**Abstract**

Formal youth mentoring is an effective intervention strategy for healthy development during adolescence. Modest and varied effects across programs, however, demonstrate a need to identify factors that can reliably improve outcomes for mentored youth. The purpose of this randomized controlled trial was to test the relative impact of embedding mentee-mentor matches in small groups on youth outcomes and to examine whether this effect was mediated by the quality of the program setting and mentoring relationship quality. Participants included 676 adolescents (*M*age= 14.21, range = 11-18; 41.6% female) enrolled in Campus Connections, a site-based youth mentoring program. Most measured outcomes in both conditions (i.e., mentoring groups and a control condition in which pairs were not embedded in a group) were significantly better at post-intervention as compared to pre-intervention. The hypothesis that mentoring groups would have stronger impact, however, was not supported. The results imply that organizing mentor-mentee matches in small groups offer no advantage or disadvantage and that youth may be able to garner benefit from both structures.

*Keywords:* youth mentoring, site-based mentoring, group mentoring, adolescence, randomized controlled trial

**Introduction**

The practice of pairing youth with caring adults in formal mentoring relationships is an effective strategy for affecting adolescent development. In general, mentored youth fare better than non-mentored youth, yet program effects can be modest (Raposa et al., 2019). Although the average effect of youth mentoring is comparable to that of other preventive interventions that target diverse outcomes, there is good reason to suspect stronger impact with greater specificity in program models and evaluation (Christensen et al., 2020; McQuillin et al., 2018). Examining site-based mentoring programs (i.e. mentoring that occurs within a pre-specified setting, such as a community center or school) is especially important because they account for just over half of all programs in the U.S. (Garringer et al., 2017). In comparison, exclusively community-based programs (i.e., mentoring that occurs independent of a specific program setting) make up 18 percent of programs (Garringer et al., 2017). Identifying factors that can increase overall impact and reliably produce positive outcomes within site-based programs remains a high priority within the field, but few experimental studies exist. Mentoring groups, in various forms, are commonly used in site-based programs and warrant further investigation because they may be able to uniquely affect youth’s experience within the program. The purpose of this randomized controlled trial was to test the relative impact of embedding mentee-mentor matches in small groups within a site-based program on youth outcomes and to examine whether this effect was mediated by features of quality settings and mentoring relationship quality.

**Literature Review**

Although there are some programmatic similarities between site- and community-based mentoring programs (e.g., emphasis on mentor training, support and monitoring), site-based programs tend to have less difficulty with mentor recruitment, greater likelihood of sustainability and can keep costs low while offering high-dose programming (Garringer et al., 2017). Many site-based programs are also time-limited, aiding in mentor retention (Komosa-Hawkins, 2010). It is no surprise, therefore, that communities are investing in these programs. Implementation of such models, however, has outpaced systematic study of their effectiveness.

Evidence about effective community-based mentoring can be applied to the practice and science of site-based mentoring, but total downward extension of this literature is inadequate. In contrast to mentor-mentee pairs who engage in activities largely independent of a particular site, pairs in site-based programs are heavily influenced by the setting in which their relationship is fostered (Herrera et al., 2000). As a result, the quality of the setting, in addition to the quality of the mentoring relationship (Chesmore et al., 2017; Goldner & Mayseless, 2009), affects youth outcomes.

Important here is distinguishing between program and setting quality. Although they do intersect, program and setting qualities are distinct aspects of youth development programs. Program quality includes mentoring best practices, such as mentor screening and match support (e.g., Deutsch & Spencer, 2009), whereas setting quality refers to “features of the participant’s interaction with the setting” (Eccles & Gootman, 2002, p. 88). What matters most is the experience of the adolescent within the setting, as opposed to considering the setting absent the youth (Eccles & Gootman, 2002). In other words, setting quality is the extent to which youth experience and engage with key features within the setting. Based on developmental theory, the National Research Council and Institute of Medicine identified eight features of positive developmental settings including providing youth with a sense of physical and emotional safety, supportive relationships, appropriate structure, opportunities to belong and build skills, exposure to positive social norms, support for efficacy and mattering, and setting integration (Eccles & Gootman, 2002). Creating a setting in which these features are evident is prerequisite to positive program impacts. Although most site-based programs are arguably creating this important context, this leaves the question – is there a specific program component that could ensure that participants experience the positive development setting and subsequently positive youth outcomes?

**Campus Connections**

Campus Connections (formerly known as Campus Corps), is a time-limited youth mentoring program for at-risk youth. This 12-week preventive intervention targets at-risk adolescents through an intentional multi-level mentoring community facilitated by experienced mentor coaches and family therapists (See Masked for review, 2015 for complete description). Youth are matched one-to-one with an undergraduate university student mentor who is enrolled in a 3-credit service learning course (cf. Masked for review, 2013). The mentoring pairs meet 4 hours per week on campus and engage in a semi-structured program including walks on campus, academic support, dinner and prosocial activities.

A central objective in developing the Campus Connections site-based model was to create an environment conducive for positive youth development and one in which mentoring pairs could overcome known barriers to mentoring success. For instance, because mentors feeling overwhelmed by logistics can impede the development of a positive bond (Spencer, 2007), the program is flexibly designed with pre-planned activities and access to resources on campus. To address mentors becoming beleaguered by the difficult life situations of vulnerable youth (Spencer, 2007), the program provides on-site family therapists who are immediately accessible to support youth and mentors, respectively. In alignment with other positive youth development interventions, Campus Connections’ site-based model promotes positive relationships with others, includes prosocial activities, and encourages the development and use of life skills (Lerner, 2004). Campus Connections intentionally engages youth in a community of other mentors and mentees so they can gain a sense of belonging and mattering, develop social skills and confidence, and realize leadership skills. Additionally, the Campus Connections curriculum is semi-structured so youth are empowered to make decisions about how they navigate the structure, such as the type of prosocial activity or the focus of academic support.

Campus Connections’ theory of change assumes that youth outcomes will stem from both the quality of the one-to-one mentoring relationship and the quality of the youth’s interactions with the setting. When Campus Connections was developed, great attention went to designing the larger community context as a positive developmental setting based on the recommendations of Eccles and Gootman (2002). Campus Connections matches youth with a mentor, and together, the dyad engages in a variety of prosocial activities within the context of a community of other matches and program staff. Yet, because the program served 28-32 matches per evening, there were reservations that for individual matches, the larger community setting may be too diffuse and youth may feel disconnected. As such, mentoring groups of four mentee-mentor matches (known as Mentor Families within the program) were created, believing they would both strengthen the quality of the mentoring relationship and ensure and deepen the youth’s experience of the setting, thereby improving youth outcomes. A qualitative inquiry into the group experience found that these groups provided a place (a) for mentors to receive support and supervision, (b) for mentors and mentees to belong, and (c) for mentees to grow and learn (Masked for review, 2014).

