THESIS

THE INFLUENCE OF MENTOR RELATIONSHIP QUALITY AND YOUTH'S SENSE OF BELONGING ON ADOLESCENT SUBSTANCE USE

Submitted by

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ABSTRACT

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Objective: Adolescent substance use (alcohol, cannabis, and nicotine) is a public health concern that negatively impacts youth and their ability to successfully navigate through life. Mentoring is an intervention tool used to reduce problem behaviors in adolescents, and research suggests that the mentoring relationship quality and a youth's sense of belonging within a mentoring program may be crucial to its effectiveness. The proposed study seeks to examine mentorship quality and youths' sense of belonging as they relate to adolescent substance use in a secondary data analysis of Campus Connections and explore sustained abstinence in substance use between mentee and mentor reports of mentor alliance. Method: 680 adolescent mentees participated in Campus Connections and completed a survey at the beginning and end of the program which assessed for substance use, mentor alliance, and their sense of belonging in the program. To account for abstinence, the data was subsetted to only include mentees that reported no substance use at baseline. 526 mentees were used in analyses. Firth logistic regression models were used to address the study's hypotheses. Results: A high-quality mentee reported relationship was associated with decreased odds of using substances at follow-up. Similarly, as a mentee's reported sense of belonging increased, the odds of them using substances at follow-up decreased. Lastly, there was a significant difference between the mentee and mentor reported relationship quality where the mentee report was a stronger predictor of sustained abstinence at study end. Conclusion: This study established a relationship between mentor alliance and youth's sense of

belonging as a preventative method for continued abstinence. Understanding the factors within mentoring that contribute to positive outcomes for youth can help further develop mentoring as an intervention and improve techniques to maximize effectiveness. In addition, these findings may inform intervention and treatment recommendations that include mentoring and encourage future researchers to explore additional factors that contribute to mentoring successfulness in positively impacting adolescent substance use.

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INTRODUCTION

Mentoring – Definition and History

Mentoring is a dyadic long-term relationship between a supervisory adult and a less experienced individual that fosters the mentee's personal, professional, and/or academic development through structured support, guidance, and care (Donaldson et al., 2000). While mentoring programs universally strive to promote positive youth outcomes, they tend to vary in their structure, procedure, emphasis, and goals. Specifically, some programs maintain broad developmental goals to enhance multiple domains/aspects in a youth's life, while other programs provide a narrower focus such as improving academic performance, enhancing social and emotional development, preparing youth for occupational endeavors, or reducing substance misuse and other delinquent behaviors (DeWit et al., 2016; Herrera et al., 2013; Jekielek et al., 2002; Tolan et al., 2014). Although the specific components of mentoring programs differ, the primary goal of all mentoring programs is to pair a nurturing, capable non-parental adult with a youth who typically comes from a disadvantaged background (Keller, 2005; Rhodes, 2002).

Evidence for the effectiveness of youth mentoring interventions suggests benefits for a broad range of outcomes for diverse youth populations with varying program models (DuBois et al., 2011; Raposa et al., 2016). Mentoring has been shown to improve the positive development of youth who have experienced adversity and assist in reducing negative outcomes (DeWit et al., 2016). Youth who have experienced adversity are defined as adolescents who are less likely to transition successfully into adulthood (Keating et al., 2002). When an effective mentoring relationship is created, there are significant advantages to the youth. These include higher self-esteem, deterring risky behaviors, higher prosocial behavior, greater performance in school,

improved mental health, reduced substance misuse, reduced delinquent behavior, an increase in both peer and family connections, and reduced rates of overall risky behaviors (Blinn-Pike, 2007; Eby et al., 2008; Herrera et al., 2011, 2013; Protogerou & Flisher, 2012; Tolan et al., 2014; Willaims et al., 2014). A study conducted by Gulley et al. (2016) found that mentoring programs improved youths' mental health, social interactions, and positive behaviors. Additionally, they found that youth who participated in a mentoring program had greatly increased coping skills and support from parental figures. In a similar study, mentoring was found to increase quality of life and decrease social anxiety for youth (Curtin et al., 2016).

Mentoring - Theory

Stewart and Openshaw (2014) suggest that the influential impact of a rewarding mentoring relationship can be considered through a wide variety of theoretical lenses. There is a growing body of research focusing on both traditional and contemporary theories of delinquent risk and protective factors that support the expanded use of mentoring youth who have experienced adversity (Agnew, 2011; Howell, 2003; Jenson & Fraser, 2015; Matz, 2014; Mmari et al., 2010; Murray & Farrington, 2010; Reingle et al., 2012; Shoemaker, 2009; Thornberry et al., 2004; Vanderbilt-Adriance & Shaw, 2008). This includes theories and research that primarily investigate factors such as social bonds, social disorganization, social learning, and strain. Research suggests that by creating a caring and sustained relationship between a supportive adult mentor and a youth who has experienced adversity reduces risky behaviors and increases protective factors at the individual, family, peer, academic, and community levels (DuBois et al., 2011; DuBois & Karcher, 2013; Miller et al., 2013; Stewart & Openshaw, 2014; Tolan et al., 2014).

Rhodes et al. (2006) proposed a mentoring model highlighting the importance of providing a supportive and caring relationship between a youth who has experienced adversity and a non-parental adult. Specifically, they suggest that mentoring affects youth through three interrelated processes: (1) enhances adolescent's social relationships and emotional well-being, (2) improves their cognitive abilities through tutoring and engagement, and (3) promotes positive identity development by serving as role models and supporters through mentoring. These processes are likely to interact and influence one another throughout the mentoring relationship (Rhodes et al., 2002, 2005a, 2005b, 2006). An in-depth literature review assessing these interrelated processes is described next:

(1) *Social and Emotional Development:* Mentoring relationships may promote the social and emotional well-being and development of youth who have experienced adversity in several ways. Not only does the mentoring relationship provide an opportunity for adolescents to engage socially with their mentor, it provides corrective emotional experiences and assistance with emotion regulation that can be generalized to improve social relationships across multiple contexts (Rhodes, 2002, 2005a). Research on social support through mentoring highlights involvement in mutually pleasurable social activities as one method of developing a supportive relationship, often referred to as companionship (Sarason & Sarason, 2001). Mentors who use their relationships as opportunities for emotion regulation can enhance the social competence of their mentees, allowing for them to further develop their social network and develop deeper and more supportive relationships with their peers (Denham & Kochanoff, 2002; Rhodes et al., 2006).

(2) *Cognitive Development:* Mentoring can contribute to the cognitive development of youth who have experienced adversity by offering exposure to new opportunities for learning,

providing intellectual challenge and support, and by promoting/encouraging academic success (Rhodes et al., 2006). Research suggests that a key component for youth learning is the development of social relationships. For example, positive perceptions of student-teacher relationships are associated with increases in adolescent motivation, academic competence, achievement, school engagement, school value, and behavioral adjustment (Hamre & Pianta, 2001; Reddy et al., 2003; Roeser & Eccles, 1998). Additionally, mentors can encourage a positive attitude toward school, increase academic efforts, and assist with schoolwork that the youth may be struggling to complete (Herrera, 1999; Herrera et al., 2000; Rhodes et al., 2006). Research on adolescent education and academic learning report that effective mentors are not overbearing in direction but are more responsive of the youth's needs and engage in an appropriate balance of support, structure, difficult tasks, and enjoyment (Csikszentmihalyi & Rathunde, 1998; Rhodes et al., 2006).

(3) *Identity Development:* By serving as role models and positive supporters in the youth's life, mentors can assist in developing a positive identity. Rhodes model of mentoring incorporates a positive shift in the contact that adolescents have with positive role models within the community (Rhodes et al., 2006). Research suggests that youth create their identity based on the behaviors and engagement of the people around them, which may inform their decisions and behavior (Larson, 2000). Youth placed at risk due to low socio-economic status tend to have more limited opportunities to engage with positive role models which can lead to them believing that their opportunities for success are limited compared to their peers (Blechman, 1992; Larson, 2000; Rhodes et al., 2005a, 2006). This is crucial for development, as adolescents' self-image and identity are refined over time and help the youth navigate the transition into early adulthood. Research suggests that these youths' perception of acceptance, support, and affection from others

is crucial in positive identity development (Rhodes et al., 2006). As the mentors' positive appraisal becomes incorporated into the mentees' sense of self, it may modify the way the youth perceive themselves and how they believe others are perceiving them (Dubas & Snider, 1993; McLaughlin, 2000). Participation in such new opportunities can also facilitate identity development by providing experiences on which youth can draw to construct their sense of self (Youniss & Yates, 1997). When mentors promote youths' participation in prosocial activities and settings, they expose them to socially desirable or high-achieving peer groups with whom they can then identify.

Mentoring – Programs

When discussing mentoring as an intervention technique for at-risk adolescents, it is important to explore the application of programs. One commonly known program in the United States and Canada is the Big Brothers Big Sisters program. This program is designed to provide youth with a one-on-one relationship with a caring adult mentor for a minimum of one year, spending an average of 2-4 hours per week engaging in recreational, skill-focused, or career-oriented activities (DeWit et al., 2016). An impact study of the Big Brothers Big Sisters program found that mentees were 45.8% less likely to start using illegal drugs than were adolescents who were not active in the program and were 27.4% less likely to start using alcohol (Grossman & Tierney, 1998). Additionally, this study found an increased sense of belonging, higher academic achievement, increased social support, and increased quality of life 18 months after program participation (Grossman & Tierney, 1998; Herrera et al., 2011).

A similar program to Big Brothers Big Sisters is Campus Connections: a 12-week site-based mentoring program provided through Colorado State University (CSU) for youth who have experienced adversity. The mentees who participate in Campus Connections are typically

referred by the local school districts, the District Attorney's Office, the Department of Human Services, and the Probation Department. These youth are matched with undergraduate student mentors who receive course credit after completing 18 hours of training prior to program start and engage in supervision from Marriage and Family Therapist graduate students and instructors throughout the semester. The mentors and mentees meet for four hours of structured activities one night per week, which consists of exploring the university campus, personalized tutoring or other academic support, dinner, and two mentor-led pro-social activities chosen by each dyad. Each dyad has ample opportunity to interact with other dyads throughout the night and is most prominent during the pro-social activities. The Campus Connections program follows Rhodes et al. (2006) mentoring model, as the program aims to enhance mentee's social relationships and emotional well-being, advance their cognitive abilities through tutoring and engagement, and fosters positive identity development by the mentors serving as role models and supporters.

Research conducted on the Campus Connections program found that youth reported improved school experiences and performance, healthier relationships, increased self-worth, more positive outlooks on their future, and decreased engagement in delinquency (Haddock et al., 2017). Youth's overall self-reported outcomes were also significantly better at post-intervention compared to pre-intervention (Haddock, et al., 2020) and mentees rated the program components (i.e., structure, support, safety) and the relationship with their mentor as critically important (Haddock et al., 2017). Another study found mentees who reported high mentor relationship quality often expressed feelings of acceptance, empathy, and authenticity in their mentor relationship, while low mentor relationship quality dyads described their relationship as collaborative and fun, which may not be enough to produce positive outcomes for the youth (Kazlauskaite et al., 2020). Mentors and mentees were also more likely to report having a

positive mentoring alliance when the mentors reported relatively high levels of self-efficacy at the beginning of the relationship that increased throughout the semester (Boat et al., 2019). This study also found that greater mentor conscientiousness, extraversion, and agreeableness were associated with increased mentor-reported self-efficacy.

Mentoring – A Tool to Prevent Delinquent Behaviors

Adolescent delinquent behavior, including theft, substance misuse, possession of illicit substances, vandalism, trespassing, assault, and harassment is a serious problem in the United States and contributes to severe mental health problems in later life (Yancy et al., 2011). In 2012, more than 1.3 million adolescents were arrested for delinquent charges related to risky behaviors (Sickmund & Puzzanchera, 2014). These risky behaviors tend to cluster among adolescents who engage in multiple maladaptive behaviors, such as substance misuse, unprotected intercourse, aggressive behavior, violent tendencies, vandalism, and academic underachievement (Mason et al., 2007; The National Center on Addiction and Substance Abuse, 2004; Palermo, 2009).

