# PREDICTING ATTENDANCE IN A FAMILY-CENTERED PREVENTIVE INTERVENTION FOR AFRICAN AMERICAN YOUTH

By

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(Under the Direction of Steven M. Kogan)

ABSTRACT

The current study investigates predictors of a full dose of prevention in a trial of the Strong African American Families (SAAF) substance use prevention program. Predictors included socioeconomic disadvantage, caregiver depression, family disorganization, youth vulnerability for problem behavior, and community disadvantage. SAAF includes an ecologically appropriate curriculum and a comprehensive set of engagement procedures. A full dose was operationalized as attendance of at least 5 of 7 sessions. Logistic structural equation modeling (SEM) revealed no evidence of the tested factors predicting an incomplete dose. However, family disorganization was associated positively with dose, controlling for all other factors. Moreover, the interaction of youth vulnerability for problem behavior and community disadvantage positively predicted dose. Findings may suggest that ecologically sensitive engagement protocols and curricula may obviate the influence of certain barriers to participation. This conclusion requires replication and confirmation with experimental manipulation of engagement protocols.

INDEX WORDS: Family-Centered Prevention, Program Dose, Barriers to Attendance, Ecologically Sensitive Curricula

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# CHAPTER 1

## INTRODUCTION

Research suggests that 32% of adolescents in the United States use substances regularly (Han et al., 2017). Underage substance use has an extensive range of negative consequences that include physical injury and impaired psychosocial development (Miller et al., 2006). Research suggests that influential factors affecting adolescent substance use originate in the family environment, particularly in parenting practices (Dishion et al., 2002). Further, studies demonstrate that adolescent substance use can be prevented through programs that focus on the family system (e.g., Coatsworth et al., 2002; Dishion et al., 2002; Haggerty et al., 2007; Kumpfer & Alvarado, 2003; Orrell-Valente et al., 1999). Subsequently, family-based prevention programs have been developed to address adolescent substance use (Van Ryzin et al., 2015). The efficacy and durability of these programs have been well documented (Dishion et al., 2002; Foxcroft, 2006).

Ensuring high attendance levels has emerged as a significant and persistent challenge for the widespread implementation of family-centered programs for substance use prevention (Barrera et al., 2017). Studies document a linear association between prevention dose and prevention outcomes; that is, the higher the number of sessions attended, the more optimal the outcomes (Aber et al., 1998; August et al., 2001; Braswell & August, 1997; Kogan et al., 2019). Early research on parents' perceptions of family-centered programs suggested that parents viewed them as useful and necessary and would be interested in attending them if available (Spoth & Redmond, 1995; Spoth et al., 1997). However, subsequent research underscored the

difficulties in facilitating high levels of attendance for family-centered programming. Carefully controlled implementations in research trials have reported attendance rates over 60% (e.g., Brody et al., 2006; Garbacz et al., 2019). A substantial portion of families in these projects did not receive a sufficient dose. Other studies, with programs implemented in community settings, evinced considerably lower attendance rates. For example, Spoth and colleagues (2007) reported an attendance rate (defined as attending at least one of 7 sessions) of 17% in a community implementation trial. Encouraging participants to receive a full dose of prevention remains a serious concern for the widespread dissemination of family-centered programming (Barrera et al., 2017).

Studies indicate that attendance in family-centered prevention is a health-related behavior influenced by characteristics of the family, the family's context, and of the program itself (Spoth & Redmond, 1994, 2000). Ecological perspectives and research point to the importance of socioeconomic, community, family, and youth characteristics in understanding attendance (Whittaker & Cowley, 2012). Program characteristics include the use of engagement procedures to obviate barriers to participation and the relevance and salience of the curriculum, which provides a more or less engaging experience for participants.

Given these challenges, researchers have underscored the need for (a) culturally responsive curricula for diverse ethnic groups (Barrera et al., 2019) and (b) the development and implementation of strategies designed to make programming more accessible (Barrera et al., 2017; Kogan et al., 2016). Recently developed prevention programs increasingly consider their applicability to diverse communities (Dishion & Stormshak, 2007; Spoth et al., 2002). Alternatively, several evidence-based programs have been developed specifically for designated ethnic/cultural groups (Brody et al., 2004; Coatsworth et al., 2002; Gonzales et al., 2012). Well-

designed programs also specify implementation processes that include extensive engagement protocols to facilitate attendance (Gonzales et al., 2012; Kogan et al., 2016). Engagement most commonly refers to attending the first few sessions of a program (Gonzales et al., 2012). Engagement protocols include providing childcare, family meals, transportation, an accessible location of the program, lay community facilitators, and culturally and ecologically relevant curricula. Increases in the use of these engagement protocols and curriculum salience could attenuate the influence of dose-related risk factors. However, few investigations relating ecological risk factors to participant attendance have been conducted with recent programs that include these characteristics. The present study seeks to address this need.

**Research Question**

I examined factors associated with a full dose of prevention in the context of an implementation of the Strong African American Families (SAAF) program. SAAF includes both an ecologically appropriate curriculum developed specifically for African American families in rural settings and a set of engagement procedures to increase attendance. SAAF's substance use efficacy was replicated recently in a randomized trial (Kogan et al., 2019). This provided an opportunity to examine the association of common dose-associated factors with attendance. My study was guided by the following research question; which factors in the family's ecology are useful in understanding program dose in a context where high levels of engagement procedures were implemented, and an ecologically tailored curriculum was used? To that end, I investigated if socioeconomic disadvantage, caregiver depression, family disorganization, youth vulnerability for problem behavior, and community disadvantage predicted completion of a full dose of programming (5 of 7 sessions). I also considered the possibility that ecological factors may interact to predict dose. Specifically, I tested the interaction of a community-level factor with

family and youth-level factors. Past research on the association of many of these factors with dose is inconsistent. Some factors, such as family disorganization and youth vulnerability for problem behavior, may act as risk factors for dose in some studies and promotive factors in others (Gorman-Smith et al., 2002; Haggerty et al., 2002; Heinrichs et al., 2005; Prado et al., 2006; Winslow et al., 2009). It is possible that when program characteristics (i.e., use of engagement procedures, culturally appropriate curricula) effectively facilitate a full dose, ecological risk factors are attenuated or may even promote attendance as caregivers experience greater motivation, and the program has greater salience. I thus made no directional hypotheses in my study.

**Methods**

I investigated factors associated with dose among the experimental group (N = 252 families) of participants in a randomized prevention trial of SAAF (total trial N = 472). Participants (youth and caregivers) completed self-report surveys on demographics, depression, youth behavior, family variables, and community disadvantage prior to attending SAAF. The association of dose-related factors with the receipt of a full dose of SAAF (5-7 sessions) was investigated with logistic structural equation modeling. Three latent factors were used as predictors in the model: family disorganization, youth vulnerability for problem behavior, and community disadvantage. Socioeconomic disadvantage and caregiver depression were also predictors in the model. Youth gender was used as a covariate. Prior to testing the predictive model, I examined the measurement model with a confirmatory factor analysis (CFA). I then tested each measurement and factor individually with youth gender controlled. To test the latent moderated structural equation, I used a two-step estimation process to find the best fitting model. The final model, with all latent factors, measurements, and the interaction, was investigated with

logistic structural equation modeling. The interaction was probed for directionality by plotting using the Johnson-Neyman technique.

# CHAPTER 2

# LITERATURE REVIEW

Previous research suggests that various individual, family, and community risk factors may reduce attendance in family-centered prevention programs for adolescent substance abuse (Brody et al., 2006; Coatsworth et al., 2006; Spoth & Redmond, 2000). However, research is lacking in assessing dose-related factors in prevention programs that intentionally seek to reduce barriers and increase curriculum salience. The present study is designed to meet this need by investigating the effects of socioeconomic disadvantage, caregiver depression, family disorganization, youth vulnerability for problem behavior, and community disadvantage on receiving a full dose of the program. A conceptual model of the research questions is presented in Figure 1.