Results from two pilot studies of Campus Connections suggested positive impacts on adolescent problem behavior (Masked for review, 2015) and youth-perceived improvements in school, relationships, self-esteem, future orientation, and behavior (Masked for review, 2017). Although these findings are suggestive of a treatment effect, there were questions about whether the model could be optimized further (e.g., identifying which component(s) are critical for change). Overall, increased precision in the conceptualization and practice of mentoring is needed to increase effects (Cavell & Elledge, 2014). Striving for greater specificity does not preclude certain types of models, target populations, or intervention goals. Instead, it challenges program developers to clearly delineate the key program components and change mechanisms in an effort to use resources more wisely for maximum benefit. With increased pressure to show program impact, however, few programs have the capacity to test the relative effect of varying program components. As one step toward identifying critical components within Campus Connections and informing similar program models, mentoring groups were identified as the first to test.

**Mentoring Groups**

Group mentoring, broadly speaking, refers to the practice of involving one or more mentors and at least two mentees in mentoring activities (Kuperminc, 2016). Programs using this approach are naturally site-based and vary widely in their size, composition, and mentor to mentee ratios. A hybrid mentoring approach is a specific case of group mentoring that involves intentionally combining one-to-one and group mentoring activities (as opposed to one mentor with several mentees, for instance). For the purposes of this study, the term *mentoring groups* will be used to refer to the practice of embedding one-to-one mentee-mentor matches in small groups. Programs such as Mentoring for Sexual Health (Shin & Rew, 2010) and the Young Women Leaders Program (Lawrence et al., 2008) show evidence of promising effects. One systematic review of the literature on mentoring for adolescent girls and young women showed that (non-specific) group mentoring approaches may be more effective than one-to-one mentoring (Plourde et al., 2017), and a 2011 meta-analytic review of youth mentoring programs found similar effects for varied group and one-to-one approaches (DuBois et al.). No known empirical studies have tested the relative impact of mentoring groups compared to one-to-one mentoring or other reasonable comparison groups.

Theoretically, the use of mentoring groups in a hybrid structure may be an efficient way to (a) strengthen the mentoring relationship and (b) ensure that all youth experience features of quality youth settings. First, mentoring groups are hypothesized to strengthen key social processes within mentoring relationships, such as companionship, authenticity, mutuality, and empathy (Rhodes, 2005). Mentoring groups can provide a structure that allows matches to feel a sense of stability (Griffith et al., 2019) and mentors to easily access real-time support from one another in connecting with mentees (Masked for review, 2014). This support should translate to greater mentor self-efficacy and skill. Additionally, being embedded as a match in a small group could reinforce dyadic belongingness and promote a sense of companionship within a match (e.g., “This is my mentee or my mentor”), as matches differentiate their unique connection with one another from that of others. This companionship, along with mutuality, are likely to be further developed as the group provides matches with a shared common experience (Griffith et al., 2019). Other research suggests a more complicated picture, such that group processes can influence the mentoring relationship but that the impact differs by role (Williams et al., 2019). It is also plausible that the group processes could distract from the development of the one-to-one relationship. For instance, attending to the group processes and maintaining additional relationships could overwhelm or frustrate youth or mentors who prefer one-to-one relationships.

Second, mentoring groups also provide a means by which youth can more fully engage with and experience a positive developmental setting. Youth in mentoring groups are provided opportunities to develop and benefit from supportive relationships with caring adults beyond their primary mentor (Deutsch et al., 2017), which may provide additional benefits in terms of role modeling, support, and supervision. Mentoring groups also provide a pro-social network for youth to build supportive relationships with peers (Kuperminc et al., 2018) and to practice social skills (Herrera et al. 2002). As such, mentoring groups are likely to provide youth with a safe place to belong and matter. At the same time, the potential for negative contagion effects exists (Dishion et al., 1999) - albeit a small risk due to the one-to-one matching of adults to youth. Additionally, because the groups engage in a variety of pro-social activities together, youth can be expected to gain a strengthened sense of self-efficacy through multiple opportunities for skill building and connection. Inherently, participating in a group raises opportunities for problem solving, teamwork, and compromise (Deutsch et al., 2013). The extent to which a group is successful in these tasks, of course, rests on the overall health of the members and group. Negative or toxic members and/or processes within the group could result in negative effects. Overall, the structure and support offered by mentoring groups within a site-based program should help to attenuate any impact of a potential weak primary mentoring relationship (Deutsch et al., 2013) —and augment the impact of a strong relationship—as youth will be connected to a development-enhancing setting that does not rely solely on the mentor or relationship to produce positive outcomes.

**Current Study**

The use of mentoring groups is assumed to be a key program component that contributes to positive youth outcomes within site-based mentoring programs. Conceptually and logistically, mentoring groups may be an efficient way to promote positive outcomes by fostering youth’s positive experience with their mentor and with the setting, although this has yet to be tested. Broadly speaking, the main question was whether mentoring groups were a better method by which youth garnered positive experiences within site-based programs. Or, was it sufficient to engage matches in the site-based program independent of such groups? Accordingly, the purpose of this study was to test the impact and process of mentoring groups (i.e., small groups of four mentor-mentee matches) within a site-based mentoring program. It was hypothesized that participants in the group condition would demonstrate more desirable youth outcomes, as compared to participants in the dyadic condition. It was also hypothesized that positive effect of mentoring groups on youth outcomes would be mediated by features of quality settings (i.e., physical and psychological safety, appropriate structure, supportive relationships, opportunities to belong, positive social norms, support for efficacy and mattering, opportunities for skill building, and setting integration), and higher quality mentoring relationships.

**Method**

**Participants**

The sample consisted of 676 mentees: 338 in the treatment condition (i.e., mentoring group) and 338 in the control condition (i.e., no mentoring group). This total sample size represents all mentees who started the program (even if they dropped out later) and excludes mentees who completed the intake process in the months prior to the start of the study but did not begin the intervention. Table 1 presents demographic and background characteristics for the sample of youth. Overall, participants in the treatment and control groups were comparable. The control condition, however, included more White mentees than the treatment condition (p <.05) and mentees in the treatment condition showed lower academic grades compared to mentees in the control condition (p <.05). No other differences were found.

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Table 1 Here

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**Procedures**

**Recruitment.** Youth in the Campus Connections program and their parents were recruited and informed of the study during their intake meeting with a trained staff member. They were assured that their participation in the study was voluntary and would have no effect on youth’s standing in the program. As an incentive to participate, parents and youth received $10 gift cards for participation in each survey. After describing the study conditions, informed assent and consent was obtained from youth participants and one of their parents/guardians.

Student mentors in the Campus Connections program were recruited and informed of the study during the first week of class. They too were assured that their participation in the study was voluntary and would have no effect on their enrollment or standing in the course. As an incentive to participate, students received course credit for completing questionnaires, and those who opted not to participate were provided with an alternative assignment. After describing study requirements, informed consent was obtained from college student participants.

