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

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 (https://www.bbbs.org/) and MENTOR (https://www.mentoring.org/). 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 (https://www.chhs.colostate.edu/cc/) and Go Girls! (https://www.bbbso.ca/programs/go-girls/). While mentoring programs 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.

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The fundamental element of any mentoring program is the bond that the mentee forms with others in the program. That is, 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, to discover 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, anger, and delinquent behaviors). In this way, new insights into the types of relationships most salient for positive program outcomes may be discovered.

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Adolescence – a critical time for intervention

Decades worth of research demonstrates that adolescence is a unique and consequential developmental period (Steinberg, 2007), and adolescents cannot be simply considered older children or younger adults (Crosnoe & Johnson, 2011). Numerous biological changes occur during adolescence. For example, pubertal development has been associated with increased activation of the frontal lobe, pruning and myelination of the brain (Paus, Keshavan, & Giedd, 2008; Steinberg, 2007). Additionally, there is enhanced capacity to the dopaminergic reward system of the brain (Siegel, 2015). Changes in the nucleus accumbens, a brain area associated with reward seeking, have also been seen in adolescent development (Galvan et al., 2006).

Amidst these critical biological developments, adolescents are prone to impulsivity, sensation-seeking, and inaccurate assessment of vulnerability (Steinberg, 2007). Thus, health-risking behaviors (Arthur et al, 2002; Broidy et al, 2003; Resnick et al., 1997), including substance use (Henry, Thornberry, & Huizinga, 2009), unsafe sexual practices (Myklestad & Rise, 2007) and violence (Resnick et al, 1997; Reiss & Roth, 1993) are most common during this developmental period. Longitudinal models indicate that depressive symptoms are often formed during adolescence (J. R. Cohen, Andrews, Davis, & Rudolph, 2018). Additionally, adolescents are at risk for various psychiatric illnesses such as schizophrenia, substance use disorders, and anxiety disorders (Paus et al., 2008). Such disorders have been found to continue into adulthood (Rohde et al. , 2013). Indeed, adolescence is a critical period for development, prosocial behaviors and the key to lifelong health and well-being. Interventions designed to maximize health and prosocial development during adolescence are of critical importance.

Certain personal and contextual factors increase the likelihood that an exposed adolescent will engage in risk behaviors, particularly risk behaviors that threaten prosocial and healthy development. In the literature, young people exposed to these risk factors are commonly labeled as *at-risk adolescents*. These personal and contextual factors can negatively contribute to an individual's ability to thrive academically, socially, emotionally, and/or physically (Mcdaniel & Yarbrough, 2016). At-risk adolescents have the potential to escalate problem behaviors, such as drug abuse (Mcdaniel & Yarbrough, 2016), poor academic performance (Malecki & Demeray, 2006) and school misconduct (Schmidt, 2003). Given these considerations, preventive efforts are needed to minimize behavioral difficulties amongst at-risk adolescents. This is particularly salient for the design of interventions, as many existing interventions for adolescence are

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I really think you would benefit from careful outlining – of the overall paper, each section, and each paragraph.

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specifically designed for at-risk adolescents (Raposa et al., 2019). These complexities will be discussed in terms of the current thesis in subsequent sections.

Mentorship Interventions

One promising intervention to promote positive adolescent outcomes among at-risk youths is mentorship. Mentorship programs provide adolescents with a role model straight from the community which they both reside. Mentors are encouraged to enhance coping strategies, reduce stressors, and create an attachment to the youth mentee (DeWit et al, 2016). Meta-analytic reviews show that adolescents in mentorship programs improve in behavioral and psychosocial outcomes as compared to their non-mentored counterparts (DuBois et al., 2011; Tolan, Henry, Schoeny, Lovegrove, & Nichols, 2014). A more recent meta-analysis found the averaged effect size of mentorship interventions across several outcomes (i.e. cognitive functioning, psychological, health) to be $\bar{g} = 0.21$ (Raposa et al., 2019). However, results are not always positive. For example, a meta-analytic review by Wood and Mayo-Wilson (2012) found mentorship intervention effect sizes to be small , and in some cases iatrogenic, for academic achievement, attendance and negative behavior (i.e., school misconduct, drug use). Thus, while mentoring is considered an evidence-based practice, more work to understand for whom and under what conditions mentoring leads to better outcomes for participants is needed.

