

Is There a Relationship between Teams-Games-Tournaments and Changes in
Communication and Attitude about Substance Abuse?

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Abstract

The purpose of this dissertation is to investigate relationships between gender and race as it pertains to communication with parents about substance abuse and attitudes about substance abuse, using Teams-Games-Tournaments as an intervention. The scope of the substance abuse problem, adolescent communication and attitudes regarding substance abuse literature, attachment theory, and Teams-Games-Tournaments intervention literature are reviewed. Secondary data was used with a repeated measures design, with 159 subjects at baseline, 112 at exit, and 99 at follow-up. The Statistical Package for Social Sciences and Hierarchical Linear Modeling were used for analysis. Findings suggest that gender and race are not significant factors in pre-test scores nor rates of change in adolescent substance abuse communication and attitude using Teams-Games-Tournaments as an intervention.

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Chapter One: Introduction

Problem and Significance

Large numbers of adolescents abuse substances. For example, forty-seven percent of adolescents responding to a 2008 national survey funded by the National Institute on Drug Abuse reported that they had used drugs (Johnston, O'Malley, Bachman, and Schulenberg, 2008). There are several reasons why it is important to explore and address adolescent substance abuse. Mental, behavioral, physical, social, and legal problems are associated with substance abuse (Scaife, O' Brien, McEune, Notley, Millings, and Biggart, 2009; Velleman and Templeton, 2007). Some adolescents that are experiencing the turmoil of adolescence may abuse substances as a coping mechanism. Rewarding effects of substance abuse may include temporary reduction of stress, escape from responsibility, and an excuse for misbehavior (Wodarski and Feit, 1995). According to Chassin, Dmitrieva, Modecki, Steinberg, Cauffman and Piquero (2010), development of psychosocial maturity in adolescents can potentially be influenced by drug use. Baumrind and Moselle (1985) argue that adolescent substance abusers are often egocentrically focused, the substance abuse allowing them to avoid normal developmental challenges, engagement, coping and subsequent growth. Cross-sectional studies have suggested that substance abuse is related to a number of problems with adolescent social maturity (Chassin, Dmitrieva, Modecki, Steinberg, Cauffman, and Piquero, 2010), including increased impulsivity (Colder and Chassin, 1997), problems with regulating affect (Cooper, Agocha, and Sheldon, 2000), deficits in judgment (Giancola, Martin, and Tarter, 1996), impaired ability to make decisions (White, 1990), inability to postpone incentives (Potenza, 2007), and deficits in inhibitory control (Volkow, Fowler, and Wang, 2003).

Race and gender differences are reported to exist in adolescent substance abuse. Rivaux, Springer, Bohman, Wagner, and Gil (2006) make the case that professionals in substance abuse intervention programs should be aware of and sensitive to differences in race and gender, as they are important in tailoring interventions to the individual. While substance abuse treatment for adolescents appears to be effective in reducing substance abuse (Rivaux, Springer, Bohman, Wagner, and Gil, 2006; Lipsey and Wilson, 1998; Williams, Chang, and the Addiction Centre Adolescent Research Group, 2000), more evidence is needed to help identify what interventions work best with what groups of adolescents, including racial and ethnic subgroups. Otherwise, treatment outcomes may be less optimal. For example, in their study of 211 high risk adolescents who received substance abuse treatment services, Springer, Rivaux, Bohman, and Yeung (2006) found that Caucasian subjects were 50 % more likely to leave treatment before completing the program.

Research has shown the best predictors of drug use are the influence of parents and peers (Wodarski and Feit, 1995; Adler and Kandel, 1982; Lewis and Lewis, 1984). It has also been shown that adolescents who lack good communication skills or with cognitive impairment are more susceptible to negative modeling and reinforcement, resulting in maladaptive behavior patterns and high substance abuse risk (Wodarski and Feit, 1995).

The collaborative learning intervention called Teams-Games-Tournaments (TGT) has been shown to be effective in increasing talking between adolescents and their parents (Wodarski, 1987a; Wodarski, 1987b; Wodarski, Wodarski, and Parris, 2004). Increased talking appears to be related to a reduced prevalence of adolescent substance abuse. However, there is no evidence concerning the possible differential impact of TGT on change in adolescents' talking with parents about substance abuse, or on attitudes about substance abuse, between African

Americans and Caucasians, or between males and females. The recognition of differential effects of TGT on change in adolescent talking with parents and on change in substance abuse attitudes that may exist between races and genders increase social worker's ability to optimally match the TGT intervention to individual clients.

Purpose of the Study

The purpose of this study is to test whether gender and race moderate the effect of TGT on changes in adolescents' talking with parents about substance abuse; and whether gender and race moderate the effects of TGT on changes in the attitudes of adolescents towards substance abuse. Also of interest is whether there are differences in levels of talking with parents about substance abuse, and in attitudes towards substance abuse, at entry into TGT between males and females and between Caucasians and African Americans.

Based on the review of literature to follow, it is expected there will be differences in pre-test scores (intercepts), and differential improving trends (slopes) between males and females, and between African Americans and Caucasians, in adolescents' talking with their parents and in their attitudes about substance abuse. It is expected that pre-test scores will show that African Americans talk more with parents about substance abuse than do Caucasians, and that African Americans have less permissive attitudes about substance abuse than do Caucasians. Pre-test scores should also show that females talk more with parents about substance abuse than do males, and that males have more permissive attitudes about substance abuse than do females.

Based on the literature review to follow, it is also expected that scores for talking with parents will show improving trends during TGT, with Caucasians improving at a greater rate than do African Americans. It is also expected that scores for attitudes about substance abuse will show improving trends indicating that Caucasians improve at a faster rate than do African

Americans. Finally, it is expected that scores for talking with parents will show improving trends during TGT that are greater for males than for females; and that scores for substance abuse attitudes will show improving trends during TGT that are greater for males than for females.

Overview

Chapter Two reviews the literature on adolescent substance abuse prevalence, problems associated with substance abuse, race, gender, parental relationships and substance abuse, Teams-Games-Tournaments, and attachment theory. It also contains a methodology section, research questions, and hypotheses.

Chapter Three is the methods section. It provides information on participants in the study, original study design (this dissertation uses secondary data), data used for this dissertation, dependent and independent variables, scale questions used to collect data, and plans for data analysis.

Chapter Four is the results section. It contains sample characteristics, reliability analyses for attitude and communication subscale scores, hierarchical linear modeling (HLM) unconditional model results, and HLM level 2 model results.

Chapter Five is the discussion section. It contains a summary, report of recognized strengths and limits of the study, and implications for future research, practice, and policy.

This study concludes with references and two appendices. A brief vitae is also included.

Chapter Two: Literature Review

Prevalence of Adolescent Substance Abuse

Several studies report on the prevalence of adolescent substance abuse. Tobacco, binge drinking, and other drug use is common among adolescents (Hair, Moore, Hadley, Kaye, Day, and Orthner, 2009; Johnston, O'Malley, and Bachman, 2003; Johnston, O'Malley, Bachman, and Schulenberg, 2006; The Kaiser Family Foundation, 2002). The National Institute on Drug Abuse (2009) reports findings from a 2009 Monitoring the Future survey of eighth, tenth and twelfth grade students. The survey is conducted by the University of Michigan's Institute for Social Research, and collects data on adolescent substance abuse and attitudes about drugs. The survey is cross-sectional as students from across the country are surveyed. The survey shows that interviewees claim to use certain drugs like alcohol, tobacco, cocaine, inhalants, and heroin slightly less frequently or about the same as they did in years 2006, 2007, and 2008. However, tenth grade students reported an increase for use of Vicodin and Oxy-Contin. One in ten twelfth graders reported abusing Vicodin, which was the same as the previous five years, and one in twenty twelfth graders reported abusing Oxy-Contin, which was the same for the previous five years. Further, while marijuana use had consistently declined since the mid 1990's, rates of use have remained steady for the last five years. Perceived risk of using marijuana decreased for eighth and tenth grade students, indicating they may be more likely to use marijuana.

Using the 2009 Youth Risk Behavior Survey (A three-stage cluster sample design was used and data from high school students from 50 states and the District of Columbia were obtained from all public and private schools. The overall response rate was 71 %.), the Centers for Disease Control and Prevention (2010) reports that rates of use for marijuana, cocaine, methamphetamines, and steroids by adolescents have remained the same from 2007 to 2009.

Findings from the study also indicate no change in the number of adolescents that were offered, given, or sold drugs at school during those years. While 38.6 % of students had tried marijuana, 20.8 % had used marijuana at least once in the 30 days prior to the survey. Results show that 2.8 % used some form of cocaine in the month prior to being surveyed, 11.7 % had huffed intoxicating inhalants one or more times during their lives, 4.1 % had used methamphetamines in their lifetime, and 3.3 % had illicitly used steroids during their lifetime. Alcohol is the most commonly used drug by United States adolescents, who consume 11 % of the alcohol used in this country. Over 90 % of alcohol use by adolescents in the United States is consumed in binge drinking sessions. In the 2009 survey, 24.2 % of students had consumed five or more drinks in one drinking session in the 30 days prior to being surveyed. In 2008, about 190,000 adolescents received emergency medical care for injuries related to alcohol consumption (Centers for Disease Control and Prevention, 2010). Eaton, Kann, Kinchen, Shanklin, Ross, Hawkins, Harris, Lowry, McManus, Chyen, Lim, Whittle, Brener, and Wechsler (2009) found that within a 30 day period ten percent of adolescents completing surveys drank and drove and 28 % rode with someone who had been drinking alcohol.

In summary, research demonstrates that substance abuse continues to be a problem, with prevalence of use rates for many abused substances staying the same or increasing (Johnston, O'Malley, Bachman, and Schulenberg, 2008; Squeglia, Spadoni, Infante, Myers, and Tapert, 2009) over the last several years. Such research appears to indicate a need for a different type of intervention, perhaps based on innovative thinking and on an interdisciplinary approach to the problem.

Problems Associated with Substance Abuse

It has been argued that adolescent substance abuse may impair brain development, impacting behavioral, cognitive, and emotional processes (Clark, Thatcher, and Tapert, 2008; Moss, 2008). This is especially alarming considering adolescence is a time when the brain is known to undergo changes to the prefrontal and limbic areas (Sowell and Jernigan, 1998). For example, Tapert, Brown, Kindermann, Cheung, Frank, and Brown (2001) report that female drinkers with sustained drinking show decreased frontal and parietal activation in the brain.

As would be expected with substance abuse related changes to the adolescent brain, adolescent substance abuse correlates to maturity levels in adults (Chassin, Dmitrieva, Modecki, Steinberg, Cauffman and Piquero, 2010). However, in their cross-sectional study of 1,170 male adolescent juvenile offenders, they found that while substance abuse is related to declines in maturity levels, decreased substance abuse is related to increased maturity. These findings indicate that positive change and growth can be made despite a history of substance abuse if the abuse is decreased.

Other problems exist with adolescent substance abuse. Deficits in interpersonal skills hamper adolescent's ability to decline drug use (Wodarski, Wodarski, and Parris, 2004). In their preliminary longitudinal study of 76 adolescents that abuse substances, Squeglia, Spadoni, Infante, Myers, and Tapert (2009) report that females showed a decline in visio-spatial memory which could negatively impact their ability to drive and perform figural reasoning. They report that males in their study showed deficits in sustained attention ability, which can adversely affect academic achievement and behavior.

Adolescents who abuse substances may commit crimes to obtain drugs and maintain the drug habit (Wodarski and Feit, 1995), property crimes, drug crimes, and assaults (Brown,

Gleghorn, Schuckit, Myers, and Mott, 1996; Bentler and Newcomb, 1986; Newcomb and Bentler, 1988). The Centers for Disease Control and Prevention (2010) report that academic and behavioral problems at school, problems with interpersonal relationships, involvement in the legal system, physical problems, increased risk of sexually transmitted disease and pregnancy, physical and sexual assault as victim or perpetrator, increased suicide and homicide risk, stunted emotional and physical development, and alcohol poisoning may be consequences of underage drinking. Another issue of concern includes increase in stress of being a teenager (despite initial relief from stress that may be found by using drugs). Missing school and work due to substance use ultimately results in economic loss that is hard to measure (Wodarski and Feit, 1995).

Race

Rivaux, Springer, Bohman, Wagner, and Gil (2006) report that epidemiological studies show substance abuse rates to be highest among white adolescents, followed by Latinos, and then African Americans. They go on to write that African American adolescents appear to be more strongly influenced by family (due to cultural norms), which impacts parental monitoring of negative behavior including substance abuse. Nasim, Belgrave, Corona, and Townsend (2009) explored relationships between family and peers and substance abuse attitudes in 227 African American adolescents. They reported that higher levels of self-efficacy, related to higher levels of social relationships with family and peers, are in turn correlated with lower levels of substance abuse. However, African Americans adolescents in urban areas are found to be at greater substance abuse risk than white adolescents (Nasim, Belgrave, Corona, and Townsend, 2009; Bell-Scott and Taylor, 1989). In their national sample of 4,023 adolescents using self-report for data collection, Kilpatrick, Acierno, Saunders, Resnick, Best, and Schnurr (2000) reported that

African Americans had one-third the risk for substance abuse and dependence as compared to Caucasians.