Mentoring has been associated with a wide range of developmental benefits and positive outcomes, such as deterring these risky delinquent behaviors and promoting prosocial behavior (Eby et al., 2008; Williams et al., 2014). Developmental benefits include higher self- esteem, greater engagement and performance in school, reduced delinquency and substance misuse, and improved mental health (Blinn-Pike, 2007; Herrera et al., 2013). Mentoring has also provided reduced rates of depression and involvement in bullying, significant improvements in academics, and an increased positive connection to peers, family, and in school (King et al., 2002; Protogerou & Flisher, 2012). Improvement in these developmental outcomes has been linked to the prevention of delinquency and continued delinquency after a youth's first offense (Li et al.,

2011; Tolan et al., 2014). Mentoring of first-time offending youth has also been found to prevent negative outcomes and promote positive youth development (DeWit et al., 2016; Matz, 2014).

While research has explored the impact of delinquent behaviors on adolescents and the effective intervention of mentoring, an understudied area is the potential impact that mentoring may have on substance use specifically. Research suggests that among delinquent behaviors, substance misuse is a crucial influential factor to engaging in additional unwanted behaviors (Carney & Myers, 2012). Additionally, studies focusing on early onset of substance use have shown adolescents' use to be associated with high levels of conduct problems when untreated (Chassin et al., 1993, 2004, 2015, 2016; Costello et al., 1999; Hill et al., 2000; Loeber et al., 1999).

Mentoring – A Tool to Prevent Adolescent Substance Use

In 2001, 1.1 million American adolescents (ages 12 through 17) reported sufficient symptoms that met criteria for a substance misuse diagnosis (based on diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [DSM-IV]), yet fewer than 100,000 received treatment (Griswold et al., 2008; McLellan & Meyers, 2004). Initiation and escalation of substance use during adolescence is common (Steinberg et al., 1994; Yancey et al., 2011). Data from the Monitoring the Future (MTF) study, a national school-based survey, showed that adolescent substance use is relatively common by the end of high school (Griffin & Botvin, 2010; Kann et al., 2016; Kumar et al., 2002). When exploring alcohol use, age of onset as well as first intoxication is typically between 7th and 10th grade (Chassin et al., 2004, 2009, 2015; Hill et al., 2000; Kumar et al., 2002). Alcohol use before the age of 18 has been associated with a greater likelihood of developing substance dependence in adulthood by eightfold (Griswold et al., 2008; Tims et al., 2002). Additionally, adults who began to use alcohol before

age 15 are five times more likely to report dependence and/or misuse compared to those who began using alcohol at age 21 or older (Griswold et al., 2008).

Another commonly used substance during adolescence is cannabis (Steinberg et al., 1994; Yancey et al., 2011). Cross-sectional data suggest that adolescents who use cannabis are more likely to use alcohol, be sexually active, and engage in petty crimes, truancy, fighting, and parental defiance (Donovan & Jessor, 1985) and are less likely to engage in health-promoting behaviors (Donovan et al., 1991). Similarly, cannabis use among young adults correlates positively with drunkenness, deviance, and use of other illicit substances (Jessor, 1987, 1991, 2001). In 2008 approximately 48% of 12th graders used some "illegal drug" in their lifetime, with 37% self-reported using in the past year. Cannabis is the most frequently used illegal drug, with 49% of 12th graders reporting some lifetime use. The use of substances that are legal for adults (i.e., alcohol and tobacco) is even more common, with 73.3% of high school seniors reporting drinking in their lifetime and 61% reporting smoking tobacco (Griffin & Botvin, 2010; Kumar et al., 2002; Kann et al., 2016). Moreover, 18.6% of adolescents consumed alcohol and 8.6% consumed cannabis before 13 years of age (Kann et al., 2016). It is clear that adolescent substance use, particularly with alcohol and cannabis, is prominent and can lead to disordered use and negative health consequences in later life. As substance misuse among adolescents is associated with an increased risk for death, disability, and morbidity (World Health Organization, 2011; Yancey et al., 2011), excessive alcohol and cannabis use, engagement in risky sexual behaviors, and increased likelihood to participate in physical aggression (Kilpatrick et al., 2000; Yancey et al., 2011).

Jessor's Problem Behavior Theory

Problem Behavior Theory is one explanation for high levels of substance use during adolescence, originally proposed by Jessor in 1987. This theory posits that all human behavior is the result of the interaction between the person and environment (Jessor, 1987). This theoretical framework includes three major systems: (1) the perceived-environment system, (2) the personality system, and (3) the behavior system.

The *(1) perceived-environment system* is specific to how adolescents perceive themselves in relation to their environment. This can primarily be seen with proximal variables (peer models engaging in substance misuse) that directly reinforce/encourage a particular negative behavior, or with distal variables (such as parental support). Alternatively, the *(2) personality system* supports the pattern and interrelated set of relatively enduring, socio-cognitive variables—values, expectations, beliefs, attitudes, and orientations toward self and society—that reflect social learning and developmental experience (Jessor, 1987). Lastly, the *(3) behavior system* includes both problem behaviors and conventional behaviors. Problem behaviors include alcohol use, problematic drinking, cigarette smoking, cannabis use, other illicit drug use, general deviant behavior (delinquent behaviors and other norm-breaking acts), risky driving, and precocious sexual intercourse. Alternatively, conventional behaviors are behaviors that are socially approved, normatively expected, and classified as appropriate for adolescents. This can include church attendance and involvement with academic course work and achievement (Jessor, 2001).

Combining these systems together allows for a more detailed view of the components that drive adolescent substance use and unwanted behavior. Research has found that Problem Behavior Theory can account for substantial changes in an adolescent's problem behaviors, prosocial behaviors, and health related behaviors when applied to a social-psychological

framework (Jessor, 2001; Monahan et al., 2014). This theory also asserts that adolescents who are prone to one problem behavior (e.g., delinquency) are also prone to other problem behaviors (e.g., substance use). Problem Behavior Theory suggests that adolescents are at high risk for engaging in substance use if they are (a) criticized socially and culturally alienated, (b) have low self-esteem and feel that they have little to risk through deviant behaviors, (c) they have an external locus of control, believing that their conventional behaviors are not socially rewarded and their deviant behaviors are not socially punished, (d) highly value their involvement with peers, (e) seek independence from parental figures, (f) devalue academic achievement, and (g) have low expectations for academic achievement (Donovan, 1996; Jessor et al., 1995; Ko et al., 2008; Madkour et al., 2010).

Using the foundation of this theory, researchers suggest that all three systems can be targeted through role modeling and close relationships to reduce unwanted risky behaviors in adolescents (Herrera et al., 2011; Rhodes, & DuBois, 2008; Weiler et al., 2015). Interventions have been investigated to assist in reducing/eliminating adolescent substance use; one of which is mentoring. Mentoring has become more popular in assisting youth who have experienced adversity, and many studies have been conducted evaluating the effectiveness of this intervention (Thomas et al., 2013) in programs such as Big Brother and Campus Connections, as discussed above. Mentoring can also assist to alleviate many of the problem behaviors previously described by utilizing Problem Behavior Theory to positively influence the way adolescents perceive themselves in relation to their environment, increase socio-cognitive variables that reflect social learning and developmental experience, and reduce engagement in problem behaviors while encouraging conventional behaviors (Donovan et al., 1991; Herrera et al., 2011; Jessor et al., 1995; 1996; 2001; Ko et al., 2008; Madkour et al., 2010; Rhodes, & DuBois, 2008; Weiler et al.,

2015). Mentoring programs are commonly built on utilizing these described approaches to refine the application for youth who have experienced adversity. The application of mentoring as a tool to achieve these outcomes will now be discussed in more detail as it pertains and is applied to adolescent substance use.

Mentoring – Application

The prevalence of substance use among adolescents is likely to be higher for youth that are engaged in mentoring programs because by virtue of their environmental situation or circumstances, they are at a greater risk for poor developmental outcomes (DuBois et al., 2002; Rhodes, 2002; Rhodes et al., 2005a). This prevalence is higher due to a selection effect, as adolescents do not typically become involved in most mentoring programs unless they are at a greater risk for negative consequences. This increased prevalence provides a unique opportunity within the mentoring relationship as mentors are able to provide a safe context for conversations and disclosures for the youth while transmitting adult values, perspectives, and advice (Darling, 2005; Darling & Steinberg, 1993, Rhodes, 2002; Rhodes et al., 2005a; Steinberg, 2001). Additionally, mentors may be able to directly reduce adolescent substance use by delivering messages about its dangers and negative health outcomes (Beier et al., 2000; LoSciuto et al., 1996). For example, Brown et al. (2008) proposed three contributing factors that influence the risk for adolescent substance use that can be targeted for change through mentoring: 1) a direct display and/or encouragement of substance use, 2) a self-sustaining relationship with like-minded peers, and 3) the overestimation of the prevalence of adolescent peers' using (Chartier et al., 2010). Mentoring has been shown to improve these aspects among adolescents by utilizing the key components of Problem Behavior Theory and assist in reducing unwanted substance use

outcomes (Blinn-Pike, 2007; DeWit et al., 2016; Eby et al., 2008; Herrera et al., 2013; Protogerou & Flisher, 2012; Tolan et al., 2014; Williams et al., 2014).

While much of the research stated supports the implementation of mentoring, treatment effects tend to be small (DeWit et al., 2016; DuBois et al., 2002, 2011; Matz, 2014). Additionally, almost half of all mentoring relationships fail (Pryce & Keller, 2012; Rhodes & DuBois, 2006). This lack of effectiveness could be due to other variables that persist within the mentoring program, such as the quality of the relationship between the mentor and the mentee. Rhodes et al. (2006) suggest that the effectiveness of each of the three processes discussed in the Problem Behavior Theory is likely to be modified, at least in part, by the quality and longevity of the dyadic relationship established between adolescents and their mentors. Additionally, research suggests that the effectiveness of mentoring that targets the perceived-environment system, personality system, and behavior system could be influenced in part by social competencies and youth feeling that they are a part of a community and/or group (Chesmore et al., 2017; Daud & Carruthers, 2009; Goldner & Mayseless, 2009; Kazlauskaite et al., 2020; Peterson et al., 2001; Renick Thomson & Zand, 2010). These two aspects of mentoring will now be discussed, starting with a youth's sense of belonging and followed by relationship quality as they relate to adolescent substance use.

Mentoring – Sense of Belonging

One of the most consistent findings in research on the etiology of adolescent substance use is that peer influences are central, powerful factors that promote experimentation or initiation of use and can be associated with heavier use (Griffin & Botvin, 2010). Along with exposure to positive attitudes and expectations regarding substance use, the modeling of substance use behavior by important others (e.g., parents, siblings, and peers) is a critical negative social

influence that impacts a youth's perceived-environment system (Griffin & Botvin, 2010; Mayberry et al., 2009). Moreover, social competence and peer substance use have been found to influence youths' behavior system and increased adolescent substance use. Although Wills et al. (1992) found that peer pressure is positively related to adolescent substance use, social competence is considered a protective factor of substance use among adolescents. Adolescents with high competence levels tend to develop strategies that are effective in offsetting peer pressure and reduce successful offers of alcoholic behaviors, leading to a personality system that encourages positive behaviors (Scheier & Botvin, 1998). Mentoring has been shown to increase competency levels, which suggests that it can be an effective counter measure for youth who have been exposed to peers' risky behaviors.

Research also suggests that those who are more assertive, socially confident, and engaged in positive communication are less likely to participate in substance use with their peers. In contrast, adolescents who have poor competency are more likely to engage in substance misuse because they perceive that there are important social benefits (e.g., increase in social network, increase in popularity, and appearing more adult) that accompany substance use (Griffin et al., 2001). This suggests that youth who have stronger social competency are more likely to engage in positive behaviors because they are less likely to participate in unwanted behaviors so that they feel that they belong to a group. Significant positive correlations have been found between a youth's substance use and the use of their friends (Botvin, 1983), suggesting the importance of peer substance use, peer influence, and conformity to their immediate community. This highlights the positive outcomes that peer influence can have when applied to the key systems described and addressed in Problem Behavior Theory and mentoring.

