FAMILY MANAGEMENT, RELATIONS RISK AND PROTECTIVE FACTORS FOR ADOLESCENT SUBSTANCE ABUSE IN SOUTH AFRICA

by

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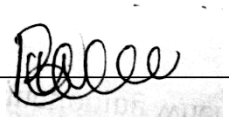
DECLARATION

I declare that "Family Management, Relations Risk and Protective Factors for Adolescent Substance Abuse in South Africa" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



_____ 2nd November 2015_

SIGNATURE DATE

(Mrs)

DEDICATION

To my dear husband Patrick and daughters Micaela and Adrielle for your love, support, encouragement and bearing the long hours when I was absorbed in reading, writing, or away for interviews

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May the Lord enlarge the frontiers of all these individuals and institutions.

Most of all "To Him who is seated on the throne, and to the Lamb, be ascribed all blessing and honour and glory and might, until the ages of the ages!" (Bible, Weymouth New Testament Version, Revelation 5:13).

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LIST OF ABBREVIATIONS, SYMBOLS AND TERMS

WHO: World Health Organization

CSRP: Centre for Suicide Research and Prevention, University of Hong Kong

United States or U.S. or USA: United States of America

U.K.: United Kingdom

LSD: Lysergic Acid Diethylamide

MDMA: 3,4-methylenedioxymethamphetamine, known as “Ecstasy” or “Molly.”

HIV: Human Immunodeficiency Virus

AAPCSA: American Academy of Paediatrics Committee on Substance Abuse

UNODC: United Nations’ Office on Drugs and Crime

CADCA: Community Anti-Drug Coalitions of America

SDM: Social Development Model

AODs: Alcohol and other Drugs

OTC: Over the Counter

NRI-SPV: The Network of Relationships Social Provision version

p-values: probability values

r.drop: correlation of the specific item (or question) with the total correlation of all the questions

Nyaope: also known as whoonga, is a South African street drug in form of a fine white powder that varies in composition but usually combined with cannabis or other substances

Khat: a shrub (*Catha edulis*) containing the psychoactive chemicals cathinone and cathine

χ^2: Chi-Square

CI: Confidence Interval

ABSTRACT

An increasingly recognised prevention approach for substance use entails reduction in risk factors and enhancement of promotive or protective factors in individuals and the environment surrounding them during their growth and development. However, in order to enhance the effectiveness of this approach, continuous study of risk aspects targeting different cultures, social groups and mixture of society has been recommended. This study evaluated the impact of potential risk and protective factors associated with family management and relations on adolescent substance abuse in South Africa. Exploratory analysis and cumulative odds ordinal logistic regression modelling was performed on the data while controlling for demographic and socio-economic characteristics on adolescent substance use. The most intensely used substances were tobacco, cannabis, cocaine, heroin and alcohol in decreasing order of use intensity. The specific protective or risk impact of family management or relations factors varied from substance to substance. Risk factors associated with demographic and socio-economic factors included being male, younger age, being in lower education grades, coloured ethnicity, adolescents from divorced parents and unemployed or fully employed mothers. Significant family relations risk and protective factors against substance use were classified as either family functioning and conflict or family bonding and support. Several family management factors, categorised as parental monitoring, discipline, behavioural control and rewards, demonstrated either risk or protective effect on adolescent substance use. Some factors had either interactive risk or protective impact on substance use or lost significance when analysed jointly with other factors such as controlled variables. Interaction amongst risk or protective factors as well as the type of substance should be considered when further considering interventions based on these risk or protective factors. Studies in other geographical regions, institutions and with better gender balance are recommended to improve upon the representativeness of the results. Several other considerations to be made when formulating interventions, the shortcomings of this study and possible improvements as well as future studies are also suggested.

KEY TERMS

Risk factors; protective factors; substance use; adolescents; cumulative odds ordinal logistic regressions; family management; family relations; family functioning and conflict; family bonding and support; parental monitoring; parental discipline; behavioural control; parental rewards

CHAPTER 1

INTRODUCTION

Background

Substance use among adolescents is having a significant global impact on their health and various facets of individual well-being (Stone, Becker, Huber & Catalano, 2012). This is because early adolescence is a period characterised by both a rapid increase in rate of substance use inception as well as vulnerability (Peltzer, Ramlagan, Johnson & Phaswana-Mafuya, 2010). Furthermore, behavioural problems such as delinquent and disruptive behaviour have been reported to increase by almost two-fold between ages 9 and 15 (Brody, Kogan, Chen & McBride, 2008). Adolescent substance use can also become the foundation to emerging adult and latter adult addiction (Stone et al., 2012). The affirmative aspect is that early adolescence forms an important developmental period for prevention of initiation and establishment of behavioural as well as substance use problems.