Gender

Gender differences offer another area of exploration. Latimer, Newcomb, Winters and Stinchfield (2000) report that extant research results on gender substance abuse treatment are mixed. Females appear more likely to exhibit psychological well-being post substance abuse treatment, and appear to use less alcohol post substance abuse treatment than do boys. In their pre-test, post-test, and follow-up study of 225 adolescents, they found that bivariate correlations suggest being female and decrease in substance abuse are related. However, using a multivariate approach they found a lack of gender effect. Becker and Grilo (2004) report that more research needs to be done considering gender differences, correlates and risk factors for adolescent substance abuse. They go on to say that such research on gender differences and substance abuse can have prevention and treatment implications. In their study, they found that the common factor in both adolescent male and female substance abuse is the presence of delinquency, whereas previous understanding held that little relationship between being female, delinquency, and substance abuse existed. Marsiglia, Kulis, Rodriguez, Becerra, and Castillo (2009) report that gender communication style studies show that females and males interpret communication differently and that females and males employ different substance abuse resistance strategies. Results of the Springer, Rivaux, Bohman, and Yeung (2006) study show females were 73 % more likely to leave substance abuse day treatment programs than were males. However, actual substance abuse rates by gender are important to consider; males engage in substance abuse more than females. For example, Johnston et al. (2008) report that within a two week time period 31 % of male 12th graders and 22 % of female 12th graders reported heavy binge drinking.

Parental Relationships

It has long been suspected that an influential relationship exists, through communication and modeling, between parents and adolescents. Such influence plays an important role in adolescent substance abuse. For example, it has been shown that family poses both protective and risk factors for tobacco and alcohol use (Nettles and Pleck, 1993; Rutter, 1979).

Wodarski and Feit (1995) report that “It is quite evident that the family plays a crucial part in the formation of habits and attitudes regarding drug use” (p.199). Several studies have found consistencies between lack of support from family and deviant behavior in adolescents (Barrera and Li, 1996; Krohn and Massey, 1980; Sampson and Laub, 1994; Bernberg, Thorlindsson, and Sigfusdottir, 2009). Linking the relationship between adolescents and parents, Wills and Cleary (1996) used their limited sample study to identify mediating pathways between adolescent substance abuse and parental support. Mediating factors included behavioral coping skills, academic competence, low tolerance for deviance and weak behavioral control. They also found that stronger parental support increased protective factors and reduced risk factors for tobacco, alcohol, and marijuana use.

Parental modeling occurs when parents engage in behavior that can be used as an example of behavior the adolescent can repeat. Research shows that parental modeling can make a powerful impact on adolescents. For example, it has been found that an adolescent is more likely to be influenced by what his parent does rather than what his parent says (Wodarski and Feit, 1995). They go on to say that adolescents are most influenced by parents regarding starting use of hard liquor and illicit substance use (other than marijuana), and that parental modeling and parental relationships with their adolescents are primary mechanisms in adolescent substance

abuse. Scaife, O' Brien, McEune, Notley, Millings, and Biggart, (2009) report that individuals whose parents or older siblings abuse substances are more likely to abuse substances themselves.

While there are a myriad of risk factors identified for adolescent substance abuse (Frischer, Crome, Macleod, Bloor, and Hickman, 2007; Hawkins, Catalano, and Miller, 1992; Spooner, 1999), Gilvarry (2000) identified several protective factors including family support and a caring relationship with an adult. Parental communication and guidance (via rules and expectations) have also been found to make important impacts on adolescent substance abuse; the family can have a stabilizing impact on adolescents and their attitudes (Wodarski and Feit, 1995). Likewise, Frischer, Crome, Macleod, Bloor, and Hickman (2007) report that substance use is linked to parental monitoring and discipline, and to family cohesion.

In their study of 3,316 adolescents, Hair, Moore, Hadley, Kaye, Day, and Orthner (2009) found that poor relationships with parents were related to substance abuse (including binge drinking and heavy smoking). Adolescents who live with and have positive relationships with both parents are less likely to engage in heavy tobacco use and hard substance use than are adolescents with positive relationships with only one parent (Bernberg, Thorlindsson, and Sigfusdottir, 2009; Hair, Moore, Hadley, Kaye, Day, and Orthner, 2009). Further, adolescents who have positive relationships with only one parent appear to be more likely to continue using drugs into adulthood.

Quality of the parent-child relationship is important. Nasim, Belgrave, Corona, and Townsend (2009) state that "With respect to relationship quality, positive mother-adolescent relations were associated with strong tobacco refusal attitudes among rural youths" (p. 229-230). They go on to state that such a positive mother-adolescent relationship is also associated with the adolescent's efficacy to refuse alcohol. However, adolescent relationships with the father did not

influence African American substance use behaviors. Hair et. al. report that adolescents whose parents have marital disruption experience higher rates of smoking and hard drug use. Using a nationally representative sample, Resnick, Bearman, Blum, Bauman, Harris, Jones, Tabor, Beuhring, Sieving, Shew, Ireland, Bearinger, Udry (1997) found that parent-family connectedness served as a protective factor against cigarette, alcohol, and marijuana use.

Intolerance of substance use and less substance use of adolescents are associated with stronger family cohesiveness and relationships with parents (Bray, Adams, Greg, and Baer, 2001; Grover, 1998; Brook, Whiteman, Gordon, and Brook, 1984). Conversely, parental conflict and substance use among parents predict poor refusal efficacy and high substance use of adolescents (Bray et al., 2001). Nasim, Belgrave, Corona, and Townsend (2009) report that strong family relationships supersede whether or not parents use substances in terms of influence on adolescent substance use. Cohesion among family members buffered negative effects of paternal alcohol abuse on alcohol use by adolescents (Hair, Moore, Hadley, Kaye, Day, and Orthner, 2009; Farrell, Barnes, and Banerjee, 1995).

Teams-Games-Tournaments

In the late 1940's social scientists addressed student education values (that is, what is important to students, what detracts from their learning experience, and what motivates them to learn), and began to understand the importance of peer influence and diversity in academic ability on learning attitudes. As a result, collaborative learning efforts and fun team competitions for students began to be formed. In the 1960's academic games designed to enhance learning became more popular. Due to the work of Barrish, Saunders, and Wolf (1969) and Hamblin, Buckholdt, Ferritor, Kozloff, and Blackwell (1971), reinforcement theory went from being an intervention for individual students to being used in classroom group work. Academic games,

group competition, and reinforcement theory evolved and merged to become Teams-Games-Tournaments. (DeVries and Slavin, 1978).

Although Teams-Games-Tournaments is rooted in education, it was initially developed to help prevent adolescents from using alcohol. Besides being guided by research on teaching games, it uses small group work and a task-reward system. Teams-Games-Tournaments emphasizes group learning, peers as teachers and moderators of social norms (Feldman and Wodarski, 1975; Wodarski, 1981; Wodarski, Adelson, Tidball, and Wodarski, 1980). When used as a substance abuse intervention, the goal of Teams-Games-Tournaments is for adolescents to have awareness and responsibility, knowing that abstinence may be unrealistic. That Teams-Games-Tournaments uses peers to teach adolescents about substance abuse and their behavioral affects is unique (Wodarski and Feit, 1995). The influence and reinforcement from peers are powerful factors in acquiring, altering, and maintaining behavior in youth (Buckholdt and Wodarski, 1978; Decker, Graitcer, and Schaffner, 1988; Feldman, Caplinger, and Wodarski, 1983; Grimes and Swisher, 1989). As the focus of Teams-Games-Tournaments is on the group and collaborative learning instead of on the individual learner (Wodarski, 1987b), it allows students to develop and practice interpersonal and problem-solving skills in the group learning setting. Group learning offers immediate peer feedback, support, and role modeling. These skills can then be used outside the classroom setting when the student is interacting with various others involved in his life that encourages drug use (Wodarski, Wodarski, and Parris, 2004).

According to Wodarski, Wodarski, and Parris (2004), three methods are sequentially used in Teams-Games-Tournaments. They are using games as teaching tools, small group work units, and task and reward structure. Teams-Games-Tournaments works by organizing students of varying learning abilities into small groups or teams that play educational games in a classroom

tournament. Ideally, there should be high achievers, average achievers, and low achievers in each group. The group members tutor one another on material taught by the teacher. The ongoing tournament allows teams to play in games against one another, with points for mastery of skills accumulated as they play over time. Top scorers at each game in the tournament are awarded more points than average scorers, who are awarded more points than low scorers. Each player's points are added to the team's cumulative score. Individual points are not shared with students; only team scores and standings are shared. Allowing students to be continuously aware of their team's standings in the tournament provides frequent rewards for students, as indicated in reinforcement theory (DeVries and Slavin, 1978). According to DeVries and Slavin (1978), Teams-Games-Tournaments successfully addresses three factors that often impede learning: Student values (students tend to value their peer group's interests inside and outside the classroom), student diversity (classrooms are often filled with students of varying abilities, from disadvantaged students to gifted students), and basic skills (basic skills are sometimes erroneously assumed to be in place).

Peer influence and reinforcement, important to development and maintenance of adolescent pro-social behavior, is central to using a group reward structure (Buckholdt and Wodarski, 1978; Wodarski, Wodarski, and Parris, 2004). The group reward structure uses influence and reinforcement for acquisition, alteration, and maintenance of adolescent behavior (Buckholdt and Wodarski, 1978; Wodarski and Feit, 1995). Further, Teams-Games-Tournaments permits all students, from disadvantaged learners to gifted learners, an equal opportunity to succeed (Wodarski, 1987b). Teams-Games-Tournaments helps adolescents (who drink and who report having unsatisfactory interpersonal relationships) learn and develop social skills, which

impact their ability to have successful interpersonal relationships (Wodarski, 1987b). Further, Wodarski, Wodarski, and Parris (2004) report that:

When applied in alcohol education, TGT focuses on alcohol misuse as well as its effects, including biological, psychological, socio-cultural, and physiologic determinants and attributes to alcohol; self-management skills for responsible drinking; drinking and driving; recognizing and treating drinking problems; and assertiveness training to respond to peer pressure regarding alcohol. (p. 107)

Wodarski, Wodarski, and Parris (2004) report that peers are the most important socialization factor in an adolescent's life. Early adolescence, with influence from family and peers, appears to be the optimal time for intervention (such as Teams-Games-Tournaments that capitalizes on peer influence) to occur (Wodarski and Feit, 1995). Perhaps the best way to avoid substance use is to choose to have a peer group that is drug-free. However, as McIntosh, MacDonald, and McKeganey (2005) explain in their study of 2,328 pre-teens, contacts with various peers frequently change and adolescents tend to be impulsive. Increased opportunity for exposure to other kids that engage in substance abuse is the result. The authors call for continued teaching of skills that will allow kids to avoid illicit substances. According to Wodarski, Wodarski, and Parris (2004), successful intervention will include skills for making assertive decisions and to develop strong communications to implement decisions, express feelings, set appropriate boundaries, obtain information, ask for behavioral changes in others, and reach acceptable solutions to dilemmas. One effective way, other than parental guidance alone, to teach such skills is Teams-Games-Tournaments.

Several other positive aspects of Teams-Games-Tournaments exist. Teams-Games-Tournaments can serve as a preventative program, not just an intervention for those already

abusing substances. Preventative programs are needed and should focus on pro-social influences such as family and peers because they are primary influences on adolescents (Wodarski and Feit, 1995; Adler and Kandel, 1982; Lewis and Lewis, 1984). Also, adolescent education about alcohol (for example) should be exciting, motivating, personalized, and non-judgmental, according to Wodarski (1987b). Another important consideration for effective interventions, which often rely on grant funding, is financial cost. In light of budget and overcrowding problems at schools, cooperative learning such as Teams-Games-Tournaments is cost effective in that students provide instructional assistance instead of hiring more teachers and teacher's aids (Wodarski, Wodarski, and Parris, 2004). Yet another important aspect of Teams-Games-Tournaments is that strong research programs and studies have supported the intervention's effectiveness.

The Johns Hopkins University for Social Organization of Schools, according to Wodarski, Wodarski, and Parris (2004), has engaged in 20 years of research on Teams-Games-Tournaments. Teams-Games-Tournaments is now supported by four decades of research. Educational research provides a basis for understanding the Teams-Games-Tournaments mechanisms related to successful educational outcomes. When compared with students given traditional learning approaches, students provided with Teams-Games-Tournaments instruction had higher academic achievement, better attitudes toward learning, increased peer tutoring, more belief in their ability to succeed, better social skill, and increased value placed on academic achievement (Wodarski, 1987b). Early research suggests that Teams-Games-Tournaments is a viable alternative to standard education procedures. DeVries and Slavin (1978) list examples where Teams-Games-Tournaments had a positive impact on "academic achievement, mutual concern, race relations, and peer norms supportive of academic achievement" when compared to

traditional education methods (p.36). The research of Ben-Ari (2001), Ke and Grabowski (2007), Okebukola (1985), and Slavin (1995) shows that Teams-Games-Tournaments improves academic attitudes and achievement. Wodarski (1987b) used a pre-test, post-test, and follow-up design to test for differences in adolescent alcohol consumption before and after Teams-Games-Tournaments intervention. In his study there were 526 members in an experimental group, 361 in a traditional instruction group, and 384 in a control group with no instruction. Results indicated a 12.7% decrease in drinking in the experimental group and no decrease in the other groups. The experimental group also had a decrease in amount of alcohol consumed at one time by 40%, whereas the other groups showed no change. Wodarski (1987a, 1987b) also found that Teams-Games-Tournaments participants increased self-confidence regarding resisting drinking behavior when compared to traditional and control groups. Results further indicated that Teams-Games-Tournaments is associated with significant change in adolescent's attitudes and knowledge about drinking behavior and that the change was sustained over time. Subjects in the experimental group reported less impulsivity and increased self-esteem. Self-reports of Teams-Games-Tournaments groups also indicate lower alcohol consumption and changes in attitude about drinking and driving (Wodarski, 1987b). In their follow-up study of the Wodarski (1987a, 1987b) studies, Wodarski, Wodarski, and Parris (2004) found that, compared to the other groups, the experimental Teams-Games-Tournaments group showed significant gains in attitudes about alcohol abuse, and the attitude changes were sustained at follow-ups (Teams-Games-Tournaments allows for over-learning which permits knowledge to be maintained over time).