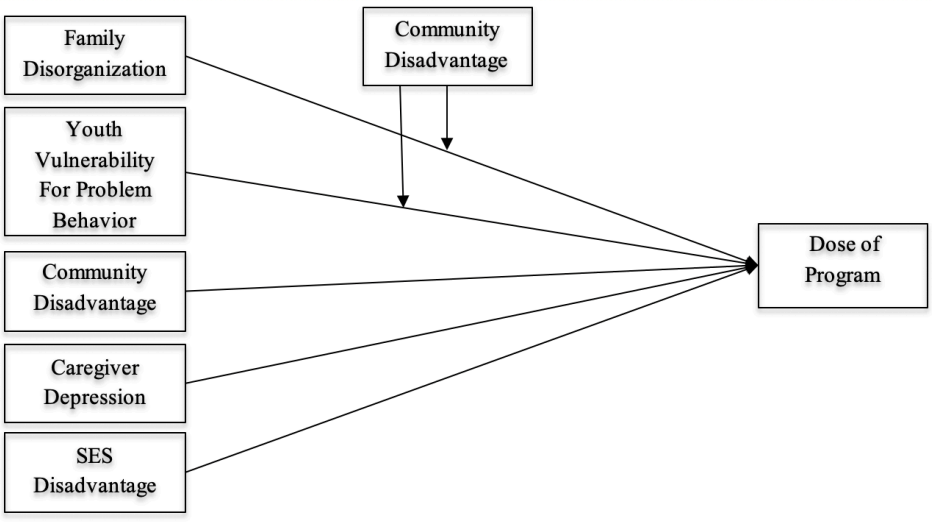


**Figure 1**

*Conceptual Model of the Current Study*

This chapter will present a review of the literature that informs the proposed study. It is organized as follows: (a) Adolescent Substance Use (b) Family-Centered Prevention Programs and Program Attendance (c) Ecological Factors and Engagement in Family-based Prevention Programing, and (d) Program Characteristics, Attendance, and the Strong African American Families Program.

**Adolescent Substance Use**

Adolescence is defined as the period between childhood and adulthood and is commonly divided into three subsections; early (11-13 years), middle (14-16 years), and late (17-19 years) (Ogden & Hagen, 2018). The adolescent period is often associated with an increase in risk-taking behaviors, and the initiation and escalation of substance use most commonly begin in adolescence (Hines & Lynskey, 2019). Research suggests that substance use between the ages of 11 and 20 years is associated with poor health and social outcomes later in life (Newcomb & Bentler, 1989; Spoth et al., 2001). According to a 2016 report from the National Survey on Drug Use and Health, substance use has been increasing more rapidly among rural youth than urban youth, resulting in decreased academic performance and increased emotional and behavioral difficulties (Center for Behavioral Health Statistics and Quality, 2017). The average first initiation of alcohol use tends to peak during early adolescence around 13 years old, whereas marijuana use increases steadily from 13 to 18 years old (Kosterman et al., 2000).

Substance use in adolescence can lead to severe short and long-term consequences. Alcohol intoxication can lead to injuries, fights, unintended sexual intercourse, and accidents (Kuntsche & Gmel, 2013). Early-onset nicotine use predicts more frequent and chronic use throughout life (Kuper et al., 2002), which, in turn, increases the risk of disease and early death (Chang et al., 2012). Marijuana, the most widely used illicit substance in North America,

has been shown to increase respiratory problems and school dropout rates (Miech et al., 2015). Further, studies have demonstrated that using marijuana or alcohol during adolescence is a precursor for the use of other illicit drugs (Kosterman et al., 2000). Therefore, preventing adolescent substance use is a critical public health need.

The emergence of adolescent substance use can be understood through ecological systems theory (Bronfenbrenner, 1994). Ecological systems theory provides a framework for researchers to examine the complex context of human development, which includes family, community, and societal influences (Bronfenbrenner, 1994). It also specifies how nested systems affect individual behavior, risk, and development. Specifically pertinent to substance abuse research and consistent with the ecological systems theory, family factors have been identified to play essential roles in youth substance use's etiology. Research suggests that when caregivers minimally monitor their youth and have limited rules and reinforcement concerning substance use, their adolescents are more likely to have early-onset and sustained use of substances (Rusby et al., 2018; Varvil-Weld et al., 2014). Therefore, parents play an important role in deterring adolescent substance use. Henry and colleagues (2004) found that out of a range of school, community, and individual factors, parental support was the primary predictor of low adolescent substance use. When youth feel as though their parents provide praise, support, and affection, they tend to participate less in substance use. Research has highlighted parental support as having a direct relationship with adolescent substance use and indirectly through reducing peer orientation (Bogebscheider et al., 1998). That is, when youth can rely on their parents, they may be less likely to seek support and approval from peers, which will reduce adherence to substance use peer pressure throughout the adolescent period.

Further, negative family factors, such as poor family relationships, can directly predict an increase in substance use among adolescents (Rusby et al., 2018; Van Ryzin et al., 2012). Research informed by ecological systems theory suggests that a salient way to prevent adolescent substance use is by addressing both the family as a whole and parent-youth relationships (Bronfenbrenner, 1994; Henry et al., 2004). This research highlights the importance of providing education to families while improving family relationships to prevent adolescent substance use.

**Family-Centered Prevention Programs and Program Attendance**

The influence of family factors on adolescent substance use has led to the development of family-centered substance abuse prevention programs (Van Ryzin et al., 2015). Family-centered prevention programs include intervention with parents or caregivers, youth, and, in some cases, siblings. These programs work with families to influence the way parents manage, organize, and monitor their families (Van Ryzin et al., 2015). Programs work to improve parenting and family relationships by promoting protective factors and reducing risk factors for substance use. Over the last 20 years, evidence-based interventions for preventing substance use have been developed that focus on changing family factors (Van Ryzin et al., 2015). Research suggests that family-based prevention may reduce adolescent substance use more than an array of other approaches (Foxcroft et al., 2006). For example, the Cochrane Review of substance use prevention programs concluded that interventions that incorporated parents were more effective at reducing substance use than those that only targeted youth (Foxcroft et al., 2003). Findings on the efficacy of family-based programs have been replicated. A 2003 systematic review of prevention programs for adolescent substance use identified seven family-based programs as being particularly effective, with findings from each program independently replicated (Kumpfer & Alvarado, 2003). Some

research has suggested that a sufficient dose of family-centered programming can result in efficacious, cost-effective, and long-lasting decreases in adolescent substance use (Kumpfer & Alvarado, 2003; Van Ryzin et al., 2015).

A significant challenge in the implementation of effective family-centered programs is ensuring high participation rates. Participation and retention are important aspects of program implementation because research has found a linear association between prevention dose and outcomes; that is, the closer to a full dose of programming, the better the outcomes (Aber et al., 1998; August et al., 2001; Braswell & August, 1997; Kogan et al., 2019). Early research focused on developing family-centered programs suggested that families were interested in family programming and would attend a family program if available to them (Spoth & Redmond, 1995; Spoth et al., 1997). Spoth and Redmond (1995) interviewed 1,192 parents regarding their willingness to enroll in a parenting-skills family program. The authors found that most parents stated they were inclined to attend, and their perception of the program's benefits directly predicted this motivation (Spoth & Redmond, 1995). However, over the last three decades, ensuring high participation rates has emerged as a persistent challenge in family-centered programs. Implementation of family programs in communities (Galano et al., 2001; Kumpfer et al., 1996) and carefully constructed prevention trials (Cunningham et al., 1995; Myers et al., 1992; Perrino et al., 2001) underscored the difficulties in facilitating high levels of attendance for family-centered programming. Participation rates among programs have varied. Carefully controlled implementations in research trials have reported engagement rates exceeding 60% (Brody et al., 2006; Garbacz et al., 2019; Spoth et al., 2001). Although substantial, a sizeable portion of families in these projects did not attend the intervention at all, and others may not have received a full dose. Carefully controlled research trials are more likely to follow detailed

program procedures, such as offering resources that reduce the number of barriers families face, which may increase participation rates (Hansen et al., 2013). Other studies, with programs implemented in community settings, evinced considerably lower attendance rates (Cohen & Linton, 1995; Spoth et al., 2007). For example, Cohen and Linton (1995) found that only 10% of families participated in at least one session of the adolescent substance use prevention program offered. More recently, Spoth and colleagues reported 17% of eligible families in a community implementation trial of the Strengthening Families Program attended at least one of seven sessions (2007). Families with the highest need for the intervention are frequently underrepresented in preventive interventions (e.g., Biglan & Metzler, 1999; Cohen & Linton, 1995; Stein et al., 1991). This may be due to barriers faced by vulnerable populations, such as difficulty in affording childcare or transportation, as well as an increased stigmatization families may face by attending prevention programs (Cohen & Linton, 1995; Stein et al., 1991).

Variability in attendance rates underscores the need to understand the factors associated with participation. Investigations of risk factors associated with dose facilitate the development of implementation protocols that can obviate barriers to attendance. Empirical and theoretical studies indicate that attendance in family-centered prevention is a complex, multi-factor health-related behavior (Dumas et al., 2007). The decision to attend a program is related both to (a) barriers experienced by the family (b) characteristics of the program that obviate these barriers, and (c) the relevance and salience of the curriculum, which provides an engaging experience for participants (for review see Barrera et al., 2017). In the present study, I examine how factors identified as influencing dose in the previous literature affect attendance in the context of a program designed to obviate barriers and provide a highly salient curriculum. The section that follows reviews past research on participant factors that influence attendance in family-centered

prevention and related family-based intervention programs (e.g., child mental health treatment). Family-based mental health programs were included in the following review because many factors that predict participation in these programs overlap with those that predict participation in substance use programs.