Survey data were collected immediately before the start of the intervention, at weeks 3, 6, and 9, and 11 of the 12-week program for mentors and mentees. Survey data were collected immediately before the start of the intervention and at week 11 for parents/guardians. The final week of the intervention is devoted to program graduation and administering the final survey during the 12th week would have disrupted the celebration of the youth’s accomplishments.

**Intervention and control conditions.** Campus Connections occurred four nights per week (Monday-Thursday) during the regular academic year from the 2015 Fall Semester through the 2018 Spring semester. Each night, nested within a semester, is referred to as a session (e.g., one session represents the 12-week program that met every Monday evening in the Fall 2018 semester). The program was administered for six semesters (4 sessions per semester), which resulted in 24 12-week Campus Connections sessions over the course of the study. Each semester, all students eligible for Campus Connections were matched with a mentor. Next, all participants were grouped into mentoring groups, with four mentor-mentee dyads per group. Selection of matches into mentoring groups was based on youth age (no more than 1 year or grade difference between youth) and gender of the mentee (either all-boy/all-girl or two boys and two girls). Each semester, two sessions were randomly assigned to utilize the mentoring groups as part of the programming and the remaining two sessions each semester did not utilize the mentoring groups. Therefore, in both conditions, mentoring groups were formed prior to the start of the intervention using the same criteria; however, participants in the control condition were unaware of any grouping structure. Given that mentoring groups were formed based on gender and age, and these variables are primary drivers of friendship formations among adolescents, it is likely that connections among youth in the same mentoring group would form in the control condition even though the mentoring group structure was not apparent to the participants.

**Measures**

The following measures were used to assess setting quality, mentoring relationship quality, developmental outcomes, and positive (rather than negative) youth development. Nearly all measures were self-report scales from mentees and their parent(s)/guardian(s). All measures exhibited adequate reliability as measured by Cronbach’s alpha. Tables 3 and 4 present the n, mean, and standard deviation for all measures at pre-intervention (where applicable) and post-intervention as a function of treatment condition. Prior to analysis of the treatment effects, all program outcomes (at pre- and post-intervention) were scaled to range between 0 and 10. This linear transformation does not impact the significance of the results, but allows for a more straight-forward variable to variable comparison, particularly for the graphs presented in the results section. All variables were coded such that a higher score represents “more” of the construct – for example, greater sense of self-efficacy or more depressive symptoms.

**Setting quality.** Setting quality consists of youth’s interaction with the Campus Connections program setting across these ten variables: sense of belonging, mattering, physical and emotional safety, supportive relationships, appropriate structure, opportunities to belong, opportunities for skill building, positive social norms, support for efficacy and mattering, and integration of family, school, and community.

***Belonging.*** Expectations for belonging and sense of belonging at Campus Connections were measured using the 5-item Support and Opportunities Scale (Youth Development Strategies, Inc) ranging from 0 = disagree to 10 = agree. Sample items include: “I feel like I will belong at Campus Connections/I belong at Campus Connections” and “I feel like my ideas will count at Campus Connections/My ideas count at Campus Connections.” The internal consistency of the scale was good (α = .90, .92 at pre- and post-intervention, respectively).

***Mattering***. General mattering and mattering at Campus Connections were measured with 6 items from the Interpersonal Mattering Index (Elliot, Kao, & Grant, 2004). At post-intervention, each item was revised to be specific to mattering at Campus Connections, ranging from 0 = disagree to 10 = agree (e.g., “Most people do not seem to notice when I come or when I go,” “Most people at Campus Connections do not seem to notice when I come or when I go). The internal consistency of the scale was good (α = .89 for general mattering at pre-test and α = .92 for mattering at Campus Connections at post-intervention).

***Youth and program strengths survey.*** The Youth and Program Strengths survey (Search Institute, 2005) was measured at week 9. This scale consists of 8 subscales and each scale was rated on a 5-point scale (1=never, 5=very often): (1) Appropriate structure (e.g., “Mentors and staff really know what they are doing”), (2) Integration of family, school, and community (e.g., “The mentors and staff make sure my parents know what we are doing in the program”), (3) Opportunities to belong (e.g., “I feel like an important part of Campus Connections”), (4) Opportunities for skill building (e.g., “At Campus Connections, I am learning how to cooperate with others”), (5) Physical and psychological safety (e.g., “When I am at Campus Connections, I feel safe from others who might hurt me or be mean to me”), (6) Positive social norms (e.g., “At Campus Connections, I am encouraged to work hard at school”), (7) Supportive relationships (e.g., “There is at least one mentor or staff member I can talk to if I have a problem”), and (8) Support for self-efficacy and mattering (e.g., “I have fun at Campus Connections”). Each scale showed good internal consistency (α = .72 to .93).

**Mentoring relationship quality.** Mentor alliance was measured at mid-point of the program (week 6) using the 16-item Mentor Alliance Scale (Cavell et al., 2009; α = .85). Mentees were asked to rate the relationship quality with their mentor on a 5-point scale (1=never, 5=always), such as “I look forward to meeting with my mentor,” “When I am with my mentor, I bring up things that bother me.”

**Developmental outcomes**. Developmental outcomes included 8 variables: conscientiousness, developmental assets, future orientation, self-efficacy, meaning in life, behavioral difficulties, prosocial behavior, and social-emotional competencies.

***Conscientiousness.*** Conscientiousness was measured with 9 items using the adapted Big Five Inventory (John & Srivastava, 1999). Example items include “I do things carefully and completely,” “I am a reliable worker”, α = .78, .76 at pre- and post-intervention, respectively). Each item was rated on a 11-point rating scale (0=disagree, 10=agree).

***Developmental assets***. Developmental assets were measured with 58 items from the Developmental Assets Profile (Search Institute, 1997). This scale includes assets from eight domains (i.e., support, empowerment, boundaries and expectations, constructive use of time, commitment to learning, positive values, social competence, and positive identity). Each item was rated on a 4-point scale (1=not at all/rarely, 4=extremely/almost always). A total asset score was calculated at pre- and post-intervention (α = .95, .97 at pre- and post-intervention, respectively).

***Future orientation***. Future orientation was measured by 5 items (e.g., “I am serious about working hard now so that I have a good future,” α = .89, .93 at pre- and post-intervention, respectively) using the adapted Well-being Scale (Ryff & Keys, 1995). Each item was rated on a 11-point rating scale (0=disagree, 10=agree).

***Self-efficacy***. Self-efficacy was measured with 8 items (e.g., “I can do just about anything I really set my mind to; α = .90, .93 at pre- and post-intervention, respectively) using the General Self-Efficacy Scale (Sherer et al., 1982). Each item was rated on a 11-point scale (0=disagree, 10=agree).

***Meaning in life***. Meaning in life was measured using the 3-item Meaning in Life Questionnaire (Steiger, Frazier, Oishi, & Kaler, 2006; α = .92, .94 at pre- and post-intervention, respectively; e.g., “My life has a clear sense of purpose”). Each item was rated on a 11-point scale (0=disagree, 10=agree).

