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FAMILY ENVIRONMENT AND SUBSTANCE USE IN ADOLESCENT MALES

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ABSTRACT OF THESIS

FAMILY ENVIRONMENT AND SUBSTANCE USE IN ADOLESCENT MALES

The purpose of this study was to examine the relationships between several aspects of family environment and adolescent substance use. Participants included 372 (M = 15.45 years, range = 15-17) adolescent males with and without a paternal history of Substance Use Disorder (SUD). Participants completed measures of family functioning, family communication, parent-adolescent communication, living arrangement, temperament, and substance use. Results indicated that family functioning and communication predicted a significant reduction in the number of drugs used, frequency of drug use, and problems associated with drug use beyond the effects of demographic covariates. Additionally, temperament and family history of SUD were examined as moderators of the associations between family environment and adolescent substance use. Neither temperament nor family history of SUD significantly altered these relationships. The results of this study highlight the importance of elucidating family environment and the role it may play in prevention and interventions efforts for adolescent substance use.

KEYWORDS: Family, Communication, Functioning, Adolescent, Substance Use, Family History, Temperament

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THESIS

Emily H. Brechting

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2004

FAMILY ENVIRONMENT AND SUBSTANCE USE IN ADOLESCENT MALES

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Arts and Sciences
at the University of Kentucky

By

Emily H. Brechting

Lexington, Kentucky

Director: Dr. Charles R. Carlson, Professor of Psychology

Lexington, Kentucky

2004

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TABLE OF CONTENTS

Chapter Four: Discussion

LIST OF TABLES

LIST OF FILES

Chapter One

Introduction

Adolescent Substance Use

"Monitoring the Future", a project sponsored by the National Institute on Drug Abuse, has been tracking a nationally representative sample of American adolescents and young adults for over 25 years (Johnston, O'Malley, & Bachmann, 2002). Following a well-recognized substance use epidemic in the 1960s and 1970s, substantial declines in substance use occurred in the 1980s and early 1990s. Johnston et al. noted dramatic increases in substance use beginning in the early 1990s and continuing into the mid-1990s. In the past few years, substance use has remained fairly constant, albeit at high levels. Currently, 35% of American children have tried an illicit substance by the completion of 8th grade, more than half of adolescents have used an illicit substance by the end of 12th grade, and more than 60% of America's youth have tried an illicit substance by their late twenties. Clearly, these high prevalence rates indicate that substance use in today's youth deserves continued research attention, particularly in light of research suggesting increased substance use in years following high school (Johnston et al.).

Marijuana, alcohol, and nicotine are the most frequently used substances by America's youth (Johnston et al., 2002). Fifteen percent of 8th graders have used marijuana at least once and 37% of high school seniors have tried marijuana. Further, approximately 6% of high school seniors smoke marijuana daily and 18% report having been daily marijuana smokers for one month or more. Approximately one-third of high school seniors report current cigarette use while 19% of seniors also endorse daily cigarette use. Eighty percent of high school seniors have consumed alcohol at least once while the percentages of 8th and 10th graders are 51% and 70%, respectively. With regard to binge drinking (i.e. consuming more than five drinks on one occasion), 30% of high school seniors endorse this level of consumption in the two weeks prior to the assessment. Given the prevalence of substance use and the diversity of substances used, it is important to consider the impact of substance use on adolescent functioning.

In addition to general concerns about adolescent substance use, specific ramifications of adolescent substance use have been evaluated. Brown, Myers, Mott, and Vik (1994) reported that adolescent substance use affected five general domains: family relationships, emotional well-being, social activities, interpersonal conflict, and academic involvement and achievement. Specifically, they found that adolescents engaging in less substance use reported better school

1

performance and interpersonal relationships with family members as well as less emotional dysregulation compared to adolescents who reported higher levels of substance use. Furthermore, Swadi (1992) found that adolescent substance abusers displayed more emotional and family dysfunction than non-abusers. These adolescents also exhibited higher rates of behavioral problems, particularly opposition and delinquency, than non-abusing counterparts. These findings suggest that adolescent substance use influences a variety of domains including academic performance, overall well-being, and social interactions.

Beyond the immediate consequences of substance use, the long-term impact of adolescent substance use must also be considered. Intervention and prevention research has established a link between age at substance use initiation and subsequent adult substance use such that individuals who initiate substance use at earlier ages are more likely to exhibit greater substance use in adulthood than those who initiate substance use at older ages (Clapper & Lipsitt, 1992; Single & Wortly, 1993). In a longitudinal study, Pederson and Skrondal (1998) found that age of substance use initiation was significantly related to future substance use such that a 10% delay in age of initiation would be accompanied by a 35% reduction in expected adult substance use. The association between adolescent substance use and substance use in adulthood highlights the importance of understanding factors contributing to adolescent substance use.

In addition to recognizing the long-lasting effects of adolescent substance use, it is important to consider factors contributing to adolescent substance use. Prior research has identified several contributors to adolescent substance use. For example, Oetting and Beauvais (1987) argued that peer group, community, socioeconomic status, family, and school environment contribute to adolescent substance use. Similarly, Wodarski and Fisher (1986) presented a multilevel approach for addressing the troubling problem of adolescent substance use and in particular, adolescent arrests for driving under the influence of alcohol. Specifically, Wodarski and Fisher highlighted the impact of peer group, community, school environment, media, and family as contributors to adolescent substance use. In sum, several substance use contributors have been posited; the present study focused specifically on the family environment as a factor affecting adolescent substance use.

Family Environment

Family environment possesses substantial potential to influence adolescent substance use. Family dynamics and behavior provide the basis for adolescent's early conceptions of self

(Moon, Jackson, & Hecht, 2000; Vakalahi, 2001). Moreover, relationships and interactions among family members provide the atmosphere for role modeling and reinforcement of adolescent behavior. As such, adolescence presents the opportunity for the individual to progressively develop autonomous functioning in various environments including family, peer group, school, and romantic relationships (Aquilino & Supple, 2001). In order to develop the autonomy characteristic of adulthood, adolescents require not only opportunities for growth, but also a positive family environment in which to do this. Adolescents who develop within a positive family context have been shown to score higher on measures of identity and ability to bear the responsibility for their decisions (Grotevant & Cooper, 1986), obtain higher grades, and exhibit lower levels of deviant behavior (Herman, Dornbusch, Herron, & Herting, 1997). Furthermore, adolescents who endorse higher levels of autonomy report less substance use (Herman et al., 1997). That is, individuals who mature within a supportive framework are less likely to use substances regularly or experience problems related to substance use. In order to better understand the impact of family on the developing adolescent, the present study endeavored to further examine the relations between various aspects of family environment (e.g., family functioning, communication, living arrangement) and substance use in an adolescent sample.

Family Functioning. Overall family functioning reflects the emotional qualities of the family system and the emotional bonds between family members. Family functioning may include attachment, commitment, affection, encouragement, and companionship. Additionally, family support is often used to index family cohesion or overall family functioning (Foxcroft & Lowe, 1992; Miller, 1997). Families reporting high levels of support may be characterized by not only positive emotional attachment but also by overall positive family functioning. Positive functioning has been linked to several areas of adolescent competence such as self-esteem and academic success. Further, negative associations have been demonstrated between family support and deviant behavior, symptoms of depression, and substance use (Wills, Vaccaro, & McNamara, 1992). In sum, family functioning, characterized in a variety of ways, has been linked to several positive outcomes and inversely related to negative outcomes for adolescents.