**Ecological Factors and Engagement in Family-Centered Prevention Programming**

Empirical research has documented a range of factors associated with attendance in the context of family-centered prevention, occurring at different levels of families' ecology (Kumpfer et al., 2002). These levels can be understood through Bronfenbrenner's ecological systems theory (1994). Ecological systems theory suggests that individual behavior is embedded within larger social systems and is affected by risk and protective factors at multiple contextual influence levels (Bronfenbrenner, 1994; Stokols, 1996). Per the ecological model, factors that occur at various levels of a family's ecology affect their interest and ability to attend prevention programs (Bronfenbrenner, 1994; Spoth & Redmond, 2000). This translates most commonly into investigations that consider individual, family, peer, and community levels of influence in predicting program attendance (Spoth & Redmond, 2000). Individual factors include race/ethnicity and youth vulnerability for problem behavior (Kazdin & Wassell, 2000; Mendez et al., 2009; Perrino et al., 2001; Spoth et al., 2001). Family level factors include caregiver depression and family disorganization (Brody et al., 2006; Coatsworth et al., 2006; Fox & Gottfredson, 2003). Larger community and contextual factors affect the community at large, such as high crime rates, low public transportation, or poor social ties (Heinrichs et al., 2005). Ecological systems theory has been applied to a range of research that examines behavior in health promotion efforts (Golden & Earp, 2012) and family-centered programs (Kumpfer et al.,

2008). Below I review selectively common factors discussed in the literature on prevention program attendance.

***Socioeconomic disadvantage***

Socioeconomic disadvantage includes poverty, low parental education, single-parent status, and unemployment. Socioeconomically disadvantaged families may find it challenging to participate in programs due to economic stress, lack of flexibility in work schedules, or lack of resources needed to organize attendance such as childcare or transportation. Rohrbach and colleagues (1994) examined parental participation in the Midwestern Prevention Project and found a significant association between the number of activities parents attended and their socioeconomic status. That is, families with a lower socioeconomic status attended fewer sessions (Rohrbach et al., 1994). A 2010 study of enrollment in a family program for youth-at-risk of conduct disorders found that enrollment rates differed significantly based on socioeconomic status (Baker et al., 2010). The authors found 83% of high socioeconomic status families enrolled compared to 38% of low socioeconomic status families (Baker et al., 2010). However, studies on socioeconomic status have varied (Spoth & Redmond, 2000). For example, Coatsworth and colleagues (2006) found that household income predicted attendance in a family-centered prevention program only for Hispanic families and not for African American families.

***Caregiver Depression***

Several studies related to engagement that have been conducted in the clinical literature suggest caregiver depression is a risk factor for low-participation in adolescent substance abuse treatment (Kazdin & Wassell, 2000; Mendez et al., 2009). Research has found that caregiver depression predicts low attendance rates primarily through perceived barriers; that is, caregivers who have a high number of depression symptoms are more likely to report a larger number of

barriers to participation (Kazdin & Wassell, 2000; Mendez et al., 2009). Kazdin and Wassell (2000) examined parent psychopathology in a clinical intervention for parents and youth. They found that caregiver depression was associated with difficulties in coping with the intervention's demands and hence more barriers to overall attendance. Mendez and colleagues (2009) reported that mothers in their community-based Head Start parenting program who had high levels of depression reported more barriers and attended fewer sessions than parents with no depression symptoms. Depressed mothers may lack the energy and motivation to engage and attend prevention programs when experiencing mental health issues such as depression.

***Family Disorganization***

Family disorganization refers to a lack of consensus among members, a lack of functionality, disorganized social roles, and a heightened level of conflict and aggression (Goode, 1971; Repetti et al., 2002). Disorganized family environments also are characterized by a lack of routines and predictability, with parents who struggle to (a) monitor and supervise their children's whereabouts and behavior and (b) provide consistent discipline (Matheny et al., 1995). Some studies have identified family organization as a positive predictor of dose. Perrino et al. (2001) had facilitators rate families' organization in a pre-intervention home visit. The authors found that family organization was associated positively with African American families' engagement and moderately associated with engagement for Hispanic families (Perrino et al., 2001). Family disorganization may act as a barrier to participation due to a lack of routines and collective efficacy required to schedule and attend regularly (Coatsworth et al., 2006). Disorganized families may be experiencing high-tension levels and, therefore, cannot withstand the added pressure of weekly program sessions (Coatsworth et al., 2006). Family disorganization may impede attendance because parents in such families are hesitant to participate in group

workshops where their family dynamics are on display (Whittaker & Cowley, 2012). However, these findings are not consistent. Some studies have shown that parents who report difficulty managing their families are more likely to attend due to perceiving more benefit from a program that helps address these issues (Gorman-Smith et al., 2002; Prado et al., 2006). Gorman-smith and colleagues (2002) found that low levels of parental involvement and monitoring were associated with higher levels of full participation in a family-centered parenting program. The authors suggest that families who reported low levels of involvement and monitoring may be interested in increasing family involvement or monitoring through the program's curriculum (Gorman-Smith et al., 2002). Similarly, Prado and colleagues (2006) found that family stress was positively related to engagement in a family-centered HIV prevention program for Hispanic youth. These mixed findings highlight the need for additional research on how family disorganization affects attendance rates in family-centered programs.

***Youth Vulnerability for Problem Behavior***

Youth vulnerability for problem behavior constitutes a potential predictor of attendance (Brody et al., 2006). Problem behavior vulnerabilities include youth's engagement with delinquent peers, their vulnerability to problem behaviors due to low self-control or emotion regulation, and their anger and hostility (Arthur et al., 2002). Kazdin and colleagues (1995) found that families with antisocial children were more likely to drop out of a family mental health outpatient program than were families of non-antisocial children. This effect was present for both Black and White children (Kazdin et al., 1995). Youth who are vulnerable to problem behavior may refuse to attend a program, and parents may have difficulty organizing their youths' behavior, making attendance difficult (Brody et al., 2006). Again, findings are mixed. Some research suggests that parents of children with problem behavior may perceive the

intervention as more useful and thus be more likely to attend (Haggerty et al., 2002; Heinrichs et al., 2005; Winslow et al., 2009). Early research on program attendance, for instance, found that parents' perceived need for change in their youth's behavior predicted an increase in time spent in a parent-training program (Sutton & Dixon, 1986). More recently, Winslow and colleagues analyzed predictors of enrollment in a family-based prevention intervention for divorced families (2009). The authors found that higher levels of child maladjustment were linked to a higher enrollment rate (Winslow et al., 2009). Baker and colleagues (2010) suggest that a child's problem behavior may lead parents to perceive a greater need for interventions and motivate them to attend.

***Community Disadvantage***

Community disadvantage is characterized by high levels of poverty, limited resources, and high crime levels that can hinder programs' attendance. For example, Heinrichs and colleagues (2005) found that attendance in the "Triple P" parenting program was associated with the number of social problems in their community. Community problems were inversely related to program attendance (Heinrichs et al., 2005). Community disadvantage may be a barrier to attendance in prevention programs due to the lack of access to transportation or unsafe travel options.

A body of ecologically informed research has documented how characteristics of a community can act as moderators of factors at other ecological levels (Brody et al., 2003; Beyers et al., 2003; Yonas et al., 2010; Bronfenbrenner, 1994). Multiple studies show that community risk can amplify other risk factors' effects on a range of outcomes (Brody et al., 2003; Beyers et al., 2003; Snedker et al., 2009; Zimmerman & Vasquez, 2011). To my knowledge, research on family-centered programs has not yet considered interactions between community factors and

dose-related factors. Thus, the current study examines community disadvantage's interaction with youth vulnerability for problem behavior and family disorganization in the prediction of dose.

**Program Characteristics, Attendance, and the Strong African American Families Program**

In addition to factors in the family's social ecology, a prevention program's characteristics also affect attendance rates (Barnes & Freude-Lagevardi, 2002; Hoagwood, 2005). Given the challenges of providing and receiving a full dose of prevention, researchers have underscored the need for (a) implementing strategies designed to make programming more accessible (Barrera et al., 2017; Kogan et al., 2016) and (b) developing engaging, culturally responsive curricula, particularly for members of diverse ethnic groups (Barrera et al., 2017). Well-designed family-based prevention programs specify engagement procedures, which encourage participation, reduce barriers, promote attendance, and provide a specified curriculum for the target population (Gonzales et al., 2012; Kogan et al., 2016).