The result of substance use disorders has been a considerable compromise in health, safety and economy of many governments irrespective of development status (Fothergill & Ensminger, 2006; Beyers, Toumbourou, Catalano, Arthur & Hawkins, 2004). However, for low income countries, substance use problems may act in synergy with other factors therefore aggravating social problems, scarce resources, poor social networks, health and social well-being problems (Gil, Vega & Turner, 2002).

Negative health consequences are increasingly being addressed by prevention science, which involves reducing risk and enhancing promotive or protective factors in individuals and the environment surrounding them during their growth and development (O'Connell, Boat & Warner, 2009). Risk factors predict enhanced likelihood of problems while protective factors mediate or moderate exposure to the risk (Hawkins, Catalano & Miller, 1992). Risk factors, on one hand, are those factors that increase the risk or likelihood that adolescent problem behaviours emerge either in adolescence or in young adulthood (Centre for Suicide Research and Prevention, University of Hong Kong [CSRP], 2011). Protective factors, on the other hand, buffer adolescents from exposure to risks leading to a reduced likelihood of acquiring such behaviours (CSRP, 2011). Additionally, promotive factors play a further role in the decreased likelihood of health problems (Sameroff, 2000). An understanding of these risk and protective factors is important in the development of effective interventions.

Risk and protective factors can be classified into fixed markers, individual and interpersonal, as well as contextual factors (Kraemer, Stice, Kazdin, Offord & Kupfer, 2001). Fixed

markers of risk define those factors that cannot exhibit change, while variable risk/ protective factors define factors liable to manipulation by way of intervention measures. The variable factors are further delineated into contextual and interpersonal factors. Contextual factors define "broad societal and cultural" factors, whereas individual factors "lie within individuals and their interpersonal environments" (Hawkins et al., 1992, p. 65).

Among individual and interpersonal risk and protective factors, the family environment influences significantly the likelihood of substance abuse problems. Family environment is viewed in terms of family relations and family management (Stone et al., 2012). Modification of risk and protective factors may too ameliorate harms from substance abuse prior to birth and continue through to young adulthood. These developmental periods are predominantly spent in the family context (Stone et al., 2012).

Family relations and their influence on substance use can be viewed either in terms of connectedness or conflict (Stone et al., 2012). Increase in either parent to parent conflict or parent to offspring conflict has been shown to increase risk of substance addiction (Zhou, King & Chassin, 2006). This family conflict also aggravates the influence of older siblings towards alcohol use (Trim, Leuthe & Chassin, 2006). Levels of family bonding and support by parents to their offspring are a predictor of alcoholism and drug use amongst the youth (Stone et al., 2012). Parental support has been shown to decrease the risk of substance use by about 50 % even when other factors are controlled for (King & Chassin, 2004). Favourable family bonds or relationships also reduce the likelihood of substance use problems even amongst those with personality problems (Morojele & Brook, 2001).

Family management involves parental monitoring, discipline, and behavioural control, as well as reward systems by parents for good child behaviour (Stone et al., 2012). Good family management is associated with decreased risk of substance use. Males from a well-functioning family even when they experience childhood aggression were at reduced risk of later problem drinking (Engels, Vermulst, Dubas, Bot & Gerris, 2005). A protective association has been reported between parental monitoring at ages 10-12 and adolescence to alcohol problematic use between ages 18–22 especially in males (Ghandour, 2009; Arria, Kuhn, Caldeira, O'Grady, Vincent & Wish, 2008). Consistent discipline and behavioural control lowers alcoholism amongst young adults and even mediates the relationship between parent alcoholism and young adult drug use disorder (King & Chassin, 2004). However, high and low extremes in discipline or control are also associated with heightened risk of problem behaviours (Stone et al., 2012). Rewards for positive behaviour at 16 years predicted a lowered risk of alcohol addiction at 21 years (Guo, Hawkins, Hill & Abbott, 2001).