***Behavioral difficulties/prosocial behavior***. Parents or guardians were asked to rate the mentee’s behavioral difficulties and prosocial behavior using the Strengths & Difficulties Questionnaire (SDQ, Goodman, 1997). The prosocial behavior construct was measured with 5 items from the pro-social subscale (e.g., “Considerate of other people’s feelings”, α = .76, .75 at pre- and post-intervention, respectively) and the behavioral difficulties construct was measured with 20 items from the difficulties subscales (i.e., emotional problems, conduct problems, hyperactivity, peer problems; α = .84, .85 at pre- and post-intervention, respectively). Each item was rated on a 3-point scale (1=not true, 2=somewhat true, 3=certainly true).

***Social-emotional competencies***. Social-emotional competencies were reported by parents/guardians using the Devereux Student Strengths Assessment (DESSA; LeBuffe et al., 2009). This scale consists of 8 subscales with 72 items: decision making (e.g., “Show good judgment”), goal-directed behavior (e.g., “Try to do her/his best?”), optimistic thinking (e.g., “Carry herself/himself with confidence?”), personal responsibility (e.g., “Serve an important role at home or school?”), relationship skills (e.g., “Compliment or congratulate somebody?”), self-awareness (e.g., “Show an awareness of her/his personal strengths?”), self-management (e.g., “Pass up something he/she wanted now, to get something better in the future?”), and social awareness (e.g., “Cope well with insults and mean comments?”). All items were rated on a 5-point scale (1=never, 5=almost always). Scores for each subscale were averaged across the respective items to create a composite score of social-emotional competencies (α = .97 at both pre- and post-intervention).

**Positive youth development.** Nine constructs comprised positive youth development outcomes: internalizing behaviors, anxiety, depression, anger, delinquency, substance use, academic aspirations, grades, and school misbehaviors.

***Internalizing behaviors.*** Parents/guardians reported mentee’s internalizing behaviors (e.g., “overtired without good reason,” “There is very little he/she enjoys”) using theChild Behavior Checklist (Achenbach & Rescorla, 2001; α = .86, .85 at pre- and post-intervention, respectively). Each item was rated on a 3-point scale (1=not true, 2=somewhat or sometimes true, 3=very true or often true).

***Anxiety***. Anxiety was measured with 10 items (e.g., “I often worry about something bad happening to me”) from the revised Children’s Manifest Anxiety Scale (Gurley, 2011; α = .84, .87 at pre- and post-intervention, respectively). Each item was rated on a binary scale (0=no, 1=yes).

***Depression***. Depression was measured with 9 items (e.g., “I was tired all the time”) using the revised Center for Epidemiologic Studies Depression Scale (Haroz et al., 2014; α = .89, .91 at pre- and post-intervention, respectively). Mentee answered the frequency of their symptoms in the past week (range= 0-7 days).

***Anger***. Anger was measured with 3 items (e.g., “I get mad”) from the Brief Anger Scale (Deffenbacher et al., 1996; α = .93, .94 at pre- and post-intervention, respectively). Each item was rated on a 11-point scale (0=never, 10=all of the time).

***Delinquency.*** The frequency of delinquent behaviors in the past month (range = 0-30 days) was measured with 6 items (e.g., “I damaged property that did not belong to me”; α = .72, .85 at pre- and post-intervention, respectively).

***Substance use.*** The frequency of substance use (e.g., marijuana, alcohol) in the past month (range = 0-30 days) was measured with 4 items (e.g., “I used marijuana”; α = .79, .82 at pre- and post-intervention, respectively).

***Academic aspirations.*** Mentees reported their academic aspirations with 3 items (e.g., “I plan to continue my education following high school”) using the Student Engagement Instrument (Appleton, Christenson, Kim, & Reschly, 2006; α = .88, .90 at pre- and post-intervention, respectively). Each item was rated on a 11-point rating scale (0=disagree, 10=agree).

***Grades.*** Mentee reported their GPA (1=mostly F’s to 9=mostly A’s).

***School misbehaviors***. The frequency of school misbehaviors in the past month (range = 0-30 days) was measured with 8 items (e.g., “I didn’t finish my homework,” “I skipped a whole day of school”; α = .82, .76 at pre- and post-intervention, respectively).

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Table 2 Here

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Tables 3 & 4 Here

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**Analytic Approach**

**Missing Data.** Missing data occurred primarily on the outcome measures (i.e., post-intervention) as a result of dropout from the program or failure to complete the post-intervention survey. A total of 62 participants dropped out before the end of the program, including 36 from the control condition and 26 from the treatment condition. A *X2* test of independence was conducted to determine if dropout from the program differed as a function of condition. There was no evidence of a significant difference (*X2* (1) = 1.78, *p* = .18).

A series of logistic regression models to determine if any of the pre-intervention measures were predictive of drop out. Given this involved testing 24 different demographic, background, or pre-intervention construct measures, a more conservative alpha (alpha = .01) was used for testing these differences. Several variables predicted the odds of dropping out. Participants who were older, had greater baseline individual risk, had more internalizing behaviors and used substances had a greater odds of dropping out. Participants who were more academically oriented (better school grades, greater future orientation) had a lower odds of dropping out. Of those who remained in the program, 46 mentees did not complete the post-intervention survey, including 20 from the control condition and 26 from the treatment condition. A *X2* test of independence was conducted to determine if their nonresponse differed as a function of condition. There was no evidence of a significant difference (*X2* (1) = .65, *p* = .42). The same technique described above was used to examine whether any of the demographic, background, or pre-intervention variables predicted failure to complete the post-intervention assessment. No variables were predictive of missing the post-intervention survey.

Using an intent to treat approach, all participants who were randomly assigned were retained in data analysis. Listwise deletion of cases due to missing data can severely bias estimates (Allison, 2012). In order to properly account for missing data due to dropout and due to survey non-response, full information maximum likelihood (FIML), an estimator that allows all cases to be retained in the analysis was used to fit each treatment effects model. It has been demonstrated that FIML can recover the bias caused by predictable reasons for missingness when other variables that are related to missingness or predict missingness are included in the model (Collins et al., 2001). Given that each of the models include baseline demographic characteristics as well as the baseline version of the outcome, FIML’s ability to adequately account for missing data is tenable.

While FIML is helpful for missing data on the outcome variables, cases with missing data on the predictors (e.g., demographic, background, or pre-intervention variables) cannot be handled using FIML. As demonstrated in Table 1 (for demographic variables) and Tables 3 and 4 (for construct measures), only a small number of cases were missing on these variables. Thus, mice, a R package (van Buuren, & Groothuis-Oudshoorn, 2011), was used to impute missing values on the variables measured prior to the start of the intervention. Given the few missing cases, a single imputation was performed.