Consistent with previous research demonstrating associations between family functioning and positive and negative adolescent outcomes, the present study focused specifically on family functioning and adolescent substance use. Studies have shown inverse relationships between

family functioning and adolescent substance use outcomes such as age at first use, average quantity used, and frequency of substance use (Elliot, Huizinga, & Ageton, 1985; Jenson, Howard, & Yaffe, 1995). In a study of 3,368 adolescents, Hellandsjø Bu, Watten, Foxcroft, Ingebrigtsen, and Relling (2002) found a significant relation between level of family support or functioning and age of alcohol debut. Further, age of first alcohol intoxication shared the same relation; that is, adolescents reporting poorer family functioning escalated alcohol use to intoxication at an earlier age than their counterparts endorsing greater family functioning. With regard to frequency of substance use, Resnick et al. (1997) demonstrated significant inverse associations between family functioning and cigarette, alcohol, and marijuana use in a sample of 12,118 adolescents. More specifically, adolescents experiencing closeness within their families exhibited less frequent substance use. These studies suggest an important inverse relationship between family functioning and adolescent substance use such that adolescents experiencing greater family functioning delay substance use and following initiation, use fewer substances and engage in less frequent substance use than adolescents from less functional families.

Family Communication. Another potential contributor to adolescent substance use involves the level and quality of communication among family members. The available literature suggests an inverse relationship between family communication and adolescent substance use. For instance, Piercy, Volk, Trepper, & Sprenkle (1991) found an inverse relationship between family communication and adolescent substance use and abuse. In fact, relational factors such as family communication were more strongly related to substance use than family structure factors such as number of parents in the home or parental marital status. Shek (1998) found that adolescent perception of family environment, including communication, was inversely associated with current adolescent substance use. In addition, these perceptions of communication predicted substance use one year later. Family communication has also been associated with more positive treatment outcomes. In a study of substance-abusing adolescents by Friedman, Tomko, and Utada (1991), adolescents who characterized their families as high in positive communication experienced superior treatment outcomes. Further, adolescents from families with more positive communication maintained superior substance-abuse treatment outcomes at 15-month follow-up. The available literature suggests that family communication may serve as an important contributor to adolescent substance use as well as substance use treatment success. The present study attempted to extend this literature by examining family

4

communication specifically and evaluating the relationships between family communication and several adolescent substance use outcomes.

Parent-Adolescent Communication. Although studies have suggested an inverse association between family communication and adolescent substance use, less attention has been directed at understanding the relative importance of communication within specific relationships of the family. The level and quality of communication between specific family members, such as parents and adolescents, may be more important in understanding adolescent substance use than general family communication. The available literature, admittedly limited, suggests a similar relationship to general family communication such that parent-adolescent communication is negatively related to adolescent substance use (Barnes, Farrell, & Banerjee, 1994). Barnes et al. found that parent-adolescent communication predicted adolescent alcohol use in a diverse sample of adolescents such that higher quality communication was associated with less substance use. Despite the limited research focusing specifically on parent-adolescent communication and its relation to adolescent substance use, these studies suggest that parent-adolescent communication may be an important factor in understanding adolescent substance use.

Living Arrangement. Considerable research has demonstrated a significant negative relation between the number of parents in the home and adolescent substance use. In fact, several researchers have contended that single-parent families pose a risk for adolescent substance use (Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Miller, 1997. However, more recent research posits that qualitative dimensions of family life such as communication, family activities, attachments, and monitoring are the links to maladjustment in the adolescent, not the actual number of parents present in the home (Bahr, Marcos, and Maughan, 1995). Selnow (1987) concluded that although the number of parents in the home was significantly related to adolescent substance use, the quality or strength of the parent-adolescent relationship was more powerful in predicting substance than the number of parents in the home. As such, the present study aimed to further comprehend qualitative aspects of family environment and thus focused on overall family functioning, family communication, and parent-adolescent communication in addition to the number of parents so as to better understand these constructs and their relations with adolescent substance use.

Moderators of Family Environment and Adolescent Substance Use

Beyond extending knowledge about the relations between aspects of family environment and substance use, the present study aimed to better understand these associations by considering two potential moderators: temperament and family history of Substance Use Disorder (SUD).

Temperament. Recent research has highlighted temperament as a potential link to future problem behavior. Temperament has been defined as a latent construct consisting of a collection of trait dimensions depicting individual variations in behavioral and affective responsivity as well as self-regulatory styles (Giancola, 2000; Thomas & Chess, 1977). Temperament deviations have been repeatedly associated with substance use and abuse in adolescents and young adults, such that individuals exhibiting deviations in temperament engage in more substance use (Pulkkienen & Pitkänen, 1994; Wills, DuHamel, & Vaccaro, 1995), and display a greater number of risk factors for Substance Use Disorder (SUD) than those without temperament deviations (Blackson, 1994). The present study investigated the effects of two dimensions of temperament: activity and attention span/persistence.

Hyperactivity has been demonstrated as a risk factor for substance use, specifically alcoholism. Hyperactive children are more likely to have a biological father with alcoholism than their nonhyperactive counterparts (Morrison & Stewart, 1973). Additionally, hyperactive adolescents are more likely to engage in problematic substance use than nonhyperactive adolescents (Mendelson, Johnson, & Stewart, 1971). Similar results have been found with college student and young adult samples (Valliant, 1983). Hechtman, Weiss, Perlman, and Ansel (1984) followed a cohort for more than ten years and reported that childhood activity significantly predicted future alcohol abuse. In light of this link between hyperactivity and substance use, the present study investigated activity level as a moderator of the associations between family environment and adolescent substance use.

Attention span/persistence has also been linked to substance use and abuse. In a comprehensive study of young military registrants, Rydelius (1983) found that 35% of heavy drinkers were rated as having low concentration and endurance whereas less than 5% of nondrinkers received this rating. Additionally, 40% of heavy drinkers were rated as restless compared to 4% of nondrinkers. Goodwin, Schulsinger, Hermansen, Guze, & Winokur (1975) found that individuals who became alcoholics had higher occurrences of daydreaming and distractedness in childhood than those who did not develop substance use problems. Tarter,

6

Hegedus, Goldstein, Shelly, & Alterman (1984) found that adolescent sons of alcoholics (i.e. adolescents at high risk for substance misuse) performed inferior to sons of nonalcoholics on tests of attention and concentration. Attention/persistence has been associated with substance use; as such, the present study evaluated attention/persistence as a potential moderator of the relations between family environment and adolescent substance use.

A recently expanding area of theory and research has addressed the potential moderation by temperament of the relations between family environment and substance use. Tarter, Blackson, Martin, Loeber, and Moss (1993) argued that the relation between deviations in temperament and substance use and/or misuse may actually be better understood by considering the role of the family. More specifically, Tarter et al. suggested that deviations in temperament may impact the quality of the family environment, which may then predispose the child to subsequent substance use/misuse. Although research in this area is quite limited, work by Stice and Gonzales (1998) illustrated mechanisms by which this effect may occur. Stice and Gonzales reported that parental support and control demonstrated stronger associations with substance use and anti-social behavior at higher levels of temperamental risk. That is, adolescents exhibiting higher levels of problem behavior than their counterparts provided the opportunity for parenting effects to operate. Following this line of reasoning, the present study sought to explore temperament as a moderator by investigating the effects of activity and attention span/persistence on the relations between family environment and adolescent substance use.