In addition to peer influence, research suggests that general social support and a sense of belonging to a community during adolescence provides significant improvement of substance misuse in early adulthood (Kazlauskaite et al., 2020; Newcomb & Bentler, 1988). Sense of belonging is the mindfulness that one is accepted, appreciated, and a genuine member of a group or community (Baumeister & Leary, 1995; Kazlauskaite et al., 2020; Napoli et al., 2003). A sense of belonging to a community has been identified as a resiliency factor for school success and reduced substance use among younger adolescents (Bornholt, 2000; Napoli et al., 2003). Research also supports that a youth's sense of belonging is an essential component to the effectiveness of interventions that target positive youth development, such as mentoring (Kazlauskaite et al., 2020; Institute of Medicine, 2002; Peterson et al., 2001). A study by Rodriguez (2019) found that youth associated many of their positive experiences with their peers to having a sense of connectedness and belonging. These associations appear to be cultivated through positive youth development communities that promote acceptance, positive peer influences, and physical and emotional safety (Daud & Carruthers, 2009; Kazlauskaite et al., 2020; Peterson et al., 2001). While minimal research explores the direct impact of a sense of belonging on adolescent substance use directly, a study conducted by Ellis et al. (2004) found that women were less likely to relapse if they had a supportive familial structure or social support that offered help post-treatment to their substance misuse. This research indicates that having a high quality and readily available social support system and a sense of belonging to a community can reduce substance use. As mentoring promotes positive youth development within their community, it also provides an opportunity for the youth to feel that they belong to a prosocial institution such as mentoring, which can protect against negative peer influence and engagement in unwanted behaviors such as substance use.

Mentoring – Relationship Quality

Mentor relationship quality (MRQ), defined as the youths' perception of mentor compatibility and satisfaction with the relationship (Zand et al., 2009), is critical to mentoring success (Renick Thomson & Zand, 2010). Also known as the mentor alliance, it can significantly impact the outcome and effectiveness of mentoring programs (Tolan et al., 2014). The quality of the mentoring relationship is associated with positive outcomes and is generally accepted as an important factor in positive changes of youth behavior (Karcher & Nakkula, 2010; Rhodes, 2005a). Additionally, quality mentoring relationships are associated with better outcomes, such as coping, interpersonal relationships, and social and academic adjustment (Chesmore et al., 2017; Goldner & Mayseless, 2009; Renick Thomson & Zand, 2010).

Within the growing body of mentoring research, several relational factors have been noted as contributors to youths' perception of mentor alliance including authenticity, empathy, collaboration, companionship, and sagacious mentoring (e.g., Keller & Pryce, 2012; Parra et al., 2002; Rhodes et al., 2006; Spencer, 2006). According to Rhodes (2002), mutual trust and a sense that one is understood, liked, and respected are essential conditions for establishing the mentor–youth relationship (Keller, 2005; Luthar & Zelazo, 2003; Masten, 2001; Rhodes, 2002; Rutter, 1987; Werner & Smith, 1982). In contrast, negative experiences within the mentoring relationship (e.g., rejection and/or abandonment) can have detrimental impacts on alliance and youth outcomes (Grossman & Rhodes, 2002; Lyons & McQullin, 2019; Rhodes & DuBois, 2006). It is crucial to develop a positive alliance and relationship between the dyadic mentoring pair, as a lack in qualities such as trust, authenticity, empathy, mutual trust, sensitivity, and attunement are likely to lead to a low formation of MRQ (Allen & Eby, 2003; Collins & Miller, 1994; Rhodes, 2005a; Rhodes et al., 2006). Prior research also links stronger alliance to high

quality mentor training, specified skills (e.g., empathy), mentor–mentee relational outcomes (e.g., mutuality, trust), and youth outcomes (e.g., academic and social adjustment, self-esteem, and self-regulation) (Bayer et al., 2015; Chesmore et al., 2017; Goldner & Mayseless, 2008; Herrera et al., 2011; Li et al., 2011; McDowell et al., 2002; Serido et al., 2011; Sieving et al., 2017; Wright et al., 2014). Mentoring relationships in which the youth consider their mentor to play a significant role in their life have also been found to be more likely to promote higher self-esteem and more positive life outcomes (DuBois et al., 2002). Liang and colleagues (2002) found that in addition to closeness or engagement within the dyadic pair, mentoring relationships that had authenticity, empathy, and empowerment were associated with lower levels of loneliness and higher self-esteem among college-aged women. Similarly, in a qualitative study of adolescents participating in a formal mentoring program, authenticity, empathy, and companionship were identified as dominant themes in close and enduring mentoring relationships (Spencer, 2004). A study conducted by Bodin and Leifman (2011) investigated how youths' emotion, behavior, and substance misuse are affected by mentoring. After finding nonsignificant results, the researchers concluded that the quality of the mentoring relationship influenced their study. Since the mentors were not properly trained or given specific guidelines for creating their relationship with the youth, a significant bond could not be created. This suggests that the mentor relationship quality can significantly impact the value and outcomes that the youth receive (Tolan et al., 2014).

Positive mentoring relationships also provide youth with more positive experiences in social setting (Keller, 2005). By offering youth genuine care and support, mentors can challenge some of the negative views that adolescents may hold about themselves or of the relationships that they have had in the past. Specifically, mentors can demonstrate that positive relationships

are possible and can be seen as a corrective experience for youth who have experienced adversity who have experienced negative relationships with adult figures (Coble et al., 1996; Olds et al., 1997). Adolescents who have experienced caregivers as unavailable or inconsistent and have been met with anger, uncertainty, anxiety, and mistrust may be less likely to turn to others for help when encountering distress (Belsky & Cassidy, 1994). However, mentors that are more likely to validate and verbally discuss a youth's emotions, view their negative emotions as an opportunity for support and/or learning, engage in problem solving, and develop strategies for dealing with situations that lead to negative emotions are more likely to create positive social and emotional development in youth (Denham & Kochanoff, 2002; Rhodes et al., 2006). Mentors who have developed a good relationship with their mentees are better at handling discussions about vulnerable topics without undermining the adolescents' sense of self-confidence (Allen & Eby, 2003). However, attunement is limited based on the extent that the mentee is willing to share their feelings and self-perceptions, their sense of belonging, and based on how actively engaged they are with the mentoring relationship (Darling et al., 2002). This does not mean that the mentoring relationship needs to be consistently focused on adolescent growth and development at every moment, but instead focusing on social interactions over an extended period of time where the mentor and mentee express genuine emotionality, exchange information, identify and work towards goals, and engage in mutually beneficial behavior that leads to a higher sense of belonging (Reis et al., 2000; Rhodes et al., 2006, 2009, 2014). An impactful mentoring relationship is primarily distinguished by the youth's meaning attributed to the relationship and interactions that they share (Laursen & Bukowski, 1997; Rhodes et al., 2006, 2014).

Research has found that a strong emotional connection may be a key feature in developing a mentoring relationship that leads to better outcomes for youth (DuBois & Neville, 1997; Grossman & Rhodes, 2002; Herrera et al., 2000; Rhodes et al., 2006). One study found that the perceived benefits of mentoring relationships can be attributed to relationship closeness for mentors and mentees, rather than being directly linked with variables such as amount of contact and types of shared activities (DuBois et al., 2002). Along these line, Rhodes (2002, 2005a, 2005b) proposed a conceptual model in which mentors influenced their mentee's development by (1) enhancing social skills and emotional well-being, (2) improving cognitive skills, and (3) promoting positive identity development by serving as a role model, advocate, and positive peer influence (Zand et al., 2009).

Predictive strength between Mentee and Mentor Reports on Outcomes

When investigating the relationship quality of mentoring youth, constructs that tap into the bond between the mentor and mentee are often measured, such as dependency, relationship satisfaction, closeness, trust, and warmth (Bayer et al., 2015; Dutton et al., 2018; Farruggia et al., 2013; Goldner & Mayseless, 2009; Leyton-Armakan et al., 2012). This is often illustrated by an emotional connection between the mentor and the mentee (Dutton et al., 2018), where two approaches are often described. The youth-centered approach focuses on the mentee's primary interests and needs through mentoring, highlighting the importance of a balance of power within the dyadic relationship. Alternatively, prescriptive mentoring relationships are more oriented by mentor-defined goals for the youth with reduced interest in developing an interpersonal connection (Dutton et al., 2018; Li & Julian, 2012; Morrow & Styles, 1995). These two approaches depict how the experience of mentoring can vary within relationships, as the mentor and mentee may feel differently about many components of the relationship.

Research on the mentor relationship quality has almost exclusively relied on mentor and mentee self-reported data, and many researchers suggest that both perspectives are critical for predictive strength and relationship quality convergence (Dutton et al., 2018; Futch Ehrlich et al., 2016; Herrera et al., 2000; Rhodes et al., 2005a; Renick Thomson & Zand, 2010; Zand et al., 2009). It is important to identify that mentors and mentees may experience the mentoring relationship drastically differently. Studies have found mentees' ratings of the relationship to be higher compared to their mentors' rating (Dutton et al., 2018; Rhodes et al., 2014), and other researchers found that mentors will typically rate the relationship quality lower than their mentees (Farruggia et al., 2013; Rhodes et al., 2014). In a study conducted by Rhodes et al. (2014), researchers found that while both the mentor and mentee reports of relationship quality were significant predictors of success and duration, the youth's perceptions were considerably more predictive. Considering that the target of a mentoring intervention is the mentee, their perspective on the mentor relationship quality is essential. Additionally, research suggests that the mentee's views may be the most important as they are more likely to be indicative of the effectiveness that occurs (Dutton et al., 2018; Rhodes et al., 2014).

Proposed Study

Adolescent substance use (alcohol, cannabis, nicotine, and other drugs) arises from many factors as described above. To prevent the development or progression of problematic substance misuse, research is needed to elucidate the specific components of mentoring programs that are most strongly associated with more beneficial substance use outcomes, such as sustained abstinence. The proposed study examined mentorship quality and youths' sense of belonging as they relate to sustained abstinence for adolescent substance use in a secondary data analysis of Campus Connections. Additionally, this study explored the difference in predictive strength

between mentee and mentor reports of mentor alliance on endpoint substance use. These findings may fill a gap in the literature by exploring the application of mentoring as a prevention technique for the harmful use of substances through adolescence and explore the perceptions and strength of mentee versus mentor reports towards the dyadic relationship. Due to the limited number of mentees that reported substance use at baseline, substance use (alcohol, cannabis, and tobacco) was combined into one variable indicating whether mentees reported any substance use at the beginning of the program. As this study focused on prevention and sustained abstinence, only mentees that reported zero substance use at baseline were included.

Hypotheses

H1: Forming a high-quality relationship between dyads will predict sustained abstinence of substance use at follow-up compared to dyads that form a low-quality relationship, using the mentee's reported relationship quality.

H2: Mentees' reported sense of belonging at program end will also predict sustained abstinence of substance use at follow-up compared to mentees that report low levels of belonging.

H3: Mentees will be less likely to report substance use at the end of the program if they report a stronger mentor alliance and have a higher reported sense of belonging compared to mentees that report a weaker mentor alliance and low sense of belonging.

H4: The relationship quality reported by the mentee will be a stronger predictor of substance use at follow-up compared to the mentor reported relationship quality.

METHOD

Participants

All participants in this study were youth mentees enrolled in the Campus Connections mentoring program. The sample consisted of 680 adolescent mentees, which represents all mentees who started the program (even if they dropped out later) and excludes mentees who completed the intake process but did not begin the intervention. Participants ranged in age from 10 to 18 years (M = 14, SD = 1.81), where 42% identified as female. The race of the participants was different from the racial/ethnic demographics of the geographic area where Campus Connections was provided, as the ratio of the sample primarily identifying as Caucasian being lower (52%), with fewer Hispanic (37%), American Indian or Alaskan Native (1.4%), African American (1.2%) and other (3.8%) participants. Some participants chose not to identify a race (4.6%).