Programs vary in their use of engagement procedures. Examples of engagement procedures include pre-intervention home-visits and the reduction of barriers by providing transportation, childcare, and meals. Rostad and colleagues (2018) found that logistical barriers predicted parents' low attendance in the Parenting Our Children to Excellence program, an intervention for parents at risk of maltreatment. The authors defined these barriers as 'competing priorities,' which included reported barriers such as difficulty finding time and resources, the possibility of homework, and low energy (Rostad et al., 2018). Spoth and Redmond (1995) suggested that programs could engage participants by offering incentives that address barriers such as childcare, meals, and transportation. Initial engagement in prevention programs has become a focus in recently developed family-centered programs (Brody et al. 2004; Coatsworth

et al., 2002; Gonzales et al., 2012).

Curriculum salience, or a program's importance and relevance to participants', has implications for attendance. It has been emphasized that program curricula should be ecologically sensitive (Kotchick & Forehand, 2002). The term "ecologically sensitive program" refers to programs that utilize ecological systems theory to target risk and protective factors for substance use with a specifically relevant curriculum for the population's social and ecological context. This includes addressing the nested factors that form the individuals' complex context (Bronfenbrenner, 1994). Ecologically sensitive curricula regard the family as a principal context and address how families specifically relate to multiple social systems (e.g., neighborhood, school) and how they may influence developmental outcomes (Liddle, 1995, 1999). Kotchick & Forehand (2002) recommend prevention programs utilize curriculum specific to families' community resources, neighborhood quality, family dynamics, and socioeconomic status to provide curricula relevant to the families' lived experiences. The inclusion of ecologically relevant information is likely to increase the dose of individual participation (Kotchick & Forehand, 2002; Kumpfer et al., 2012; Zane et al., 1998).

An essential aspect of ecologically sensitive curricula is creating cultural relevance in the programs. Cultural relevance refers to programs that address their participants' cultural practices, underscoring the effect culture has on parenting and family practices. Many prevention programs lack culturally sensitive curricula when provided to minority youth or families, as they were developed for White, middle-class populations (Turner, 2000). These programs may not be relevant for the parenting styles and cultural context of minority families, resulting in less incentive to participate (Kotchick & Forehand, 2002; Kumpfer et al., 2002). For example, parenting practices among African American families include traditions passed between

generations associated with racial pride, awareness of discrimination, and the history of people of color (Garcia-Coll et al., 1995; Kotchick & Forehand, 2002). Programs that do not consider participants' cultural context may be less engaging (Kotchick & Forehand, 2002; Kumpfer et al., 2012).

Research on engagement and curriculum salience has resulted in a number of prevention programs designed to enhance participation rates. These ecologically sensitive programs focus on reducing barriers and increasing salience by developing curricula grounded in empirical evidence that capitalizes on the strengths of culturally diverse families (Brody et al., 2004; Coatsworth et al., 2002; Gonzales et al., 2012). In the current study, I examine factors that have been associated with attendance within the context of the Strong African American Families Program (SAAF), an ecologically, culturally relevant program with robust engagement procedures.

### *The Strong African American Families Program*

SAAF is a preventive intervention designed to deter alcohol use among rural African American adolescents (Brody et al., 2004). SAAF was developed based on research with rural African American families (Brody et al., 2004). SAAF focuses on content relevant to African American families, including protective factors that focus on parents' caregiving practices evaluated for efficacy using culturally sensitive measures (Brody et al., 2004). These factors included promoting regulated, communicative homes that have involved parenting, clear expectations about risky behavior, and racial socialization (Brody et al., 2004). Recruitment procedures were developed with input from focus groups of rural African American community members (Brody et al., 2004; Murry & Brody, 2004). SAAF was held at sites within target communities while relying on community liaisons to recruit participants (Brody et al., 2004).

SAAF protocol, including offering participants transportation, childcare, a family meal during sessions, and a pre-intervention home visit to address any questions the participants may have (Kogan et al., 2016). The SAAF program consisted of seven sessions during seven consecutive weeks. SAAF provided separate parent and child portions of each session and ended with a family session within each two-hour period (Brody et al., 2004). Randomized controlled trials have found SAAF effective at reducing alcohol use among adolescents (Brody et al., 2006; Kogan et al., 2016). Data from a recent trial of SAAF will be analyzed in the current study (Kogan et al., 2019).

**Summary**

Robust research underscores the crucial role family factors have in preventing adolescent substance use (Henry et al., 2004). Programs that address behavior change within the family have become increasingly prominent and show efficacious results in deterring substance use in youth (e.g., Coatsworth et al., 2002; Dishion et al., 2002; Haggerty et al., 2007; Kumpfer & Alvarado, 2003; Orrell-Valente et al., 1999). However, attendance remains low in many family-centered programs (Barrera et al., 2017; Spoth et al., 2007). Recent programs have been developed to increase participation rates. Few investigations relating risk factors to participant attendance have been conducted with recent programs that include family, individual, and community characteristics. The present study is designed to address this need. I investigated the extent to which multiple factors in the family's ecology were useful in understanding program dose in a context where high levels of engagement procedures were implemented, and an ecologically tailored curriculum was used. I investigated if socioeconomic disadvantage, caregiver depression, family disorganization, youth vulnerability for problem behavior, and community disadvantage predicted completion of a full dose of programming (5 of 7 sessions). I

also examined the interactive effects of youth vulnerability for problem behavior with community disadvantage and family disorganization with community disadvantage. Past research on the association of many of these factors with dose is inconsistent. Youth vulnerability for problem behavior and family disorganization have been associated with low attendance in some studies and high attendance in others. I consider it possible that when characteristics of the program effectively promote a full dose, risk factors associated with a low dose may be weakened or may predict an increase in attendance as caregivers experience greater motivation, interest, and ease in participation. I thus made no directional hypotheses in this study.

# CHAPTER 3

# METHODS

## Study Sample

I investigated factors associated with dose among the experimental group (N = 252 families) of participants in a randomized prevention trial of SAAF (total trial N = 472). Primary caregivers and their adolescent youth were recruited from 8 rural counties in Georgia. The current study uses data from Time 1 (T1), which occurred before randomization to the treatment condition.

Participant families had an average of 2.9 children. Approximately 47% of child participants were female. Of the caregivers, 92% were the youth's biological parents, 5.6% were grandparents, and the remaining 2.4% were aunts or uncles. 94.4% of caregivers were female. Sixteen percent of caregivers had less than a high school education, 72% had completed high school, trade school, or obtained a GED, 7.2% had a bachelor's degree, and the remaining 4.8% had some graduate school training or a graduate degree.

## Recruitment

Administrators from elementary schools in 8 rural counties in Georgia provided lists of African American 5$^{th}$-grade students. These students' parents were randomly selected for contact to discuss participation. Research staff first contacted families with a letter that introduced the study. Local community liaisons conducted follow-up phone calls with families. Community Liaisons are trained and respected community members who served as a bridge between the families and SAAF researchers to increase trust. Community liaisons were in charge of screening

and recruiting participants. The study's eligibility requirements were having an 11 or 12-year-old (at pre-test) youth in the family who self-identified as Black or African American. There were 825 families screened for eligibility, and 625 were eligible to participate. Of those eligible, 472 were enrolled in the trial, representing a 76% recruitment rate. Of the 472 enrolled in the trial, 252 were randomized to be enrolled in SAAF and comprise the analytic sample for this study.

## Procedure

After enrollment and a baseline assessment, participants were assigned randomly to a group enrolled in SAAF or to a no-treatment control group. All families took part in a baseline assessment prior to random assignment. In the current analysis, baseline measures are used, and a measure of attendance taken by project staff at each session. African American field researchers made home visits to collect data using audio computer-assisted self-interviews. Computer-assisted self-interviews were administered on a laptop computer and allow participants to navigate the surveys with picture and audio directions, diminishing literacy concerns. Informed consent/assent was obtained from parents and youth. Caregivers were paid $100, and youth were paid $40 at the assessment. All study protocols were approved by the University of Georgia Institutional Review Board.

## Measures

### *Dose*

The session facilitators recorded families' attendance at each of the seven sessions. *Dose* was operationalized as either a full dose (5-7 sessions) or an incomplete dose (0-4 sessions).

### *Socioeconomic Disadvantage*

Socioeconomic disadvantage was assessed at pretest via a risk index based on four dichotomous variables. A score of 1 was assigned to each of the following variables that were

present: below the family poverty line based on federal guidelines, caregiver unemployment, receipt of Temporary Assistance for Needy Families, and caregiver education level less than high school graduation. The scores were summed to form the index, which ranged from 0 to 4 factors.