Mitigation measures are not universal and risk factors are influenced by cultural groupings which have called for culturally relevant programmes (Brook, Morojele, Pahl & Brook, 2006). An increasing number of studies have therefore identified factors influencing substance use in industrialised nations but there are few studies presently in South Africa and other developing countries that explore these facets (Brook et al., 2006; Flisher, Parry, Evans, Muller & Lombard, 2003; Morojele, Flisher, Muller, Ziervogel, Reddy & Lombard, 2002).

From a survey of published literature there is a lack of studies focusing on family predictors of substance use based on family management and relations. Brook et al. (2006) assessed the effect of two types of parental factors in South Africa: parental drug use and adolescent's identification with the parent. The study found that child rearing variables (for example parental monitoring and attachment between parent and child) maternal drug use, parental drinking and marijuana use were significantly related to the frequency of drug use by adolescents. However, no investigators have focused on how family factors aside from the parent–child relationship predict adolescent substance use (Brook et al., 2006). These factors and their interactions would provide more insight into possible family environment based intervention strategies. Such interactions include risk/ protective interaction (for example, risk factor of family substance drug use being ameliorated by a good family environment, leading to less drug use) and protective/ protective factor interactions (for example, protective factor of low family substance use being enhanced by good family environment, leading to less drug use).

Research question

The study seeks to address the following primary question: What are the important family environment (family management and relations) risk and protective factors that affect alcohol, tobacco and other drugs use problems amongst adolescents in South Africa?

Hypothesis

> South African adolescents living in families characterised by good family management practices and more favourable relations are less likely to engage in substance abuse than those who live in poorly managed families with less favourable relations.

Rationale

Adolescent substance use is the foundation of substance addiction during latter emerging adult and adult period (Stone et al., 2012). Effective and efficient mitigation strategies are

based on preventative approach which reduces the risk and enhances promotive or protective factors in individuals and the environment surrounding them during their growth and development (O'Connell et al., 2009). However, risk factors are influenced by cultural groupings (Brook et al, 2006). Very few studies on risk factors influencing substance use in developing countries as well as South Africa have been conducted (Flisher et al., 2003; Morojele et al., 2002). Family environment plays an important role amongst other individual and interpersonal factors in predicting the likelihood of drug abuse problems in adolescents (Stone et al., 2012). Additionally, the period spent in the family environment prior to birth continuing through to young adulthood has been found to be most effective in administering interventions involving modified risk and protective factors (Stone et al., 2012). There is a lack of studies focusing on family predictors of substance use based on family management and relations factors even though there is evidence of crucial role these predictors may play from studies incorporating the parent-child relationships (Brook et al., 2006).

The significance of studying the familial predictors of illegal substance use is therefore of great importance given the fact that consequences of adolescent substance use are for a lifetime. Important family based considerations when mediating the problem amongst minors which translates to poor adolescent behavioural control and latter in emerging adulthood when the youth move out of parental homes were outlined.

Outline of the Study

Chapter 1 provides a brief background, the research question, hypothesis and rationale of the study. Chapter 2 discusses the literature which has been reviewed during the study. Chapter 3 describes the research design and methodology applied in the study. Chapter 4 covers exploratory data analysis, modelling and interpretation. Chapter 5 discusses the main findings of the study. Chapter 6 highlights major conclusions of the study, its limitations, recommendations from the findings, and perspectives for future research. Reflections from the study are also outlined.

Chapter Summary

Chapter 1 consists of a brief introduction to the study, the research question, hypothesis and rationale of the study. The problem of substance among adolescents and the negative impact on society, economy and governments especially in the developing countries is highlighted. Prevention science which consists of risk and protective factors is introduced and as well as the potential of enhancing protective factors and reducing risk factors in addressing substance

use challenges. The importance of studying family management and relations as emerging mitigation measures which form important aspects of prevention science is highlighted.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Societal and individual significance of substance abuse

Substance use and abuse amongst adolescents is one of the major issues facing modern society (Greydanus & Patel, 2005). Substance use disorders cause considerable compromise in health, safety and economy of many governments in both developed and developing countries (National Research Council, 1993; Fothergill & Ensminger, 2006; Challier, Chau, Prédine, Choquet & Legras, 2000; Beyers et al., 2004). Substance use problems may act in synergy in low-income communities to aggravate social problems, scarce resources and poor social networks, health and social well-being (Gil et al., 2002).