Procedure

A secondary data analysis of the Campus Connections program, supported by the William T. Grant Foundation (#182809) was conducted. The youth self-report and mentor reported surveys were used in analysis.

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 coded as a session (e.g., one session represents the 12-week program that met every Monday evening in the Spring 2017 semester). The program was administered for six semesters (4 sessions per semester), which resulted in 24 total 12-week sessions over the course of the study. Each semester, all youth eligible for Campus Connections

were matched with a mentor and each mentee-mentor dyad completed online surveys through Qualtrics. Survey data was collected immediately before the start of the intervention, at weeks 3, 6, 9, and 11 of the 12-week program for mentors and mentees. Data were collected immediately before the start of the intervention and at week 11 for parents/guardians, but they will not be used for the purpose of the study. 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 youths' accomplishments, which is why the final survey was administered on week 11. Measures for substance use and mentor relationship quality was used in this study, along with demographic responses.

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 youths' 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.

Measures

Substance use was measured through the *Self-Reported Delinquency scale* (α=.89), adapted from Elliott et al. (1985) *Explaining Delinquency and Drug Use*. Items measure the number of days that the adolescent consumed/ingested substances in the last 30 days. These items include alcohol, cannabis, tobacco, and other illicit drugs. An example of the item used for this study is: "In the last 30 days, how many days have you consumed alcohol?" These measures contain the same structure throughout the scale, specifying different substances.

Mentor relationship quality was measured through the *Mentor Alliance Scale* (α=.88), adapted from the *Relationship Quality and the Mentoring of Aggressive, High-Risk Children* scale written by Cavell et al. (2009). These items focus on the alliance of the relationship between the mentor and mentee. Items ask the participant to rate their relationship with their mentor/mentee on a 5-point Likert scale, ranging from 1="Never" to 5="Always" with items such as: "I like spending time with my mentor" and "I feel like my mentor is on my side and tries to help me." Both the mentor and mentee completed this survey.

Mentee's sense of belonging at Campus Connections was measured through an adaptation from Youth Development Strategies, Inc. These items focused on capturing the youth's current experience in the program and sense that they were part of the Campus Connections community. Items ask the participant: "How much do you agree with the following statements?" with slider scale choices ranging from 0="DISAGREE!!!" to 10="AGREE!!!". Statements consisted of: "I belong at Campus Connections", "My ideas count at Campus Connections", "People listen to me at Campus Connections", "If I didn't show up at Campus Connections people would miss me", and "I feel like a part of Campus Connections".

A Campus Connections specific Mattering Index was used, adapted from Elliott et al. (2004). These items focused on capturing the youth's current experience in the program and sense of mattering to the Campus Connections community. Items ask the participant: "How much do you agree with the following statements?" with slider scale choices ranging from 0="DISAGREE!!!" to 10="AGREE!!!". Statements consisted of: "Most people at Campus Connections do not seem to notice when I come or when I go", "At Campus Connections, no one recognizes me", "Sometimes when I am at Campus Connections, I feel almost as if I were invisible", "People do not care what happens to me at Campus Connections", "When I have a problem, people at Campus Connections usually don't want to hear about it", and "No one at Campus Connections would notice if one day I disappeared".

Demographic variables were collected at the start of the program for both mentors and mentees, consisting of biological sex (Boy=1, Girl=0), age, and race (1=American Indian, 2=Asian, 3=Black, 4=Hispanic, 5=Hawaiian, 6=White, 7=Mixed). Due to the low endorsement of minority identities, ethno-racial identity was coded as Non-Hispanic White and Other, following recommendations from studies exploring minority stress theory (Dentato, 2012; Mereish et al., 2017). Additionally, this study did not seek to explore specific pairwise comparisons of race and used the dichotomized ethno-racial identity as a control variable. Another variable controlled for within this study was the condition of Campus Connections that each mentee was assigned (mentor family versus solely dyads).

Analysis Plan

A series of Firth logistic regression models (Firth, 1993) were conducted to test the study hypotheses, listed again here for convenience:

H1: Forming a high-quality relationship between dyads will predict sustained abstinence of substance use at follow-up compared to dyads that form a low-quality relationship, using the mentee's reported relationship quality.

H2: Mentees' reported sense of belonging at program end will also predict sustained abstinence of substance use at follow-up compared to mentees that report low levels of belonging.

H3: Mentees will be less likely to report substance use at the end of the program if they report a stronger mentor alliance and have a higher reported sense of belonging compared to mentees that report a weaker mentor alliance and low sense of belonging.

H4: The relationship quality reported by the mentee will be a stronger predictor of substance use at follow-up compared to the mentor reported relationship quality.

Data Considerations

Missing data occurred primarily on the outcome measure (i.e., post-intervention endpoint) as a result of dropout from the program or failure to complete the post-intervention survey. A total of 72 participants (10%) had missing data on the outcome measure. To account for missing data, multiple imputations with predictive mean matching was used in model estimation per recommendations made by Van Buuren (2018). Multiple imputation creates complete versions of the data by replacing missing values with plausible data values. These values were determined with predictive means matching, which calculates the predicted value of a missing datapoint by creating a series of possible datapoints from all complete cases in the dataset that have predicted values closest to the predicted value of the missing entry, and randomly selects a datapoint to replace the missing value. To avoid the pitfalls of duplication of the same value and issues with modeling, 25 imputations were used (Van Buuren, 2018). This allowed for all cases with missing values to be retained in the analysis.

All variables were modified to have a meaningful zero point within analyses. Specifically for the predictor variables, mentor relationship quality and sense of belonging were mean centered. For the control variables, mentee age was mean centered while gender and ethno-racial identity were dichotomized, as discussed above. These variables were included to control for variance within model. Following recommendations by Hünermund and Louw (2020), the estimated effect sizes of the control variables were not interpreted as they are unlikely to have a causal interpretation themselves. Instead, interpretations focus exclusively on the variables of interest within each model.

All three measures of adolescent substance use were administered as count variables in the survey ranging from 0-30 days of use. All three variables were not normally distributed and contained a preponderance of zeros (92% reported zero use throughout the study). Due to the limited number of mentees that reported baseline substance use, substance use (alcohol, cannabis, and tobacco) was combined into one variable indicating whether mentees reported any substance use at the beginning of the program. As this study focused on prevention and sustained abstinence, only mentees that reported no substance use at baseline were included in analyses (526 participants). Subsetting the data to only include mentees that reported no substance use at baseline allows the analyses to determine the preventative impact that relationship quality and sense of belonging have on sustained abstinence of substance use.

When analyzing a dichotomized variable such as substance use, rare events and complete separation are common analytical challenges that occur that influence the convergence of a logistic regression model. Complete separation occurs when a covariate or variable always or never occurs with the variable of interest (outcome variable) and tends to occur more often with rare events in a dataset such as adolescent substance use (Karanon, 2020). When using logistic

regression, a common analytical method is maximum likelihood estimation. However, Allison (1990) suggests that maximum likelihood estimation of logistic models is known to be influenced by small-sample bias, which in this study would be strongly dependent on the number of mentees that reported use versus the number of mentees that reported no use. One proposition to addressing this issue within a logistic regression model was proposed by Firth (1993) and is known as Firth's Penalized Likelihood logistic regression model. This approach reduces the impact of small-sample bias in maximum likelihood estimation (Firth, 1993; Karanon, 2020; King & Zeng, 2001). This approach also produces consistent estimates of the regression parameters when the maximum likelihood estimates do not exist.

Firth's Penalized Likelihood is a common solution to diminish the bias of rare events within the data and successfully converges when complete separation occurs (Firth, 1993). This model produces penalized likelihood odds ratios and 95% confidence intervals. Odds ratios provide the odds that an outcome will occur per a one-unit increase in the predictor, where an odds ratio > 1 is associated with higher odds of the outcome occurring, an odds ratio < 1 is associated with lower odds of the outcome occurring, and an odds ratio = 1 indicates that there was no evidence of an effect on the outcome. Interpretations of odds ratios herein follow the examples provided by Szumilas (2010). Confidence intervals that are considered to be statistically significant are those that do not contain 1. Analyses were conducted in RStudio version 2022.07.0 (RStudio Team, 2020) using packages brglm2 for analyses (Kosmidis & Firth, 2020), sjPlot for graphing (Lüdecke, 2021), and mice, janitor, ggfortify, ggeffects, sjlabelled, here, skimr, and tidyverse for data wrangling (Buuren, 2011; Firke, 2021; Horikoshi & Tang, 2016; Lüdecke, 2018; Lüdecke, 2021; Müller, 2020; Waring et al., 2021; Wickham et al., 2019).

Interactions

Mentor relationship quality and mentee's sense of belonging was used as predictors in this study with endpoint substance use as the outcome. Demographic variables (mentee biological sex, ethno-racial identity, age, and Campus Connections condition assignment) were included as control variables. Per recommendations by McCabe et al., (2020), a visual inspection of the data was completed for significant product terms.

Model one tested hypothesis one, examining the main effects of mentor relationship quality on endpoint substance use.

Model two tested hypothesis two, examining the main effects of mentee's sense of belonging on endpoint substance use.

Model three tested hypothesis three, examining the interaction between mentor relationship quality and sense of belonging on endpoint substance use.

Model four tested hypothesis four, exploring the effect of the relationship between mentee reported relationship quality and endpoint substance use compared to the relationship between mentor reported relationship quality and endpoint substance use.

RESULTS

Table 1 presents descriptive statistics for the raw study variables with all 680 participants. It is important to note that at baseline 90.56% of mentees reported zero alcohol use (9.44% reported use: 54 reported using at baseline, 58 at end), 91.67% reported zero tobacco use (8.33% reported use: 48 reported using at baseline, 62 at end), and 90.22% reported zero cannabis use (9.78% reported use: 56 reported using at baseline, 61 at end). Due to the preponderance of zeros, the different substances used were combined into one variable and dichotomized to represent use versus non-use. For the purposes of this study, only mentees that reported zero use at baseline were used in analyses to determine the preventative impact that relationship quality and sense of belonging have on sustained abstinence of substance use. Table 2 presents descriptive statistics for of the study variables used in analyses after wrangling to data with 526 participants.

Table 1.
Descriptive Statistics of Raw Variables Before Data Wrangling

Note. ALC = Alcohol; TOB = Tobacco; CAN = Cannabis; MRQ = Reported mentor relationship quality; SOB = Mentee reported sense of belonging.

				Excluding 0 use	
Variable	*Mean*	*SD*	*% with 0*	*Mean*	*SD*
Base ALC (days)	0.80	3.65	90.58%	6.56	7.92
End ALC (days)	0.50	2.62	90.00%	4.88	6.76
Base TOB (days)	1.22	5.17	91.67%	9.92	11.51
End TOB (days)	1.04	4.35	89.10%	9.44	9.67
Base CAN (days)	1.56	5.90	90.22%	12.84	12.05
End CAN (days)	1.01	4.42	89.50%	9.26	10.24
Mentee MRQ	4.21	0.62	--	--	--
Mentor MRQ	3.88	0.56	--	--	--
SOB	8.45	2.05	--	--	--

Table 2.
Descriptive Statistics of Model Variables Used in Analyses for Mentees that Reported Zero Use at Baseline

Note. Substance use = Alcohol, Tobacco, and Cannabis; MRQ = Reported mentor relationship quality; SOB = Mentee reported sense of belonging.

Variable	*Use*	*No Use*
Base Substance Use	0%	100%
End Substance Use	8%	92%
	Mean	*SD*
Mentee MRQ	4.21	0.62
Mentor MRQ	3.88	0.56
SOB	8.45	2.00

Tables 3-6 present the regression results. Effects were considered significant when $p < 0.05$ and estimates where $p > 0.05$ indicate that there was no evidence of an effect. Firth logistic regression models also use a log link function. Odds ratios were calculated by exponentiating the unstandardized regression coefficient (i.e., logit) from the model. Odds ratios provide the odds that an outcome will occur per a one-unit change in the predictor.