***Caregiver Depression***

Caregiver depression was measured at pretest using the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). Caregivers were given a list of statements (e.g., "How often were you bothered by things that usually don't bother you?" and “How often did you feel like you could not “get going”) with a response scale ranging from 0 (*not at all*) to 3 (*a lot*). Cronbach's alpha was .88.

***Family Disorganization***

A latent family disorganization variable was constructed using three caregiver-reported scales. Chaotic home environment was measured using a 16-item self-report survey (Matheny et al., 1995). The survey asked caregivers to rate statements such as, "There is often a fuss going on at our home," "I often get drawn into other peoples' arguments at home," or "No matter what our family plans, it usually does not seem to work out" as false (0) or true (1) for their household (α = .77). Inconsistency in household routines and discipline were indexed with a 7-item measure developed for the SAAF-STEPS trial. Example items include "When I am stressed out, I don't enforce house rules," and " In my house, we keep a strict routine for chores and homework” (reverse coded). The response set ranged from 1 (*not at all true*) to 4 (*very true*). Cronbach's alpha was .63. Caregiver knowledge regarding their child's activities was measured with the 7-item Knowledge Subscale from the Knowledge, Monitoring, and Solicitation Questionnaire (α = .73). Example statements include, "I know what my child does with their free time," and "I know

who my child's friends are." The response set ranged from 1 (*not at all true*) to 4 (*very true*). This scale was reverse-scored to indicate low levels of caregiver knowledge.

***Youth Vulnerability for Problem Behavior***

A latent variable was constructed using assessments of youth self-reported anger, affiliation with risky peers, self-control, and problem behavior. *Anger* was measured with an 8-item scale (Joe et al., 2002; α = .86). Example items include "You have urges to fight or hurt others," and "Your temper gets you into fights or other trouble." The response scale ranged from 0 (*strongly disagree*) to 4 (*strongly agree*). Affiliation with risky peers was measured using the 9-item Peer Behavior scale developed for the SAAF-STEPS trial (α = .77). The youth answered questions regarding their close friend's risky activities. Item examples include "How many of your close friends have drunk a lot of alcohol, enough to get drunk?" and "How many of your close friends get into trouble at school?" The response scale ranged from 0 (*none of them)* to 3 (*all of them*). Poor self-control was measured using a 7-item subscale of the Self-Control Scale (Wills, 1986; α = .80). Example items include, "I have to have everything right away," and "I often do things without stopping to think." The response scale ranged from 1 (*not true at all*) to 4 (*pretty true*). Finally, problem behavior was measured using the 9-item Youth Problem Behavior scale developed for the SAAF-STEPS trial (α = .82). Youth answered questions such as "I don't really care about doing well at school," and "I go places that my [CAREGIVER] does NOT allow me to go." The response scale ranged from 1 (*not true at all*) to 4 (*very true*).

***Community Disadvantage***

A latent community disadvantage variable was constructed using parents' reports on subscales of the Community Resources and Problems measure (Forehand et al., 2000). The Child Resources subscale includes 7-items (α = .82). Caregivers were asked how good or poor their

community was in terms of a list of resources. Example resources for the Child Resources subscale include "After School Programs," "Schools," and "Childcare for working parents." The Agency Resources subscale includes four items (α = .90). Example resources include, "Agencies to help with housing," "Agencies to help with money problems," and "Agencies to help with food and clothing." These subscales' response scale ranged from 0 (*very poor*) to 4 (*very good*). Resources subscales were reverse coded to indicate low levels of resources. For the 8-item Child-Related Risk subscale (α = .89), caregivers were given a list of risks (e.g., "Teen Pregnancy," "Unsupervised Children," "Gangs") and asked how prevalent they were in their neighborhood on a response scale ranging from 0 (*not a problem*) to 3 (*a big problem*).

**Analytic Approach**

Data were first examined using Statistical Package for Social Sciences (SPSS). Mean, standard deviation, skewness, and kurtosis were reviewed for all study variables. A distribution was considered normal if skewness and kurtosis fit the criteria for the range of normality (-2 to 2 skew; -7 to 7 kurtosis; Ryu, 2011; Tabachnick & Fidell, 2001). Two measures fell out of this range, the Youth Problem Behavior scale (Skewness = 2.6 and kurtosis = 10.3) and the Peer Behavior scale (Skewness = 2.9 and kurtosis = 13.8). Log-transformations were conducted using SPSS. After completing log-transformations, the skewness and kurtosis were within the range of normality. All other study variables were within the range of normality, and therefore no further transformations were required.

Factors associated with a full dose of SAAF were investigated with logistic structural equation modeling (SEM) as implemented in Mplus 8.0 (Muthén & Muthén, 1998-2020). SEM is a diverse set of statistical procedures that require hypotheses based on theory and a set of questions on the causal relation between variables from the model specification (Kline, 2015).

SEM returns outputs that give numeric estimates of the specified model parameters based on the data and the magnitude in which the model implications are supported by the data (Kline, 2015). I modeled a full dose of SAAF as 5-7 sessions attended per Kogan and colleagues (2019). Missing data due to skipped survey items were minimal (< 2% per variable). Missing data were managed with full information likelihood estimation. FIML uses all available data to estimate model parameters and standard errors (Enders, 2001).

I first examined the measurement model with a confirmatory factor analysis (CFA) in Mplus 8.0 (Muthén & Muthén, 1998-2020). CFA is a form of SEM which measures the relationship between observed indicators and latent factors (Brown, 2015). Latent factors account for the variation and covariation among observed variables (Brown, 2015). In the current study, family disorganization, youth vulnerability for problem behavior, and community disadvantage were latent factors, and the construction of these variables are explained on pages 24-26. The measurement model was confirmed based on model fit and the resulting parameter estimates (Brown, 2015). Model fit was assessed using various fit indices, which indicate how well the observed data fit a probability of distribution in a suggested model. The indices used in the confirmatory factor analysis were the chi-square statistic/degrees of freedom ratio, comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The comparative fitness index (CFI) is considered acceptable when CFI is within .90-.95 (Hu & Bentler, 1999). Root Mean Square Error of Approximation (RMSEA) is regarded as a close fit when RMSEA falls between .01 and .05 (Hu & Bentler, 1999). A $\chi^2/df$ ratio less than 3.0 indicate acceptable model fit (Carmines & McIver, 1981; Hu & Bentler, 1999).

I then tested each predictor individually with youth gender controlled using logistic regression in Mplus 8.0 (Muthén & Muthén, 1998-2020). This analysis was conducted to

understand the association of each factor with dose. To test interactions, I used a two-step estimation process (Klein & Moosbrugger, 2000) using the XWITH command in Mplus (Muthe´n &Muthe´n, 1998–2012). This method is limited because the Mplus output does not produce traditional model fit indices or standardized coefficients for the latent interaction, which then renders interpretation of the latent variable interaction difficult. I followed the recommendations of Maslowsky and colleagues' (2015) protocols for applying the latent moderated structural equation method. I completed a two-step estimation process for each latent interaction and the full model. It has been recommended to use maximum likelihood estimation in latent interaction models (Asparouhov & Muthén, 2019). To complete the first step in this process, I estimated the model without interaction terms with logistic structural equation modeling (Muthén & Muthén, 1998-2020). This model is hereafter referred to as Model 0. Model 0 included socioeconomic status, caregiver depression, family disorganization, youth vulnerability for problem behavior, and community disadvantage predicting dose with youth gender controlled. Maximum likelihood does not produce traditional model fit statistics in either probit or logistic models. Therefore, I examined various fit statistics provided by Mplus, including the maximized value of the logarithm of the likelihood function multiplied by -2 (-2LL), Akaike's Information Criterion (AIC), and Bayesian Information Criteria (BIC). Higher values of -2LL, AIC, and BIC represent a worse fit to the data (Allison, 2012). I then estimated the model with the first latent interaction between youth vulnerability for problem behavior and community disadvantage added to the model, hereafter referred to as Model 1. I used a log-likelihood ratio to test the comparison between Model 0 and Model 1. Log-likelihood tests are used to test whether Model 0 has a significant loss in model fit when compared to Model 1 (Satorra, 2000; Satorra & Bentler, 2010). If the log-likelihood test suggested Model 0 represents

a loss in model fit compared to Model 1, I could assume Model 1 is appropriate to use (Maslowsky et al., 2015). The test statistic for the log-likelihood ratio test is calculated with the following equation: D = -2[(log-likelihood for model 0) – (log-likelihood for Model 1)] (Maslowsky et al., 2015). The values of *D* are approximately distributed as $\chi^2$ (Maslowsky et al., 2015). The degrees of freedom (*df*) to determine D's significance are calculated by subtracting the number of free parameters in Model 0 from the number of free parameters in Model 1 (Maslowsky et al., 2015). Next, I estimated the second interaction term using the predictors from Model 0 and the interaction term between family disorganization and community disadvantage, referred to as Model 2. I compared the results from Model 2 to Model 0. I then estimated the full model by adding all predictors and interactions into the model simultaneously, hereafter referred to as Model 3. I used the same log-likelihood ratio test mentioned above to test the changes from Model 1 and Model 2 to Model 3. The model with the best fit will provide the final regression coefficients and their significance (Maslowsky et al., 2015). If the interactions are significant, they can be interpreted using standard graphing techniques, and when graphing, regression coefficients for main effects and the latent interaction should be obtained from the final model (Aiken &West, 1991; Maslowsky et al., 2015). Factor scores were saved and used to obtain the latent variable's minimum and maximum values, and Johnson-Neyman plots were obtained through Mplus to further understand the interaction's interpretation (Hayes & Matthes, 2009; Muthén &Muthén, 1998–2020).