Substance use amongst adolescents leads to a number of deleterious effect on individual health and well-being including: (i) violence leading to higher possibilities of injury or death; (ii) road accidents, and drowning (Flisher, Ziervogel & Charlton, 1996); (iii) proneness to high risk sexual engagement (Flisher, Ziervogel, Chalton, Leger & Robertson, 1996); and (iv) enhanced chance of suicidal tendencies and activities (Stoelb & Chiriboga, 1998). Whereas tobacco use annually accounts for about four million deaths worldwide (Corroa, Guindon, Sharma & Shokoohi, 2000), a World Health Organization (WHO) and World Bank study revealed that alcohol-related death and disability contributes to even greater life and mortality related costs (WHO, 1999).

Substance use is also associated with criminal activities and it has also been associated with higher prevalence in juvenile offenders (Zhang & Wieczorek, 1997; Guo et al., 2001). Problematic behaviours such as delinquency, teen pregnancy, school drop-out and violence have been associated with substance use (CSRP, 2011). Furthermore, commencement of these behaviours in early adolescence is a significance prognosis for school failure, criminal justice system involvement, and drug abuse (Brody et al., 2008).

Epidemiology of substance use

The study of epidemiology and aetiology of substance abuse is an important guide for the development of prevention and treatment interventions (Greydanus & Patel, 2005; Stephens, McBride & Levy, 1999). Alcohol is one of the most commonly accepted, used and abused substances in society. In the United States, the average initial exposure to alcohol is 12 years of age. The Future National Survey of secondary school students reported that about 52%, 71% and 80% of 8th, 10th and 12th grade students respectively had used alcohol at some life

period (Arthur, Hawkins, Pollard, Catalano & Baglioni, 2002). Societal pressure promoting use of alcohol as well as other drugs further forms a major challenge to individuals with problematic alcoholism (Greydanus & Patel, 2005). Cannabis is also widely accepted amongst adults and the youth alike and it is the first illicit substance used by majority of individuals. Cannabis accounts for the highest prevalence amongst illicit substances used and as part of substances used by multi-substance users in the United States alone (Arthur et al., 2002).

A wider array of substances is available for abuse today than ever before and public health workers have to deal with the problem of interaction between substances abused especially the mixing of other substances with alcohol. Even though tobacco and alcohol use has reduced in some societies, their use in addition to commonly used illicit substances still remains common amongst adolescents (Giovino, Henningfield, Tomar, Escobedo & Slade, 1995; Challier et al., 2000).

The epidemiology of substance abuse has historically experienced significant transformation. Cannabis and heroin remain the most common illicit substances abused. Substance abuse profile changed in the 1970s with advent in use of synthetic drugs such as Lysergic Acid Diethylamide (LSD) and 3,4-Methylenedioxymethamphetamine (MDMA). This gave way to processing of the expensive cocaine into the cheaper form, crack-cocaine by the mid-1980s. The use of crack-cocaine subsequently became only second to cannabis. A swing occurred in the 1990s to intranasal heroin use as the use of crack-cocaine became increasingly associated with increased risk of HIV infection (Arthur et al., 2002). However, it has been proposed that the most globally significant switch in the pattern of substance use was the rapid increase in popularity of party drugs (including ecstasy and ketamine), commonly used in social youth gatherings, since the 1990s (Joe-Laidler, 2005). The frequency of illegal substance use (primarily cannabis use) then increased steadily on annual basis from years 1991 through to 1997 before another decline phase was reported in the beginning of year 1998 (Stephens et al., 1999).