Family History of SUD. Parental modeling of substance use and characteristics of families with a substance-abusing member suggest that family history of SUD may be an important component in understanding specific aspects of adolescent substance use. Substantial research has demonstrated links between parental substance use and subsequent substance use in the adolescent (Johnson & Pandina, 1991; Johnson, Shontz, & Locke, 1984; McDermott, 1984). Adolescents engaging in substance use were significantly more likely to have a parent using substances than were non-using adolescents (McDermott, 1984). In a longitudinal study of 1,308 adolescents, Johnson and Pandina found parental alcohol use to be a significant determinant of subsequent adolescent alcohol use as well as abuse of alcohol by the adolescent to cope with challenges. Studies of families with a substance-abusing member (most frequently studied are alcoholic families) have found that these families are characterized by lower cohesion and connectedness as well as greater conflict than control families (Moos & Moos, 1984). Further,

families with a substance-abusing member are described as controlling, unsupportive, and unconducive to autonomy for family members (Frost, 1982; Friedman & Utada, 1992). Offspring in these families receive less attention, more sporadic discipline, and are exposed to less consistent surroundings and decreased parent reliability. In light of the findings suggesting lower levels of cohesion, support, and autonomy in addition to higher levels of conflict in families with a substance-abusing member as well as the impact of parental modeling, it was hypothesized that the relation between family factors and substance use would weaken for individuals with a family history of SUD.

Specific Aims of the Current Study

In light of previous research, the present study aimed to establish relationships between several aspects of family environment and adolescent substance use. That is, this study attempted to expand knowledge of family environment. Whereas many of the studies evaluating family environment and substance use have relied on single measures of family environment, the present study aimed to extend previous research by investigating multiple aspects of family environment. Specifically, it was hypothesized that family functioning would be inversely related to adolescent substance use. Adolescents reporting higher levels of family functioning would also endorse lower levels of substance use than adolescents indicating lower levels of family functioning. It was also hypothesized that general family communication would be negatively related to adolescent substance use. That is, adolescents experiencing greater family communication would report less substance use than adolescents experiencing lesser communication. Further, the present study endeavored to facilitate understanding of family communication and extend previous research by examining the importance of communication between specific family members by assessing the relations between parent-adolescent communication and adolescent substance use. It was hypothesized that parent-adolescent communication would be inversely related to adolescent substance use. It was also hypothesized that the number of parents in the home would be related to substance use such that adolescents from single-parent families would report higher levels of substance use than adolescents from intact families.

Additionally, the current study examined whether temperament dimensions (activity and attention span/persistence) and family history of SUD moderate the relations between family environment and substance use. It was hypothesized that deviations in temperament

(hyperactivity and inattention/impersistence) would alter the relations between family environment and substance use such that the relations were stronger for individuals characterized by temperament deviations. Further, family history of SUD was examined as a possible moderator of the relations between family environment and substance use. Family history of SUD was hypothesized to moderate these associations in such a way that the associations were lessened for individuals with a positive family history of SUD.

Chapter Two

Method

Participants

Participants in this study were 372 boys who had been tested during the first, second, and third assessment waves of a prospective investigation at the Center for Education and Drug Abuse Research (CEDAR). The CEDAR project is an ongoing 20-year study aimed at ascertaining the etiology of SUD in adolescent males with and without a paternal history of SUD. The boys were assessed at ages 10-12 (T1), 12-14 (T2), and 15-16 (T3) years. For the purposes of the present investigation, only data from T3 were used since the assessment measures needed to answer the questions posed in this study were not all administered at T1 or T2. Participants ranged in age from 15 to 17 years, with a mean age of 15.45 (SD=.607). Two hundred and eighty-seven (77%) participants were Caucasian, 69 (19%) were African American, 11 (3%) reported other ethnic backgrounds, and 5 (1%) failed to indicate their ethnic origin. At the third assessment wave, the entire sample had approximately 9.14 (SD=.772) years of education.

Participants were excluded from the *CEDAR* project if they had a chronic neurological disease or neurological injury requiring hospitalization, chronic physical disability, life-threatening illness, or a past or present psychotic disorder. Additional exclusionary criteria were an IQ below 85, an inability to comprehend English, an uncorrectable sensory incapacity or maternal consumption of drugs or alcohol during pregnancy (as reported by the mother). Two final exclusionary criteria were if either parent reported any of the above criteria or an inability to read at the eighth-grade level. Adolescents received $150 and each parent received $25 remuneration for taking part in the third assessment wave of the project.

Families were recruited from the greater Pittsburgh, PA area from SUD treatment programs, various advertisements (e.g. newspapers, radio, and television), a professional recruitment agency, as well as psychiatric clinics and other research projects at the University of Pittsburgh. The recruitment agency contacted families in a random manner employing telephone listings.

A potential source of sampling bias is that a large percentage of adolescents with a positive family history of SUD (FH+) were recruited because their fathers were participating in SUD treatment programs. It was quite probable that this group of families would have

significantly lower socioeconomic status (SES) than families recruited via advertisements or by the recruitment agency. This sampling bias could not be avoided, however, as fathers without SUD were not likely to be enrolled in SUD treatment programs. As such, recruiting families from SUD treatment programs was necessary so as to have sufficient number of FH+ participants. Considering the potential complications of disproportionate SES between FH+ and family history negative (FH-) groups, SES (as measured by Hollingshead Four-factor Index of Social Status, Hollingshead, 1975) were deemed a covariate for all relevant statistical analyses.

Participants were included in the FH+ or FH- groups based on psychiatric diagnoses of the father. Diagnoses were determined according to the criteria contained in the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-III-R*; American Psychiatric Association, 1987) utilizing an extended version of the *Structured Clinical Interview for DSM-III-R* (*SCID*; Spitzer, Williams, & Gibbon, 1987). A trained research clinician performed the psychiatric evaluations and diagnoses were formulated using the best estimate method (Leckman, Sholomskas, Thompson, Belanger, & Weissman, 1982) during a case conference including the research clinician who conducted the interviews, a clinical psychologist, and a psychiatrist.

FH+ participants have fathers with a lifetime diagnosis of SUD (excluding nicotine and caffeine). Adolescents in the FH+ group were not excluded if the father had comorbid psychiatric diagnoses. FH- participants have fathers with no lifetime psychiatric or SUD diagnosis. At the time of this study, 225 (60%) participants were in the FH- group and 147 (40%) were in the FH+ group.

Measures

Family Functioning and Family Communication. The Family Assessment Measure (*FAM*, Skinner, Steinhauer, & Santa-Barbara, 1983) was used to assess overall family functioning and family communication. The *FAM* is a 50-item inventory addressing several components of the family environment. Given the aims of the present study, the General Scale was used to assess overall family functioning and the 5-item Communication Scale was used to assess family communication. The General Scale emphasizes the family as a system and yields an overall rating of family functioning whereas the Communication Scale assesses the quality of exchanges of information between family members (e.g., "We argue about who said what in our family."). Participants responded to each item using a 4-point scale ranging from *strongly*

disagree to *strongly agree*. Cronbach's alpha for this study indicated satisfactory to good internal consistency and were as follows: general scale $\alpha = .84$ and communication $\alpha = .66$.

Parent-Adolescent Communication. A revised version of the Parent-Adolescent Communication Form (PACF) was used to assess communication between the adolescent and the mother and/or father. This measure contains 38 items addressing open and problematic communication between the adolescent and parent (e.g., "Can you have your say, even if your mother/father disagrees with you?"; "Do you find it easy to discuss problems with your mother/father?"), and can be keyed toward each parent, thus doubling the number of items. The revised PACF assesses overall communication quality by evaluating openness of discussions, willingness to share feelings or concerns, and affective aspects of communication. Participants rated each item on a 3-point scale: 0 (*Almost never*), 1 (*Sometimes*), and 2 (*Always*). Cronbach's alphas for this study indicated good internal consistency and were as follows: mother-adolescent communication $\alpha = .81$ and father-adolescent communication $\alpha = .84$.