Hypothesis 1. There was a significant direct effect for mentee reported relationship quality predicting substance use at follow-up (OR = 0.42, CI [0.26, 0.67], $p = <0.001$), such that the odds of use at the end of Campus Connections are about 58% lower for each one-unit increase in relationship quality. See Table 3.

Visual Inspection: Figure 1 depicts the fitted relationship between mentee reported relationship quality and substance use at the end of Campus Connections. Visual inspection of Figure 1 revealed that mentees reported less substance use with higher levels of relationship quality, confirming the results of the Firth logistic regression model.

Table 3.

Firth Regression Model Results for Fitted Relationship Between Mentee Reported Relationship Quality and Substance Use at the End of Campus Connections

Note. CI = Confidence Intervals; Mentee = Mentee Reported Relationship Quality. Relationship quality was centered at the mean. **p*-value < 0.05.

Variable	*Odds Ratio*	*Lower CI*	*Upper CI*	*p-Value*
Intercept	**0.07***	0.03	0.15	**<0.01**
Mentee Relationship Quality	**0.42***	0.26	0.67	**<0.01**
Treatment Condition	0.92	0.47	1.80	0.81
Sex (Male)	1.45	0.73	2.87	0.29
Non-Hispanic White	1.25	0.65	2.40	0.51
Age (centered at the mean)	1.18	0.99	1.42	0.07

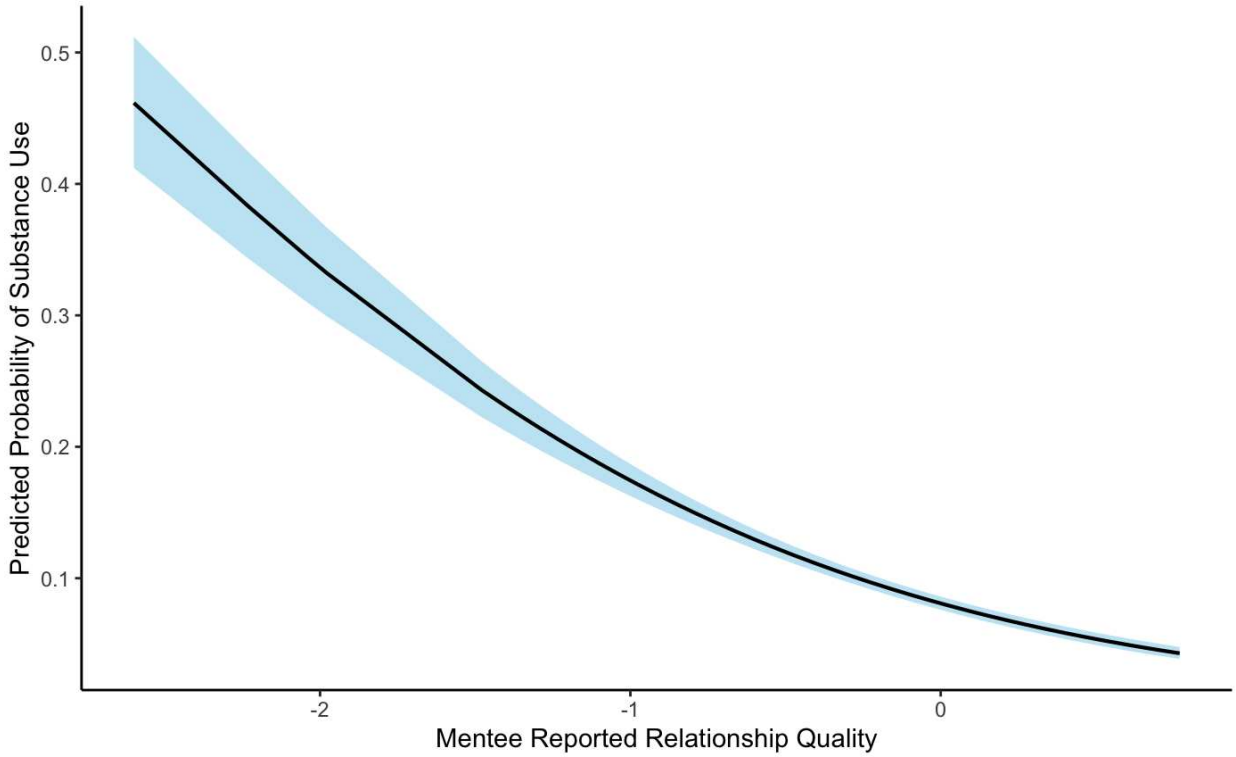

Figure 1.
Firth Model: Fitted Relationship Between Mentee Reported Relationship Quality and Substance Use at the End of Campus Connections

Note: Figure was created using a Firth Logistic Regression Model. Substance use was dichotomized indicating any self-reported use of alcohol, cannabis, and/or tobacco at the end of Campus Connections. Mentee reported relationship quality was centered at the mean.

Hypothesis 2. There was a significant direct effect for mentee reported sense of belonging predicting substance use at follow-up (OR = 0.77, CI [0.68, 0.88], p = <0.001), such that the odds of use at the end of Campus Connections are about 23% lower for each one-unit increase in sense of belonging. See Table 4.

Visual Inspection: Figure 2 depicts the fitted relationship between mentee reported sense of belonging and substance use at the end of Campus Connections. Visual inspection of Figure 2 revealed that mentees reported less substance use (alcohol, cannabis, and/or tobacco) in accordance with higher levels of sense of belonging, confirming the results of the Firth logistic regression model. See Figure 2.

Table 4.

Firth Regression Model Results for Fitted Relationship Between Mentee Reported Sense of Belonging and Substance Use at the End of Campus Connections

Note. CI = Confidence Intervals. Sense of belonging was centered at the mean. *p-value < 0.05.

Variable	*Odds Ratio*	*Lower CI*	*Upper CI*	*p-Value*
Intercept	**0.06***	0.03	0.14	**<0.01**
Sense of Belonging	**0.77***	0.68	0.88	**<0.01**
Treatment Condition	0.97	0.50	1.89	0.92
Sex (Male)	1.68	0.85	3.32	0.14
Non-Hispanic White	1.17	0.60	2.25	0.64
Age (centered at the mean)	1.14	0.95	1.37	0.16

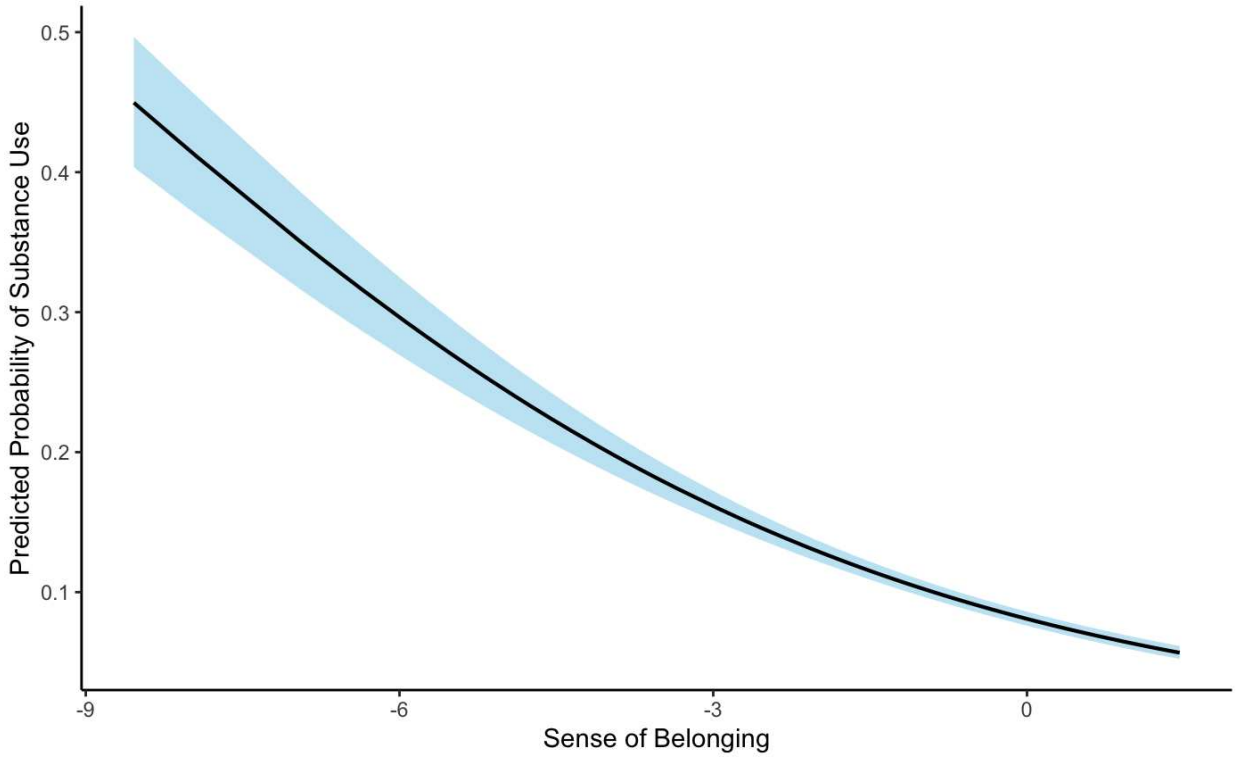

Figure 2.
Firth Model: Fitted Relationship Between Mentee Reported Sense of Belonging and Substance Use at the End of Campus Connections

Note: Figure was created using a Firth Logistic Regression Model. Substance use was dichotomized indicating any self-reported use of alcohol, cannabis, and/or tobacco at the end of Campus Connections. Mentee reported sense of belonging was centered at the mean.

Hypothesis 3. The interaction between mentee reported relationship quality and mentee's sense of belonging was not significant, indicating that there was no evidence of an effect. Since this interaction was insignificant, visual inspection was not completed. See Table 5.

Table 5.

Firth Regression Model Results Examining the Interaction Between Mentor Relationship Quality and Mentee's Sense of Belonging on Substance Use at the End of Campus Connections

Note. CI = Confidence Intervals; SOB = Sense of Belonging; MRQ = Mentee Reported Relationship Quality; Mentee = Mentee Reported Relationship Quality. Relationship Quality and Sense of Belonging was centered at the mean. **p*-value < 0.05.

Variable	*Odds Ratio*	*Lower CI*	*Upper CI*	*p-Value*
Intercept	**0.07***	0.03	0.15	**<0.01**
Interaction between SOB and MRQ	0.89	0.75	1.07	0.22
Mentee Relationship Quality	**0.78***	0.64	0.95	**0.02**
Sense of Belonging	**0.50***	0.28	0.88	**0.02**
Treatment Condition	0.93	0.48	1.83	0.84
Sex (Male)	1.51	0.75	3.03	0.24
Non-Hispanic White	1.18	0.61	2.31	0.62
Age (centered at the mean)	1.14	0.94	1.38	0.18

Hypothesis 4. There was a significant difference between the mentee and mentor reported relationship quality, such that the mentee reported relationship quality significantly predicted substance use at the end of Campus Connections (OR = 0.42, CI [0.26, 0.67], p = <0.001), while the mentor reported relationship quality had no evidence of an effect (OR = 1.01, CI [0.56, 1.83], p = 0.97). This indicates that for the mentee report, the higher the reported relationship quality the lower the odds of substance use at follow-up. As there was no evidence of a relationship for the mentor reported relationship quality, mentee reports of relationship quality were a stronger predictor of the odds of using substances at the end of Campus Connections. A positive relationship between mentee and mentor reported relationship quality was found with a correlation of 0.4. See Table 6.

Table 6.
Mentee versus Mentor Reported Relationship Quality on Substance Use at End of Campus Connections

Note. CI = Confidence Intervals. Relationship quality was centered at the mean. **p*-value < 0.05.