**Partitioning of variance.** The study design represents a three-level model (Raudenbush & Bryk, 2002) in which mentees (level 1) were nested within mentoring groups (level 2) and mentoring groups were nested within sessions (level 3). Thus, each level 1 outcome (e.g., mentee’s sense of belonging at post-intervention) has the potential to vary at each level. For example, at level 1, mentees may vary in their sense of belonging – some mentees may experience a high degree of bonding, while others may experience a low level of bonding. At level 2, the average level of belonging among mentees in a family may vary – some mentoring groups may be comprised of mentees with a greater sense of belonging than other mentoring groups. Finally, the average level of belonging of mentees in a session may vary – the average level of belonging may be higher in some sessions compared to others. To gain a sense of how much of the variability of each program outcome existed at level 2 and level 3 (as compared to level 1), the intraclass correlation (ICC) was calculated. The ICCs (presented in Tables 3 and 4 for the post-intervention outcomes) describe what percentage of the total variability is observed at level 2 (mentoring group) and level 3 (session). Only a small amount of the variability in each outcome was captured at these upper levels. For example, in the treatment condition, 6% of the variability is attributed to mentoring group differences and 2% of the variability is attributed to session differences. The remainder (92%) is attributed to between mentee differences. For each variable, analyses tested whether the variability at level 2 and level 3 of the multilevel model differed across condition; results showed no significant differences (all *p’s* > .05).

**Analysis of the effect of the treatment condition.** Each of the program outcomes was modeled in a separate 3-level, random-intercept, multilevel model. Each mentee’s pre-intervention score[[1]](#footnote-1) for the outcome of interest and demographic/background information (i.e., age, gender, race, parent’s education and income, and a combined risk assessment—average of individual and environmental risk) were included at level 1 as fixed effect control variables. Treatment condition (group mentoring = 1, no group mentoring = 0) was included as a level 3 effect. The effect of treatment condition captured the expected difference in the outcome between mentees in the treatment condition and mentees in the control condition, holding constant the covariates. A 95% confidence interval (2-sided) that does not contain 0 for this expected difference is indicative of a treatment effect.

**Analysis of intervention effects within each condition.** In addition, a post-hoc analysis was conducted to determine if there were significant changes in the outcomes from pre- to post-intervention within each condition. When analyzing the conditions separately, there were only 12 sessions at level 3, therefore, a three-level model is not viable. Instead, a two-level model (mentees at level 1, mentoring group at level 2), random intercept, multilevel model was fit. This multilevel model was specified as a multiple group model, one group representing the treatment condition and one group representing the control condition. In these models, the variability of the scores at pre- and post-intervention at each level was allowed to freely vary across conditions. These analyses were conducted for all outcomes measured at both pre- and post-intervention. To control for session in these models, a set of dummy coded variables was used to explain variation across sessions within each condition, thereby treating session as a fixed, rather than random, effect. Demographic variables were adjusted for as described in the previous model. A change score was calculated for each outcome and for each condition, holding constant the control variables at the mean. A 95% confidence interval (2-sided) that does not contain 0 for this expected difference is indicative of significant change from the beginning to the end of the program.

**Manipulation check.** Over the course of the intervention, social ties among mentors and mentees within each session were measured. It was expected that mentees would develop more ties with other members of their mentoring group if they were in the treatment condition. Therefore, the comparison of the number of social network ties across conditions was conceptualized as a manipulation check. If the mentoring groups were salient in the treatment condition, then mentees in the treatment condition (as compared to the control condition) would report having more social network ties at week 11 with people in their mentoring group. This supposition was in fact confirmed. Mentees reported more connections with other mentees in their mentoring group in the treatment condition (M = 1.14, *SD* = 1.11) compared to the control condition (M = .57, *SD* = .79), 95% CI for difference in log count of ties = .17, .37. Mentees also reported more connections with mentors in their mentoring group in the treatment condition (M = 2.15, *SD* = 1.34) compared to the control condition (M = 1.20, *SD* = .79), 95% CI for difference in log count of ties = .17, .41.

R, version 3.5.3 (R Core Team, 2020), and the tidyverse (Wickham et al., 2019) was used for all data management, table creation, and graphs. The multilevel models were fit using Mplus, Version 8.4 (Muthén & Muthén, 2018), using a full-information robust maximum likelihood (MLR) estimator for multilevel models. MplusAutomation, an R package, was used to collate results (Hallquist, & Wiley, 2018).

**Results**

**Comparison of Treatment Conditions**

Figure 1 presents the estimated difference (and 95% confidence interval) between the treatment condition and control condition for key constructs of all three outcome domains. A 95% confidence interval that does not include 0 (see the gray vertical line marking 0 on the x-axis) would indicate a significant difference between the treatment and control groups at post-intervention; however, all 95% confidence intervals include 0. This indicates that there were no significant differences in any of the post-intervention outcomes between the treatment and control conditions. That is, these results provide no support for the hypothesis that youth in the mentoring group condition would show better outcomes. Further, the groups did not differ with respect to setting quality (e.g., supportive relationships, opportunities to belong and build skills, exposure to positive social norms, support for efficacy and mattering) or mentoring relationship quality (i.e., mentoring alliance).

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Figure 1 Here

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**Pre- to Post-Intervention Changes within Condition**

Figure 2 presents the estimated change (and 95% confidence interval) in all outcomes from pre- to post-intervention for participants in the treatment condition and for participants in the control condition. For this analysis, a 95% CI that does not cross 0 (the gray vertical line) is indicative of significant change. For desirable constructs (e.g., social-emotional competencies) a point estimate to the right of the vertical line marking 0 demonstrates improvement. For undesirable constructs (e.g., anger) a point estimate to the left of the vertical line marking 0 demonstrates improvement. For most of key constructs, significant improvements were observed within both the treatment and the control condition. For example, mentees in both conditions exhibited reductions in emotional dysregulation (e.g., anger, anxiety, internalizing behaviors), and improvements in developmental outcomes (e.g., meaning in life, social-emotional competencies, developmental assets). Large improvements in mentee’s sense of belonging and mattering in the program (compared to their pre-intervention expectation) were observed for both conditions. Standardized mean differences (Cohen’s *d,* Cumming, 2012) were calculated for all outcomes of interest across time (pre- to post-intervention) to understand the program effect size and compare them to other similar types of mentoring programs serving at-risk youth. Effect sizes ranged from |.00| (for substance use) to |1.02| (for belonging). Most of the effect sizes were below .2 (Cohen’s threshold for a small effect). Several were in the small to moderate range (meaning in life, developmental assets, conscientiousness, and anger). Two constructs, belonging and mattering at Campus Connections, exceeded .5 -- Cohen’s threshold for a moderate effect. These findings are in line with recent meta-analytic studies (Christensen et al., 2020; Raposa et al., 2019) that showed small effects.