Living Arrangement. Participants indicated with whom they lived during the past year. Participants selected from the following options: (1) with both parents, (2) with mother, (3) with father, (4) with relatives, (5) own home, (6) with friends, (7) dormitory, (8) foster home, (9) public institution (correctional facility), (10) private residential center (group home or transitional living), (11) drug/alcohol/psychiatric hospital, or (12) other.

Temperament. The Dimensions of Temperament Survey-Revised (*DOTS*-R, Windle & Lerner, 1986) was used to measure two aspects of temperament. The *DOTS-R* is a 54-item self-report inventory comprised of nine scales. Given that the present study focused on the moderating potential of activity and attention span/persistence, only the General Activity Level (e.g., "If I have to stay in one place for a long time, I get very restless") and Task Orientation (e.g., "If I am doing one thing, something else occurring won't get me to stop.") scales were used. Participants indicated how well each item described them on a 4-point scale ranging from *usually false* to *usually true*. Higher scores on the General Activity Level scale indicate higher levels of activity while higher scores on the Task Orientation scale indicate greater persistence and attention along with lower distractibility. The nine subscales of the *DOTS-R* maintain moderate to high levels of internal consistency ($\alpha = .62$ to .89) and good test-retest reliability (six-week range $= .59$-.75) for male and female adolescents (Windle & Lerner, 1986). Cronbach's alphas for this study indicated good internal consistency for the selected subscales

and were as follows: General Activity Level α = .83 and Task Orientation α = .83. The nine

factors of the *DOTS-R* also possess good convergent and discriminant validity (Windle, 1992).

    Drug Use Involvement. The term "drug use involvement" is often used to refer to several

aspects of drug use. These may include, but are not limited to, the quantity of drugs used by an

individual, the frequency with which the individual engages in drug use, or the degree to which

the individual's life is affected by his or her drug use. In order to investigate drug use

involvement, the current study examined each aspect of the term separately and thus examined

drug use quantity, frequency of drug use, and problems associated with drug use.

    Drug use quantity was measured with the *Drug Use Chart* (*DUC; CEDAR*, 1989), which

consists of a listing of 37 substances of abuse such as beer, liquor, amphetamines,

benzodiazepines, cocaine, morphine, tobacco, and psilocybin. Participants were asked to

indicate which substances they had used since their last assessment at *CEDAR* (Time2 = 12-14

years). The dependent measure was the total number of substances endorsed by each participant.

    Drug use frequency was assessed using the *Drug Use Screening Inventory* (*DUSI*; Tarter,

1990). The *DUSI* is a 149-item self-report instrument that measures drug use involvement across

10 associated domains. The *Drug Preference* section of the *Substance Use* subscale requires the

participant to indicate their frequency of use for twenty different substances such as alcohol,

amphetamines, barbiturates, benzodiazepines, cocaine, hallucinogens, heroin, and inhalants. For

each substance, participants responded to the question, "Ordinarily how many times each month

have you used [substance X] in the past year?" using a 5-point scale ranging from 0 (0 times) to 4

(more than 20 times). For the purpose of this study, a drug use frequency composite score was

constructed by tallying responses to all 20 questions. As such, drug use frequency represents the

number of times any listed substance was used in an average month during the past year.

    Drug use problems were inventoried using the *Substance Use* subscale of the *DUSI*. This

subscale is comprised of 15 items addressing problematic thoughts, attitudes, and behaviors that

may have resulted from substance use involvement (e.g., "Have you had a serious argument or

fight with a friend or family member because of your drinking or drug use?"). The *Substance Use*

subscale boasts very good internal consistency (α = .87), split-half (.87), and test-retest (one

week = .98) reliability coefficients (Tarter, Mezzich, Kirisci, & Kaczynski, 1994). Cronbach's

alpha for this study was .85, indicating good internal consistency. Construct validity for this

subscale is obtained from the subscale's relation to symptomology for SUD according to DSM-

III-R (Tarter, Laird, Bukstein, & Kaminer, 1992). Further validity evidence emerges from the fact that adolescents with SUD have been found to score significantly higher on this scale compared with normal and psychiatric controls (Kirisci, Mezzich, & Tarter, 1995).

Chapter Three

Results

The main goals of this study were to evaluate the relationships between several aspects of family environment and substance use in adolescent males. Specifically, it was hypothesized that adolescents reporting more functional families and greater family communication would engage in less frequent drug use, use fewer substances, and experience fewer substance-related problems than individuals reporting lesser communication and poor family functioning. The current study also aimed to compare the living arrangement of participants (i.e., number of parents in the home) to more comprehensive measures of family functioning for predicting substance use. Additionally, the current study aimed to understand better the relationships between family environment and substance use by introducing temperament dimensions and family history of SUD as potential moderators of the associations between family environment and substance use.

Analyses of Age, SES, Education, and Ethnicity as Covariates

Age was significantly associated with drug use problems (r = .148, p = .005), number of drugs (r = .176, p = .001), and frequency of drug use (r = .169, p = .001). Older individuals reported more problems associated with their drug use, used greater numbers of drugs, and engaged in substance use more frequently than younger individuals. SES was significantly related to drug use problems (r = -.123, p = .019), such that individuals from lower SES families experienced more problems related to their substance use than individuals from higher SES families. However, SES was not significantly associated with number of drugs used (r = -.012, p = .820) or frequency of drug use (r = -.082, p = .120). Given the significant associations between age, SES, and the substance use variables, age and SES were considered covariates for further analyses. Education and ethnicity were not significantly related to drug use problems (education r = .029, p = .580; ethnicity r = .048, p = .359), number of drugs (education r = .024, p = .644; ethnicity r = -.052, p = .324), or frequency of drug use (education r = -.008, p = .881; ethnicity r = .052; p = .329). Because education and ethnicity were not significantly associated with the dependent variables, education and ethnicity were not included as covariates in further analyses.

With regard to the relationships between covariates and independent variables, age was not significantly related to the family environment variables (FAM General r = .009, p = .857; FAM Communication r = .019, p .717; PACF Mother r = .000, p = .996; PACF Father r = -.034,

p = .533; Living arrangement r = -.007, p = .885). Similarly, age was not significantly related to hyperactivity (r = -.022, p = .668), inattention/impersistence (r = -.044, p = .394), or family history of SUD (r = .025, p = .629). SES was significantly associated with overall family functioning (FAM General r = -.188, p = .000) and family communication (FAM Communication r = -.184, p = .000). Specifically, individuals from lower SES families reported lower family functioning and poorer family communication. As anticipated, SES was also significantly related to family history of SUD (r = -.236, p = .000). Individuals with a positive family history of SUD reported lower SES levels than their counterparts with a negative family history. SES was not significantly associated with mother-adolescent communication (PACF Mother r = .011, p = .832), father-adolescent communication (PACF Father r = .086, p = .110), or the number of parents in the home (Living arrangement r = .053, p = .291). Finally, SES was not significantly related to hyperactivity (r = -.042, p = .415) or inattention/impersistence (r = .02, p = .704).

Relationships among Substance Use Variables

Drug use problems were significantly related to drug use frequency (r = .605, p = .000) and number of drugs used (r = .576, p = .000). Drug use frequency was also significantly related to the number of drugs used (r = .677, p = .000). These data are presented in Table 1.

Regression Models Testing Family Environment

Analytic Strategy. All analyses were conducted using a 2-step hierarchical regression procedure. For each model, age and SES were entered in the first step. This was done so as to control for their relationships with the substance use variables. The family environment variable was entered in the second step for each model.