Variable	*Odds Ratio*	*Lower CI*	*Upper CI*	*p-Value*
Mentee Reported Relationship Quality	**0.42***	0.26	0.67	**<0.01**
Mentor Reported Relationship Quality	1.01	0.56	1.83	0.97

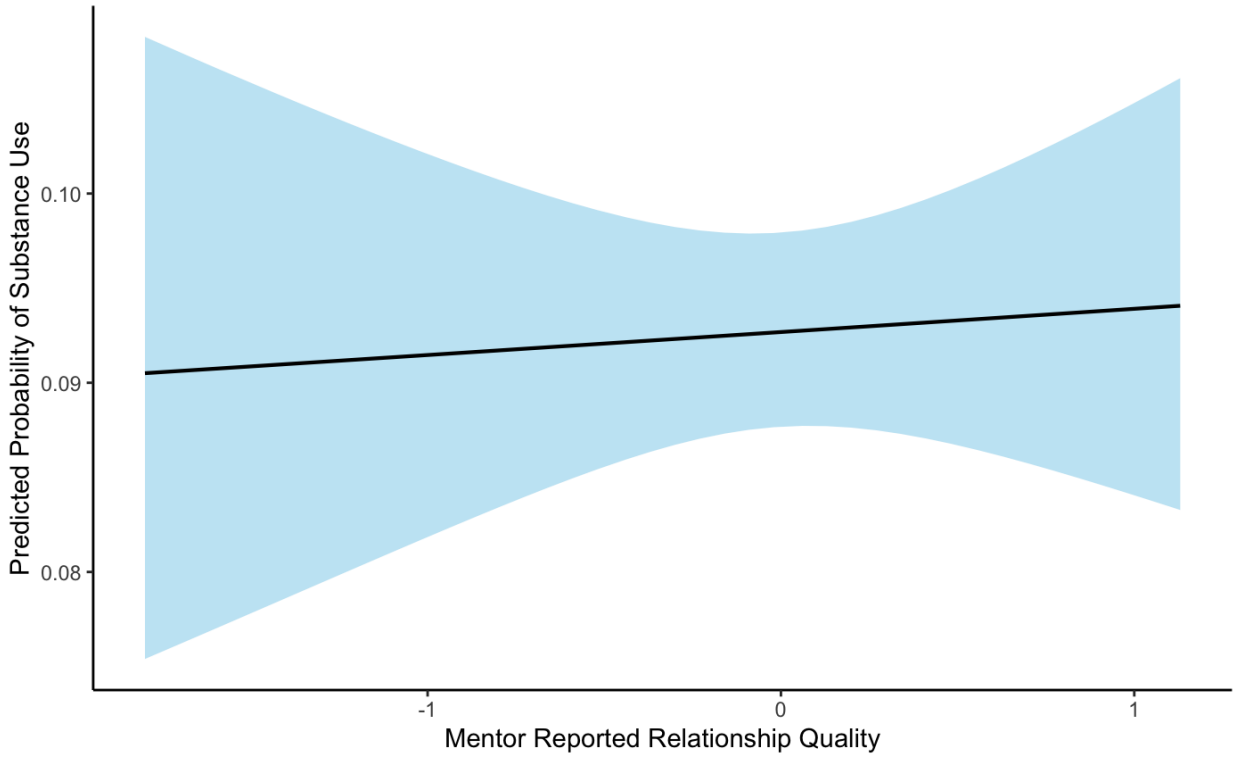

Figure 3.
Firth Model: Fitted Relationship Between Mentor Reported Relationship Quality and Substance Use at the End of Campus Connections

Note: Figure was created using a Firth Logistic Regression Model. Substance use was dichotomized indicating any self-reported use of alcohol, cannabis, and/or tobacco at the end of Campus Connections. Mentor reported relationship quality was centered at the mean.

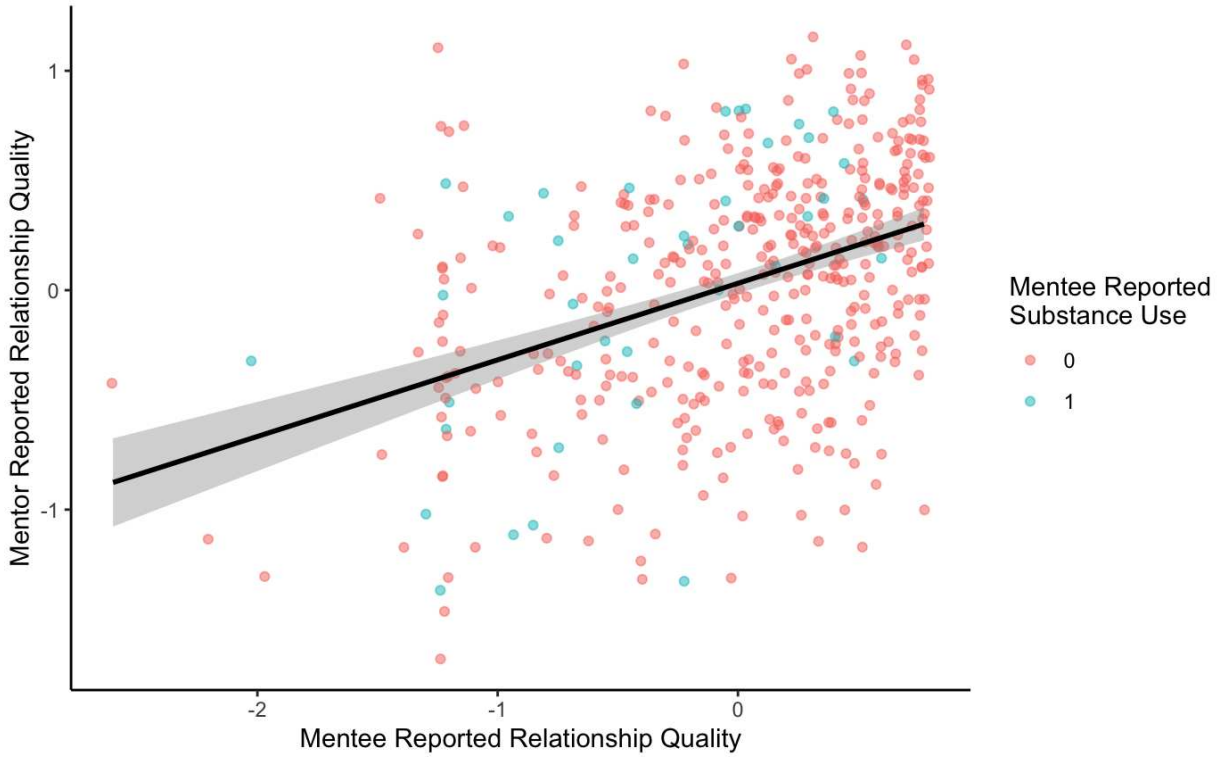

Figure 4.
Scatterplot of Mentor and Mentee Reported Relationship Quality on Mentee Reported Substance Use at End of Campus Connections

Note: Substance use was dichotomized indicating any self-reported use of alcohol, cannabis, and/or tobacco at the end of Campus Connections. Mentor and mentee reported relationship quality was centered at the mean.

DISCUSSION

This study aimed to elucidate the specific components of mentoring programs that are most strongly associated with more beneficial substance use outcomes for adolescents, specifically towards preventative variables. Empirical evidence suggests that mentoring can produce modest improvements in substance use of youth who have experienced adversity (DuBois, et al., 2002; DuBois, et al., 2011; Raposa et al., 2019; Tolan, et al., 2014). According to Rhodes' Model of Youth Mentoring (2002, 2005), the most widely used model, a key component in creating change and promoting positive outcomes for youth is the development of a high-quality mentoring relationship. Additionally, research suggests that a sense of belonging to a community during adolescence provides significant improvement of substance misuse in early adulthood (Kazlauskaite et al., 2020; Newcomb & Bentler, 1988). The proposed study examined mentorship quality and youths' sense of belonging as they relate to adolescent substance use in a secondary data analysis of Campus Connections. Additionally, this study explored the predictive strength between mentee and mentor reports of mentor alliance on end-point substance use.

Multiple findings were discovered in this study. First, it was found that forming a high-quality relationship between the mentee-mentor dyad (per the mentee report) predicted higher odds of sustained abstinence at the end of Campus Connections. Second, if the mentee developed a high sense of belonging within Campus Connections, they are less likely to report substance use at follow-up. Third, the interaction between mentee reported relationship quality and sense of belonging did not predict the odds of using substances at follow-up. Last, there was a difference between the mentee and mentor reported relationship quality, where the mentee report of relationship quality was a stronger predictor of being less likely to report substance use at

follow-up. Additionally, the mentor report of relationship quality had no impact on substance use at the end of the Campus Connections program. This finding indicates that the mentee reported relationship quality may be more impactful on the likelihood of use and should be used in analyses. This is not to say that the mentor report should be discarded, but for the purposes of this study, mentee reported relationship quality was used over the mentor reported relationship quality due to this finding.

When mentor family condition, mentee biological sex, ethno-racial identity, and age were controlled for in substance use outcomes at follow-up, there was no change in the patterns of significance in the models. This suggests that the results from testing the hypotheses were robust to differences in outcomes based on these demographic variables. It is important to note that the mentee's age was significant in predicting substance use at follow-up in some models, such that the older mentees were more likely to report use compared to the younger mentees. This outcome is expected as research suggests that substance use is age-sensitive and more likely to occur in late adolescence (Chassin et al., 2004, 2009, 2015; Griffin & Botvin, 2010; Hill et al., 2000; Kann et al., 2016; Kumar et al., 2002; Sutherland & Shepherd, 2001).

Throughout the remainder of this discussion, the supported and unsupported hypotheses are investigated. Implications of the findings, recommendations for beneficial steps that could be taken to address these findings, and suggestions for future research is provided. The supported hypotheses include: 1) higher mentee reported relationship quality increasing odds of sustained abstinence, 2) higher sense of belonging increasing odds of sustained abstinence, and 3) mentee reported relationship quality being the more predictive report for sustained abstinence at follow-up compared to the mentor report.

Supported Hypotheses. Mentee's self-reported relationship quality was associated with lower likelihood of substance use at follow-up, holding constant several control variables. This finding suggests that dyads who form a high-quality mentoring relationship throughout the Campus Connections program have lower odds of using substances (alcohol, cannabis, and tobacco) at follow-up. This finding provides support that the mentoring program is an effective preventative tool for continued abstinence in adolescent substance use when a high-quality relationship is formed. These results are consistent with findings from previous research, which support mentoring and forming a high-quality mentor relationship as critical for positive health outcomes for adolescents (DuBois & Neville, 1997; Grossman & Rhodes, 2002; Herrera et al., 2000; Rhodes et al., 2006). These studies also provide support for the perceived benefits of mentoring relationships being created by relationship closeness for mentors and mentees, rather than being directly linked with other variables such as amount of contact and similarities (DuBois et al., 2002). This study's findings also coincide with Rhodes' (2002, 2005a, 2005b) proposed conceptual model in which mentors influenced their mentee's development through enhanced social skills and emotional well-being, improving cognitive skills, and promoting positive identity development by serving as a role model, advocate, and positive peer influence (Zand et al., 2009).

Additionally, results significantly support the hypothesis that as a mentee's sense of belonging to the Campus Connections program increased, the odds for mentees reporting using alcohol, tobacco, and cannabis at the end of the program decreased. These findings are consistent with prior studies and replicate their findings, helping to further the importance of belonging to a community within a preventative model (Kazlauskaite et al., 2020; Institute of Medicine, 2002; Peterson et al., 2001). Overall, this pattern coincides with other findings that propose that

forming a high-quality relationship within the dyad and having a strong sense of belonging to the program independently are critical components to mentoring success and decreasing substance use (DeWit et al., 2016; Griffin et al., 2001; Kazlauskaite et al., 2020; Keating et al., 2002; Napoli et al., 2003; Newcomb & Bentler, 1988; Rhodes et al., 2005; Tolan et al., 2014; Weiler et al., 2015).