Substance use amongst adolescents

The effects of biological, psychological and social predictors may vary from one life stage to another (Zucker, Fitzgerald & Moses, 1995; Guo et al., 2001). An adolescent is regarded to be a person over the age of 10 but less than 20 years old (WHO, 1999; Parry et al., 2004). During adolescence, the individual is experiencing changes in intrapsychic structure and its organisation (Muisener, 1994). Early adolescence forms an important developmental period for prevention of initiation and establishment of behavioural as well as substance use

problems. This is because there is a rapid increase in prevalence of substance use and use vulnerability in early adolescence (Wills, McNamara, Vaccaro & Hirky, 1996; Peltzer et al., 2010) and behavioural problems such as delinquent and disruptive behaviour will increase by almost two-fold between ages 9 and 15 (Brody et al., 2008). Behavioural problems including substance use are in many instances highest during adolescence and decline as individuals transition to adulthood (Fothergill & Ensminger, 2006). A high proportion of substance use burden affects the youth (aged between 15-24 years) and more than 25% and approximately 10% of male and female mortality respectively can be attributed to alcohol (Foxcroft & Tsertsvadze, 2011; Arthur et al., 2002). According to The Panamá, Centroamérica, and República Dominicana project (PACARDO), among school attending Central American adolescents aged 12–20 years, more than half (51.5%) had experimented with alcohol, 29.1% had experimented with tobacco and 4.6% with cannabis (Kliewer & Murrelle, 2007). Initiation of substance use prior to age 15 may pose the greatest risk for long-lasting problematic substance abuse (Greydanus & Patel, 2005; Arthur et al., 2002).

With continued use into adulthood, some individuals develop substance use disorders and it has been suggested that this is influenced by individual childhood characteristics (Fothergill & Ensminger, 2006). Moffitt's (1993) Developmental Theory suggests that delinquent behaviour may either occur exclusively during adolescence or it may originate in childhood neuro-psychological problems with a tendency to last throughout a lifetime (Fothergill & Ensminger, 2006). For instance, delayed initiation into alcohol use, reduced mid-school alcohol use and reduced heavy drinking episodes in high school may prevent alcohol abuse and addiction at 21 years of age (Guo, Collins, Hill & Hawkins, 2000). Due to this prediction of later substance abuse by childhood and adolescence use, early age prevention strategies have therefore emphasised avoidance of first experience with substances especially tobacco or alcohol (Challier et al., 2000; Guo et al., 2000).

Progression in substance use

The study of substance abuse involves identification of the essential addiction dynamics, the stages of drug addiction and the disease concept of addiction (Muisener, 1994). Multiple factors are involved in the initiation of substance use and a complex interaction between genetic, psychological, and social variables may be involved (Newcomb & Felix-Ortiz, 1992). Including these factors in a single study would pose a formidable task and theory-driven models for the study of adolescent problem behaviours have been recommended (Cleveland, Feinberg, Bontempo & Greenberg, 2008). Three levels of substance influenced behaviour and functioning can be distinguished (American Psychiatric Association, 1987)

based on the criteria by the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R): (i) low or infrequent use leading to few or minor injurious consequences; (ii) abuse, with use at dose and/or incidence which is less than that of addiction with demonstrable health and functional outcomes and; (iii) addiction, regarded as high degree of use leading to critical health and functional outcomes as well as withdrawal symptoms (National Research Council, 1993; Fothergill & Ensminger, 2006).

Amongst individuals who initially use a substance, not all progress to abuse and addiction, and this has raised query on the relationship between biological properties and substance dependency. An assessment was conducted on the neurobiological and neurochemical nature of addiction as well as the degree of discontinuation of alcohol, cannabis, LSD, heroin, cocaine and inhalants use in a senior class in 1995. The study revealed that inhalants were most discontinued whereas a considerable section of users continued to use the rest of the substances. The study also revealed that continued use is more likely for tobacco (in cigarettes), alcohol, cannabis, and cocaine in decreasing order of prevalent (National Institute on Drug Abuse, 1995; Arthur et al., 2002). A hierarchical model of development in alcoholism proposes intensification into higher drinking intensity and frequency (Zucker et al., 1995; Guo et al., 2000). The sequence of substance abuse amongst youngsters involves progression from tobacco and alcohol use to cannabis use and then to other drugs (Kandel, Yamaguchi & Chen, 1992). The risk of cannabis use was found to be 65 times higher amongst individuals who have smoked or drank while the risk of initiation into cocaine is increases 104 times higher with use of cannabis (National Institute on Drug Abuse, 1995; AAPCSA, 1999).

The normalisation hypothesis was proposed by Parker, Williams and Aldridge (2002) to depict and account for popularity and the varying nature of substance use among the youth in modern, high risk communities. This hypothesis proposes three main aspects: a rapid increase in incidence of substance use among the youth; the extensive popularity of recreational substance use; and an open way of thinking towards substance use as a conventional way of leisure (Parker, 2003). In this way, professionals intervening in cases of substance use amongst the youth face challenges in identification and intervention of cases because the majority of such youth cannot be classified in clinical diagnostic criteria for substance abuse (Parker, 2003).