The promises and perils of group-based mentoring initiatives

This thesis is focused specifically on group-based mentoring, which carries its own set of potential promises and perils. A group-based approach to mentorship can have several benefits. For example, group-based mentoring allows programs to serve a larger number of youths at once. Similar to dyadic (one on one) mentoring, group mentorship has seen promotions in resiliency and prosocial attitudes (Kuperminc, Chan, Hale, Joseph, & Delbasso, 2019; Weiler et

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Here is some good info on active voice:

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al., 2015). However, group-based mentoring can also produce challenges. If the group-based mentoring program is focused on exclusively at-risk adolescents, then the act of congregating the at-risk adolescents may produce unwanted outcomes. This phenomena is described by Dishion and colleagues as deviancy training (Dishion, Eddy, Haas, Li, & Spracklen, 1997). Deviancy training is the process in which congregated deviant youth have a tendency to endorse and encourage negative and rule-breaking behavior (Poulin, Dishion, & Haas, 1999). Unfortunately, at-risk youth in group-based mentorship programs may be at risk to learn negative behaviors from each other as a result of deviancy training (Dishion & Tipsord, 2011). Friendship networks, formed during group interventions for at-risk youth, can be a root cause of deviancy training (Dishion & Tipsord, 2011; Poulin et al., 1999). Group-based mentorship interventions need to be aware of such unintended consequences.

There are effective strategies to prevent social deviancy in group interventions. Some protective moderators against the effects of deviancy training include adult monitoring, supervision, and structure (Dishion & Tipsord, 2011). Despite the known protective factors against negative deviancy training, not all group mentorship programs may utilize positive practices.

Belongingness as an Intermediate Goal of Group-based Mentoring Programs

An important aspect of any group-based mentorship program is perceived belongingness to the program. Belongingness is the need to gain acceptance within a community (Malone, Pillow, & Osman, 2012) and is, furthermore, an essential psychological need (Galliher, Rostosky, & Hughes, 2004). Belongingness has been studied for decades in adolescent research (Slaten, Rose, Bonifay, & Ferguson, 2018). Baumeister & Leary (1995) explain that belongingness is a fundamental part of forming relationships with adolescent peers. Prior

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evidence suggests that youth who report a greater sense of belonging are more likely to have higher levels of expressed relationship satisfaction (Marsh & Evans, 2009). Additionally, research conducted by Gummaden, Pittamen and Ioffe (2016) showed having a higher sense of belonging in school has positive impacts on psychological well-being. This general benefit of feeling a sense of belonging is extended to belonging within youth programs. For instance, measures of belonging have been positively correlated with program attendance in youth development programs (Anderson-Butcher & Conroy, 2002).

Developing a sense of belonging for youth is often a central goal of youth programs (Anderson-Butcher & Conroy, 2002). As such, a deep understanding of how belongingness is formed is essential. Two such features that lead to enhanced belonginess in youth interventions are group characteristics and staff practices (Akiva, Cortina, Eccles, & Smith, 2013). Children of similar age range and SES have been shown to have increased belongingness in youth programs (Akiva et al., 2013) and therefore, needs to be considered when measuring belongingness in a group intervention program.

We can also explain the need to measure belongingness from a theoretical perspective. Maslow (1943) famously indicates love and belonging as the third tier on the hierarchy of human needs. Thus, explaining its importance to humans and adolescents alike Additionally, prosocial bonds between youth are theoretically and empirically implicated in the development of delinquent behavior (Hirschi, 2017). As such, it is important to examine an adolescent's feeling of belongingness they form while participating in a social program focused on building positive friendships with peers.