An alternative to the traditional classroom approach, Teams-Games-Tournaments is a result of extensive research on teaching games, small group work, and rewards (Wodarski,

1987b). It has been shown that Teams-Games-Tournaments is an effective intervention for not only traditional classroom education, but for adolescent substance abuse as well.

Theory

While several theories (ecological systems theory, social learning theory, reinforcement theory, peer cluster theory, social control theory, bonding theory, and family interaction theory) appear useful for understanding influence of parents and peers on adolescents' substance abuse attitudes and communication about substance abuse, attachment theory is particularly useful for this inquiry. For example, attachment theory provides an appropriate framework for investigating problem drinking and the impact of attachments on drinking habits (Molnar, Sadava, DeCourville, and Perrier, 2010). It postulates that people who are secure (with minimal anxiety and avoidance) regarding attachment tend to have a positive sense of self-esteem (Molnar, Sadava, DeCourville, and Perrier, 2010; Bowlby, 1973; Kuncie and Shaver, 1994); People with low self-esteem are more likely to be influenced by others to drink alcohol (Molnar, Sadava, DeCourville, and Perrier, 2010). Attachment theory not only provides plausible explanation as to why adolescents abuse substances, but also provides a theoretical basis for the collaborative learning intervention TGT.

Originated by the English psychiatrist John Bowlby (1907-1990) as the product of his own early attachment trauma and also of his life-long work, attachment theory focuses on the bond experience between two people. Borrowing insights from ethology, psychoanalysis (more specifically, from the object-relations tradition of psychoanalysis), and cognitive psychology, Bowlby's work began with infants and immediate caregivers. He postulated that parents serve as an emotional safety base for children and adolescents, who will explore their environment in

individuation processes if they feel sufficiently attached to their parent (Bowlby, 1988; Steele, Davidson, Davidson, Monroe, Mercer, and Kaplan, 2007).

Attachment theory uses the concept of an internal working model, which can be described as children's beliefs about how relationships with others work. Important aspects of an internal working model include how we perceive others' availability to meet attachment needs and whether we see ourselves as worthy of attention. Bowlby believed that attachment needs continue into adulthood and throughout the lifespan, and that change in attachments and attachment needs also continue through-out a person's lifespan (Steele, Davidson, Davidson, Monroe, Mercer, Kaplan, 2007).

Holmes (1993) states that Bowlby believed that a disruption between child and primary caregiver could have a severe negative impact (in terms of neurosis and delinquency) on adolescents. Reflecting research by Furman and Buhrmester (1992) and Noller (1994) showing that adolescents continue to seek support from parents, Barrocas (n.d.) suggests that parental attachment may provide a support base from which adolescents venture into attachments with peers. Adolescents may eventually turn to peers in times of need, according to Barrocas (n.d.), Hazen and Shaver (1994), Schneider and Younger (1996), and Nickerson and Nagle (2005). However, according to Barrocas (n.d.) and Freeman and Brown (2001), more securely attached adolescents reported attachment to their mothers while less securely attached adolescents reported attachment to peers. Holmes (1993) goes on to explain that attachment theory is spatial in nature: a person feels good when close to a loved one and anxious, sad, or lonely when distant from the loved one. While adolescence can be described as a period of seeking and testing autonomy in effort to make the transition from childhood to adulthood and from their childhood primary caregiver to peer partner, adolescents remain attached to their primary support figure

(which serves as an anchor), returning in the face of threat, danger, or need. Bowlby (1988), in describing his hypothesis concerning psychopathology treatment, states that:

So long as current modes of perceiving and construing situations, and the feelings and actions that ensue therefrom, are determined by emotionally significant events and experiences that have become shut away from further conscious processing, the personality will be prone to cognition, affect, and behavior maladapted to the current situation. (p. 117)

It appears that conscious processing can be facilitated by communication with other, especially a parent (who provides a safe base) or a peer. It is plausible that adolescents that do not express troubling feelings and thoughts by communication with significant others and instead suppress them may be more likely turn to substance abuse for relief.

Allen (2008) also postulates that the attachment relationship between adolescents and parents change during teen-age years as the adolescent begins making the transition from childhood to adulthood. The autonomy-seeking adolescent practices developing communication skills and perspective-taking skills. Barrocas (n.d.) postulates that a substantial gap in attachment literature exists concerning how adolescents make use of relationships with parents and with peers. This gap is especially true, according to Barrocas, in describing how parental attachment influences peer attachments. Barrocas obtained data on 24 racially diverse, middle class adolescents and their parents. The data was collected using the Inventory of Parent and Peer Attachment-Revised Questionnaire. She found that adolescents in her study rated peer interactions as more important than parent interactions, especially regarding communication. Although the adolescent explores newfound ability, freedom, and responsibility, he remains attached to the parental figure, which continues to serve as a safety base when life becomes

overwhelming. Adolescents who do not have a secure attachment base have higher levels of substance abuse and delinquent behavior (Allen, Moore, Kuperminc, and Bell, 1998; Rosenstein and Horowitz, 1996). However, over-engagement in the adolescent-parent relationship can undermine adolescent autonomy efforts, resulting in angry adolescents who exclude their parents and make further associations with peers (some of which may be troubled and substance users). Allen (2008) goes on to say that adolescents transfer, at least to a degree, their attachment dependence from a parental figure to peers. As a result, both parents and peers have influence on adolescents; although adolescents may reject the importance of their relationships with primary caregivers and other attachment figures, such attachments remain important and are worthy of scientific inquiry.

Methodology

The proposed dissertation will be a secondary data analysis. The proposed secondary data analysis will be of three waves of data from Dr. John Wodarski's ongoing SAMHSA funded grant. The three waves of data are comprised of pre-test scores, post-test scores, and follow-up scores. These data can be conceptualized as coming from a single-group time series design with data obtained at three time points.

Glass, Willson, and Gottman (2008) argue that the time series design offers an alternative to the traditional, randomized comparative experimental design. They go on to note that its most important benefit is its ability to provide for the evaluation of intervention effect patterns over time. They further explain that time series designs are more appropriate than experimental designs for studying complexities of interventions in social organizations and human beings. Time series design threats to internal validity may include repeated testing, maturation,

mortality, and history effects. However, Campbell and Stanley (1963) suggest that only history effects offer the most plausible weakness of time series designs.

Research Questions.

The following research questions will be asked:

- Are there differences in communication scores at pre-test (intercept) that show African Americans talk more with parents about substance abuse than do Caucasians?
- Will communication scores show an improving trend for talking with parents about substance abuse that is greater for Caucasians than for African Americans?
- Are there differences in substance abuse attitude scores at pre-test (intercept) that show Caucasians have more permissive attitudes about substance abuse than do African Americans?
- Will substance abuse scores show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for Caucasians than for African Americans?
- Are there differences in communication scores at pre-test (intercept) that show females talk more with parents about substance abuse than do males?
- Will communication scores show an improving trend for talking with parents about substance abuse that is greater for males than for females?
- Are there differences in substance abuse attitude scores at pre-test (intercept) that show that males have more permissive attitudes about substance abuse than females?
- Will substance abuse attitude scores show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for males than for females?

It is believed that answers to the proposed research questions will provide practical and useful information to social workers, educators, parents, and adolescents about decreasing substance abuse behaviors through communication and knowledge-based attitude changes. Such answers may be useful for treatment matching, allowing intervention focus to be placed where it is most efficacious.

Hypotheses.

There are eight hypotheses for this proposed study. The hypotheses focus on pre-test (intercept) and temporal trends in participants' responses to subsets of items from The National Minority SA/HIV Prevention Initiative Cohort 7 Youth Questionnaire used in the ongoing Wodarski study. The hypotheses for this proposed study are as follows:

- It is hypothesized that the scores for talking with parents about substance abuse will show differences in pre-test (intercept), with African Americans communicating with parents about substance abuse more than Caucasians.
- It is hypothesized that the scores for talking with parents about substance abuse will show a trend that improves, and the improving trend will be greater for Caucasians than for African Americans.
- It is hypothesized that the scores for substance abuse attitude will show differences at pre-test (intercept), with Caucasians having more permissive attitudes about substance abuse than African Americans.
- It is hypothesized that the scores for substance abuse attitude will show a trend in the direction of less permissive attitudes toward substance abuse, and the improving trend will be greater for Caucasians than for African Americans.

- It is hypothesized that the scores for talking with parents about substance abuse will show differences at pre-test (intercept), with females communicating more than males.
- It is hypothesized that the scores for talking with parents about substance abuse will show a trend that improves, and the improving trend will be greater for males than for females.
- It is hypothesized that the scores for substance abuse attitude will show differences at pre-test (intercept), with males having more permissive attitudes about substance abuse than females.
- It is hypothesized that the scores for substance abuse attitude will show a trend in the direction of less permissive attitudes toward substance abuse, and the improving trend will be greater for males than for females.

Chapter Three: Methods

Participants

Adolescents from inner city and low socio-economic backgrounds were targeted as participants in the original study conducted by Wodarski. These participants were aged 12 to 17 years and attended one of six Boys and Girls Clubs in a Southeastern State. There were 159 participants at baseline, 112 at exit, and 99 at follow-up. Participants participated on a voluntary basis and consent was obtained from parents or guardians.

Original Study Design

The original study, Dr. John Wodarski's Substance Abuse Mental Health Services Administration funded research entitled *HIV/AIDS and Substance Abuse Primary Prevention Program with Minority Adolescents*, is ongoing. His research uses Teams-Games-Tournaments (TGT) as an intervention for minority adolescents who are high-risk for contracting HIV/AIDS and for substance abuse, with a goal of increasing access to, engagement in, and retention of clients in HIV/AIDS prevention and substance abuse services. The Wodarski study is being conducted using a within-subject time-series (pre-test, post-test, and follow-up) survey design. Studies that collect data at only two time points are often inadequate for studying individual change or growth (Bryk and Weisberg, 1977; Rogosa, Brand, and Zimowski, 1982; Raudenbush and Bryk, 1987, 2002). For example, statistical precision can be impacted by number of observations, according to Raudenbush and Liu (2000).

In the Wodarski study a survey is being administered prior to Teams-Games-Tournaments training, directly after the training, and at six months after the training. The collaborative Teams-Games-Tournaments training consists of substance abuse education and

Human Immunodeficiency Virus prevention training. The training curriculum and schedule being used with the subjects of the Wodarski study can be found in Appendix A.

Dissertation Study Design

Secondary data were used in this dissertation research. The data were initially collected as part of Dr. John Wodarski's Substance Abuse Mental Health Services Administration funded research. Pre, post, and six-month follow-up data from ad hoc measures were used in the current research. Studies on the validity and reliability of data used from the National Minority SA/HIV Prevention Initiative Cohort 7 Youth Questionnaire used in Dr. Wodarski's study have not been conducted. Hierarchical linear modeling was used to analyze data.

Variables

Dependent Variables.

Dependent variables in this study were (1) attitudes about substance abuse and (2) talking about substance abuse with parents. Responses on the following questions from the National Minority SA/HIV Prevention Initiative Cohort 7 Youth Questionnaire were used to compute scores for the two dependent variables. Questions 36 through 42 focused on substance abuse attitudes and the total score over these seven items were used as the "attitude about substance abuse" scores. Questions 94 through 96 focused on talking more about substance abuse with parents, and the total score over these three items was used as the "talking about substance abuse with parents" score. The items 36, 37, 38, 39, 40, 41, and 42, and 94, 95 and 96, were worded and formatted as follows:

36). How do you feel about someone your age smoking one or more packs of cigarettes a day?

- 0). Don't know or can't say
- 1). Neither approve or disapprove
- 2). Somewhat disapprove
- 3). Strongly disapprove

37). How do you feel about someone your age trying marijuana or hashish once or twice?

- 0). Don't know or can't say
- 1). Neither approve or disapprove
- 2). Somewhat disapprove
- 3). Strongly disapprove

38). How do you feel about someone your age using marijuana once a month or more?

- 0). Don't know or can't say
- 1). Neither approve or disapprove
- 2). Somewhat disapprove
- 3). Strongly disapprove

39). How do you feel about someone your age having one or two drinks of an alcoholic beverage nearly every day?

- 0). Don't know or can't say
- 1). Neither approve or disapprove
- 2). Somewhat disapprove
- 3). Strongly disapprove

40). How much do people risk harming themselves physically or in other ways when they smoke one or more packs of cigarettes per day?

- 0). Don't know or can't say

- 1). No risk
- 2). Slight risk
- 3). Moderate risk
- 4). Great risk

41). How much do people risk harming themselves physically or in other ways when they smoke marijuana once or twice a week?

- 0). Don't know or can't say
- 1). No risk
- 2). Slight risk
- 3). Moderate risk
- 4). Great risk

42). How much do people risk harming themselves physically or in other ways when they have five or more drinks of an alcoholic beverage once or twice a week?

- 0). Don't know or can't say
- 1). No risk
- 2). Slight risk
- 3). Moderate risk
- 4). Great risk

94). Now, think about the past 12 months through today. During the past 12 months, have you talked with at least one of your parents about the dangers of tobacco, alcohol, or drug use? (By PARENTS, we mean your biological parents, adoptive parents, stepparents, or adult guardians, whether or not they live with you).

- 1). No

0). Yes

2). Don't know or can't say

95). I'm available when others in my family want to talk to me.

1). Not true

2). Sometimes true

3). Usually true

4). Always true

99). I don't have any family

96). I listen to what other family members have to say, even when I disagree.