Family Functioning (FAM General Score). As expected, overall family functioning was inversely related to the number of drugs used, drug use frequency, and drug use problems as shown in Table 2. It should be noted that high FAM General scores suggest family dysfunction. Family functioning was significantly related to the number of drugs used after accounting for age and SES. More specifically, individuals reporting diminished family functioning used greater numbers of drugs than individuals from more functional families. Overall family functioning was significantly associated with drug use frequency beyond the effects of age and SES, with individuals from less functional families engaged in more frequent drug use. Lastly, family functioning significantly predicted problems associated with drug use after controlling for age

16

and SES, such that individuals experiencing less family functioning experienced more drug use problems than those reporting higher levels of family functioning. In sum, family functioning was significantly related to all substance use variables even after accounting for the effects of age and SES.

Family Communication (FAM Communication Scale). As shown in Table 3, family communication was significantly related to number of drugs used, frequency of drug use, and drug use problems. It should be noted that high scores on the FAM Communication Scale are indicative of poorer family communication. As such, positive associations between family communication and substance use suggest greater substance use for individuals reporting poorer family communication. Family communication was significantly related to the number of drugs used, even after accounting for age and SES. Individuals with less positive family communication consumed greater numbers of drugs than those reporting more positive communication. Family communication was also significantly inversely associated with frequency of drug use after controlling for age and SES. Individuals from families characterized by poorer family communication used drugs more frequently than those from families with more positive communication. Finally, poorer communication was significantly related to problems associated with drug use such that individuals reporting lesser family communication experienced more problems related to their drug use than those reporting greater family communication, even after controlling for age and SES.

Parent-Adolescent Communication (PACF). As shown in Table 1, mother-adolescent communication was not significantly related to the number of drugs used ($r = .012$, $p = .822$), drug use frequency ($r = .058$, $p = .285$), or drug use problems ($r = .006$, $p = .906$). The quality of the relationship between the participant and mother was not significantly associated with substance use outcomes. This same pattern emerged for father-adolescent communication quality where father-adolescent communication was not significantly related to number of drugs used ($r = .012$, $p = .824$), drug use frequency ($r = .050$, $p = .368$), or drug use problems ($r = -.025$, $p = .651$). Due to these non-significant relationships, regression analyses were not conducted to ascertain the ability of mother-adolescent and father-adolescent communication to predict drug use beyond age and SES.

Living Arrangement. Similar to the PACF, the number of parents in the home was not significantly related to number of drugs used ($r = -.065$, $p = .210$), drug use frequency ($r = -.013$,

p = .806), or drug use problems (r = .035, p = .503). These data are presented in Table 1. The number of parents in the home was not associated with substance use outcomes. However, further analyses revealed that 77% of participants resided in two-parent homes during the previous year, raising concerns about the overrepresentation of individuals from two parent homes in the present sample.

Temperament Dimensions and Family History of SUD as Moderators of the Relationships between Family Environment and Substance Use

Analytic Strategy. All analyses were conducted using a 3-step hierarchical moderated regression procedure. For each model, age and SES were entered as covariates in the first step in order to control for their relationships with the substance use variables. Second steps included the simultaneous entry of the appropriate linear term (i.e. family environment variable) and the moderator (family history or temperament dimension). Third steps involved the entry of the two-way interaction term between the family environment variable and the moderator (family history of SUD and temperament dimensions).

Hyperactivity. It was hypothesized that activity level would alter the relationships between family environment and substance use such that these associations would be stronger for individuals characterized by hyperactivity. Activity failed to moderate the relations between overall family functioning (FAM General Score) and number of drugs used, drug use frequency, and drug use problems. Similarly, activity did not moderate the relationships between family communication style (FAM Communication) and number of drugs used, drug used frequency, and drug use problems. Additionally, activity failed to alter the relations between parent-adolescent communication (PACF Mother and PACF Father) and number of drugs used, drug use frequency, and drug use problems or between living arrangement and number of drugs used, drug use frequency, and drug use problems. These results are presented in Table 4.

Inattention/Impersistence. Similar to activity, it was hypothesized that attention/persistence would moderate the relations between family environment and substance use such that the relations would be stronger for individuals characterized by inattention/impersistence. Attention/persistence did not moderate the associations between overall family functioning (FAM General Score) and number of drugs used, drug use frequency, and drug use problems. Likewise, attention/persistence failed to moderate the relationships between family communication style (FAM Communication) and number of drugs used, drug

use frequency, and drug use problems. Attention/persistence did not alter the relations between parent-adolescent communication (PACF Mother and PACF Father) and number of drugs used, drug use frequency, and drug use problems. Finally, attention/persistence failed to alter the associations between living arrangement and number of drugs used, drug use frequency, and drug use problems. These results are presented in Table 5.

Family History of SUD. Family history of SUD was hypothesized to moderate the associations between family environment and substance use in such a way that the relations would be weaker for individuals with a positive family history of SUD. Family history of SUD did not moderate the relationships between overall family functioning (FAM General Score) and number of drugs used, drug use frequency, and drug use problems. Additionally, family history of SUD failed to moderate the relationships between family communication style (FAM Communication) and number of drugs used, drug use frequency, and drug use problems. Likewise, family history of SUD did not alter the relations between parent-adolescent communication (PACF Mother and PACF Father) and number of drugs used, drug use frequency, and drug use problems or between living arrangement and number of drugs used, drug use frequency, and drug use problems. These results are presented in Table 6.

Table 1

Correlations Between Demographic Characteristics, Family Variables, Temperament Dimensions, and Substance Use Variables

	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	.076	.009	.019	.000	-.034	-.007	-.022	-.044	.025	.176**	.169**	.148**
2. SES		-.188***	-.184***	.011	.086	.053	-.042	.020	-.236***	-.012	-.082	-.123*
3. FAMg			.812**	-.011	.008	-.060	.233**	-.258**	.239**	.209**	.210**	.181**
4. FAMc				.033	.023	-.060	.218**	-.260**	.240**	.162**	.181**	.136**
5. mPACF					.643**	-.001	.000	-.069	.044	.012	.058	.006
6. fPACF						.337**	.017	-.101	-.009	.012	.050	-.025
7. Home							.110*	-.018	-.080	-.065	-.013	.035
8. Activity								-.343	.127*	.179**	.138**	.151**
9. Attention									-.101	-.233**	-.244**	-.173**
10. History										.148**	.122*	.104*
11. DRG#											.677**	.576**
12. FREQ												.605**
13. PROB												

Note: ***p<.001   **p<.01   *p<.05

Family Assessment Measure General Scale (FAMg); Family Assessment Measure Communication Scale (FAMc); Parent Adolescent Communication Form – Mother (mPACF); Parent Adolescent

Communication Form – Father (fPACf); Number of Parents in the Home (Home); DOTS-R Activity Level (Activity); DOTS-R Task Orientation (Attention); Family History of SUD (History); Number

of Drugs Used (DRG#); Frequency of Use (FREQ); Substance Use Problems (PROB)

Table 2

Regression Analyses of Family Functioning (FAM General Scale)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032*	6.001	2, 364	
Age					.173**
SES					.011
Step 2: FAMg	.076	.044***	17.122	3, 363	.213***
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Age					.171**
SES					-.063
Step 2: FAMg	.077	.039***	14.938	3, 356	.200***
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Age					.156**
SES					-.110*
Step 2: FAMg	.066	.025**	9.457	3, 356	.160**