Predisposing and protective factors

An understanding of predictors of alcohol abuse and addiction is important in efforts to prevent the emergence of alcohol abuse and addiction in early adulthood (Guo et al., 2001). A

number of main or interacting factors influence substance use as well as other adolescent behavioural issues (CSRP, 2011). A commonly used prevention approach, the resistance training for teenagers, does not address the basic developmental conditions experienced by children (Harachi, Ayers, Hawkins & Catalano, 1996; CSRP, 2011). Recent developments in preventive knowledge propose that predictors of problem behaviour should be studied through prospective longitudinal research on risk and protective factors as promising targets for preventive intervention (Coie et al., 1993; Durlak, 1998; Kellam, Koretz & Moscicki, 1999; Mrazek & Haggerty, 1994; Arthur et al., 2002). Various adolescent problem behaviours including substance abuse, delinquency, teen pregnancy, school drop-out, and violence can be predicted by a series of common risk and protective factors (Hawkins & Catalano, 2005).

Risk factors, on one hand, are those factors that increase the risk or likelihood that adolescent problem behaviours emerge either in adolescence or in young adulthood (CSRP, 2011). A risk factor can also be defined as a variable that significantly predicts if an individual is likely to develop a disorder or disease. Mrazek and Haggerty (1994) proposed that for a variable to be a risk factor, it must be associated with enhanced probability of disorder and must antedate the onset of disorder.

Protective factors, on the other hand, buffer adolescents from exposure to risks leading to a reduced likelihood of acquiring such behaviours (CSRP, 2011). Protective factors are those variables that decrease the chances of problem behaviour either directly or by mediating or moderating the effect of exposure to risk factors (Fraser, 1997; Luthar & Zigler, 1991; Werner & Smith, 1992). Risk factors tend to independently predict involvement in early and heavy youth substance use whereas protective factors modify the effects of risk factors while not directly and independently predicting substance use. Based on these definitions, effective harm minimisation strategies can be defined as protective factors.

The definition of risk and protective factors depends on the outcome being predicted, the developmental age, and the stage in the development of the behaviour being predicted (Loxley et al., 2004). The number of risk factors is proportional to the chance of problem behaviours but protective factors may neutralise such effects (Harachi et al., 1996; Patin, Schwartz, Sullivan, Coatsworth & Szapocznik, 2003).

Table 1 (p. 12) outlines risk and protective factors affecting substance use. These risk and protective factors can be classified into fixed markers, individual and interpersonal, as well as contextual factors (Kraemer et al., 2001). Fixed markers of risk includes those factors that are not liable to change while variable risk/ protective factors define factors are capable of

manipulation by way of intervention measures. The variable factors are further divided into contextual and interpersonal factors. Contextual factors define “broad societal and cultural” factors, whereas individual factors “lie within individuals and their interpersonal environments” (Hawkins et al., 1992, p. 65). Such factors include family history of the problem behaviour, family management problems, family conflict, favourable parental attitudes and involvement in the problem behaviour (Muisener, 1994). Risks and protective factors operate under four environmental contexts amongst the youth including peer and individual, school, family, and the community (Hawkins & Catalano, 2005). Some factors become more important than others during the course of human development. The higher the number of risk factors and the longer the duration, the greater the impact on subsequent development with the cumulative effect of risk factors operating in a snowball like fashion (Loxley et al., 2004).

Social Control Theory postulates that when individuals have robust relationships with societal institutions such as family, school, or work, this reduces the possibility of engaging in deviant behaviour (Hirschi, 1972). Competent socialisation irrespective of pathway leads to the development of a social bond between the individual and the socializing unit. This social bond has a direct effect on the behaviour of an individual. A pro-social bond may inhibit deviant behaviour when this bond benefits an individual who lives up to the norms and values of the socializing unit (CSRP, 2011).

Family associated factors

Family life factors are those conditions of living that are a part of every family (CSRP, 2011). A number of theories and models on factors influencing substance abuse amongst the youths have been proposed. Domains such as school, peer influence and society are important but the most outstanding, amongst all of them is parental and family factors (United Nations Office on Drugs and Crime [UNODC], 2009; Velleman, Templeton, Copello & Alex, 2005).