1). Not true

2). Sometimes true

3). Usually true

4). Always true

99). I don't have any family

The measure of the dependent variable, "attitude about substance abuse" was the sum of scores on items 36 through 42. This gave a range of possible scores on this variable from 0 to 24, with lower scores indicative of attitudes more supportive of substance abuse, and higher scores indicative of more negative attitudes towards substance abuse.

The measure of the dependent variable for "communication with parents about substance abuse" was the sum of scores on items 94 through 96. This gave a range of possible scores on this variable from 0 through nine, with higher scores suggestive of greater adolescent communication with parents about substance abuse. Item 94 was recoded so that a "yes" response was indicated by the number one and a "no" response was indicated by zero.

Independent Variables.

Independent variables were gender (male or female adolescents) and race (Caucasian or African American adolescents). Participant's responses to the following questions from the National Minority SA/HIV Prevention Initiative Cohort 7 Youth Questionnaire were used as scores for the independent variables.

1). How would you describe yourself? (Gender)

0). Male

1). Female

3). What is your race?

0). White

1). Black or African American

Data Analysis

Social sciences contain data structures that are often hierarchical: for example, individual level variables are nested in small group variables, which in turn may be nested within successively larger variable groups. These hierarchical data structures are commonplace in the social environment, according to Raudenbush and Bryk (2002). Several research studies reviewed for this work used hierarchical linear modeling as a means to analyze their data. It was used by Nasim, Belgrave, Corona, and Townsend (2009) in their exploration of social influences on African American adolescents regarding substance abuse. Latimer, Newcomb, Winters, and Stinchfield (2000) used hierarchical linear modeling in studying the effect of problem severity, psychosocial factors, and treatment factors on treatment outcomes. Hierarchical linear regression was also used by Kilpatrick, Acierno, Saunders, Resnick, Best, and Schnurr (2000) in their study of risk factors for adolescent substance abuse using a national survey sample.

Hierarchical linear modeling is a powerful tool for individual change research. It was used to analyze the data for this dissertation study, as the data were repeated measures nested within individual subjects. More specifically, an intercept- and-slopes-as-outcomes-model, which is a sub-model of more general growth models, was used in this study because it can be used to study individual change across time. In the data analysis in this dissertation, the intercept represented the level of the dependent variable at first (i.e., pre-test) observation, and the slope represented the linear rate of change for a person on the dependent variable across time.

Using hierarchical linear modeling to analyze the data in this study made statistical and conceptual sense. It was the most appropriate way to analyze the data for this study. Other approaches, such as analysis of variance and subsequent t-test analysis would not be useful because of the number of nested variables to be measured using a within-subjects repeated measures design. Analysis of covariance also requires equal time intervals between observations; data for this study were observed pre and post intervention with the intervention lasting three months, then a follow-up observation six months later. According to Raudenbush and Bryk (2002) and Rogosa, Brand, and Zimowski (1982), many measurement instruments are scaled to have constant variance over time, which is often inappropriate for the study of change over time.

Raudenbush and Bryk (2002) further explain that the correlation between initial status and change in status is important in studies investigating change across time, but it is impossible for a simple pretest-posttest design to produce consistent correlation estimates. Finding spurious negative correlations between initial status and rate of growth or change is common with pretest and posttest studies due to measurement errors in negatively correlated pretest and posttest scores. These problems imply the need for use of multi-wave data where measurements are taken repeatedly over time, allowing for more accurate estimates of correlations between initial status

and rate of change across time. Correlations such as these can be obtained using a linear individual growth model.

The linear (as opposed to nonlinear) growth model is appropriate for use, according to Raudenbush and Bryk (2002), when there are few individual observations (there were up to three observations for participants in this study). The level 1 model used in this study was a linear growth model. The intercept represented the participant's initial status (i.e., pre-test score) on the dependent variable, and the linear slope represented the participant's linear rate of change in the dependent variable across the three waves of data. For this study, the individual level 1 model can be expressed as,

$$Y_{ti} = \pi_{0i} + \pi_{1i} T + e_{ti}$$

where Y_{ti} represented the observed status at time t for individual i . The intercept parameter π_{0i} was the level 1 coefficient which represented the true level of communication or attitude (depending on which variable was being examined) at time of pre-test observation. The change parameter, π_{1i} , was the level 1 model coefficient that represented expected individual linear rate of change over a fixed time period. The error parameter, e_{ti} , was the level 1 residual term for the level-1 model and was assumed to be normally and independently distributed, with a mean of 0, and constant variance, σ^2 .

A level 2 model, according to Raudenbush and Bryk (2002), can be constructed, and can be useful in predicting variability in intercept and slope across persons associated with between subjects variables, such as gender and race. Predictor variables can be given and controlled for in the level 2 model. Level 2 predictors for this study were race and gender (refer

to Appendix B for coding). A level 2 model predicting the level-1 individual intercept and slope parameters, respectively, for communication and substance abuse attitude was given as two regression equations:

$$\pi_{0i} = \beta_{00} + \beta_{01} (\text{race})_i + \beta_{02} (\text{gender})_i + r_{0i}$$

and

$$\pi_{1i} = \beta_{10} + \beta_{11} (\text{race})_i + \beta_{12} (\text{gender})_i + r_{1i}$$

where π_{0i} was the intercept parameter for communication (for example) and π_{1i} represented expected linear rate of change in communication across a specific time period. The β coefficients were the level 2 coefficients that represented the level 2 relationship between the independent variables race and gender and the intercept and slope parameters in the level-1 model. The level 2 random effects terms were r_{0i} and r_{1i} .

Chapter Four: Results

Sample Characteristics

There were scores for 159 participants at pre-test, 113 at post-test, and scores for 100 participants at the six-month follow-up. At pre-test, there were more males ($N = 98$, or 62 %) than females ($N = 60$, or 38 %), and more African Americans ($N = 82$, or 51.9 %) than Caucasians ($N = 77$, or 44.9 %). There were no missing data for gender, and 3.2 % ($N = 5$) missing data for race.

At post-test, there were more males ($N = 64$, or 56.6 %) than females ($N = 46$, or 40.7 %) and slightly more Caucasians ($N = 55$, or 48.7 %) than African Americans ($N = 54$, or 47.8 %). There were 2.7 % ($N = 3$) missing data for gender and 3.5 % ($N = 4$) missing data for race.

At six-month follow-up, there were more males ($N = 53$, or 53 %) than females ($N = 47$, or 47 %) and more African Americans ($N = 60$, or 60 %) than Caucasians ($N = 38$, or 38 %). There were no missing data for gender, and 2 % ($N = 2$) missing data for race.

The overall sample was 57.8% male, and 41.1% female, with 0.8% missing data on this variable. In the overall sample, 52.7% of participants were African-American, and 44.1% were Caucasian, with slightly over 3% missing data.

Scoring item responses “Don’t know/can’t say”

An important issue concerned how to score responses to any of the attitude subscale items or the communication subscale items marked by respondents “don’t know/can’t say”. Following Rubin, Stern and Vehovar (1995) such responses were treated as missing data and scored three different ways: with a zero; with values imputed using the EM algorithm in SPSS; and coded as missing data and list-wise deleted. The HLM analyses testing the research hypotheses were conducted on the subscale data with “don’t know/can’t say” responses scored

each of the above three ways. The results were essentially the same, with no significant differences between results. The results concerning research hypotheses were statistically the same, regardless of the method used for scoring “don’t know/can’t say” responses. The results that follow were based on scoring “don’t know/can’t say” responses with a zero (0). In the interest of space the results based on the other two methods for scores “don’t know/can’t say” responses are not reported.

Scores on the Dependent Variables

The mean attitude score at pre-test was 19.0 (SD = 5.3), at post-test was 19.9 (SD = 5.1), and at follow-up was 20.6 (SD = 4.8). The mean communication score at pre-test was 6.3 (SD = 2.0), at post-test was 6.4 (SD = 1.95), and at follow-up was 6.1 (SD = 1.90).

Figures 1 thru 3 below show the frequency distributions of attitude scores at pre-test, post-test, and follow-up respectively. Figures 4 thru 6 below show the frequency distributions of communication scores at pre-test, post-test, and follow-up respectively. The important thing to note about the frequency distributions of attitude scores at pre-test, post-test, and follow-up is, in all three cases, the presence of an apparent ceiling effect. The implications of this apparent ceiling effect are considered in the next chapter.

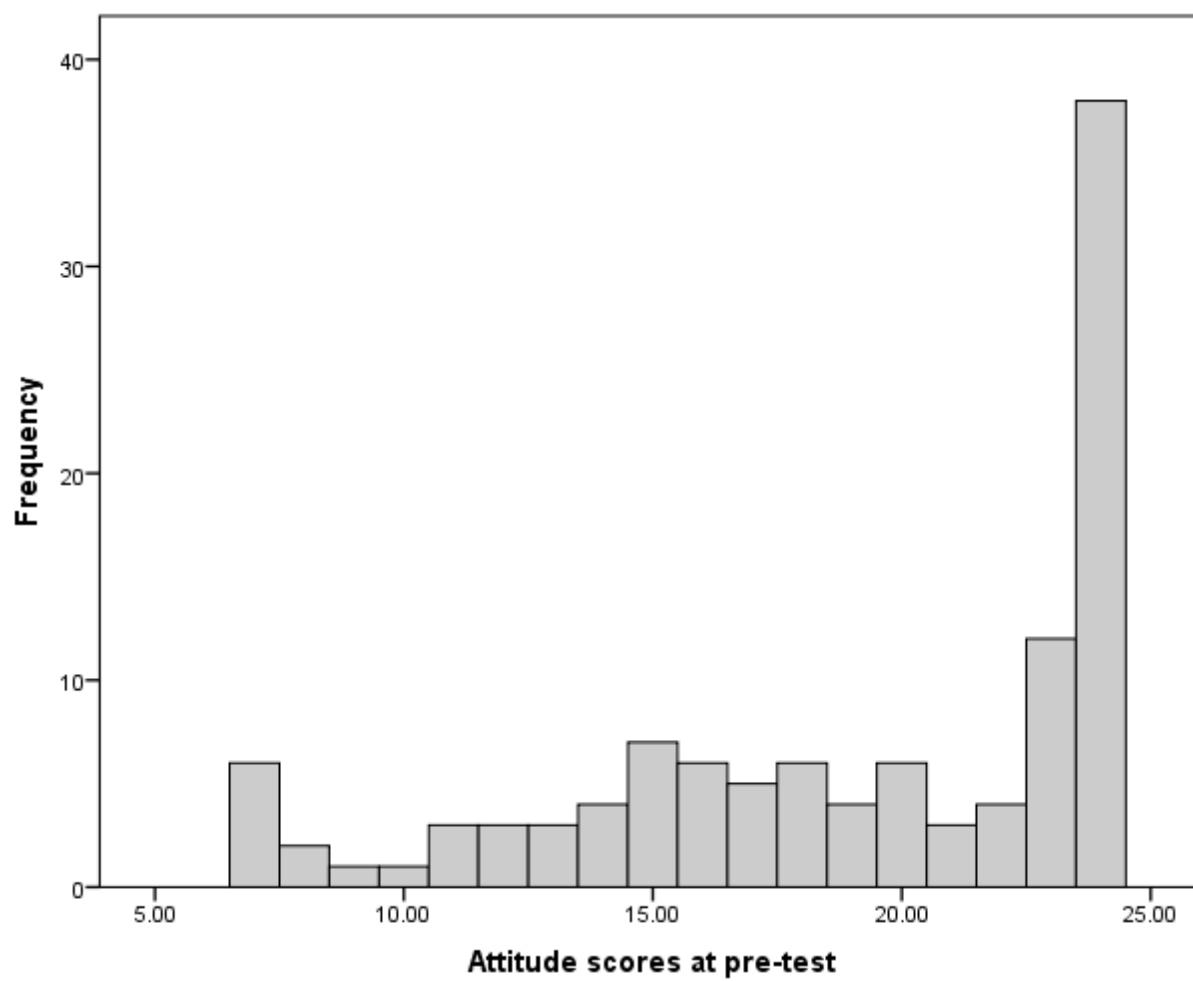


Figure 1: Frequency distribution of attitude scores at pre-test.