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The Indirect Effect of Social Connections on Developmental Outcomes via Belonging

Belongingness has been shown to mediate the relationship between social connections and achievement outcomes (Walton, Cohen, Cwir, & Spencer, 2012). Overall, people feel an innate need to maintain positive social bonds with one another (Baumeister & Leary, 1995). As such, belonging to a group has a deep and profound impact on our attitudes and behaviors (G. L. Cohen, 2003; Walton et al., 2012).

The feeling of belonging may be formed by social connections. Even a small, weak, connection may cause a sense of mere belongingness (Walton et al., 2012). For example, Cwir and colleagues (2011) found that sharing preferences with a confederate stranger increased emotions and physiological arousal of a participant. Findings from Cwir and colleagues (2011) illustrate the impact of having even a subtle feeling of social connectedness. Further research shows belongingness predicts youth protective factors, such as engagement in a youth program (Anderson-Butcher & Conroy, 2002).

For my thesis, I plan to exhibit belongingness as an important mediator between social ties and several key developmental outcomes (e.g. academic achievement, anger, depression). My specific model can be seen in Figure 1. As can be seen in Figure 1, belongingness will partially mediate the relationship between social ties and developmental outcomes. The b path represents the variance explained specifically by belongingness after accounting for social ties. From this model, I will be able to identify the indirect effect (a*b path) of social ties through belongingness. The c' path will represent the effect of social ties after controlling for the indirect effect of belongingness.

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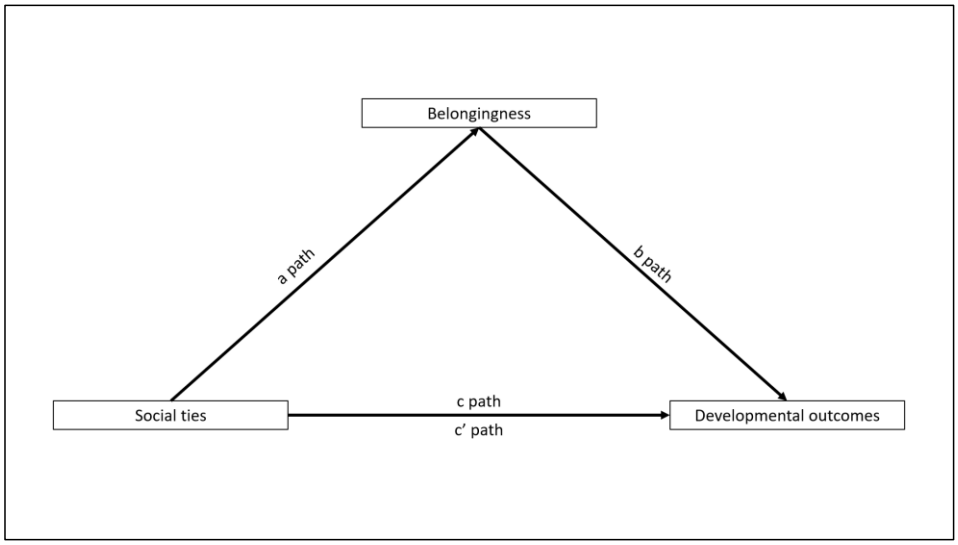

Figure 1. Proposed mediation model.

Social Network Analysis (SNA)

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. I aim to incorporate the social network to further evaluate the effectiveness of a mentorship intervention. A social network approach will shed light on how an adolescent in a group-based intervention can develop an enhanced sense of belonging as they develop bonds to other individuals in the program. Using a social network 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 SNA will be used to answer my research questions.

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How does social network analysis help you evaluate mentorship interventions?