# CHAPTER 4

# RESULTS

Correlations among study variables and their means and standard deviations are presented in Table 1. The mean number of socioeconomic disadvantage factors reported was two. The mean caregiver depression score was 15.2, which is approaching the common clinical cutoff of 16 for elevated depressive symptoms (Radlof, 1977), suggesting elevated caregiver depression in the sample as a whole. SAAF attendance rates, as reported previously (Kogan et al., 2019), were generally high. Of the families assigned to the prevention condition, 157 (62%) received a full dose (5-7 sessions) of the program, and 95 families received less than a full dose (38%). Approximately 83 (33%) of those assigned to SAAF attended all sessions, 50 (19%) attended six sessions, 24 (10%) attended five sessions, and 45 (18%) attended between one and four sessions. Approximately 20% (n = 50) attended no sessions.

A CFA of the measurement model for family disorganization, youth vulnerability for problem behavior, and community disadvantage was conducted. It evinced an acceptable fit to the data $\chi^2$ (32) = 49.56, $p$ = .025, CFI = 0.95, RMSEA = .05. All factor loadings were significant, exceeded .40, and loaded in the expected directions.

Table 2 presents the results of a series of logistic SEMs testing each factor, and each interaction, with gender controlled. Socioeconomic disadvantage, caregiver depression, youth vulnerability for problem behavior, and community disadvantage were not associated significantly with dose. Family disorganization was associated positively with a full dose of SAAF (OR = 1.32, $p$ < .05, 95% CI [1.08-1.61]). The interaction between youth vulnerability for

problem behavior and community disadvantage was also significantly associated with a full dose of SAAF (OR = 1.03, $p$ = .05, 95% CI [1.00-1.05]).

The interaction of community disadvantage with (a) family disorganization and (b) youth vulnerability for problem behavior was estimated using a two-step approach for each interaction and the final model. Table 3 presents the model fit statistics for Model 0, Model 1, Model 2, and Model 3.

Model 0 fit the data as follows, -2LL of 11053.86, AIC of 11131.86 and BIC of 11269.50, and a sample size adjusted BIC of 11145.87. Model 1 was then estimated by adding an interaction term between youth vulnerability for problem behavior and community disadvantage. The relative fit of Model 1 versus Model 0 was determined via a log-likelihood ratio test comparing the log-likelihood values of Model 0 and Model 1. Model 0 has 39 free parameters and a log-likelihood value of -5526.93. Model 1 has 40 free parameters and a log-likelihood value of -5523.94, yielding a log-likelihood difference value of D = 5.98, and the difference in free parameters is 1. Using a chi-square distribution, this log-likelihood ratio test proved significant ($p$ < .05), indicating that the null model (Model 0; the model without the interaction effect) represents a significant loss in fit relative to the alternative model (Model 1; the model with the interaction effect). Model 1 had a -2LL of 11047.88, an AIC of 11127.88, a BIC of 11269.06, and a sample size adjusted BIC of 11142.26. Next, Model 2 was estimated by testing the predictors in Model 0, with the interaction term between family disorganization and community disadvantage. Model 2 had a -2LL of 11051.86, an AIC of 11131.86, a BIC of 11273.04, and a sample size adjusted BIC of 11146.24. Model 2 had a log-likelihood value of -5525.93 and 40 free parameters. The log-likelihood difference value between Model 2 and Model 0 is D = 2, with a difference in parameters of 1. Using a chi-square distribution, this log-

likelihood ratio test proved not significant ($p > .05$). This suggests that the null model (Model 0) fits the data better than Model 2. It is recommended to test all predictors and interactions in a simultaneous model (Malowsky et al., 205). Therefore, Model 3 was tested by estimating the full model, with both interactions. Model 3 had a -2LL of 11046.58, an AIC of 11129.58, a BIC of 11273.29, and a sample size adjusted BIC of 11144.31. Model 3 has 41 free parameters and a log-likelihood value of -5523.29. I used the log-likelihood ratio test to compare Model 1 (the better fitting model) to Model 3 (D = 1.3). Using a chi-square distribution, this log-likelihood ratio test proved insignificant ($p > .05$), indicating that Model 1 does not represent a significant loss in fit relative to Model 3. Further, the interaction between family disorganization and community disadvantage was non-significant in Model 2 (B = .05, $p = .20$, OR = 1.06, 95% CI [0.97, 1.13]) and in Model 3 (B = .04, $p = .30$, OR = 1.05, 95% CI [0.96, 1.14]). Therefore, the second interaction term was removed, and Model 1 was used in the final analysis. Table 4 presents the unstandardized betas in Model 0 – Model 3.

Model 1 examined all predictors and the interaction of youth vulnerability for problem behavior and community disadvantage in a simultaneous multivariate model. Unstandardized coefficients, p-values, standard errors, odds ratios, and 95% confidence intervals are presented in Table 5. Again, family disorganization was a significant predictor of dose ($\beta = .31$, $p = .01$). For each unit increase in family disorganization, families were 1.39 times more likely to receive a full dose of SAAF, independent of all other predictors. Results indicated youth vulnerability for problem behavior was not significant in predicting dose ($\beta = -.03$, $p = .79$). Further, community disadvantage was not significant in predicting dose ($\beta = .10$, $p = .34$). The interaction between youth vulnerability for problem behavior and community disadvantage was significant in predicting dose (B = .03, $p = .04$, OR = 1.03, 95% CI [1.01-1.05]). The interaction was probed

using the Johnson-Neyman technique to identify regions of significance and the interaction's direction (Hayes & Matthes, 2009). In a Johnson-Neyman plot, the x-axis contains the moderator's values, and the y-axis is the unstandardized effect of the independent variable on the dependent variable (Hayes and Matthes, 2009). The direction of the interaction is determined by locating the plot's region in which the 95% confidence intervals do not contain 0 (Hayes and Matthes, 2009). Figure 2 presents the Johnson-Neyman plot. This plot revealed that youth vulnerability for problem behavior predicts dose only at high levels of community disadvantage, as the 95% confidence interval did not contain 0 only at high levels of community disadvantage. Finally, results indicated socioeconomic disadvantage was non-significant in predicting dose ($\beta = .03$, $p = .66$) and caregiver depression was non-significant in predicting dose ($\beta = -.06$, $p = .50$).

# CHAPTER 5

# DISCUSSION

Adolescent substance use is a common occurrence in the United States and has an extensive range of deleterious outcomes (Han et al., 2017; Miller et al., 2006). Salient factors that influence adolescent substance use originate in the family, primarily in parenting practices and parent-youth relationships (Dishion et al., 2002). Family-centered prevention programs have been developed to decrease adolescent substance use and have shown efficacy and robustness (Dishion et al., 2002; Foxcroft, 2006; Van Ryzin et al., 2015). A primary challenge in the implementation of family-centered programs has been relatively low levels of attendance (Barrera et al., 2017; Spoth et al., 2007). Many researchers have found that receiving a full dose of family-centered programs is crucial for participants to receive full benefits from the program (Aber et al., 1998; August et al., 2001; Braswell & August 1997; Kogan et al., 2019). Therefore, specific program curricula and implementation strategies have been designed to make programs more accessible and increase participation rates (Barrera et al., 2019; Barrera et al., 2017; Kogan et al., 2016). These efforts include curricula that have been developed specifically for designated ethnic/cultural groups and specifies implementation processes that include extensive engagement protocols to facilitate attendance (Coatsworth et al., 2002; Gonzales et al., 2012; Kogan et al., 2016). Few investigations into factors associated with participant attendance have been conducted with recent programs that include these characteristics. The present study addressed this need.