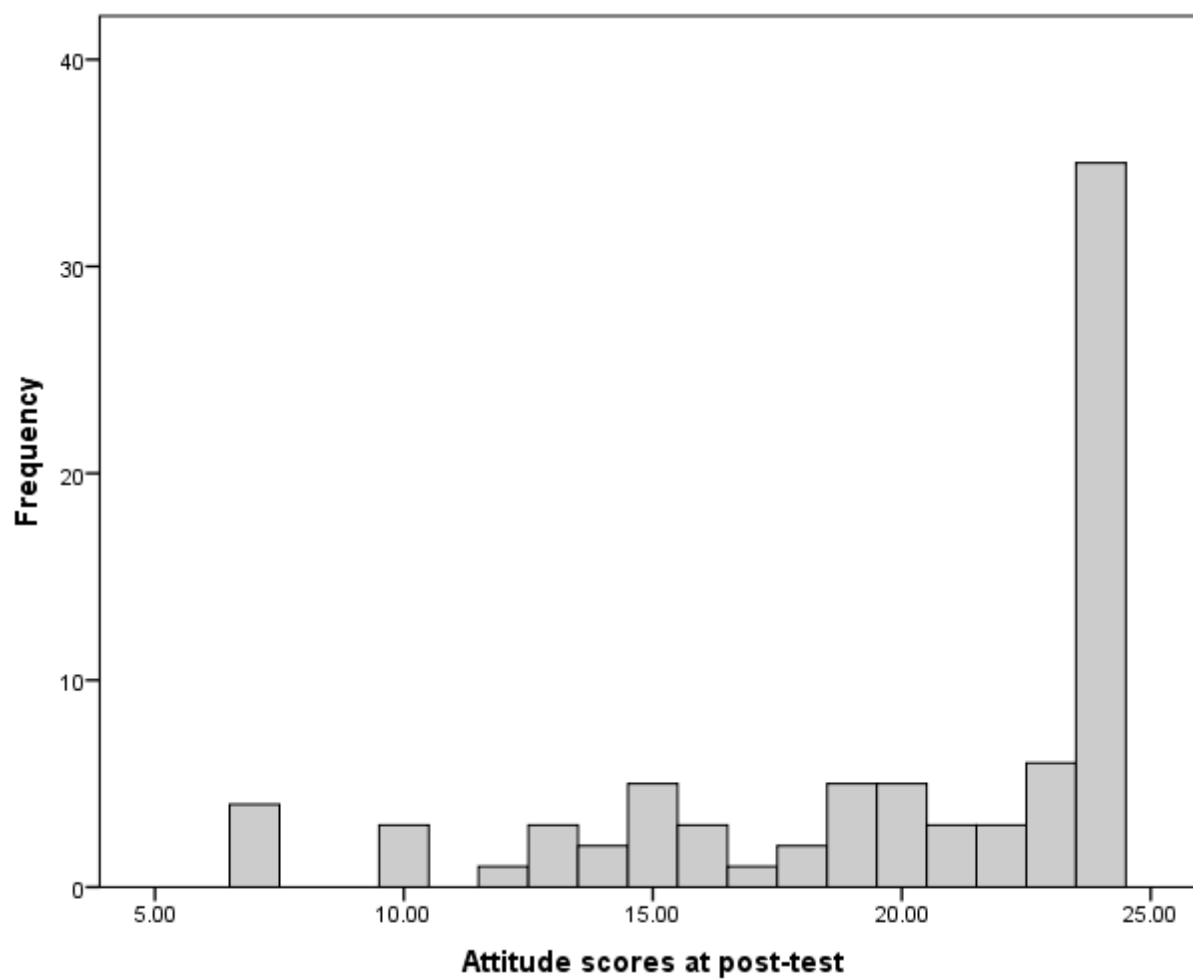


Figure 2: Frequency distribution of attitude scores at post-test.

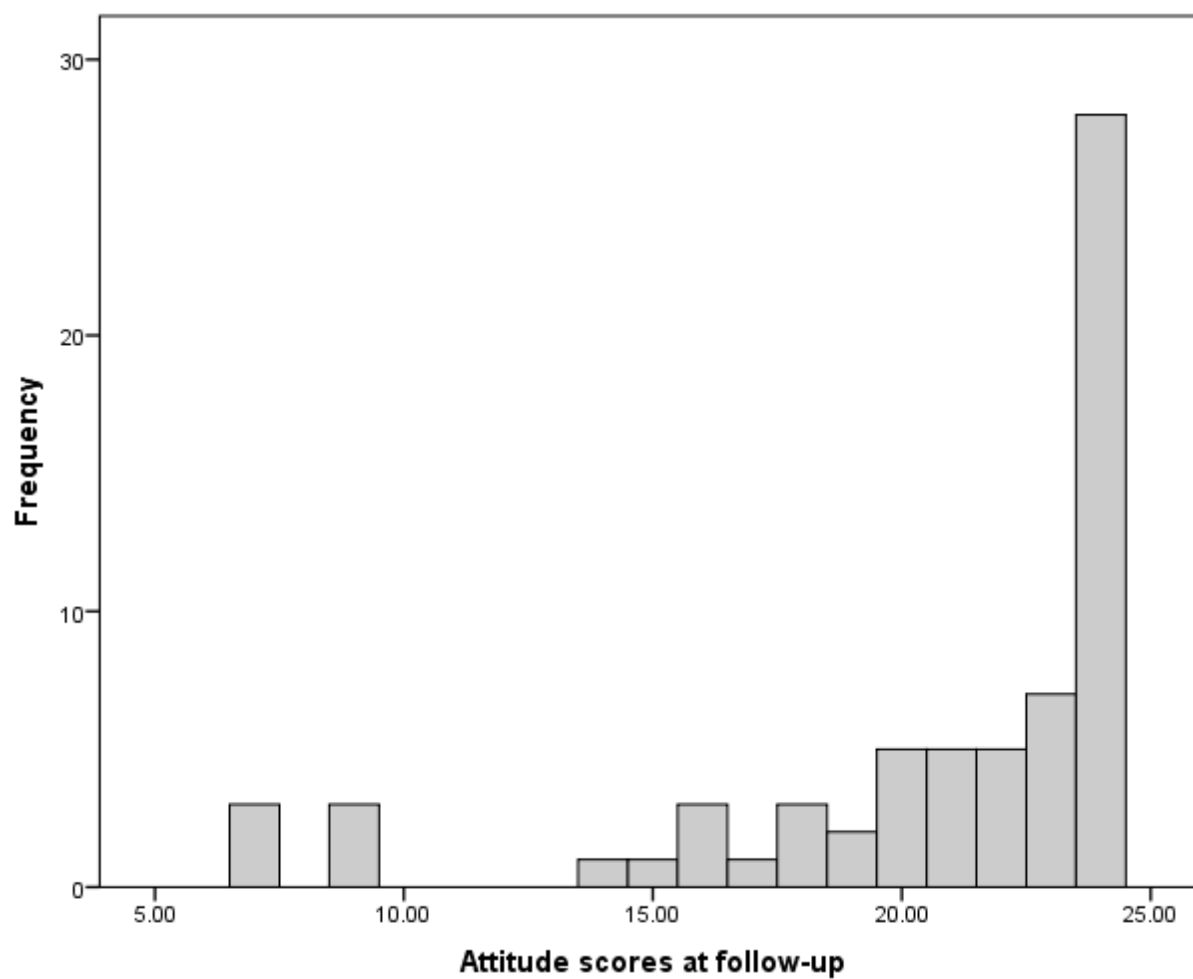


Figure 3: Frequency distribution of attitude scores at follow-up.

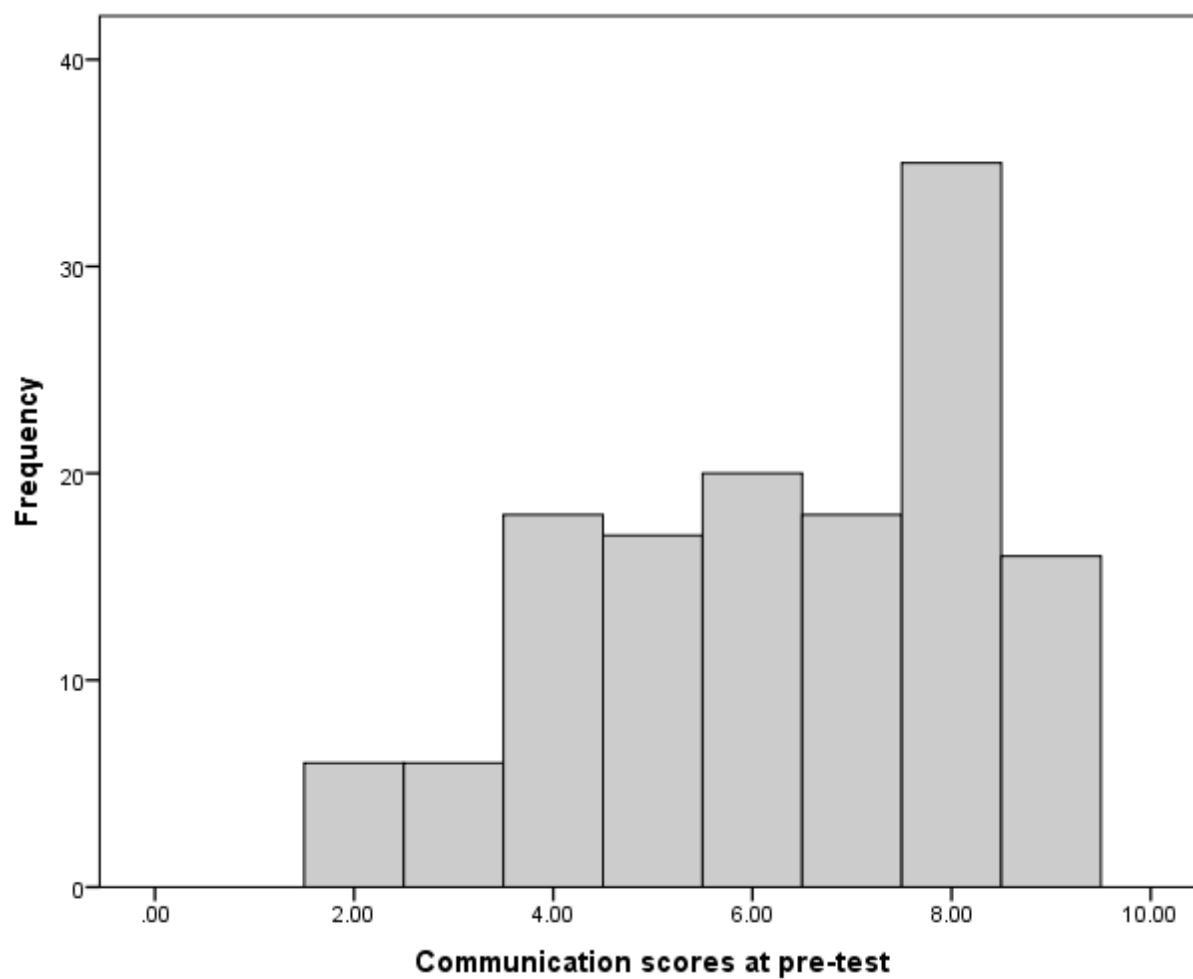


Figure 4: Frequency distribution of communication scores at pre-test.

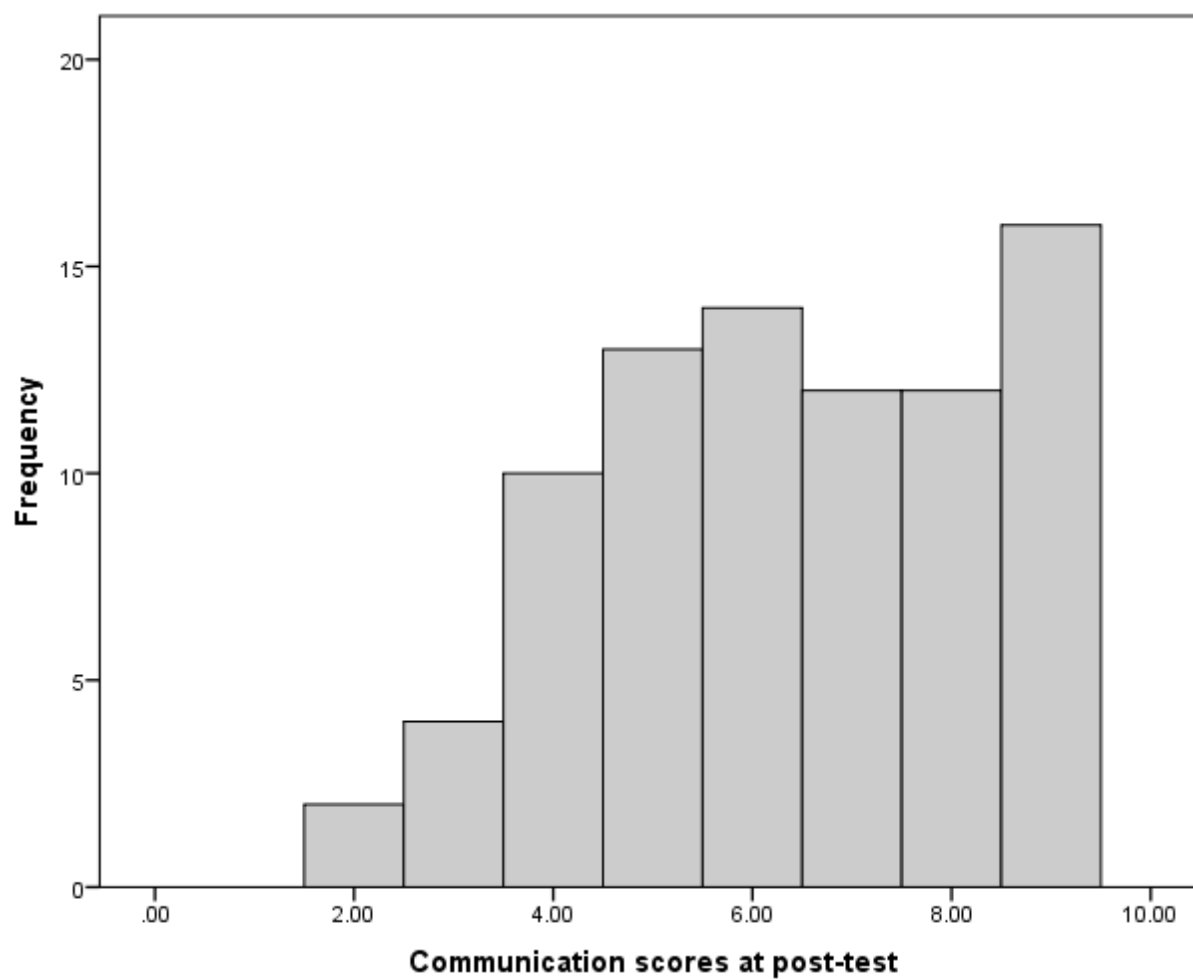


Figure 5: Frequency distribution of communication scores at post-test.