Note: ***$p<.001$ **$p<.01$ *$p<.05$

Table 3

Regression Analyses of Family Communication (FAM)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032*	6.001	2, 364	
Age					.173**
SES					.011
Step 2: FAMc	.057	.025**	9.575	3, 363	.161**
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Age					.173**
SES					-.069
Step 2: FAMc	.065	.026**	10.001	3, 356	.165**
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Age					.158**
SES					-.119*
Step 2: FAMc	.053	.012*	4.340	3, 356	.109*

Note: ***p<.001   **p<.01   *p<.05

Table 4

Hyperactivity as a Moderator for Family Environment and Substance Use

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.090	.058***	11.454	4, 362	
FAMg					.190**
Activity					.120*
Step 3: FAMg x Activity	.090	.000	.005	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.085	.046***	9.006	4, 355	
FAMg					.194**
Activity					.087
Step 3: FAMg x Activity	.085	.000	.072	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.072	.031**	5.922	4, 355	
FAMg					.193**
Activity					.068
Step 3: FAMg x Activity	.078	.006	2.178	5, 354	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.073	.041***	7.930	4, 362	
FAMc					.143*
Activity					.127*
Step 3: FAMc x Activity	.073	.000	.011	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.073	.035**	6.665	4, 355	
FAMc					.149*
Activity					.094
Step 3: FAMc x Activity	.073	.000	.000	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.060	.019*	3.568	4, 355	
FAMc					.116
Activity					.081
Step 3: FAMc x Activity	.062	.002	.569	5, 354	

Table 4 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.026	.026*	4.435	2, 338	
Step 2: Main Effects	.051	.026*	4.526	4, 336	
mPACF					.018
Activity					.160**
Step 3: mPACF x Activity	.051	.000	.077	5, 335	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	5.999	2, 332	
Step 2: Main Effects	.048	.013	2.273	4, 330	
mPACF					.062
Activity					.108*
Step 3: mPACF x Activity	.055	.007	2.477	5, 329	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.039	.039**	6.652	2, 332	
Step 2: Main Effects	.045	.006	1.102	4, 330	
mPACF					.006
Activity					.080
Step 3: mPACF x Activity	.045	.000	.001	5, 329	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.030	.030**	4.943	2, 324	
Step 2: Main Effects	.066	.037**	6.359	4, 322	
fPACF					.007
Activity					.192***
Step 3: fPACF x Activity	.071	.004	1.428	5, 321	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.041	.041**	6.864	2, 318	
Step 2: Main Effects	.062	.020*	3.424	4, 316	
fPACF					.049
Activity					.133*
Step 3: fPACF x Activity	.062	.000	.000	5, 315	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	6.748	2, 318	
Step 2: Main Effects	.051	.011	1.793	4, 316	
fPACF					-.057
Activity					.104
Step 3: fPACF x Activity	.060	.009	3.020	5, 315	

Table 4 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.025	.025*	4.468	2, 352	
Step 2: Main Effects	.070	.045***	8.516	4, 350	
Home					-.096
Activity					.204**
Step 3: Home x Activity	.070	.000	.004	5, 349	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	6.285	2, 345	
Step 2: Main Effects	.056	.021*	3.747	4, 343	
Home					-.019
Activity					.138*
Step 3: Home x Activity	.056	.000	.031	5, 342	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.038	.038**	6.887	2, 345	
Step 2: Main Effects	.058	.020*	3.629	4, 343	
Home					.041
Activity					.094
Step 3: Home x Activity	.062	.003	1.222	5, 342	

Note: ***p<.001   **p<.01   *p<.05

Family Assessment Measure General Scale (FAMg); Family Assessment Measure Communication Scale (FAMc); Parent Adolescent Communication

Form – Mother (mPACF); Parent Adolescent Communication Form – Father (fPACf); DOTS-R Activity Level (Activity); Number of Parents in the

Home (Home)

Table 5

Inattention/Impersistence as a Moderator for Family Environment and Substance Use

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.098	.066***	13.176	4, 362	
FAMg					.174**
Attention					.154**
Step 3: FAMg x Attention	.098	.000	.000	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.096	.057***	11.176	4, 355	
FAMg					.156*
Attention					.144**
Step 3: FAMg x Attention	.096	.000	.103	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.080	.039**	7.433	4, 355	
FAMg					.114
Attention					.129*
Step 3: FAMg x Attention	.081	.001	.261	5, 354	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.084	.052***	10.331	4, 362	
FAMc					.110
Attention					.176**
Step 3: FAMc x Attention	.085	.001	.232	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.086	.048***	9.273	4, 355	
FAMc					.100
Attention					.165**
Step 3: FAMc x Attention	.090	.004	1.432	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.070	.029**	5.492	4, 355	
FAMc					.024
Attention					.160**
Step 3: FAMc x Attention	.081	.011	4.274	5, 354	

Table 5 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.026	.026*	4.435	2, 338	
Step 2: Main Effects	.053	.028**	4.938	4, 336	
mPACF					-.039
Attention					.172**
Step 3: mPACF x Attention	.058	.005	1.800	5, 335	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	5.999	2, 332	
Step 2: Main Effects	.063	.028**	4.999	4, 330	
mPACF					.001
Attention					.167**
Step 3: mPACF x Attention	.066	.002	.877	5, 329	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.039	.039**	6.652	2, 332	
Step 2: Main Effects	.058	.019*	3.347	4, 330	
mPACF					-.072
Attention					.147**
Step 3: mPACF x Attention	.072	.014	5.078	5, 329	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.030	.030**	4.943	2, 324	
Step 2: Main Effects	.060	.031**	5.233	4, 322	
fPACF					-.022
Attention					.178**
Step 3: fPACF x Attention	.065	.005	1.820	5, 321	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.041	.041**	6.864	2, 318	
Step 2: Main Effects	.070	.029**	4.921	4, 316	
fPACF					.021
Attention					.166**
Step 3: fPACF x Attention	.072	.002	.573	5, 315	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	6.748	2, 318	
Step 2: Main Effects	.063	.023*	3.809	4, 316	
FPACF					-.100
Attention					.160**
Step 3: fPACF x Attention	.089	.026	8.829	5, 315	

Table 5 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.025	.025*	4.468	2, 352	
Step 2: Main Effects	.085	.060***	11.521	4, 350	
Home					-.082
Attention					-.320***
Step 3: Home x Attention	.096	.011	5, 349	5, 349	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	6.285	2, 345	
Step 2: Main Effects	.092	.057***	10.832	4, 343	
Home					-.021
Attention					-.296***
Step 3: Home x Attention	.096	.004	1.501	5, 342	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.038	.038**	6.887	2, 345	
Step 2: Main Effects	.063	.024*	4.411	4, 343	
Home					.037
Attention					-.176*
Step 3: Home x Attention	.063	.001	.345	5, 342	

Note: ***p<.001   **p<.01   *p<.05

Family Assessment Measure General Scale (FAMg); Family Assessment Measure Communication Scale (FAMc); Parent Adolescent Communication

Form – Mother (mPACF); Parent Adolescent Communication Form – Father (fPACf); DOTS-R Task Orientation (Attention); Number of Parents in the

Home (Home)