Defining Social Networks and SNA

A social network is the structure of relationships that connect people within a defined population. Every network consists of a set of actors with defining characteristics (nodes) and lines to represent the connections between them (known as ties or edges). The ties are directed, indicating whether the relationship is one-sided or reciprocal. For example, consider Figure 2, which depicts potential relationships between two nodes. In panel 1, Node A reports an outgoing connection with Node B, but Node B reports no connection with Node A (no incoming tie from Node B to Node A) – this is an unreciprocated tie. In panel 2, Node A reports a connection with Node B and Node B reports a connection with Node A – this is a reciprocated tie. Panel 3 presents a more complex social network with many nodes. Notice that some nodes (e.g, Node A) have many outgoing ties (i.e., the actor reports that he has a connection with many other actors) while other nodes (e.g., Node G) reports few connections with other actors. Some nodes (e.g., Node B) have many reciprocated connections, while others have few reciprocated connections (e.g., Node C). Notice that some Nodes (e.g., Node D) are very well connected in the network, they have may incoming and outgoing ties, while other nodes (e.g., Node F) are not well connected in the network, and there is even one node (Node H) which is completely isolated (they have no incoming or outgoing ties).

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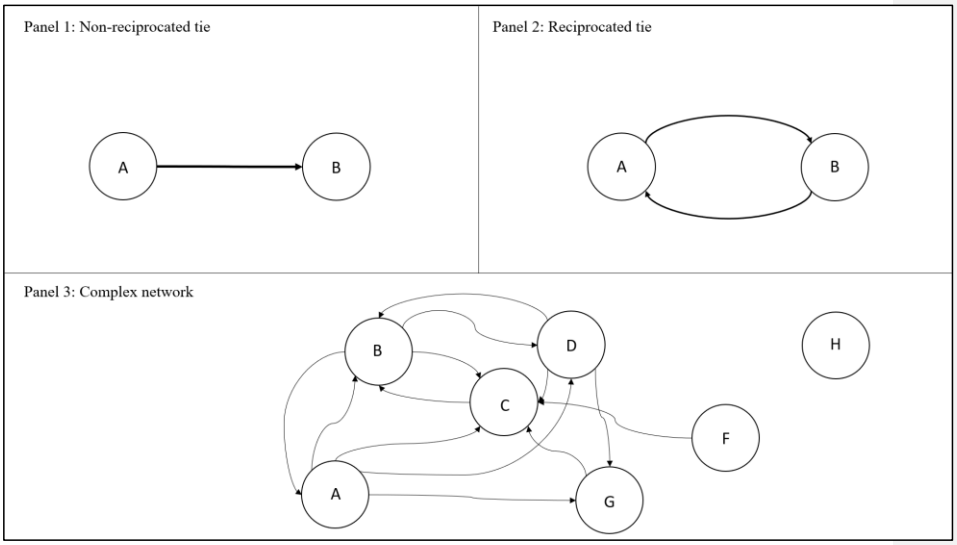

Figure 2. Three panels representing nodes and ties.

Social networks are analyzed via social network analysis (SNA), a vast set of techniques that allow for the quantitative assessment of networks, including all of the quantities touched on in my earlier example (e.g., number of incoming ties, number of outgoing ties, number of reciprocated ties, centrality in the network for each node), and much more (Kadushin, 2012; Valente, 2010). 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). Network statistics may be represented at the person-level or network-level. On a person-level, any single node may be analyzed in terms of its centrality (the number of incoming and/or outgoing ties). From here, we may evaluate whom has the most social capital in a network and what attributes (i.e. age, gender) are related to having social capital. On the network-level, we are interested in

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the structure the network takes. Network density is one such network statistic that evaluates the whole network. Network density is the proportion of actualized network ties to the total possible number of ties (Giuffre, 2015). The denser the network, the more possible connections are formed. In addition to quantifying the network ties, attributes of the nodes can also be introduced in SNA. For example, nodes may be described by their gender, age, or in the present example, their role in the program (i.e., mentor or mentee).

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Proposal

This study aims 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 intend to find out if the relationships formed between other youth, mentors, or all individuals in the program are of the most importance. 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. Furthermore, I expand our understanding of the most pertinent relationship ties in a mentorship intervention by analyzing which types of ties (i.e. ties with the mentor vs. ties with other youth in the program) provide the best understanding of adolescent outcomes (i.e. academic performance).

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).

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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.

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