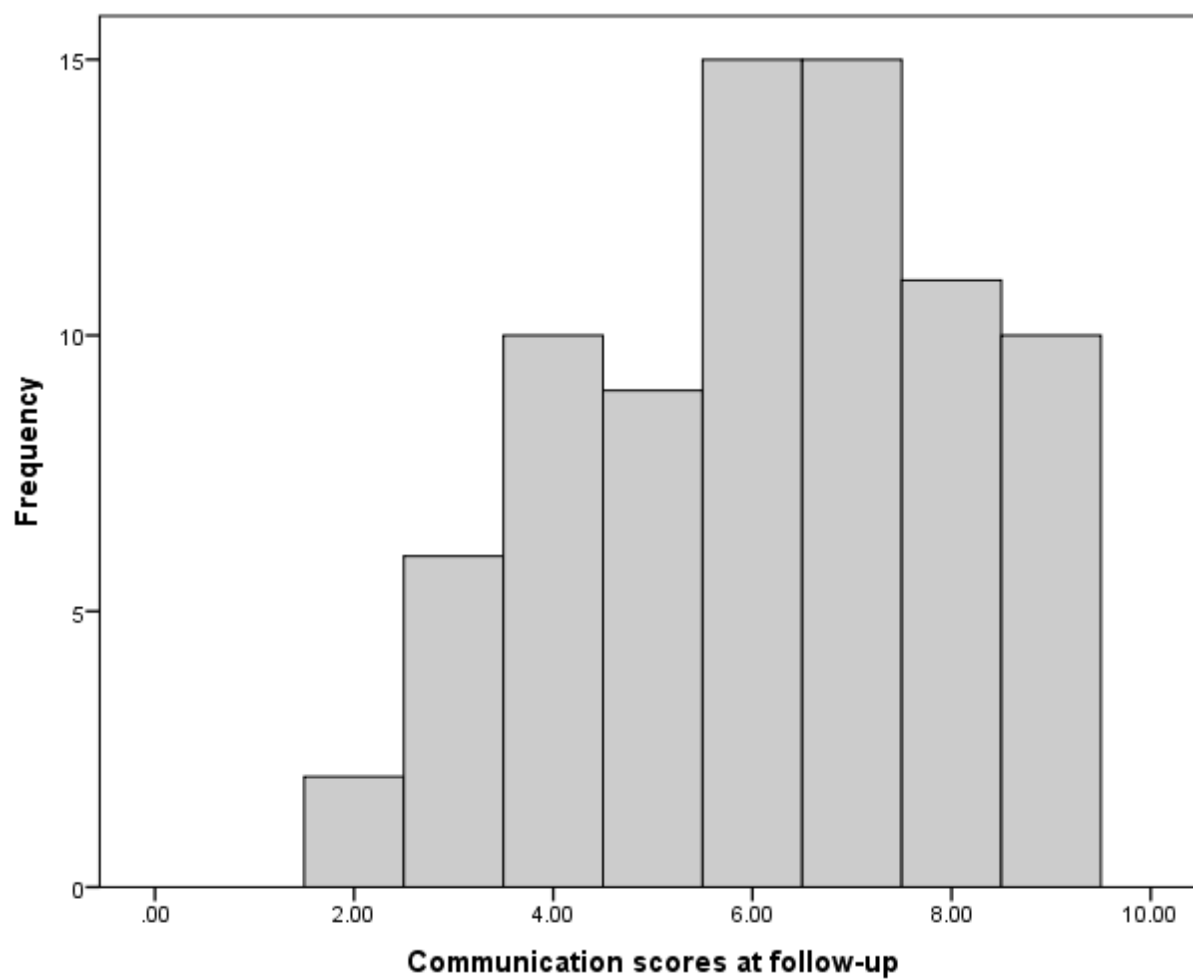


Figure 6: Frequency distribution of communication scores at follow-up.

Reliability Analysis

Using SPSS, item analyses were conducted on items that made up the attitude subscale (questions 36 through 42) and on those that made up the communication subscale (questions 94 through 96) from the National Minority SA/HIV Prevention Initiative Cohort 7 Youth Questionnaire. Reliability analyses were conducted individually for attitude subscale scores and communication subscale scores for pre-test, post-test, and six-month follow-up.

Reliability of Attitude Subscale Scores.

For the attitude subscale items at pre-test, all corrected item total correlations were reasonably high, with a range from .637 to .780. The Chronbach's alpha estimate of the reliability coefficient for the attitude subscale scores at pre-test was about .90.

For attitude subscale items at post-test, all corrected item-total correlations were also high, with a range from .644 to .777. The Chronbach's alpha estimate of the reliability coefficient for attitude subscale scores at post-test was .90.

For the attitude subscale items at six-month follow-up, all corrected item-total correlations were high, with a range from .664 to .798. The Chronbach's alpha estimate of the reliability coefficient for attitude subscale scores at six-month follow-up was .91.

Reliability of Communication Subscale Scores.

For the communication subscale items at pre-test, corrected item-total correlations for items 95 and 96 were high, with a range from .529 to .577. Item 94 had a corrected item-total correlation of .131. This low corrected item-total correlation was due, in part, to this item having dichotomous scoring. The Chronbach's alpha estimate of the reliability coefficient for the communication subscale pre-test scores was about .58. This low value was due in part to the small number of items on this subscale (3) and to the dichotomous scoring on item 94.

For communication items at post-test, corrected item-total correlations for items 95 and 96 were high, with a range from .647 to .707. Item 94 had a corrected item-total correlation of .44. The Chronbach's alpha estimate of the reliability coefficient for post-test communication scores was .77.

For communication items at six-month follow-up, corrected item total correlations for items 95 and 96 were high, with a range from .603 to .638. Item 94 had a corrected item-total correlation of .269. This low corrected item-total correlation was due, in part, to this item having dichotomous scoring. The Chronbach's alpha estimate of the reliability coefficient for six-month follow-up communication scores was .66.

Hierarchical Linear Modeling

Unconditional Model Results.

For the communication subscale scores, the estimated correlation between intercepts (pre-test scores) and slopes (linear rates of change) was $-.325$; higher pre-test score (or intercepts) were associated with lower linear rates of change in communication subscale scores. The reliability estimate for intercept parameters was about .70, and for slope parameters, .32. The relatively high reliability estimate for intercepts suggested there was a relatively high "signal to noise" ratio for these estimates and this was consistent with the presence of systematic variability in intercept parameters. The lower reliability for estimated slope parameters suggested a lower "signal-to-noise" ratio for these estimates, and therefore less systematic variability between slope parameter estimates than between intercept parameter estimates (Raudenbush and Bryk, 2001).

The estimates of the mean intercept and slope parameters for the communication subscale scores are in Table 1 below. The mean estimated intercept (i.e., mean pre-test communication

score) was 6.34, $t(154) = 43.2$, $p < .001$. The estimated mean slope parameter, the estimated linear rate of change, for participants' communication scores was $-.03$, $t(154) = -1.67$, $p > .05$, a result suggesting the mean slope was not statistically different from zero. This finding suggested the mean linear rate of change in communication subscale scores was zero. The Chi-Square for homogeneity of intercept parameters, as shown in Table 2, was $X^2(120) = 396.8$, $p < .001$. The estimated variance of intercept parameters was 2.32 (SD = 1.52). The Chi-square for homogeneity of slope parameter estimates was $X^2(120) = 182.8$, $p < .001$. The estimated variance of slope parameter estimates was .02 (SD = .13). These variance components implied the presence of significant variability in both intercept and slope parameter estimates and therefore suggested it was reasonable to go forward with testing the research hypotheses (Raudenbush and Bryk, 2001). An approximate 95 % confidence interval for linear rates of change in participants' communication with parents about substance abuse was $-.30$ to $.23$.

For attitude subscale scores, the estimated correlation between intercepts (pre-test scores) and slopes (linear rates of change) was $.278$. The reliability estimate for intercept parameters was about $.71$, and for slope parameters, $.24$. The relatively high reliability estimate for intercepts suggested there was a reasonably high "signal to noise" ratio and was consistent with the presence of systematic variability in intercept parameters. The lower reliability estimate for slope parameters suggested a lower "signal-to-noise" ratio and less systematic variability in slope parameter estimates than in intercept parameter estimates (Raudenbush and Bryk, 2001).

The estimates of the mean intercept and slope parameters for the attitude subscale scores are in Table 3 below. The mean estimated intercept (i.e., mean pre-test attitude score) was 16.94, $t(154) = 32$, $p < .001$. The estimated mean slope parameter for the attitude scores was $-.05$, $t(154) = -.78$, $p > .05$, a result that suggested the mean linear rate of change in attitude scores was not

statistically different from zero. This finding suggested the mean linear rate of change in attitude was zero. The Chi-Square for homogeneity of intercept parameters, as shown in Table 4, was $X^2(120) = 436.5, p < .001$. The estimated variance of intercept parameters was 30.55 (SD = 5.53). The Chi-square for homogeneity of slope parameter estimates was $X^2(120) = 166.74, p < .001$. The estimated variance of slope parameter estimates was .15 (SD = .39). These variance components suggested the presence of significant variability in both intercept and slope parameter estimates, and therefore, that it was reasonable to go forward with testing the research hypotheses (Raudenbush and Bryk, 2001). An approximate 95% confidence interval for linear rates of change in participants' attitudes towards substance abuse was -.83 to .73.

The estimated linear rates of change for both communication and attitude scores was not statistically different from zero. These results suggest that, on average, participants' communication with parents about substance abuse, and their attitudes towards substance abuse, did not change. The approximate 95% confidence interval for linear rate of change in participants' attitude scores, however, suggested that some participants' attitudes improved, while others did not change, while yet others deteriorated. Similarly, the approximate 95% confidence interval for participants' linear rates of change in communication with parents about substance abuse suggested some participants improved, while others remained the same, while yet others deteriorated in their communication with parents.

Table 1

Unconditional Model Final Estimation of Fixed Effects for Communication

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	6.346446	0.146758	43.244	154	<0.001
For WAVE slope, π_1					
INTRCPT2, β_{10}	-0.035109	0.021047	-1.668	154	0.097

Table 2

Unconditional Model Final Estimation of Variance Components for Communication

Random Effect	Standard Deviation	Variance Component	d.f.	χ^2	p-value
INTRCPT1, r_0	1.52316	2.32002	120	396.77102	<0.001
WAVE slope, r_1	0.13450	0.01809	120	182.80281	<0.001
level-1, e	1.13074	1.27858			

Table 3

Unconditional Model Final Estimation of Fixed Effects for Attitude

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	16.946833	0.528706	32.053	154	<0.001
For WAVE slope, π_1					
INTRCPT2, β_{10}	-0.055972	0.071829	-0.779	154	0.437

Table 4

Unconditional Model Final Estimation of Variance Components for Attitude

Random Effect	Standard Deviation	Variance Component	<i>d.f.</i>	χ^2	<i>p</i> -value
INTRCPT1, r_0	5.52741	30.55221	120	436.46753	<0.001
WAVE slope, r_1	0.39156	0.15332	120	166.73912	0.003
level-1, e	4.00450	16.03599			

Level 2 Model Results.

For communication subscale scores, the parameter estimate for predicting intercept from gender, controlling for race, was .26, $t(152) = .831$, $p > .05$. These statistically non-significant results were inconsistent with the hypothesis that the scores for talking with parents about substance abuse will show differences in intercept, with females communicating more than males. The parameter estimate for predicting intercept from race, controlling for gender, was .26, $t(152) = .85$, $p > .05$. These results were also statistically non-significant. They were inconsistent with the hypothesis that the scores for talking with parents about substance abuse will show differences in intercept (pre-test), with African Americans communicating with parents about substance abuse more than Caucasians.

The parameter estimate for predicting slope from gender, controlling for race, was -.05, $t(152) = -1.26$, $p > .05$. These results were statistically non-significant. These results, together with those above for the unconditional model, did not support the hypothesis that the scores for talking with parents about substance abuse will show a trend that improves, and that the improving trends will be the same for males and females. The results were consistent with the

slopes being the same for males and females, but the mean slope not being statistically different from zero was inconsistent with the hypothesis of an improving overall trend.

The parameter estimate for predicting slope from race, controlling for gender, was $-.032$, $t(152) = -.75$, $p > .05$. The results were statistically non-significant and inconsistent with the hypothesis that the scores for talking with parents about substance abuse will show a trend that improves, and that the improving trends will be the same for Caucasians and African Americans. The results were consistent with the slopes being the same for Caucasians and African Americans, but the mean slope not being statistically different from zero was not consistent with the hypothesis of an improving overall trend. These results can be seen in Table 5.

The reliability estimate for residuals from the intercept model was $.7$, which indicated a relatively strong signal-to-noise ratio for these residuals. The reliability estimate for residuals from the slope model was $.32$, which indicated weaker signal and higher noise for these residuals. The variance component for intercept parameter residuals was 2.33 , $\chi^2(118) = 394.86$, $p < .001$. The variance component for slope parameter residuals was $.09$, $\chi^2(118) = 181.22$, $p < .001$. These results suggested systematic and unexplained variance in these residuals that exceeds a level expected by chance, results which suggested the need for further research in this area. These results can be seen in Table 6.

For attitude subscale scores, the parameter estimate for predicting intercept from gender, controlling for race, was 1.38 , $t(152) = 1.24$, $p > .05$. These results were statistically non-significant and were inconsistent with the hypothesis that the scores for substance abuse attitude will show differences in intercept, with males having more permissive attitudes about substance abuse than females. The parameter estimate for predicting intercept from race, controlling for gender, was 1.51 , $t(152) = 1.39$, $p > .05$. These results were statistically non-significant as well

and were inconsistent with the hypothesis that the scores for substance abuse attitude will show differences in intercept (pre-test), with Caucasians having more permissive attitudes about substance abuse.

The parameter estimate for predicting slope from gender, controlling for race, was $-.001$, $t(152) = -.007$, $p > .05$. These results were statistically non-significant and failed to support the hypothesis that the scores for substance abuse attitude will show a trend that improves, and the improving trend will be greater for males than will the trend for females. The mean slope not being statistically different from zero was inconsistent with the hypothesis of an overall improving trend.