I explored attendance in a trial of SAAF, a culturally and ecologically tailored program with intensive engagement protocols. I did not find associations linking dose to socioeconomic disadvantage, caregiver depression, youth vulnerability for problem behavior, or community disadvantage. Family disorganization positively predicted a full dose of prevention. Families where parents reported greater family disorganization were also more likely to attend a full dose of SAAF than those families with less family disorganization. Further, a significant interaction was found between youth vulnerability for problem behavior and community disadvantage in predicting dose. Youth vulnerability for problem behavior is only significant in predicting dose at high levels of community disadvantage. Notably, these attendance-promoting effects on dose were found despite controlling for multiple other factors in the model.

When considering family processes, it is reasonable to assume that family disorganization will predict difficulty in attending prevention programming. Past research on prevention dose has produced mixed results regarding family processes. Some research has found that negative family processes promote attendance, while others have found only positive family processes promote attendance (Gorman-Smith et al., 2002; Prado et al., 2006; Coatsworth et al., 2006; Perrino et al., 2001). Other research has found no significant associations between family factors and dose (Spoth et al., 1999; Eisner & Meidert, 2011). The current findings are consistent with two studies in particular. Gorman-Smith and colleagues (2002) investigated attendance among 175 families receiving Schools and Families Educating Children, a delinquency, and drug use prevention program. They found that families with low monitoring levels were more likely to attend, with minimal recruitment effort. The authors also found that with extended recruitment effort, parents with higher antisocial behavior and stress levels were more likely to participate than to drop out (Gorman-Smith et al., 2002). Similarly, Prado and colleagues (2006) reported

that in a family-centered HIV prevention program, youth and their families were more likely to be engaged in the program when the family reported a higher rate of perceived stress. These studies, and my findings, may suggest that when parents are aware of specific problems, they may be more likely to take action to address them, compared to parents who are unaware. The Health Belief Model (HBM) may provide a framework for understanding this pattern (Becker, 1974; Champion & Skinner, 2008). The HBM has been widely used in research to explain health behavior and decision-making, and as a framework to develop health-related interventions (Becker, 1974; Champion & Skinner, 2008). The HBM posits that individual beliefs about the intervention will predict individual behaviors. Individual beliefs consist of perceived susceptibility, perceived benefits, perceived barriers, and perceived self-efficacy. Accordingly, when individuals perceive a clear need for intervention (susceptibility), perceive that the benefits outweigh the barriers to participation, and they have the resources needed (self-efficacy), they will engage in a health-promoting behavior (Becker, 1974; Champion & Skinner, 2008). Spoth & Redmond (1995) used the health belief model to guide their research on family engagement and found that parents' perceived need for the program was directly related to parents' enrollment into a family-centered program.

Ecologically based research commonly finds that community characteristics moderate the influence of factors at other levels (i.e., family, individual) on behavioral outcomes (Brody et al., 2003; Beyers et al., 2003; Brody et al., 2003; Duprey et al., 2017; Yonas et al., 2010). To my knowledge, interactions between community characteristics and other dose-related factors have not been examined as predictors of dose in family-centered prevention programs. I found a significant, positive interaction between youth vulnerability for problem behavior and community disadvantage in predicting dose. This interaction's plot revealed that youth

vulnerability for problem behavior significantly predicts receiving a full dose when community disadvantage is high. Research on interaction effects in dose models is limited. However, communities have been shown to increase the salience of the relationship between youth vulnerability for problem behavior and poor youth outcomes (Herman et al., 2020). For example, Zimmerman and Vasquez (2011) found that neighborhood risk, characterized by the opportunity for substance use, moderated the relationship between peer substance use and youth substance use. It is plausible that families with vulnerable youth do not perceive the need for a prevention program unless they also live in a neighborhood with high-risk factors (see Leventhal & Brooks-Gunn, 2000). If parents perceive these dual risks, they may be more likely to attend a prevention program advertised as providing resources to improve family and parent-youth relationships. Parents may perceive that the program can promote positive youth outcomes in the face of the cumulative effects of individual and community level risk (Herman et al., 2020). Notably, further research should examine interaction effects between youth and community factors on attendance in family-centered programs.

I consider it plausible that the positive associations detected between family disorganization and dose, and the positive interaction between youth vulnerability for problem behavior and community disadvantage and dose could be products of the curriculum's salience and the use of engagement procedures. Like SAAF, Familias Unidas and Schools and Families Educating Children implemented robust engagement procedures, including home visits and barrier reduction protocols. Both programs had over 60% of participants receive a full dose (Coatsworth et al., 2002; Gorman-Smith et al., 2002). Kumpfer and colleagues (2002) compared retention rates in traditional parenting programs with those that had been culturally adapted and found that retention rates increased when curricula were adapted. Culturally sensitive curricula

may provide relevant and engaging information to families, which increases the benefit they receive from attending a program. This may be especially true when the program also successfully attenuates barriers to access and offers an ecologically sensitive, engaging program that encourages families who are most in need of the intervention to attend. Further, families attending due to their perceived need for the intervention may remain in the program if they feel the information received will be useful and adequately integrated into their existing cultural practices. Studies have also investigated the effectiveness of barrier reduction. Becker and colleagues (2015) reviewed 40 family-based mental health programs and found that the programs that reduced participants' barriers to participation had higher attendance rates when controlling for other factors. The authors found "accessibility promotion," defined as any strategy used to reduce barriers, and make services convenient and accessible, improved attendance and adherence to the program (Becker et al., 2015). Research on barrier reduction also may explain the current study's non-significant findings. Although previous research evinced mixed findings on many risk factors in predicting attendance, the current study's non-significant findings may be due to the attenuation of traditional risk factors due to barrier reduction. Future research must test caregiver perceptions of the need for a program in predicting dosage. Moreover, experimental trials that manipulate engagement-relevant characteristics of family-centered programs are needed to understand further how family factors influence dosage.

Several study limitations are noteworthy. Due to this study's correlational basis, findings require replication and confirmation with experimental manipulation of engagement protocols and curricula. Such designs can confirm if engagement protocols interact with factors associated with dose. Future research should also consider analyzing parent's perceptions of benefits and barriers to the program. The health belief model suggests families' perceptions of the programs'

benefits and barriers to participation will have significant implications in their decision to attend. This study's findings are limited to a specific intervention (SAAF) and the particular population SAAF served: rural African American families. In the study, caregivers were primarily mothers, and findings may not replicate with other forms of guardians and caretakers such as fathers, grandparents, or foster parents. One measure of family disorganization had a relatively low Cronbach's alpha (.63). Its use as part of a latent variable, which tests only true score variance, obviates this concern somewhat.

These limitations notwithstanding, study findings suggest the importance of prevention programs that are ecologically and culturally relevant, with strong engagement protocols. As organizations continue to adopt evidence-based family-centered programs, they may benefit from including preparatory information, transportation, meals, and childcare. When the curriculum is ecologically relevant and common burdens of participation are minimized, families may develop a trust for the program and an increased motivation to attend.

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**Table 1**

*Correlations among predictor variables*

| Predictor | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Program Dose | — | | | | | | | | | | | | |
| (2) SES Disadvantage | -.01 | — | | | | | | | | | | | |
| (3) Caregiver Depression | .04 | . 25** | — | | | | | | | | | | |
| (4) Chaos in Home | .12* | .50** | .5** | — | | | | | | | | | |
| (5) Inconsistent Routines and Discipline | .13* | -.15* | .07 | .40** | — | | | | | | | | |
| (6) Low Knowledge of Child's Behavior | .12* | -.02 | .32** | .39** | .33** | — | | | | | | | |
| (7) Youth's Anger | .10 | .14* | .09 | .06 | -.04 | .04 | — | | | | | | |
| (8) Affiliation with Risky Peers | -.02 | .01 | .06 | .03 | .01 | -.01 | .47** | — | | | | | |
| (9) Youth's Low Self-Control | -.09 | .07 | .05 | .06 | -.01 | .05 | .46** | .34** | — | | | | |
| (10) Youth's Problem Behavior | -.03 | .14* | .16** | .15* | -.16** | .04 | .29** | .23** | .33* | — | | | |
| (11) Low Community Child Resources | -.06 | .03 | .22** | .22** | .09 | .19** | .08 | -.04 | .07 | -.03 | — | | |
| (12) Low Community Agency Resources | .01 | -.01 | .08 | .07 | .12 | .09 | .02 | -.04 | .02 | -.05 | .55** | — | |
| (13) Community Child-Related Risk | .01 | .01 | .23* | .12* | .01 | .03 | -.03 | .01 | .11 | .00 | .22* | .36* | — |
| Mean | 0.62 | 2.02 | 15.26 | 2.96 | 12.95 | 11.83 | 8.71 | 0.49 | 32.18 | 1.15 | 11.44 | 9.20 | 10.25 |
| SD | 0.49 | 1.24 | 9.73 | 3.19 | 2.57 | 2.70 | 6.50 | 0.27 | 6.96 | 0.08 | 5.50 | 3.71 | 5.57 |