Table 6

Family History of SUD as a Moderator for Family Environment and Substance Use

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.086	.054***	10.688	4, 362	
FAMg					.190***
History					.108*
Step 3: FAMg x History	.086	.000	.015	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.081	.042***	8.148	4, 355	
FAMg					.190***
History					.061
Step 3: FAMg x History	.081	.000	.074	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.067	.026**	4.949	4, 355	
FAMg					.157**
History					.033
Step 3: FAMg x History	.068	.001	.303	5, 354	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.032	.032**	6.001	2, 364	
Step 2: Main Effects	.070	.038**	7.335	4, 362	
FAMc					.140**
History					.117*
Step 3: FAMc x History	.070	.000	.149	5, 361	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.039	.039**	7.161	2, 357	
Step 2: Main Effects	.069	.031**	5.826	4, 355	
FAMc					.155**
History					.066
Step 3: FAMc x History	.070	.001	.258	5, 354	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	7.695	2, 357	
Step 2: Main Effects	.055	.014	2.538	4, 355	
FAMc					.104
History					.044
Step 3: FAMc x History	.055	.001	.194	5, 354	

Table 6 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.026	.026*	4.435	2, 338	
Step 2: Main Effects	.046	.02*	3.542	4, 336	
mPACF					.018
History					.144**
Step 3: mPACF x History	.048	.002	.775	5, 335	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	5.999	2, 332	
Step 2: Main Effects	.045	.010	1.692	4, 330	
mPACF					.055
History					.091
Step 3: mPACF x History	.049	.004	1.485	5, 329	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.039	.039**	6.652	.2, 332	
Step 2: Main Effects	.043	.004	.723	4, 330	
mPACF					.005
History					.067
Step 3: mPACF x History	.043	.000	.144	5, 329	
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.030	.030**	4.943	2, 324	
Step 2: Main Effects	.052	.022*	3.744	4, 322	
fPACF					.025
History					.150**
Step 3: fPACF x History	.052	.000	.061	5, 321	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.041	.041**	6.824	2, 318	
Step 2: Main Effects	.055	.013	2.209	4, 316	
fPACF					.064
History					.105
Step 3: fPACF x History	.060	.005	1.835	5, 314	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.041	.041**	6.748	2, 318	
Step 2: Main Effects	.047	.006	1.036	4, 316	
fPACF					-.028
History					.080
Step 3: fPACF x History	.051	.004	1.241	5, 315	

Table 6 (continued)

Step and measure	R^2	ΔR^2	F for Δ in R^2	df	Final Betas
Dependent variable: Number of Drugs Used					
Step 1: Covariates	.025	.025*	4.468	2, 352	
Step 2: Main Effects	.050	.025*	4.703	4, 350	
Home					-.065
History					.166**
Step 3: Home x History	.051	.001	.352	5, 349	
Dependent variable: Drug Use Frequency					
Step 1: Covariates	.035	.035**	6.285	2, 345	
Step 2: Main Effects	.046	.010	1.871	4, 343	
Home					.000
History					.131*
Step 3: Home x History	.047	.002	.551	5, 342	
Dependent variable: Drug Use Problems					
Step 1: Covariates	.038	.038**	6.887	2, 345	
Step 2: Main Effects	.047	.009	1.596	4, 343	
Home					.060
History					.018
Step 3: Home x History	.057	.010	3.554	5, 342	

Note: ***p<.001   **p<.01   *p<.05

Family Assessment Measure General Scale (FAMg); Family Assessment Measure Communication Scale (FAMc); Parent Adolescent Communication

Form – Mother (mPACF); Parent Adolescent Communication Form – Father (fPACf); Family History of SUD (History); Number of Parents in the

Home (Home)

Chapter Four

Discussion

Main Findings

As hypothesized, family functioning was related to a variety of substance use outcomes. Specifically, reduced overall family functioning was associated with higher numbers of drugs used, more frequent drug use, and more problems related to drug use. These relationships remained significant even after accounting for family socioeconomic status and age of the adolescent. These findings are consistent with the available literature that suggests negative relationships between family functioning and substance use (Elliot, Huizinga, & Ageton, 1985; Jenson, Howard, & Yaffe, 1995).

There are several possible explanations for the inverse relationship between family functioning and adolescent substance use. First, Jessor and Jessor (1977) argued that a functional and supportive family environment may aid in creating and reinforcing an attitude that increases adolescent resistance to temptation and/or pressure to engage in substance use. This suggests that adolescents from less functional families may not have ample opportunities to develop resistance to substance use pressures. Without sufficient adult mediation, these adolescents lack the preparation necessary to navigate substance use opportunities and limit drug usage. Second, a functional family environment may assist the adolescent in developing and utilizing more productive problem-solving and coping strategies. That is, instead of turning to substance use to deal with problems, the adolescent has learned more effective means of dealing with difficulties. Adolescents from less functional families lack family-related instruction on how to handle challenges and tolerate distress. In an ethnically diverse sample of 1,289 adolescents, Wills et al. (1992) demonstrated that the relationship between life events and substance use was diminished for adolescents from functional families. More specifically, adolescents from supportive and functional families engaged in less substance use to deal with their problems. Given the challenging nature of adolescence normally, disruption in family functioning may be especially problematic for the growing adolescent in need of effective problem solving skills and coping strategies to resist turning to drugs.

A final explanation for the relationship between family functioning and substance use involves commitment and attachment. Vakalahi (2001) argued that adolescents strongly attached and/or committed to the family are less likely to engage in substance use. That is, adolescents

positively bonded to the family are more likely to accept and adhere to the rules and substance use proscriptions of the family. Theories of deviance posit that bonding with and attachment to parents and family members facilitates the adolescent's acceptance and implementation of societal norms and values (Hirschi, 2002). This adoption of social convention reduces participation in behaviors such as substance use (Bell, Forthun, & Sun, 2000). Further investigation is needed to explore these and other mechanisms for understanding the link between family functioning and adolescent substance use.

The present study aimed to extend current understanding of family environment and adolescent substance use by investigating multiple aspects of family environment. Although significant inverse relationships between family functioning and substance use were established, the broad nature of family functioning limits understanding of the specific mechanisms by which it may influence substance use. Given the variety of potential contributors to overall family functioning, it is difficult to determine which might be useful to include in prevention or treatment efforts. Ennett, Bauman, Foshee, Pemberton, and Hicks (2001) posited that the effects of family functioning on adolescent substance use may be better understood by considering family communication specifically. In order to elucidate this effect, the current study narrowed its focus to the component of communication within the family.

The present results indicated that greater family communication and better communication quality were inversely associated with substance use such that adolescents reporting more positive family communication engaged in less frequent drug use, used fewer drugs, and experienced less drug-related problems than adolescents reporting more negative family communication. These findings support our hypotheses and are consistent with the limited literature in this area. Specifically, positive family communication has been associated with abstinence from substance use, lower levels of substance use (Barnes, Farrell, & Banerjee, 1994; Brody, Flor, Hollett-Wright, & McCoy, 1998) and better substance abuse treatment outcomes in adolescents and preadolescents (Friedman, Tomko, & Utada, 1991). This suggests examining the consequences of family communication on younger children, particularly to identify strategies that might be useful for reducing the likelihood that substances will be used.

The effects of family communication on adolescent substance use may be explained several ways. First, it may be that families with more open and constructive communication styles facilitate dialogue that includes opportunities to discuss substance use. That is,

adolescents experiencing higher quality family communication may be more informed about substance use and thus more prepared to handle substance use opportunities. Communication serves as a way to transmit expectations about substance use. Certainly the content of such communications varies and may include discussions of the ramifications of substance use, social and cultural pressures, and family guidelines for substance use. Second, it may also be that the highly communicative family provides a supportive environment in which the adolescent has access to greater resources of support and problem-solving. As a result, fewer of these adolescents turn to substances in order to deal with problems or frustrations. Further investigation into this relationship, including longitudinal studies, is needed elucidate the causal pattern of this relationship as well as the mechanisms underlying the effect between family communication and substance use.