Table 1 Contextual, variable and individual risk and protective factors affecting substance use

Risk and/ or protective factors	Risk or Protective	Reference	Finding
Fixed Markers			
Sex or gender	R	Challier et al., 2000	Smoking, alcohol use and other substance have been reported to be more frequent in boys than in girls
Biological indicators	P	Greydanus & Patel, 2005	High intelligence and good general health are associated with lower chances of substance abuse
Income	R	Fothergill & Ensminger, 2006	Poverty may indirectly affect substance use by increasing parental stress leading to a decreased quality of parenting
Family substance history	R	Weinberg, Rahdert, Colliver & Glantz, 1998	Systematic pairing of drug abusing parents poses an immense risk for substance abuse amongst offspring
	R	Challier et al., 2000	Use of substances by family members favours substance use
	R	Hawkins & Catalano, 2005	Family history of the problem behaviour is a risk factor for substance abuse
	R	Beyers et al., 2004	Use of substance by parents influences substance use initiation
	R	Kliewer & Murrelle, 2007	Problematic drugs and alcohol use by parents or other family members may model use
	R	CSRP, 2011	Siblings of substance abusers are at a greater risk compared to peers of the same age
Parent psychopathology	R	Weinberg et al.,1998	Depression and anxiety amongst parents has been linked to substance use in offspring
	P/R	Demuth and Brown, 2004	Psychological and emotional presence of parents tend to have more impact on substance use in offspring than their physical presence
Parental marital status	R	Challier et al., 2000	Single parenthood favours substance use among offspring
Income/ Social economic status	R	Hawkins and Catalano, 2005	Extreme economic deprivation is a risk factor for substance abuse
Contextual variables			
Law	P	CSRP, 2011	Strict law enforcement is a very common preventive measure for substance abuse
Availability	R	Hawkins & Catalano, 2005	Availability of drugs is a risk factor
Social norms	R	Hawkins & Catalano, 2005	Community laws and norms favourable towards drug use are risk factors
	R	Hawkins and Catalano, 2005	Favourable media portrayals of abuse behaviour are a risk factor
	R	Patel & Greydanus, 1999	Permissiveness is a risk factor for substance use
Community order	R	Hawkins & Catalano, 2005	Low neighbourhood attachment and community disorganization are a risk factor for substance use
Individual variables			
Family relations	R/P	Baumrind, 1996	Substance use may be mediated by the quality of relationship between parent and adolescent
	R/P	Fothergill & Ensminger, 2006	Bonds between adolescents with parents may discourage or aid risk behaviours including drug and alcohol use

	P	CSRP, 2011	Parental role and communication skills for high-risk and drug abuse are common preventive measures
	P	UNODC, 2009	Supportive families associated with less problems due to better social, mental, and physical health are protective factors against substance abuse
	P	UNODC, 2009	Attachment to, a sense of belonging and closeness to a biological parent or at least one surrogate care-giver may play a mentoring and protective role
	P	Pasch, Stigler, Perry & Komro, 2010	Youth satisfaction with relationship with their parents is a protective factor
	P	CSRP, 2011	Positive paternal and maternal relationships are a protective factor
	P	Greydanus & Patel, 2005	Nurturing home environment, good communication within family and supportive parents lower chances of substance abuse
	P	Beyers et al., 2004	Family bonding and support by parents are associated with lower risk of substance use initiation and regular use
	P	Kliewer & Murrelle, 2007	Presence of positive family interaction (family cohesion and communication) are a protective factor
	R	Hawkins and Catalano, 2005	Family conflict is a risk factor for substance use amongst the youth
	R	Harachi et al., 1996	High risk of substance abuse and experimentation are associated with lower family bonding
	R	Skeer, McCormick, Normand, Buka & Gilman, 2009	Exposure to conflict within the family leads to increased risk of substance use during late adolescence
	R	CSRP, 2011	Predisposing factors include frequent outburst of anger and hostility, cold and irresponsive relationships among family members
	R	CSRP, 2011	Parents low in warmth and high in hostility are predisposing factors
	R	Ackard, Neumark-Sztainer, Story & Perry, 2006	Low parent-child connectedness is a predisposing factor
	R	Yen, Yen, Chen, Chen & Ko, 2007	Predisposing family factors include high conflicts with parents
	R	CSRP, 2011	Alienated relationship between parents and teenagers is a predisposing factor
	R	Greydanus & Patel, 1999	Parental conflict is a risk factor for substance use
	R	Beyers et al., 2004	Family conflict influences substance use initiation
	R	Kliewer & Murrelle, 2007	Negative family interaction such as conflict and poor communication is a risk factor for substance abuse in adolescents
	P	Brook, Cohen & Gordon, 1983	Affection and lack of conflict between parents and adolescents protects the youth from substance use
	R	Brook et al., 1983	Poor parenting, high degree of family conflict, and a low degree of parents-children bonding appear to increase risk of abuse of alcohol and other drugs
Family management	P	Arria et al., 2008	Parental monitoring and supervision may reduce the risk for alcohol consumption among younger adolescents.
	P	CSRP, 2011	Functional families may significantly reduce the factors enhancing substance abuse and also other problems amongst the youth.