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Figure 2 Here

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**Sensitivity Analysis**

Two alternative methods were considered for examining the effect of condition on the outcomes. First, the three-level models were refit as two-level models. The benefit of this approach is that it avoids having a third level with relatively few units (i.e., 24 sessions) and little variability in the outcomes, the drawback is that it is not testing the condition effect at the proper level. Results were similar to the three-level modeling approach, indicating no significant impact of the treatment condition on the outcomes.

Second, in the two-level multiple group models specified to assess within-condition changes (i.e., the models fit to produce Figure 2), the change in each outcome from pre- to post-intervention was constrained to be constant across condition, thereby assessing whether change differed significantly for participants in the treatment condition compared to participants in the control condition. The drawback of this approach is that it does not test the condition effect at the proper level (a three-level model is not viable in this context with only twelve groups within each condition); however, the benefit is that it allows the residual variance within each condition to freely vary. Results indicated that mentees in the treatment condition showed significant improvement in grades relative to mentees in the control condition (i.e., the 95% confidence interval for the difference in pre- to post-intervention change did not include 0), although their academic aspirations slightly decreased. Conversely, mentees in the control condition showed a significantly greater improvement in academic aspirations relative to mentees in the treatment condition. No other differences were found.

**Discussion**

Site-based youth mentoring programs provide adolescents with essential access to significant relationships with caring, nonparental adults and positive developmental context. The relative ease of implementation and intuitive appeal of such programs is reflected in high community uptake (Garringer et al., 2017). Not surprisingly, as a result, systematic research trails behind, leaving many unanswered questions. Central to this study was the question of whether organizing one-to-one matches in small groups would result in better youth outcomes as compared to matches participating independent of such groups. Group-based mentoring models demonstrate similar effects to one-to-one models in meta-analytic reviews (DuBois et al., 2011), yet recent research points to the potential for mentoring groups to serve as better conduits for improving youth’s experience within site-based programs than one-to-one relationships alone, thereby producing more robust outcomes. Using a randomized controlled trial, this study evaluated the relative impact of mentoring groups (i.e., small groups of four mentor-mentee matches) on youth outcomes within a site-based program called Campus Connections.

In this study, better scores on the outcomes of interest were observed at post-intervention (as compared to pre-intervention) for most measured variables in both conditions (mentoring groups and dyad-only). Mentees in both conditions exhibited reductions in behavioral difficulties, anger, anxiety, depression and internalizing behaviors and improvements in conscientiousness, developmental assets, socio-emotional competencies, meaning in life, and self-efficacy. Mentee’s sense of belonging and mattering in the program (compared to their pre-intervention expectation) also improved for both conditions. Contrary to what was hypothesized, however, no differences were observed in youth outcomes, mentor relationship quality, or setting quality as a function of treatment condition. In other words, there was no advantage or disadvantage to organizing matches within groups. The assumption that the larger community context within Campus Connections would be inaccessible and ineffective without mentoring groups was not supported in the findings. Indeed, matches were able to glean benefit in spite of not experiencing the smaller group setting.

Several possibilities exist for why organizing matches into mentoring groups within the larger community context produced similar outcomes to a condition in which matches navigated the program independent of such groups. One possible explanation is that the larger context is sufficiently saturated with opportunities for youth to experience the positive development features of safety, appropriate structure, opportunities for belonging and skill building, positive social norms, and support for efficacy and mattering within the program. A hallmark of the Campus Connections program is the creation of a community context that is welcoming, engaging, productive, and fun. Staff and mentor training prioritizes the importance of, and practical strategies for, ensuring that youth have a positive experience. For instance, mentors, therapists, and mentor coaches greet all youth by name and inquire about recent events in youth’s lives, such as their new puppy or their grandmother’s illness. During the last two hours of each weekly session, youth are able to choose to participate with their mentor and other matches in two of several possible prosocial activities, such as mosaic tiling, soccer, slam poetry, hip hop dancing. Participating in these activities with others in the program allows youth opportunities for belonging, for building skills, for developing a sense of efficacy and mattering, and exposure to positive social norms.

Another possible explanation for why no added value was produced by the mentoring groups is that, although it was believed that the small groups would serve as a primary means of ensuring and deepening youth’s positive experience of the larger community setting, it may be that the mentoring relationship was a sufficient conduit by which youth experienced safety, belonging, mattering, self-efficacy, and positive social norms within the larger community context. During training, mentors learn and practice how to facilitate the youth’s positive interactions with positive developmental setting features. For example, mentors are trained to facilitate their mentees’ feelings of belonging and mattering during the initial stages of the program by introducing their mentees to other mentors and mentees. In later stages, mentors are trained to facilitate their mentees’ relationship with others in the program through a variety of means, such as sharing a compliment about their mentee with other mentors and staff, connecting their mentee with a mentor who shares a similar or unique life experience, or asking another mentor to provide guidance on a specific career interest or specialized topic of homework. Mentors also learn to promote the mentees’ self-efficacy by finding possibilities for their mentee to assume a leadership role (e.g., facilitating a program activity with them or join) or share a talent (e.g., sing during a program activity), and by giving them as many choices as possible within the existing structure of the program (e.g., where to go on the weekly campus walks).

In keeping with Rhodes’ (2005) model of youth mentoring, a primary mechanism of program change within Campus Connections is assumed to be the quality of mentoring relationships. Mentoring groups were hypothesized to facilitate stronger mentoring relationships through additional support, but the results suggest that mentor relationship quality is robust to this condition and is instead supported by other program features. Further research is needed to determine which features within the program context support high quality mentoring relationships. One possibility is that the mentor training and in-the-moment support available to mentors by therapists and instructors is a sufficient and primary means of support to the mentoring relationship in both conditions.

**Practice Implications and Future Directions**

The results of this study highlight the continued importance of seeking to identify the key mechanisms of change within mentoring programs and of conducting rigorous evaluations of key program components. The results also highlight one of the strengths of mentoring as an intervention strategy for promoting positive youth development; that is, mentoring can be effective in a diversity of program designs. For instance, there is evidence for the effectiveness of one-on-one mentoring, group mentoring, hybrid mentoring, and site-based models, and in diverse types of settings (schools, after-school programs, etc). Although this study was not a test of mentoring, youth appeared better off at the end of the intervention in both conditions within a site-based intervention, which provides empirical support for program flexibility.

In programs with less emphasis on the community structure or onsite support, mentoring groups may still serve the hypothesized functions in a cost efficient and effective way. Further research should test the impact of mentoring groups in diverse program models. It also may be that programs want to employ mentoring groups for practical reasons or to achieve some other aim (e.g., group-related outcomes or processes). For example, a mentoring program targeting youth civic and political engagement may hypothesize specific group processes, such as communication, cohesion, trust, teamwork, and problem solving as necessary. In those cases, mentoring groups may serve a specific function for a targeted outcome. Within Campus Connections, mentoring groups also provide solutions to practical issues, such as providing a known substitute mentor for a youth whose mentor is absent, providing additional peer support for mentors who are matched with a youth who has atypically challenging behaviors, and by providing an efficient means for managing a large group and supervising many mentors at once.