Additionally, SES was associated with several independent and dependent variables. First, SES was related to positive family history of SUD, as expected. This relationship may be due to sampling strategies. FH+ families were, out of necessity, recruited predominately from SUD treatment programs whereas FH- families responded to media advertisements or to inquiries by a recruitment agency. Second, SES was significantly associated with family functioning and family communication. Families with lower SES have fewer material resources and experience greater stress. As a result, the opportunities for communication and positive family functioning may be considerably reduced compared to families with greater resources. That is, the lower SES family's focus may be directed at meeting basic needs rather than maintaining frequent and quality communication or enhancing family functioning. Finally, SES was inversely related to problems associated with substance use in this sample. Adolescent delinquency research has shown that adolescents residing in depressed communities, as is often true for adolescents from lower SES families, have more opportunities to engage in problem behavior (Beyers, Loeber, Wikström, & Stouthamer-Loeber, 2001). That is, adolescents from lower SES families may have greater opportunities to transform their substance use into problematic substance use. Clearly, the effects of SES should remain a topic of interest in substance use research.

The present study endeavored to elucidate the importance of communication by assessing communication quality between the adolescent and parent(s) in order to understand the specific effects of parent-adolescent communication on adolescent substance use. Mother-adolescent

34

communication and father-adolescent were not significantly related to substance use outcomes. That is, the quality of the communication between mother and adolescent or father and adolescent failed to predict the number of drugs used, frequency of drug use, or problems associated with this drug use. Contrary to our hypotheses, the quality of communication between the adolescent and individual parent(s) was not significantly related to substance use outcomes. These findings are in contrast to the significant relationships demonstrated between *family* communication quality and substance use in the current sample. These data suggest that more general family communication styles may be more important in protecting against substance use/abuse than communication between specific family members.

Additionally, the present study investigated the relationship between the number of parents in the home and adolescent substance use. In contrast to previous research suggesting higher levels of substance use in adolescents from single parent-homes, the number of parents in the home was not significantly associated with number of drugs used, frequency of drug use, or drug-related problems. The relatively smaller number of adolescents from single-parent homes in the present sample may be one of the reasons contributing to this null result. Other factors could include unique aspects of the present sample. For example, participation in the CEDAR project requires considerable time and effort on the part of the adolescent and parent(s). Assessment batteries are extremely extensive and require the cooperation of the adolescent, parent(s), and other family members. As such, single-parent families in the present study may be more functional and communicative than single-parent families assessed in other research. The nature of the present study may have influenced the selection of participant families such that two-parent families were over-represented and single-parent families were more functional than the average single-parent family.

Additional Findings

The present study aimed to extend current research on the impact of family environment on adolescent substance use by considering potential moderators of these relationships. Specifically, temperament dimensions (hyperactivity and inattention/impersistence) and paternal history of SUD were hypothesized to moderate the relationship between family environment and various adolescent substance use outcomes. Unfortunately, neither temperament nor a family history of SUD significantly altered the family environment-substance use link.

Possible reasons that temperament and paternal history of SUD were not moderators of the relationship between family environment and adolescent substance use should be mentioned. The current data may be unique as a result of some sampling issues. In order to compare adolescents with and without a paternal history of SUD, many families were directly recruited from SUD treatment facilities. In contrast, families without a history of SUD were recruited by various advertisements and a recruitment agency, as well as from psychiatric clinics and other studies at the University of Pittsburgh. Families who encourage and subsequently secure treatment for a family member suggest some basic level of communication and/or family involvement. Thus it is possible that the sampling procedures in the present study may have skewed the distributions of family environment.

Another sampling issue for consideration is the fact that 77% of the adolescents in the present sample resided in two-parent homes during the previous year. This over-representation of dual-parent homes may be a result of several factors. First, as previously discussed, the *CEDAR* project requires extensive involvement with multiple assessment waves and lengthy testing batteries. The substantial time commitment required may make participation less burdensome for dual-parent homes. That is, families with two parents may be less inconvenienced by multiple study visits and the time required for completing each study wave. Second, because the families were recruited based on paternal psychiatric status, adolescents were more likely to reside in two parent homes than if recruiting was based on maternal psychiatric status. That is, because male headed single-parent homes occur less frequently than female headed single-parent homes (5% of homes headed by single male vs. 23% of homes headed by single female), recruitment strategies augmented the percentage of adolescents from two-parent homes (U.S. Census Bureau, 2003).

Implications and Future Directions

The present findings suggest the importance of family environment, specifically family functioning and family communication, for reducing substance use. Family functioning and family communication skills may be augmented through communication training and skill development as suggested by Blechman & Tryon (1992). Wills et al. (1992) presented various training options such as direct instruction or the use of video programs to enhance communication quality. Family interventions have been effective in reducing several important adolescent behaviors such as delinquency (Klein, Alexander, & Parsons, 1977) and substance

36

use (Azrin, Donohue, Besalel, 1994; Schmidt, Liddle, & Dakof, 1996). School-based programs have also been used to augment protective factors including family communication. Toumbourou and Gregg (2002) implemented an intervention where parents participated in groups designed to improve communication skills and enhance the parent-adolescent relationship. At follow-up, adolescents in the intervention group were less likely to initiate substance use. Further, adolescents using substances were less likely to escalate their use. Interestingly, the intervention did not impact cessation of use. This suggests that improved functioning and communication may not have eliminated substance use but rather modulated substance use, which lead to more responsible substance use overall. In sum, adolescent substance use intervention efforts should address family functioning and family communication in order to limit initiation of substance use and promote more responsible substance use if already being used.

The present study attempted to extend previous research on the relationship between family environment and substance use by focusing on overall family functioning and communication as well as parent-adolescent communication and living arrangement. However, scant research attention to date has focused on the effects of siblings on adolescent substance use. Siblings often function as long-term friends as well as role models (Vakalahi, 2001), suggesting significant influence. Future research attention should be directed to elucidating the positive and negative impact siblings may have on adolescent substance use.

Limitations

The findings in the present study should be considered in light of its limitations. First, the sample was predominately Caucasian (77%). This overrepresentation of Caucasians may hinder the generalizability of the findings to more diverse populations. Second, the present study is cross-sectional, which prohibits interpretation of causality. It was suggested that overall family functioning and family communication may lead to adolescent substance use; it is also plausible that adolescent substance use leads to deterioration in family functioning and communication. However, current research literature suggests that the presented relationship rather than the alternative relationship is more probable.

Conclusions

In spite of these limitations, this study augmented previous research by investigating several aspects of family environment and their associations with adolescent substance use. This

study demonstrated that (a) overall family functioning is related to adolescent substance use; (b) family communication, but not specific parent-adolescent communication, is related to adolescent substance use; (c) the number of parents in the home did not predict adolescent communication; and (d) hyperactivity, inattention, and family history of SUD did not alter the strength of the above relationships. These results suggest the importance of directing research attention and intervention resources towards improving family environment, specifically family functioning and communication, in order to attenuate adolescent substance use.

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Brechting, E.H., Brown, T.L., Salsman, J., & Carlson, C.R. (2003, March). Religiosity and alcohol use: Is the glass half full? Poster presented at the annual meeting of the Southeastern Psychological Association, New Orleans, LA.

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Woodcock Johnson Psycho-Educational Battery (WJ-III)

Boston Naming Test

California Verbal Learning Test (CVLT)

Finger Tapping Test

Grooved Pegboard Test

Judgment of Line Orientation

Minnesota Multiphasic Personality Inventory-2 (MMPI-2)

NEO Personality Inventory-Revised (NEO-PI-R)

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Ruff 2 & 7 Selective Attention Test

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