Finally, when exploring the difference between mentee and mentor reported relationship quality, the hypothesis was supported that there was a significant difference in the likelihood of continued abstinence for adolescent substance use at follow-up. Specifically, an increase in the relationship quality reported by the mentee was associated with a decrease in the odds of adolescent substance use at the end of the program. Adversely, an increase in the mentor reported relationship quality had no effect. This finding is consistent with prior research that suggests that the mentee's report of the relationship is more pertinent to successful intervention compared to the mentor's report (Dutton et al., 2018; Rhodes et al., 2014). However, other researchers found that mentors tended to rate the relationship quality lower than their mentees (Farruggia et al., 2013; Rhodes et al., 2014), which was consistent with this study. As displayed in Table 2, mentees reported an average relationship quality of $M = 4.21$ ($SD = 0.62$) while mentors reported an average relationship quality of $M = 3.88$ (SD = 0.56). A positive relationship between mentee and mentor reported relationship quality was also found, with a correlation of 0.4. This suggests that there was a small difference between overall reports of relationship quality in this study. As prior research suggests a greater difference between the mentee and mentor reports, this outcome is different from the reviewed literature. This divergence may be unique to Campus Connections as the mentor training and atmosphere of the program encourages mentors to remain positive, supportive, and focused on assisting the youth to obtain

positive outcomes, leading the mentors to rate the relationship higher than prior research suggests. Future studies could explore these differences in more depth, examining the different items and factors that mentor's rate higher and/or lower within the mentoring relationship compared to their mentee partner.

Another possible explanation for the difference in significance for mentee versus mentor reported relationship quality is common reporting bias. Common reporting bias, particularly with self-reported outcomes, occurs when there is a deviation between the self-report and the true values of an item. This bias is abundant in survey data, where the conditions of the study, cognitive processes, and/or social desirability can influence the response provided. This tends to occur more often in sensitive questions, such as for mental health, relationships, and substance use (Bauhoff, 2014; Bound et al., 2001). Common reporting bias may have influenced mentees' report of substance use, relationship quality, and sense of belonging. This could also influence the mentors' report of the relationship quality, whereby they report the relationship higher or lower due to social desirability or conditions of the study. It is important to consider these reporting biases when assessing self-reported data as it could explain the difference in significance between mentee and mentor reported relationship quality on substance use.

Unsupported Hypotheses. An unexpected finding in this study was that hypothesis 4: the interaction between forming a high-quality relationship and developing high levels of belonging would lead to the greatest odds of sustained abstinence at follow-up, was unsupported. This finding suggests that forming a high-quality relationship and having a high sense of belonging are not contingent on one another and that these variables may impact adolescent substance use differently. One possible explanation for this discrepancy is that some mentees may have experienced a high-quality relationship with their mentor and poor social competency

with other mentees in the program. In these instances, adolescents who have poor competency with their peers are more likely to engage in substance misuse because they perceive that there are important social benefits (e.g., increase in social network, increase in popularity, and appearing more adult) that accompany substance use (Griffin et al., 2001). Based on prior research, another possible explanation for this discrepancy is that some of the studies that provided support for relationship quality and belonging having an effect on promoting healthy outcomes compared the participants to a control group within the study (Tolan et al., 2014; Weiler et al., 2015). Additionally, other studies have found that the positive effects of the relationship only occur when the relationship lasted for 12 months or more (Rhodes et al., 2005). Lastly, research suggests that an emotional connection combined with a longer mentor-mentee relationship was a primary factor involved in moderating the relationship between youth mentoring and positive health outcomes (Tolan et al., 2014). These studies highlight the benefits and importance of long-term mentoring relationship and comparing the data to a control group; both factors that were not incorporated into this study. Future studies should further explore the elements that create a high-quality mentoring relationship and lead youth to feel that they belong, investigating key constructs that assist in building the relationship and the influence on the quantity/length of the program. Additionally, future research could address this incongruity by exploring patterns of mentee's self-reported sense of belonging and relationship quality with social competency within the same study.

The best approach to handling a zero-inflated count predictor variable is an open area of research and multiple recommendations were explored for how to best analyze the study data. Importantly, He and colleagues (2014) suggest that current literature assessing substance use outcomes does not precisely capture the differences among the value of zero for users versus

non-users. More specifically, they suggest that there is a crucial difference between an individual that reported zero substance use and has never consumed said substance, compared to an individual that has consumed in the past but happened to not use during the period measured. The first type of zero is considered a structural zero (lifetime abstinence) and is distinguished from the second type of zero which is considered a sampling zero (He et al., 2014; Tang et al., 2018). It is important to model and delineate the effects of structural versus random zeros when using a zero-inflated count outcome as an explanatory variable in regression analysis, otherwise the results are difficult to interpret due to bias in the estimates and a dual interpretation of the value zero. While this is the recommended approach, this study did not assess for lifetime substance use and is therefore unable to differentiate between the two types of zeros. This is a limitation of the current study and should be considered in future research.

Limitations. There were multiple limitations to this study that are important to acknowledge. First, there was an over-dispersion of zeros in the count data for substance use. The current study did not have data on lifetime use and was therefore unable to pursue recommendations for data transformation made by He and colleagues (2014). This may have impacted the results of the models as previously discussed. Additionally, the mentee-mentor dyads were selected from one formal mentoring program (Campus Connections) and therefore the results may not be generalizable to all formal mentoring programs. Additionally, the findings were based on short-term outcomes as the baseline and follow-up data was collected 12 weeks apart. It is possible that the scope of this study did not accurately assess for the impacts on adolescents' substance use long-term. One important direction for future research could include a series of follow-up tests that seek to examine long-term benefits of the mentoring program on adolescent substance use and overall positive youth development. Another limitation to this

study is that all outcome measures were exclusively self-reported. Observer reports may provide a more comprehensive understanding of outcomes.

This study also included biological sex in the model and did not include gender identity. The initial rationale for this approach was due to differences in the metabolism for digesting substances (alcohol) based on biological sex. However, this limits the potential social influencers and personal experiences for mentees who identify as non-binary or differently from their biological sex. Future research could incorporate gender identity and other factors (such as masculinity) into the models and further explore the impacts this might have. Findings should be reviewed with these limitations in mind.

Future Directions. Future research may benefit from exploring the mentoring relationship between dyads outside of the mentee and mentor reports alone. More specifically, including observational data on the quality of the relationship may have a more meaningful/impactful explanatory power compared to self-reported mentoring relationship quality. Future studies may also benefit from examining how youth define a high-quality mentoring relationship and/or perceive their belonging to a group. Whereas Rhodes (2002, 2005) describes a positive mentoring relationship quality as being illustrated by trust, empathy, and mutuality, adolescents may perceive a high-quality mentoring relationship to be more parallel to a friendship. Since Campus Connections recruited college students as mentors, there is an age difference between most dyads that could influence the formation of this relationship. Research suggests that a friendship may look different from a mentorship due to factors of prosocial behavior, intimacy, levels of conflict, support, guidance, and empathy. Additional research is needed to better understand the factors that contribute to adolescent substance use and assist to further develop intervention and prevention techniques that promote positive health outcomes.

Conclusions. This study examined the impact of the Campus Connections mentoring program on adolescent substance use in a secondary data analysis. More specifically, the relative effects of mentor relationship quality and a mentee's sense of belonging on the odds of sustained abstinence of substance use at the end of the program, consisting of alcohol, tobacco, and cannabis. Key findings in this study were that forming a high-quality mentoring relationship is one factor that contributed to reduced likelihood of substance use at follow-up. A higher sense of belonging was another factor that led to less likelihood of using alcohol, tobacco, and cannabis at the end of the program. The interaction between mentee reported relationship quality and sense of belonging was not significant. Lastly, a significant difference was found between the mentee and mentor reported relationship quality where the mentee report was a stronger predictor of the odds of sustained abstinence at follow-up.

Clinically these findings provide powerful incentive for mentoring programs that target adolescent substance use to further explore and expand on establishing a strong relationship between dyads and increasing youths' sense of belonging. With this information mentoring programs can modify their trainings and emphasize a supportive community for the mentees, assessing for the strength of their mentor alliance and fostering an environment where the youth are comfortable around their peers and mentors. Understanding the factors within mentoring that contribute to positive outcomes for youth can help further the program as an intervention and implore techniques to maximize effectiveness in reducing overall adolescent substance use. With these findings clinicians and researchers can educate mentoring programs and advocate for increasing focus on the factors that contribute to decreased unwanted behaviors.

Empirically, this study expands on the understanding of mentor relationship quality and feelings of belonging, and how these effect youth's substance uses over time. Additionally, it

may also expand on the current understanding of mentee compared to mentor reports of alliance and encourage future research to gain a more accurate representation of these variables. This study hopes to add to the existing literature base by identifying mentor relationship quality and youths' sense of belonging as important preventative factors that contribute to mentoring successfulness in increasing sustained abstinence of adolescent substance use.

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APPENDIX A

Consent Forms – Assent and Consent

Assent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: THE EFFECT OF MENTORSHIP ON POSITIVE YOUTH DEVELOPMENT

CO-PRINCIPAL INVESTIGATORS: Shelley Haddock, Ph.D., 423 Behavioral Sciences, Colorado State University (CSU), Ph: (970) 491-5649; and Kimberly Henry, Ph.D., 220 Behavioral Sciences, CSU, Ph: (970) 491-5109

CO-INVESTIGATORS: Rachel Lucas-Thompson, Ph.D., Lise Youngblade, Ph.D., & Lindsey Weiler, Ph.D.,

Hi!

I'm a teacher at Colorado State University. I do research on mentoring programs. My research is about how to create mentoring programs that help kids do well in school and be healthy. I am asking you if you would be part of my research study while you participate in Campus Connections.

If you say it is OK, I'll ask you to answer some questions on a survey before Campus Connections starts, when Campus Connections ends, and again 6 months later. The questions are about how you feel about yourself and adults in your life, and about your health and how you do in school. They will take you about 30 minutes to complete. To thank you, we will give you a $10 Visa gift card when you are done with each one. Then during Campus Connections, we will ask you to do 4 more short questionnaires that ask you about your relationships with other people in the program. These will take about 15 minutes to complete. There isn't a right or wrong answer --- it is just about what you think. We will either ask your school to give us your grades, attendance, and disciplinary actions before, during, and after the program, or we will get this information from your on-line school account. We also will ask the District Attorney's office to let us know if you have any charges before, during, and after the program. Also during Campus Connections, I and other researchers may observe you to see how you, your mentor, and other people in the program work together during activities. During one week, we will videotape you, your mentor, and other people having a group conversation and doing a group activity. We also will ask you and your mentor to wear an iPod that will randomly record some of your conversations so we can learn about mentoring relationships. I also might ask you if I can interview you to hear about your experience in Campus Connections. Sometimes we may audio tape or videotape this to be sure we don't miss anything, but you would always know when we were doing this. These audio and video recordings will not include your name, and will be kept indefinitely for the purposes of future research studies.

Agreeing to be in this project won't hurt you. It won't help you, either. What you share is confidential unless you share that you intend to harm yourself or others, or that someone may have hurt you. You will get $10 Amazon gift cards when you finish each of the long questionnaires. If you do all three questionnaires, you will get $30 in Amazon gift cards. A record of you receiving compensation (NOT your data) may be made available to CSU officials for financial audits.

You don't have to be a part of the research. If you say "yes" now but later change your mind, you can stop being in the research any time by just telling me. I will ask your

parents if it is OK for you do this, too. If you want to be in this research, sign your name and write today's date on the line below.