The current study was designed to test a set of specific a priori hypotheses – (a) participants in the mentoring group condition would demonstrate more desirable youth outcomes, as compared to participants in the control condition and (b) mentoring group effect on youth outcomes would be mediated by features of quality settings and higher quality mentoring relationships. After testing these hypotheses, social network and contextual effects analyses are logical next steps. For instance, the next study will examine the effect of varied social networks on the mentee’s outcomes within the mentoring group condition. This analysis will help to identify what type of acquired social network is most beneficial (e.g., a close tie with mentor, a close tie with several mentors, greater ties with peers). In the same way, future research should examine whether and how a broader social network of peers and caring adults contributes to greater gains in developmental outcomes as adolescents age beyond the post-intervention time point.

Finally, this study did not address the experience of mentors within the program as a function of condition. Part of the rationale for using mentoring groups is an assumption that the group could be helpful to mentors, such as releasing pressure, providing back-up support, and increasing enjoyment. Mentoring groups may also assist in managing expectations and promoting mentor retention. Qualitative evidence speaks to a potential role of mentoring groups in helping mentors build relationships with one another (Masked for review, 2014), which may promote mentor satisfaction. Within Campus Connections, all mentors are supported by undergraduate mentor coaches, family therapist trainees, and human development and family studies faculty) and are enrolled in a service learning course, which discourages dropout and includes timely training and monitoring before, during and after each mentoring session. While mentors in most mentoring programs are supported and monitored, the type of support and supervision may differ from this structure. Evaluating whether, and how, mentoring groups serve mentors across varied program models would be an additional future direction.

**Limitations**

Despite the notable strengths of this study, there are some limitations. First, the findings were based on short-term outcomes. An important direction for future study would include a follow-up test to examine long-term benefits of the mentoring program in terms of positive youth development. Second, the outcome variables were treated entirely independently, although these outcomes are likely interrelated. For example, academic aspirations may have explained being behind in grades. In this regard, possible mediation and/or moderation analyses are warranted in future research. Finally, outcome measurement was exclusively self- and parent-reported. Observer reports may provide a more comprehensive understanding of outcomes.

**Conclusion**

Site-based youth mentoring models account for a large percentage of models nationwide. Attending to the quality of the setting and the mechanisms by which youth engage positively with their mentors and the setting remains an important endeavor. Using a randomized controlled trial design, this study tested the relative impact of mentoring groups on positive youth outcomes. Participants in both conditions showed desirable change on most measured outcomes, and no differences were observed as a function of treatment condition. Research findings that extend from this and future analyses holds great potential to inform a growing science of youth mentoring. Youth mentoring models can vary widely in structure (e.g., one-to-one, group), purpose (e.g., academic success, mental health), and population (e.g., middle school youth, youth with autism spectrum disorder). As youth mentoring interventions continue to specify and test program theories, more will be understood about the conditions that make change possible within varied program models.

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms and profiles.* Burlington, VT: University of Vermont Research Center for Children, Youth, and Families.

Allison, P. D. (2012, April). Handling missing data by maximum likelihood. In *SAS global forum* (Vol. 2012, No. 312, pp. 1038-21). Haverford, PA: Statistical Horizons.

Appleton, J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology, 44,* 427-445. https://doi.org/10.1016/j.jsp.2006.04.002

Cavell, T. A., & Elledge, L. C. (2014). Mentoring and prevention science. In Dubois, D. L, Karcher, M. J. (Eds.). *Handbook of youth mentoring* (pp. 29-42). Thousand Oaks, CA: Sage. http://dx.doi.org/10.4135/9781412996907.n3

Cavell, T. A., Elledge, L. C., Malcolm, K. T., Faith, M. A., & Hughes, J. N. (2009). Relationship quality and the mentoring of aggressive, high-risk children. *Journal of Clinical Child and Adolescent Psychology, 38,* 185-198. <https://doi.org/10.1080/15374410802698420>

Chesmore, A. A., Weiler, L. M., & Taussig, H. N. (2017). Mentoring relationship quality and maltreated children’s coping. *American Journal of Community Psychology, 60,* 229-241. <https://doi.org/10.1002/ajcp.12151>

Christensen, K., Hagler, M., Stams, G., Raposa, E., Burton, S., & Rhodes, J. (2020). Non-specific versus targeted approaches to youth mentoring: A follow-up meta-analysis. *Journal of Youth and Adolescence*, *49*(5), 959–972. <https://doi.org/10.1007/s10964-020-01233-x>

Collins, L. M., Schafer, J. L., & Kam, C. M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological methods, 6*(4), 330.

Cumming, G. (2012). *Understanding the new statistics: Effect sizes, confidence*

*intervals and meta-Analysis*. NewYork: Routledge.

Deffenbacher, J. L., Oetting, E. R., Lynch, R. S., & Morris, C. D. (1996). The expression of anger and its consequences. *Behavior Research and Therapy, 34,* 575-590. https://doi.org/10.1016/0005-7967(96)00018-6

Deutsch, N. L., Reitz-Krueger, C. L., Henneberger, A. K., Futch Ehrlich, V. A., & Lawrence, E. C. (2017). “It gave me ways to solve problems and ways to talk to people” Outcomes from a combined group and one-on-one mentoring program for early adolescent girls. *Journal of Adolescent Research, 32*, 291-322. https://doi.org/10.1177/0743558416630813

Deutsch, N. L., & Spencer, R. (2009). Capturing the magic: Assessing the quality of youth mentoring relationships. *New Directions for Youth Development, 121,* 47-70. https://doi.org/ 10.1002/yd.296.

Deutsch, N. L., Wiggins, A. Y., Henneberger, A. K., & Lawrence, E. C. (2013). Combining mentoring with structured group activities: A potential after-school context for fostering relationships between girls and mentors. *Journal of Early Adolescence, 33,* 44-76. https://doi.org/10.1177/0272431612458037

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, 12,* 57-91. https://doi.org/10.1177/1529100611414806

Eccles, J. S., & Gootman, J. A. (2002). *Community programs to promote youth development.* Washington, DC: The National Academies Press. https://doi.org.10.17226/10022.

Elliot, G., Kao, S., & Grant, A. M. (2004). Mattering: Empirical validation of a social-psychological concept. *Self and Identity, 3,* 339-354. https://doi.org/10.1080/13576500444000119

Garringer, M., McQuillin, S., & McDaniel, H. (2017). *Examining youth mentoring services across America: Findings from the 2016 mentoring program survey.* Boston, MA: MENTOR. https://doi.org/10.13140/RG.2.2.18166.70728.

Goldner, L., & Mayseless, O. (2009). The quality of mentoring relationships and mentoring successes. *Journal of Youth and Adolescence, 38,* 1339-1350. https://doi.org/ 10.1007/s10964-008-9345-0.