The parameter estimate for predicting slope from race, controlling for gender, was $-.18$, $t(152) = -1.23$, $p > .05$. These results were statistically non-significant and did not support the hypothesis that the scores for substance abuse attitude will show a trend that improves, and the improving trend will be greater for Caucasians than will the trend for African Americans. The mean slope not being statistically different from zero was inconsistent with the hypothesis of an improving trend. These results can be seen in Table 7.

For attitude subscale scores, the reliability estimate for residuals from the intercept model was $.70$, which indicated a fairly strong signal-to-noise ratio for these residuals. However, the reliability estimate for residuals for the slope model was $.24$, which indicated a weaker signal, and higher noise, for these residuals. The variance component for intercept was 29.7 , $\chi^2(118) = 421.4$, $p < .001$. The variance component for slope was $.15$, $\chi^2(118) = 162.96$, $p < .004$. These results suggest the presence of systematic and unexplained variance in these residuals at a level that exceeds chance, findings which suggest the need for further research in this area. These results can be seen in Table 8.

Table 5

Level 2 Model Final Estimation of Fixed Effects for Communication

Fixed Effect	Coefficient	Standard error	<i>t</i> -ratio	Approx. <i>d.f.</i>	<i>p</i> -value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	6.101376	0.229448	26.592	152	<0.001
FEMALE, β_{01}	0.259467	0.312373	0.831	152	0.407
BLACK, β_{02}	0.259512	0.306291	0.847	152	0.398
For WAVE slope, π_1					
INTRCPT2, β_{10}	0.008110	0.035586	0.228	152	0.820
FEMALE, β_{11}	-0.054750	0.043476	-1.259	152	0.210
BLACK, β_{12}	-0.032794	0.043859	-0.748	152	0.456

Table 6

Level 2 Model Final Estimation of Variance Components for Communication

Random Effect	Standard Deviation	Variance Component	<i>d.f.</i>	χ^2	<i>p</i> -value
INTRCPT1, r_0	1.52675	2.33095	118	394.86311	<0.001
WAVE slope, r_1	0.13565	0.01840	118	181.21884	<0.001
level-1, e	1.12926	1.27524			

Table 7

Level 2 Model Final Estimation of Fixed Effects for Attitude

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, π_0					
INTRCPT2, β_{00}	15.584552	0.818525	19.040	152	<0.001
FEMALE, β_{01}	1.377736	1.114330	1.236	152	0.218
BLACK, β_{02}	1.514585	1.092608	1.386	152	0.168
For WAVE slope, π_1					
INTRCPT2, β_{10}	0.051640	0.121759	0.424	152	0.672
FEMALE, β_{11}	-0.001052	0.147263	-0.007	152	0.994
BLACK, β_{12}	-0.184025	0.148984	-1.235	152	0.219

Table 8

Level 2 Model Final Estimation of Variance Components for Attitude

Random Effect	Standard Deviation	Variance Component	d.f.	χ^2	p-value
INTRCPT1, r_0	5.45010	29.70360	118	421.37043	<0.001
WAVE slope, r_1	0.38404	0.14749	118	162.95570	0.004
level-1, e	4.02243	16.17993			

Chapter Five: Discussion

Summary of Results

There were eight research questions in this dissertation study:

1. Are there differences in communication scores at pre-test (intercept) that show African Americans talk more with parents about substance abuse than do Caucasians?
2. Will communication scores show an improving trend for talking with parents about substance abuse that is greater for Caucasians than for African Americans?
3. Are there differences in substance abuse attitude scores at pre-test (intercept) that show Caucasians have more permissive attitudes about substance abuse than do African Americans?
4. Will substance abuse attitude scores show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for Caucasians than for African Americans?
5. Are there differences in communication scores at pre-test (intercept) that show females talk more with parents about substance abuse than do males?
6. Will communication scores show an improving trend for talking with parents about substance abuse that is greater for males than for females?
7. Are there differences in substance abuse attitude scores at pre-test (intercept) that show that males have more permissive attitudes about substance abuse than females?

8. Will substance abuse attitude scores show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for males than for females?

The results suggested that the answers to all eight of these questions were no.

Two sets of hypotheses were tested concerning the relationship between participation in Teams, Games, Tournaments (TGT) and attitudes towards substance abuse, and concerning communication with parents, in this dissertation research. Four of these concerned pre-test scores, or intercepts in the HLM analyses:

1. Communication scores at pre-test will show African-American adolescents talk more with parents about substance abuse than Caucasian adolescents;
2. Attitude scores at pre-test will show Caucasian adolescents have more permissive attitudes towards substance abuse than will African-American adolescents;
3. Communication scores at pre-test will show female adolescents talk more with parents about substance abuse than male adolescents; and
4. Attitude scores at pre-test will show male adolescents have more permissive attitudes towards substance abuse than will female adolescents.

Four other hypotheses concerned linear rates of change across time, or in HLM terms the linear slopes:

1. Communication scores will show an improving linear trend for talking with parents about substance abuse that is greater for Caucasians than for African Americans
2. Substance abuse attitude scores will show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for Caucasians than for African Americans;

3. Communication scores will show an improving trend for talking with parents about substance abuse that is greater for males than for females; and
4. Substance abuse attitude scores will show an improving trend in the direction of less permissive attitudes toward substance abuse that is greater for males than for females

None of the hypotheses in these two sets were supported. Neither gender nor race were associated with pre-test scores (intercepts) on, and neither gender nor race were associated with linear rates of change in, participants' attitudes towards substance abuse. Similarly, neither gender nor race were associated with pre-test scores (intercepts) on, and neither gender nor race were associated with linear rates of change in, participants' communication with parents. As discussed below, these findings were inconsistent with previous research.

Results of the HLM analyses also suggested that there was significant residual variability in both intercepts and in linear rates of change, after controlling for gender and race, for both attitudes towards substance abuse and communication with parents. These findings imply systematic variability in both adolescents' pre-test scores and in their linear rates of change for both dependent variables, attitudes towards substance abuse and communication with parents. Thus, future research needs to focus on identifying the variables that explain this systematic variability. As noted above, these results were inconsistent with prior research that has found race differences in communication about substance abuse. For example, Rivaux, Springer, Bohman, Wagner and Gil (2006), and Nasim, Belgrave, Corona, and Townsend (2009), found that African Americans adolescents communicated more with their parents about substance abuse than do Caucasian adolescents. Similarly, these results were inconsistent with research by Nasim, Belgrave, Corona, and Townsend, (2009), who found Caucasian adolescents to have more permissive attitudes about substance abuse than African-American adolescents. This and

other previous research implied the results of this dissertation would show similar relationships between race and pre-test scores. As will be seen below, there are methodological issues that may explain the discrepancies between the results of this dissertation and previous research in this area. Previous research has also suggested relationships between gender and substance abuse. Traditionally males have been more likely to abuse substances and appear to have more permissive attitudes about substance abuse, but substance abuse by females is increasing which may suggest increasingly permissive attitudes about substance abuse for females (Latimer, Newcomb, Winters, and Stinchfield, 2000; Becker and Grilo, 2004). Communication about substance abuse is interpreted differently by females and males, according to research by Marsiglia, Kulis, Rodriguez, Becerra, and Castillo (2009). These researchers went on to say that differences may exist between males and females in substance abuse resistance strategies. Thus, the findings of the current study and these previous studies are also somewhat inconsistent. As will be considered below, methodological problems with the current study may explain these inconsistencies.

Results of this dissertation study alone do not mean that race and gender have no influence on adolescent substance abuse communication and attitudes, or on how quickly adolescents change during participation in Teams, Games, Tournaments on these dependent variables. In this dissertation study, race and gender variables were not statistically significant. Other studies with more robust research designs, and using measures with stronger evidence for construct validity may show statistically significant main and interaction effects. Factors other than research design and questionable construct validity may have influenced the results of this dissertation study. For example, self-report surveys are convenient but not always accurate. Adolescent subjects in this dissertation study may not have been truthful in answering survey

items for a variety of reasons, including distrust toward authority figures and fear of consequences for admitting substance abuse, desire to be like peers, or simply telling adults what they think adults want to hear regardless of truth. Another possible factor at play concerns delinquency. Delinquency is frequently found in adolescent substance abusers (Becker and Grilo, 2004). This dissertation study did not include delinquency as a variable, and thus since delinquency was not in the HLM models failed to find relationships between gender, and race, and the dependent variables.

This dissertation research was important because it added to the treatment matching research literature, and offered practical implications in mental health practice. Treatment matching appears useful because substance abusers, like people in general, can differ from one another. Because of individual differences, a particular treatment may not meet the treatment needs of every substance abuser that is seeking help. Use of treatment matching allows individual substance abusers to receive particular treatments that best fit their individual needs, according to Miller, Forcehimes, and Zweben, (2011). A review of over 30 studies showed evidence that treatment matching is effective in providing treatments that fit well with particular client characteristics (Mattson, Allen, Longabaugh, Nickless, Connors, Kadden (1994). However, results of other studies (McKay, McLellan, and Alterman, 1992; McKay, Cacciola, McLellan, Alterman, and Wirtz, 1997) have not supported treatment matching, showing few if any matching effects. The most well-known and extensive study on alcohol treatment methods, Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity), began in 1990. It had 1,726 participants from a nationally represented sample, three treatment modalities, and culminated in five published outcomes reports. Miller, Forcehimes, and Zweben, (2011) report that surprisingly few treatment matches were found in Project MATCH outcome results and few

matching effects from previous individual studies were replicated. Later studies (Karno and Longabaugh, 2003; Villanueva, Tonigan, and Miller, 2007) using the Project MATCH data were able to find treatment matches that were not included in the original testing. The HLM results of this dissertation found that, like Project MATCH, gender was not a statistically significant variable in treatment outcomes (Project MATCH Research Group, 1997). These results provided evidence that gender does not influence how rapidly adolescents change on the dependent variables during participation in Teams, Games, Tournaments, taking weaknesses of this study into account.

This dissertation study used attachment theory as a base. However, that this study was unable to reject the null hypotheses should not be a negative reflection on attachment theory. It remains a useful theory for understanding adolescent substance abuse because it helps explain how adolescents are influenced by, communicate with, and relate to others, including parents.

Strengths and Limitations

This dissertation has several strengths and limitations. From a methodological perspective, one strength of the study was the use of hierarchical linear modeling to analyze the data. As described earlier, HLM was most appropriate for a number of reasons for use in this dissertation research, most importantly providing unbiased estimates of standard errors and therefore more valid tests of statistical significance. Another methodological strength was that the data used in this study were collected from several sites by well-trained and strongly supervised data collectors.

However, there were significant methodological limitations. Perhaps the most important limitation concerns measurement. Both the attitude towards substance abuse subscale and the communication with parents about substance abuse subscale were ad hoc. They were created,

specifically for this study, from existing items used in the Wodarski study. While these items may have some degree of face validity, the construct validity of the scores on these subscales is unknown. There is no evidence that can be used to make a case for construct validity for the scores from either of these subscales.

Second, the reliability coefficients for the scores from the communication subscale were quite low at all three measurement times, pre-test (coefficient alpha = .58), post-test (coefficient alpha = .77), and follow-up (coefficient alpha = .66). These low reliabilities could have been a factor in the low estimated reliability of the linear slopes for the communications scores across time (reliability = .32).

The reliability estimates for the linear rates of change for both the attitude towards substance abuse and communication with parents dependent variables were quite low, .24 and .32, respectively. One implication of these low reliabilities is that the variability in linear rates of change for participants was low. Further, since low reliability attenuates correlations, these low reliabilities could be one factor in the failure to find a relationship between race or gender and linear rates of change in this study. These low reliabilities are therefore a threat to statistical conclusion validity. That is, one or more of the research hypotheses could be true, but the low reliabilities of the communication scores and the low reliabilities of the linear slope estimates interfered with detecting these relationships using the statistical tests in this research study (Kazdin, 2003).

Another threat to statistical conclusion validity in this study is restriction of range. Both race and gender were dichotomous variables. The standard deviations of attitude scores and communication scores at each of the measurement points, pre-test, post-test, and follow-up, were small. Thus, both independent and dependent variables exhibited restriction of range to a greater

or lesser degree. The ranges of values of the linear slope parameters for both attitude scores and communication scores were also small. Restriction of range makes it more difficult to find relationships between variables (Kazdin, 2003). Restriction of range is therefore a plausible explanation for the failure to find the hypothesized relationships in this study.

Yet another problem is the apparent ceiling effect for scores on the attitude scale that is suggested by the frequency distributions in Figures 1 thru 3. Had the range of possible scores on the attitude subscale been greater, with perhaps more items and a greater number of response options, the apparent ceiling effect might have been eliminated. This could have resulted in a greater variability in the spread of attitude scores as evidenced by larger standard deviations at all three measurement points. This could have increased the ability to find the hypothesized relationships if they exist.

Another limitation concerns the use of “race” as an independent variable. In retrospect and for purposes of this dissertation study, it is possible that the concept of “race” may have been a poor choice of independent variable, as “race” may have been a proxy variable for one or more other constructs. The term “race” is ambiguous and has different meanings that change over time as a social construct, and it is therefore difficult to arrive at a single definition for the term (United States Public Health Service, 2001; Lorusso, 2011; Leong and Eccles, 2010). From a sociological perspective, the concept of race is best defined, measured and understood from within social and political contexts (Lee, 1993). From a biological perspective, there is no evidence to support the concept of race as a biological category, as physical and biological traits are not consistent across groups of people. For example, eye shape is shared by Asian people and !Kung San Bushmen from Africa, according to the United States Public Health Service (2001).