_____ _____
Youth Date

_____ _____
Researcher Date

Parent Permission:

_____ _____
Parent Date

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: The Effect of Mentorship on Positive Youth Development

CO-PRINCIPAL INVESTIGATORS: SHELLEY HADDOCK, PHD, 423 BEHAVIORAL SCIENCES, COLORADO STATE UNIVERSITY, PHONE: (970) 491-5649 AND KIMBERLY HENRY, PHD, 220 BEHAVIORAL SCIENCES, COLORADO STATE UNIVERITY, PHONE: (970) 491-5109

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH? You are being invited to take part in this research study because you are an adolescent and you are a participant of Campus Connections.

WHO IS DOING THE STUDY? Shelley Haddock, PhD, who co-developed Campus Connections and is a professor in the Human Development and Family Studies Department at Colorado State University, along with Kimberly Henry, PhD, who is a professor of Psychology and Public Health at Colorado State University will lead the study. Additional investigators include Rachel Lucas-Thompson, PhD and Lise Youngblade, PhD, who are both professors in the Human Development and Family Studies Department at Colorado State University, as well as Lindsey Weiler, PhD, professor in the Department of Family Social Science at the University of Minnesota.

WHAT IS THE PURPOSE OF THIS STUDY? The purpose of this study is to learn about the effect of mentoring on positive youth development.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? The study will take place in the Gifford Building at CSU, where you attend Campus Connections, and it will last 12 weeks. Six months after you complete Campus Connections, we will ask you to complete one more questionnaire.

WHAT WILL I BE ASKED TO DO? You will be asked to complete up to 7 questionnaires. Three questionnaires will take approximately 30 minutes to complete. The first questionnaire will occur during your intake interview, a second questionnaire will occur during the last week of Campus Connections, and a third will occur 6 months after your participation in Campus Connections is completed. The additional 4 questionnaires will take 15 minutes to complete. These will occur during weeks 1, 3, 6, and 9 of the Campus Connections program. You also will be asked either to give your School District permission to provide data to researchers on your grades, attendance, and disciplinary actions, or to allow the researchers to access grades and attendance from your school's on-line account. This information will be collected two quarters prior to you beginning in Campus Connections, the quarters in which you are enrolled in the program, and for two quarters following completion of the program. You also will be asked to give permission to the Office of the District Attorney to provide data on charges prior to, during, and up to one year after completing Campus Connections. You will also

be asked to give permission to be observed, audiotaped and videotaped by research staff at multiple time points throughout the program.

You and your mentor will be wearing a digital tape recorder, called the iEAR (short for 'Electronically Activated Recorder' for the iPod Touch) to randomly record interactions during Campus Connections. Audio and videotapes will not include your name, and will be kept indefinitely for the purposes of future research studies. You also will be asked to participate in a group conversation and activity that will be video recorded. Lastly, some youth may be invited to participate in a 30-minute interview that will help us learn about your experiences in the program. This interview will be audio recorded to ensure accuracy.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY? Your participation in this study is completely voluntary. If you are 17 and younger, you can only participate in the study if your parent provides permission for you to do so.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS? Some questions in the survey and the interview ask about your thoughts and behavior, which may potentially be uncomfortable for some participants to answer. Some participants may feel uncomfortable being audio or videotaped. To minimize discomfort you have the option to not be recorded, and skip any and all questions that you do not feel comfortable answering. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential risks.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY? There are no direct benefits of participating in this study. However, your answers to questions will help in improving Campus Connections for youth who participate in the future.

DO I HAVE TO TAKE PART IN THE STUDY? Your participation in this research is completely voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision whether or not to participate will not affect your relationship or status with the Campus Connections program in any way.

WHO WILL SEE THE INFORMATION THAT I GIVE? Everything you share is confidential unless you disclose any intention to harm yourself or others or that you may have been harmed by others. As appropriate in these cases, we will talk with your parent(s)/guardian(s), police, and/or child protective services.

We will keep private all research records that identify you, to the extent allowed by law. We will make every effort to prevent anyone who is not on the Campus Connections research and program team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records and these two things will be stored in different places under lock and key. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however,

we will keep your name and other identifying information private. We may be asked to share the research files with the CSU Institutional Review Board ethics committee for auditing purposes.

In order to provide you with an incentive for participating in this study, we may have to reveal your name only to CSU officials in the event of a financial audit.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY? You will be compensated with a $10 Amazon gift card for completing each of the 3 questionnaires that occur at the intake interview, during the last week of the Campus Connections program, and 6 months after the completion of the Campus Connections program. In other words, if you complete all 3 questionnaires, you will receive a total of $30 in Amazon gift cards.

WHAT HAPPENS IF I AM INJURED BECAUSE OF THE RESEARCH? The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS? Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Shelley Haddock, PhD at (970) 491-5649. If you have any questions about your rights as a volunteer in this research, contact the CSU IRB at: RICRO_IRB@mail.colostate.edu; 970-491-1553. We will give you a copy of this consent form to take with you.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 4 pages.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

_____ _____

Name of person providing information to participant Date

_____

Signature of Research Staff

PARENTAL SIGNATURE FOR MINOR

As parent or guardian I authorize _____ (print name) to become a participant for the described research. The nature and general purpose of the project have been satisfactorily explained to me by _____ and I am satisfied that proper precautions will be observed.

_____

Minor's date of birth

_____

Parent/Guardian name (printed)

_____ _____

Parent/Guardian signature Date

APPENDIX B

Demographic Questionnaire – Mentee and Mentor Reports

Description of Demographic Variables: The mentees and mentors reported on a series of demographic questions pertaining to themselves. These items were administered at the pre-intervention survey (k0) only.

List of Demographic Variables Used:

mentee/mentor_eth Mentee/Mentor's self-reported race/ethnicity (1=American Indian, 2=Asian, 3=Black, 4=Hispanic, 5=Hawaiian, 6=White, 7=Mixed)

mentee/mentor_male Mentee/Mentor's biological sex (1=Male, 0=Female)

Note: For individuals that do not identify as exclusively a male or female, their biological sex was imputed for mentee/mentor_male. Cases are noted in the impnotes variable.

mentee_byear/mXyrborn What year were you born? (XXXX)

mentee_bmonth What month were you born? (January=1, February=2, March=3, etc.)

APPENDIX C

Self-Reported Delinquency

Description of Instrument: Adapted from: Elliott, D. S., Huizinga, D., Ageton, S. S. (1985). Explaining Delinquency and Drug Use. Sage, Beverly Hills. The instrument is available at intake (k0), week 11 (k5), and at the six month follow-up (k6).

Instructions: On how many DAYS in the LAST MONTH have the following things happened?

Scale Choices: Slider ranging from 0 (0 days) to 30 (30 days).

kXdlq_1	I wrote things or sprayed paint on walls, cars, sidewalks or anyplace you were not supposed to.
kXdlq_2	I damaged property that did not belong to me.
kXdlq_3	I hit someone or got into a physical fight.
kXdlq_4	I drank alcohol.
kXdlq_5	I got drunk.
kXdlq_6	I used marijuana.
kXdlq_7	I smoked cigarettes or chewed tobacco.
kXdlq_8	I snuck into someplace without paying, such as the movies or a bus.
kXdlq_9	I took something from a store without paying for it.
kXdlq_10	I stole something (other than from a store).

APPENDIX D

Mentor Alliance Scale – Mentee Report

Description of Instrument: Adapted from: Cavell, T.A., Elledge, L.C.,, Malcolm, K.T., Faith, M.A. and Hughes, J.M. (2009). Relationship Quality and the Mentoring of Aggressive, High-Risk Children. *Journal of Clinical Child & Adolescent Psychology, 38(2), 185-198*. The instrument is available at week 6 (k3) and week 11 (k5).

Instructions: The next set of questions are about your relationship with your mentor. How often do you experience the following:

Scale Anchors: Never=1, Hardly Ever=2, Sometimes=3, Usually=4, Always=5.

kXdlq_11	I look forward to meeting with my mentor.
kXdlq_12	I tell my mentor about things that upset me.
kXdlq_13	When I'm with my mentor, I want the time to go quickly.
kXdlq_14	When I'm with my mentor, I bring up things that bother me.
kXdlq_15	I like spending time with my mentor.
kXdlq_16	When I'm with my mentor, I keep my problems to myself.
kXdlq_17	I like my mentor.
kXdlq_18	When my mentor asks about my problems, I talk about them.
kXdlq_19	I'd rather do other things than meet with my mentor.
kXdlq_20	I feel like my mentor is on my side and tries to help me.
kXdlq_21	I talk to my mentor about my feelings.
kXdlq_22	I wish my mentor would leave me alone.
kXdlq_23	When I'm with my mentor, I feel ignored.

kXdlq_24	When I’m with my mentor, I feel mad.
kXdlq_25	When I’m with my mentor, I feel disappointed.
kXdlq_26	When I’m with my mentor, I feel bored.

APPENDIX E

Mentor Alliance Scale – Mentor Report

Description of Instrument: Adapted from: Cavell, T.A., Elledge, L.C.,, Malcolm, K.T., Faith, M.A. and Hughes, J.M. (2009). Relationship Quality and the Mentoring of Aggressive, High-Risk Children. *Journal of Clinical Child & Adolescent Psychology, 38(2), 185-198*. The instrument is available at week 6 (m3) and week 11 (m5).

Instructions: The next set of questions are about your Youth/Mentee. How often do you experience the following:

Scale Choices: Never=1, Hardly Ever=2, Sometimes=3, Usually=4, Always=5.

mXmas_1	My mentee looks forward to our visits.
mXmas_2	My mentee talks about things that upset him or her.
mXmas_3	My mentee and I get mad or get upset with each other.
mXmas_4	My mentee appears eager to have the visits end.
mXmas_5	My mentee brings up things that bother him or her.
mXmas_6	My mentee likes spending time with me.
mXmas_7	My mentee keeps problems to himself or herself.
mXmas_8	My mentee expresses positive emotion toward me.
mXmas_9	When I ask about problems, my mentee talks about them.
mXmas_10	My mentee would rather do other things than visit with me.
mXmas_11	My mentee considers me to be an ally.
mXmas_12	My mentee and I often argue with each other.
mXmas_13	My mentee talks about feelings.

mXmas_14 My mentee wishes to be alone.

APPENDIX F

Youth's Sense of Belonging at Campus Connections

Description of Instrument: Adapted from Youth Development Strategies, Inc. The instrument is available at intake (k0), week 3 (k2), week 6 (k3), week 9 (k4), and week 11 (k5). At k0 the items were worded to capture expectations (since CC hadn't yet begun), and at each subsequent survey the items were worded to capture current experiences (see List of Items below).

Instructions: How much do you agree with the following statements?

Scale Choices: Slider ranging from "0 (DISAGREE!!!)" to "10 (AGREE!!!)".

kXblng_1 I feel like I will belong at Campus Connections./I belong at Campus Connections.

kXblng_2 I feel like my ideas will count at Campus Connections./My ideas count at Campus Connections.

kXblng_3 I feel like people will listen to me at Campus Connections./People listen to me at Campus Connections.

kXblng_4 I feel like if I didn't show up at Campus Connections people would miss me./If I didn't show up at Campus Connections people would miss me.

kXblng_5 I feel like I will be a part of Campus Connections./I feel like a part of Campus Connections.

APPENDIX G

Mattering Index – Campus Connections Specific

Description of Instrument: Adapted from: Elliott, G. C., and Kao, S., & Grant, A.M. (2004). Mattering: Empirical validation of a social psychological concept. *Self and Identity, 3, 339-354*. The instrument is available at week 3 (k2), week 6 (k3), week 9 (k4), and week 11 (k5).

Instructions: How much do you agree with the following statements?

Scale Choices: Slider ranging from "0 (DISAGREE!!!)" to "10 (AGREE!!!)".

kXccmat_1 Most people at Campus Connections do not seem to notice when I come or when I go.

kXccmat_2 At Campus Connections, no one recognizes me.

kXccmat_3 Sometimes when I am at Campus Connections, I feel almost as if I were invisible.

kXccmat_4 People do not care what happens to me at Campus Connections.

kXccmat_5 When I have a problem, people at Campus Connections usually don't want to hear about it.

kXccmat_6 No one at Campus Connections would notice if one day I disappeared.