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38,* 581-586. https://doi.org/10.1111/j.1469-7610.1997.tb01535.x

Griffith, A. N., Melton, T. N., & Deutsch, N. L. (2019). How group experiences influence mentor–mentee relational development in a combined group and one-on-one mentoring program for early adolescent girls. *Applied Developmental Science*, 1-18. https://doi.org/10.1080/10888691.2018.1555042

Gurley, J. R. (2011). Revised children’s manifest anxiety scale (2nd ed.). In S. Goldstein, & J. A. Naglieri (Eds.), *Encyclopedia of Child Behavior and Development.* Boston, MA: Springer. <https://doi.org/10/1007/978-0-287-79061-9_2435>

Hallquist, M. N. & Wiley, J. F. (2018). MplusAutomation: An R Package for Facilitating Large-Scale Latent Variable Analyses in Mplus. *Structural Equation Modeling, 25*, 621-638 https://doi.org/10.1080/10705511.2017.1402334

Haroz, E. E., Ybarra, M., & Eaton, W. W. (2014). Psychometric evaluation of a self-report scale to measure adolescent depression: The CESDR-10 in two national adolescent samples in the United States. *Journal of Affective Disorders, 158,* 154-160. https://doi.org/ 10.1016/j.jad.2014.02.009.

Herrera, C., Sipe, C. L., McClanahan, W. S. (2000). Mentoring school-age children: Relationship development in community-based and school-based programs. (Report No. ED441006). Retrieved from https://files.eric.ed.gov/fulltext/ED441066.pdf

Herrera, C., Vang, Z., & Gale, L. Y. (2002). *Group mentoring: A study of mentoring groups in three programs.* Philadelphia, PA: Public/Private Ventures

John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 102-138). New York, NY: The Guilford Press.

Komosa-Hawkins, K. (2010). Best practices in school-based mentoring programs for adolescents. *Child and Youth Services, 31,* 121-137. https://doi.org/10.1080/0145935X.2009.524477

Kuperminc, G. P. (2016). *Group mentoring: National Mentoring Resource Center model review.* New York, NY: National Mentoring Resource Center. Retrieved from http://nationalmentoringresourcecenter.org

Kuperminc, G. P., Chan, W. Y., & Hale, K. E. (2018). *Group mentoring for resilience: Increasing positive development and reducing involvement in the juvenile justice system.* (Report No. 252131). Retrieved from https://www.ncjrs.gov/pdffiles1/ojjdp/grants/252131.pdf

Lawrence, E. C., Levy, M., Martin, N., & Strother-Taylor, J. (2008). *One-on-one and group mentoring: An integrated approach.* Folsom, CA: Mentoring Resource Center. (pp. 1-5). Retrieved from http://www.edmentoring.org/pubs/ywlp\_study.pdf

LeBuffe, P. A., Shapiro, V. B., & Naglieri, J. A. (2009). The Devereaux Student Strengths Assessment (DESSA): Assessment, technical manual, and user’s guide. Charlotte, NC: Apperson, Inc.

Lerner, R. M. (2004). *Liberty: Thriving and civic engagement among America’s youth.* Thousand Oaks, CA: Sage. http://dx.doi.org/10.4135/9781452233581

McQullin, S. D., Lyons, M. D., Clayton, R. J., & Anderson, J. R. (2018). Assessing the impact of school-based mentoring: Common problems and solutions associated with evaluating nonprescriptive youth development programs. *Applied Developmental Science,* 1-15. https://doi.org/10.1080/10888691.2018.1454837

Muthén, L.K. & Muthén, B.O. (2018). *Mplus user’s guide* (8th ed.). Los Angeles, CA: Muthén & Muthén.

Plourde, K. F., Ippoliti, N. B., Nanda, G., & McCarraher, D. R. (2017). Mentoring interventions and the impact of protective assets on the reproductive health of adolescent girls and young women. *Journal of Adolescent Health, 61*, 131-139. https://doi.org/10.1016/j.jadohealth.2017.03.002

Raposa, E. B., Rhodes, J., Stams, G. J. J. M., Card, N., Burton, S., Schwartz, S., Skyes, L. A. Y., Kanchewa, S., Kupersmidt, J., & Hussain, S. (2019). The effects of youth mentoring programs: A meta-analysis of outcome studies. *Journal of Youth and Adolescence, 48,* 423-443. doi. 10.1007/s10964-019-00982-8.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage.

R Core Team (2020). R: A language and environment for statistical computing. R foundation for statistical computing, Vienna. https://www.R-project.org

Rhodes, J. E. (2005). A model of youth mentoring. In D. L. DuBois & M. J. Karcher (Eds.), The *Handbook of youth mentoring.* (pp. 30-43). Thousand Oaks, CA: Sage. http://dx.doi.org/10.4135/9781412976664.n3

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69,* 719-727. https://doi.org/10.1037/0022-3514.69.4.719

Search Institute (1997). *The developmental assets profile.* Minneapolis, MN: Author. Retrieved from www.searchinstitute.org

Search Institute (2005). Y*outh and programs strengths survey*. Minneapolis, MN: Author. Retrieved from www.searchinstitute.org

Sherer, M., Maddux, J. E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogers, R. W. (1982). The self-efficacy scale: Construction and validation. *Psychological Reports, 51,* 663-671. https://doi.org/10.2466/pr0.1982.51.2.663

Shin, Y., & Rew, L. (2010). A mentoring program for the promotion of sexual health among Korean adolescents. *Journal of Pediatric Health Care*, *24,* 292–299. https://doi.org/10.1016/j.pedhc.2009.07.005

Spencer, R. (2007). “It’s not what I expected”: A qualitative study of youth mentoring relationship failures. *Journal of Adolescent Research, 22,* 331-354. https://doi.org/10.1177/0743558407301915.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53,* 80-93. https://doi.org/10.1037/0022-0167.53.1.80.

van Buuren S., & Groothuis-Oudshoorn K (2011). Mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*,*45*(3), 1-68. https://www.jstatsoft.org/v45/i03/

Wickham, H., Averick, M., Bryan, J., Chang, W., Mcgowan, L., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S., Müller, K., Ooms, J., Robinson, D., Seidel, D., Spinu, V., . . . Yutani, H. (2019). Welcome to the Tidyverse. *Journal of Open Source Software, 4*(43). https://doi.org/10.21105/joss.01686

Williams, J. L., Molloy Elreda, L., Henderson, L. J., Deutsch, N. L., & Lawrence, E. C. (2019). Dyadic connections in the context of group mentoring: A social network approach. *Journal of Community Psychology, 47*, 1184-1196. https://doi.org/10.1002/jcop.22180

1. Some variables were only measured at post-intervention (see Table 3 and 4). For these variables, pre-intervention score for expectations to belong at CC was included. [↑](#footnote-ref-1)