors are referred to as *at-risk adolescents*. Although at-risk status varies on 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 and subsequent consequences such as incarceration (Mcdaniel & Yarbrough, 2016). Given these considerations and outcomes, preventive efforts are needed to reduce levels of emotional stress and minimize behavioral difficulties amongst at-risk adolescents.

Adolescence serves as an important timepoint to intervene and prevent delinquent behaviors. In fact, past research indicates that a strong predictor of adulthood criminal outcomes is childhood delinquency (Makarios, Cullen, & Piquero, 2017). The importance of intervening at this critical timepoint during an individual’s life cannot be emphasized enough. Furthermore, serving as the last transition point into adulthood, the adolescent transitioning period is an efficient way to promote better health behaviors as they are more likely to live in a controlled environment with adult influences.

## **Mentorship Interventions**

One such intervention to promote adolescent outcomes is mentorship interventions. 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 through mechanisms of change (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 psycho-social outcomes as compared to the non-mentored counterparts (DuBois et al., 2011; Tolan, Henry, Schoeny, Lovegrove, & Nichols, 2014).

However, results in mentorship interventions for adolescents are not always positive. For example, Wood & 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, the failed expectations hypothesis and social deviancy (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.

Another aspect of mentorship programs that has taken route is making them group based. The purpose of this is to improve program efficacy and serve a larger number of youths at once. Most often, these 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 shown several positive effects for the youth they serve (Weiler et al., 2015). Unfortunately, youth in group-based mentorship programs are at risk to learn negative behaviors from each other - otherwise known as social deviancy (Dishion & Tipsord, 2011).

## **Belongingness**

An important aspect of any community program, such as a group mentorship program, is perceived belongingness to the program. 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).

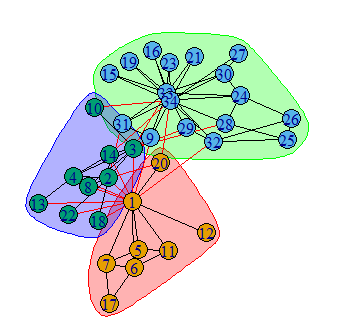
Prior evidence suggests that youth who report higher belonging in a program are more likely to have more expressed satisfaction with their relationships (Marsh & Evans, 2009). Baunmeister & Leary (1995) have discussed the importance of belongingness during the adolescent time period and explain that it is a fundamental part of forming relationships with adolescent peers. 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 can benefit greatly from enhanced feelings of belongingness.

It has also been shown that promoting positive social bonds between youth is an essential component to reducing delinquent behavior (Hirschi, 2017), delinquent behaviors that youth in mentorship interventions often possess. Due to their heavy relation, it is important to look at both a youth’s feeling of belongingness and the social bonds they form while participating in a social program focused on building positive friendships between adolescent peers. Measuring belongingness in an intervention program serves as an important feat to understand the true effect of the program. One such way to understand belongingness may be through social network analysis.

## **Social Network Analysis**

Understanding what makes a deep relationship is a key component to this thesis. Social network analysis (SNA) is a path to understand that. For my thesis, I plan to take this novel approach to incorporating a youth’s social network to further evaluate the effectiveness of a mentorship intervention.

A social network is defined as a set of relationships between people and how they can be mapped in a social structure. Every network consists of a set of actors with defining characteristics (a node) and lines to represent the connection between them (known as a tie or edge). A node is an 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 (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 where those connections come from. Social networks can be viewed from a more 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, we use SNA. Social networks analysis 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 theory, the overall encompassing theory surrounding SNA, can be applied to a wide variety of levels spanning from the simple connection of two people, up to a collection of people and how those people are integrated in a set of systems (Kadushin, 2012).

### *Social Network Analysis in Psychological Research*

Psychological research often relies on self-report surveys to answer research questions. Therefore, 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 selected all alters 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 name 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 are notorious for creating enormous datasets - Datasets that are hard to sift through without a systematic and methodical approach. Both egocentric data collection methodologies have pros and cons. 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 alters in known (Butts, 2008). On the other hand, studies utilizing nomination methods have shown that subjects are likely to produce false negatives due to subjects forgetting or overall fatigue (Butts, 2008). Errors especially occur in instances where the ego (an individual node in the network) has many connections (Brewer, 2000).

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 homosexual population. DeLay and colleagues (2016) have used adolescent friendship networks to evaluate the Family Check-up model within adolescent populations. Kornienko, Dishion, & Ha (2018) used social network interventions to reduce antisocial and violent behaviors within adolescent population. Experimental research by Valente (2003) found differences in tobacco intervention programs that identified group leaders in network analysis. In summary measures and analysis of social network can inform and improve interventions directly.

Mentorship on Adolescents are often a population of interest in social network research. Years of research have promoted the influence of peer networks towards cigarette smoking (Ennett et al., 1993; Ennet et al., 2008) and other health behaviors. Additionally, recent studies have shown that adolescent alcohol consumption is directly mediated by the peer groups they associate with (Quiroga et al., 2018). More specifically, the dyadic nature of the mentor-mentee relationship allows for a heavy emphasis in social network approach to in mentorship research.

## **Proposal**

The purpose of this study is to combine the understanding 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 similarities between social networks and belongingness, I hypothesize that a youth’s social network and score on a belongingness 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 behavior and emotional problems. It is flexibly designed to respond to the needs of a heterogeneous group of youth with varying risk levels. The program 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 within 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 occurs four nights a 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 include: Youth be aged 11-18 years of age, experience 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 (the mentee) were referred to the CC program through several community agencies including the local school district, juvenile justice system, Department Human Services, and various youth and family agencies. Upon receipt of the referral, trained CC staff contacted potential participants and conducted an intake appointment to determine program eligibility and obtain assent and parental consent.

## **Measures**

In the proposed investigation, data will be 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 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. The youth 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 two sorts of important information:

1. **Inbound relationships:** A point in which an individual in the program marked a relationship towards the youth answering the survey.
2. **Outbound relationships:** A point in which the youth answering the survey marked a relationship towards 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 understanding 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 control group is more representative of a typical group-based mentoring program.

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.

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