*Note*. ** Correlation is signficant at the 0.01 level (2-tailed). * Correlation is significant at the 0,05 level (2-tailed)

**Table 2**

*Predictors of Dose**

| Predictor | β/B | S.E. | *p* | OR | 95% CI |
|---|---|---|---|---|---|
| SES Disadvantage | 0.04 | 0.07 | 0.57 | 1.03 | 0.95-1.12 |
| Caregiver Depression | 0.04 | 0.07 | 0.61 | 1.01 | 0.98-1.03 |
| Family Disorganization | 0.25 | 0.09 | 0.01 | 1.32 | 1.08-1.61 |
| Youth Vulnerability for Problem Behavior | 0.02 | 0.09 | 0.80 | 1.01 | 0.96-1.06 |
| Community Disadvantage | 0.00 | 0.08 | 0.90 | 0.98 | 0.46-2.15 |
| Youth Vulnerability for Problem Behavior X Community Disadvantage** | 0.03 | 0.01 | 0.05 | 1.03 | 1.00-1.05 |
| Family Disorganization X Community Disadvantage ** | 0.38 | 0.27 | 0.16 | 1.46 | 0.94-2.27 |

*Note*. *Gender controlled. ** Unstandardized Betas are presented for Interaction Terms.

**Table 3**
*Model Fit Statistics for Model 0 – Model 3*

| Fit Statistics | Model 0 | **Model 1*** | Model 2 | Model 3 |
|---|---|---|---|---|
| Log-likelihood | -5526.93 | **-5523.94** | -5525.93 | -5523.29 |
| -2LL | 11053.86 | **11047.88** | 11051.86 | 11046.58 |
| AIC | 11131.86 | **11127.88** | 11131.86 | 11129.58 |
| BIC | 11269.50 | **11269.06** | 11273.04 | 11273.29 |
| SSABIC | 11145.87 | **11142.26** | 11146.24 | 11144.31 |

*Note*. * Model 1 represented the best model fit and was used in the final analysis. -2LL = -2 Log-likelihood. AIC = Akaike Information Criterion. BIC = Bayesian Information Criteria. SSABIC = Sample Size Adjusted BIC.

**Table 4**

*Unstandardized Multivariate Logistic Predictors of Dose in Model 0-3*

| Predictor | Model 0 | Model 1 | Model 2 | Model 3 |
|---|---|---|---|---|
| SES Disadvantage | 0.00 | 0.05 | 0.01 | 0.06 |
| Caregiver Depression | -0.01 | -0.01 | -0.01 | -0.01 |
| Family Disorganization | 0.31* | 0.33* | 0.31* | 0.31* |
| Youth Vulnerability For Problem Behavior | 0.01 | -0.01 | -0.01 | -0.01 |
| Community Disadvantage | -0.04 | -0.05 | -0.02 | -0.03 |
| Youth Vulnerability For Problem Behavior X Community Disadvantage | -- | 0.03* | -- | 0.03* |
| Family Disorganization X Community Disadvantage | -- | -- | 0.05 | 0.04 |

*. Correlation is significant at the 0.05 level (2-tailed).

**Table 5**

*Unstandardized Multivariate Logistic Predictors of Dose in Model 1**

| **Predictor** | **B** | **S.E.** | ***p*** | **OR** | **95% CI** |
|---|---|---|---|---|---|
| SES Disadvantage | 0.05 | 0.12 | 0.66 | 1.05 | 0.86-1.29 |
| Caregiver Depression | -0.01 | 0.02 | 0.50 | 0.99 | 0.96-1.02 |
| Family Disorganization | 0.33 | 0.14 | 0.02 | 1.39 | 1.10-1.76 |
| Youth Vulnerability for Problem Behavior | -0.01 | 0.04 | 0.80 | 1.01 | 0.93-1.06 |
| Community Disadvantage | -0.05 | 0.05 | 0.35 | 0.95 | 0.88-1.04 |
| Youth Vulnerability for Problem Behavior X Community Disadvantage | 0.03 | .014 | 0.04 | 1.03 | 1.01-1.05 |

*Note*. *Gender controlled

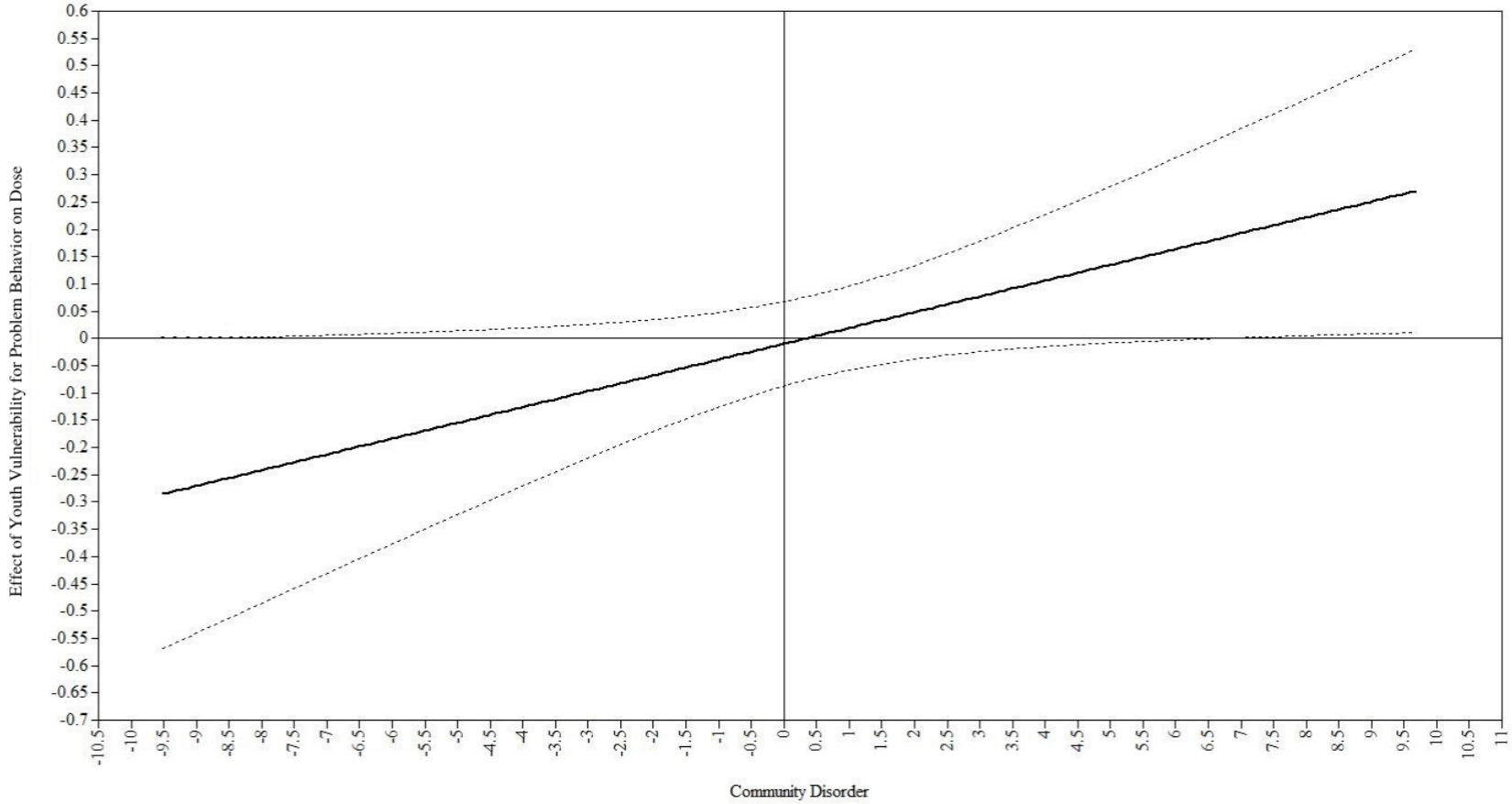


*Figure 2***.** Johnson-Neyman Plot of the Interaction between Youth Vulnerability for Problem Behavior and Community Disadvantage on Dose**.**

*Note*. Dotted black lines represent the upper and lower limit of the 95% confidence interval. The x-axis contains values of community disadvantage and the y-axis is the unstandardized effect of the youth vulnerability for problem behavior on the program dose.