A further complication of the race issue is that dark skinned immigrants from the Caribbean, Africa, and other places outside the United States are considered part of the African American population. However, these immigrants do not share the historical African American culture. Yet, people with features associated with being African American are treated the same, regardless of nationality of origin (United States Public Health Service, 2001), leading to identification of racial clusters that include phenotype (such as skin color) and geographic properties in their make-up; such clusters are used as proxies for unknown genetic patterns Lorusso (2011).

Ambiguities about the meaning and definition of race pose problems for researchers. Leong and Eccles (2010) report that research participants are sometimes grouped by race, despite race having no scientific or anthropological validity. They go on to explain that when race variables are used, some scientific journals encourage researchers to provide descriptors to distinguish between racial groups. This was not done in the current dissertation research.

This raises the question particularly for this study, “Race is a proxy for what”? Race is commonly and sometimes erroneously understood as a grouping of people with certain shared characteristics that can have social significance, especially when considering equal access to resources and power (United States Public Health Service, 2001). Social class and economic standing may be what is really represented via use of the “race” variable. All subjects in this study were reported to be from disadvantaged urban communities, initially suggesting that study participants were socially and economically homogeneous. Further inspection reveals that some significant cultural and heritage differences exist (and serve as a line of distinction) between African American and Caucasians, especially when one considers the challenges for equality common to the African American historical experience. Therefore, it is plausible that “race” is a

proxy variable for cultural and heritage differences that may define groups in populations. Even if this is the case, the dichotomous nature of “race” in the current study still carried with it a restriction of range problem.

Implications for Future Research

Results from this dissertation study can inform investigators in future research efforts. As is discussed below, researchers interested in pursuing the same research questions and hypotheses as in the current study will want to consider the methodological suggestions that follow. Suggestions for further research are also offered in this section.

Improvements in measurement are critical in future research in this area. Future researchers interested in the hypotheses in the current study should focus on improving measurement of attitudes towards substance abuse and of communication with parents. In both cases, measures should be used for which there is substantial evidence for construct validity. This was completely lacking in the current study. Further, measures should be used that at least have the potential to produce scores with substantial variability, and without floor or ceiling effects.

Participant sampling could also be improved in future research. In particular, purposive sampling needs to be done to help insure that a broad range of scores is obtained on both attitude towards substance abuse and communication with parents about substance abuse variables. This purposive sampling coupled with better measures can help reduce the threat to statistical conclusion validity posed by restriction of range and low reliability. A sample that is more clearly representative of a particular population, while perhaps difficult to obtain, would be helpful in improving external validity. Future researchers should also consider oversampling to ensure enough subjects meeting independent variable criteria are in the study. A larger sample

size could also improve statistical power, further reducing threats to statistical conclusion validity.

Strong internal validity is important for future research. A research design involving random assignment would be an enormous improvement over the current study. For example, participants could be randomly assigned into a Teams, Games, Tournaments (TGT) group and a waiting control group. Measures could be taken at one month intervals on all participants while those in the TGT group go through the program. Then the participants in the waiting control group could receive the TGT intervention. All participants would continue to be measured at one month intervals. This design would possess a level of internal validity far superior to the current study.

Another vital consideration for future research is the use of clearly specified variables. For example, the term “race” may be a proxy variable for cultural and heritage differences among groups. Future researchers should clearly specify which particular group (based on culture and heritage) is being addressed, as identified by their unique cultural and heritage differences. It is therefore plausible that the scores from the ad-hoc measures used in this study were not valid as indicators of these constructs and that this invalidity led to the null findings. Future research should include measures of these constructs for which significant construct validity evidence exists.

The null hypotheses for this study could not be rejected. However, replication of this study is needed, but with improvements such as the aforementioned. Further, replication of this dissertation study should be sensitive to potential factors that may influence adolescent’s responses to surveys about substance abuse. Adolescents may be distrustful of being truthful about substance abuse, especially when they fear consequences. They may also answer in a

certain way because of wanting to be like their peers, or to please adults. Future research on adolescent substance abuse should specifically address distrust of authority, peer pressure, desire to please adults, and delinquency issues that may influence responses to survey questions.

Researchers should inform participants before each survey is administered that the participants should answer truthfully, in a way that reflects their own beliefs and attitudes about substance abuse, and that there will be no consequences for being truthful regardless of their response or if they choose to not participate.

Another suggestion is to include more independent variables in future research. Only two independent variables were used in this study: race and gender. It is also suggested that future research should consider the roles of race and gender as moderating variables.

A final area for replication efforts is that the role of peers be considered. Adolescent substance abuse is often influenced by peers (Nasim, Belgrave, Corona, and Townsend, 2009). Questions for further study include identifying how and why peer relations affect adolescent substance abuse. The question of delinquency also arises and is a mitigating factor for both sexes and substance abuse, according to Becker and Grillo (2004). Assuming delinquency was explicitly defined and able to be accurately and consistently measured (in terms of definitions and data recording procedures across jurisdictions), does it contribute to adolescent substance abuse? If so, in what ways does delinquency impact substance abuse? Whatever the question being addressed, investigators will do well to find and use scales that have adequate validity testing and that are supported by such testing.

Implications for Practice

The results have a number of implications for practitioners. First, the findings showed that slopes were, on average, not statistically different for males and females, and not statistically

different for Caucasians and African-Americans. Further, the approximate 95% confidence intervals suggested that some adolescents improved, others showed no changes, while others deteriorated on the dependent variables. If these findings are generalizable from this research to the practice setting, the practitioner can expect, on average, the same change in females and males, and in African Americans and Caucasians, associated with participation in TGT. This current evidence suggests that neither gender nor race moderate the outcomes associated with Teams-Games-Tournaments.

Further, the variability in slope parameter estimates suggest that the practitioner can expect some participants in Teams-Games-Tournaments to improve, some to show no change, and still others to get worse in their attitudes toward substance abuse and their communication with parents about substance abuse. Practitioners should therefore closely monitor the progress of adolescents participating in Teams-Games-Tournaments. For example, single case design methods might be used to monitor progress or lack thereof. If evidence of deterioration in a particular client is observed, then it may be useful and ethically appropriate to pull her or him out of Teams-Games-Tournaments and provide them with a different intervention program.

These caveats aside, the prior research evidence suggests that the TGT intervention holds great promise for adolescent substance abusers. The results of the current study do not challenge these previous findings. The current findings merely suggest that practitioners be prudent and monitor how their clients are doing as they go through the TGT program.

Social workers and others practicing in social service fields should be aware of the ambiguities of race as a social construct. Well trained practitioners should learn to identify and appreciate unique differences in culture and heritage in their clients. Awareness of such differences instead of reliance on stereotypes will better serve those in need of services.

Implications for Policy

Perhaps the most significant implication of the results of the current study must be considered within the context of prior research on the TGT program. Policy makers considering interventions for use with substance abusing adolescents should consider TGT along with other evidence-based treatments. The implications of the findings of the current study are that policy makers can assume, within the methodological limitations of this study, that the outcomes associated with participation in TGT will not be moderated by either “race” or gender.

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Appendices

Appendix A

Table 9

Teams-Games-Tournaments Curriculum

Date	Session	Topic	Focus	Method	Materials Needed	Follow-up
9-Feb	1	Introductions and Initial Surveys				
16-Feb	2	Ice Breakers and Establish	Facilitator will introduce self and explain group process; students will introduce themselves to each other.	Small group activity consisting of interviewing each other; large group activity using matchbox cars.		
23-Feb	3	Introduction to Major Classifications of Substances (Lesson 2)	Develop understanding of the major classifications of psychoactive substances	Students will watch a short clip "Life's hard enough" from the National Institute of Drug Abuse. Student's will then divide into small groups and present on the information.	Blank charts	Students will discuss with an adult one of the major classifications of drugs that they learned about. Student and adult will identify people in the community who has been negatively impacted on drugs.
2-Mar	4	TGT				

9-Mar	5	Physical Effects of Psychoactive Substances (Lesson 3)	To understand the physical effects of psychoactive substances on the body and to understand the role genetics plays in addiction.	Students will use NIDA.gov website to explore the impact drugs have on the body. We will discuss together the impact that genetics plays in drug addiction. The students will be provided with an information sheet on What to do in an Emergency Situation.	Handout with local emergency numbers and emergency instructions .	Ask an adult if drug addiction runs in the family so that they can understand if they are at a genetic risk.
11-Mar	6	TGT				
16-Mar	7	Exploring Attitudes About Drugs and Sex in the Media (Lesson 4)	Explore and increase awareness of personal feelings and cultural messages linked to drug use and abuse and sexual behavior	Students will complete activities in which photographs and advertisements portraying drug use from magazines, cartoons, songs, and television and discuss how the media portrays them. Students will be asked to bring in songs and magazine articles/advertisements that have a sexual message. We will review these messages and decipher the marketing goals behind them and the messages they send to various populations and watch.	Current magazines, greeting cards, TV commercials.	Students will discuss with an adult what types of music and advertising they remember from their youth and the sexual/drug messages they contained and how these messages have changed over time.
18-Mar	8	TGT				

23-Mar	9	Peer Pressure, Psychoactive Substance Use and Sexual Activity (Lesson 5)	Understand the role of peer pressure in decision making and learn healthy ways to respond to peer pressure in various situations	Students will learn about different peer pressure techniques that are used and how to say no. The students will then role play to show that they understand these techniques.	Handouts on how to say no to peer pressure.	Discuss with a good friend a plan for refusing peer pressure.
25-Mar	10	TGT				
6-Apr	11	What are my values? (Lesson 6)	Explore values clarification	Discussion of definitions of values and values clarification; handouts of scenarios to be completed in small groups in which members must reach consensus on actions taken, quiz on values.	Values clarification handouts and scenarios.	Discuss with a family member family values.
8-Apr	12	TGT				
13-Apr	13	Sexually Transmitted Diseases (Lesson 7)	Understand the 20 types of STDs, how they are transmitted and treated	Students will complete an activity in which the transmission of STDs is demonstrated; students will watch "Sexually transmitted diseases: What you should know" (26 min. video); participate in discussion after video; receive a Fact Sheet on STDs.	Index cards; film; Fact Sheet on STDs	Reflect on how contracting a STD might affect their lives, their futures and their health.

15-Apr	14	TGT				
20-Apr	15	Facts and Myths about AIDS and HIV (Lesson 8)	Understand definitions of AIDS/HIV, where and how to get tested for AIDS/HIV, and how to be safe.	Quiz on AIDS/HIV with follow-up discussion and education on the quiz; handouts with counseling/testing contact/information; role play testing situation; abstinence/Birth control education and discussion.	Quiz on AIDS/HIV; handouts with local HIV testing and counseling information ; index cards with assigned roles that students will randomly pick; handout on sexual safety.	Reflect on anyone in their community who has been affected by AIDS/HIV.
22-Apr	16	TGT				
26-Apr	17	How Does One Get AIDS (Lesson 9)	Understand how AIDS/HIV is transmitted and how to avoid transmission	Discussion of AIDS Risk Factors; presentation of myths about AIDS transmission; presentation of statistics related to AIDS; watch video "Just Like Us: AIDS prevention" (28	Handout with transmission methods, statistics and myths of AIDS; video	Discuss with an adult the impact that AIDS has had on American culture.

				minute video)		
27-Apr	18	TGT-FINALS				
29-Apr	19	TGT - FINALS				
29-Apr	20	Final Surveys				

Appendix B

Questionnaire Variables

1). How would you describe yourself? (Gender)

0). Male

1). Female

3). What is your race?

0). White

1). Black or African American

36). How do you feel about someone your age smoking one or more packs of cigarettes a day?

0). Neither approve or disapprove

1). Somewhat disapprove

2). Strongly disapprove

3). Don't know or can't say

37). How do you feel about someone your age trying marijuana or hashish once or twice?

0). Neither approve or disapprove

1). Somewhat disapprove

2). Strongly disapprove

3). Don't know or can't say

38). How do you feel about someone your age using marijuana once a month or more?

0). Neither approve or disapprove

1). Somewhat disapprove

2). Strongly disapprove

3). Don't know or can't say

39). How do you feel about someone your age having one or two drinks of an alcoholic beverage nearly every day?

0). Neither approve or disapprove

1). Somewhat disapprove

2). Strongly disapprove

3). Don't know or can't say

40). How much do people risk harming themselves physically or in other ways when they smoke one or more packs of cigarettes per day?

0). No risk

1). Slight risk

2). Moderate risk

3). Great risk

4). Don't know or can't say

41). How much do people risk harming themselves physically or in other ways when they smoke marijuana once or twice a week?

0). No risk

1). Slight risk

2). Moderate risk

3). Great risk

4). Don't know or can't say

42). How much do people risk harming themselves physically or in other ways when they have five or more drinks of an alcoholic beverage once or twice a week?

- 0). No risk
- 1). Slight risk
- 2). Moderate risk
- 3). Great risk
- 4). Don't know or can't say

94). Now, think about the past 12 months through today. During the past 12 months, have you talked with at least one of your parents about the dangers of tobacco, alcohol, or drug use? (By PARENTS, we mean your biological parents, adoptive parents, stepparents, or adult guardians, whether or not they live with you).

- 1). Yes
- 0). No
- 2). Don't know or can't say

95). I'm available when others in my family want to talk to me.

- 0). I don't have any family
- 1). Not true
- 2). Sometimes true
- 3). Usually true
- 4). Always true

96). I listen to what other family members have to say, even when I disagree.

- 0). I don't have any family
- 1). Not true
- 2). Sometimes true
- 3). Usually true

4). Always true

Vita

Mike Burford has a bachelor's degree in psychology, a master's degree in educational psychology, and a master's degree in social work. He is a licensed clinical social worker. He has worked in social service and mental health settings for 18 years. He currently has a successful psychotherapy private practice.