	P/R	Shek, 2002	Family functioning significantly influences adolescent delinquency and substance abuse behaviour
	P	UNODC, 2009	Healthy parent-child attachment, functional family structure, appropriate parental monitoring, authoritative parenting style, and communications of pro-social values by family members prevent substance abuse amongst the youth.
	P	Greydanus & Patel, 2005	Functional family and appropriate adult supervision lower chances of substance abuse
	R	Fothergill & Ensminger, 2006	Inadequate supervision by parents is associated with higher risk of substance and alcohol use
	R	Hawkins & Catalano, 2005	Family management problem is a risk factor for substance use
	R	Harachi et al., 1996	High risk of substance abuse and experimentation are associated with poor family management
	R	Patel & Greydanus, 1999	Dysfunctional family dynamics is a risk factor for substance abuse
	R	Patel & Greydanus, 1999	Authoritarianism by parents is a risk factor for substance use
	R	Patel & Greydanus, 1999	Poor or lack of supervision of adolescents is a predisposing factor for substance use
	R	Beyers et al., 2004	Poor family management is a predictor of current substance use
	R	Kliewer & Murrelle, 2007	Inadequate monitoring of adolescent behaviour increases opportunity for drug and alcohol use
Education factors	R/P	Fothergill & Ensminger, 2006	Bonds between adolescents with schools may discourage or aid risk behaviours including drug and alcohol use
	P	Crum & Anthony, 2000	Educational achievement may act protectively against substance use irrespective of race
	P	Greydanus & Patel, 2005	Academic success and good schools lower chances of substance abuse
	R	Fothergill & Ensminger, 2006	Low school bonds is associated with higher risk of substance and alcohol use
	R	Hawkins & Catalano, 2005	Academic failure beginning in late elementary school and lack of commitment to school are risk factors
	R	Harachi et al., 1996	High risk of substance abuse and experimentation are associated with low commitment to school and academic failure.
Positive attitude or expectancies	P	Greydanus & Patel, 2005	Positive self-esteem and assertiveness lower chances of substance abuse
	R	Hawkins & Catalano, 2005	Favourable parental attitudes and involvement in substances is a risk factor
	R	CSRP, 2011	Favourable attitudes towards the problem behaviour are a risk factor for substance use
	R	Greydanus & Patel, 1999	Poor parental role modelling is a predisposing factor for substance use
Social competence	P	Greydanus & Patel, 2005	Social competence lower chances of substance abuse
	P	Beyers et al., 2004	Protective factors associated with an individual include social or refusal skills
	P	Loxley et al., 2004	The positive relationships with adults even in poor environments are protective against substance use
	R	AAPCSA, 1999	Lack of a warm relationship and failure during early development is a risk factor

Peer relations	P	Greydanus & Patel, 2005	Positive adult role models and peer group with positive personal attributes lower chances of substance abuse
	R	CSRP, 2011	Friends who engage in the problem behaviour and gang involvement are a risk factor for substance use
	R	Beauvais & Oetting, 1986	Peer pressure has been held as the most significant predictor of initiation and maintenance of substance use in adolescents either directly or through mediation of other factors
	R	Beauvais, 1992	Risk factors include initiation of use, supply of substances, shaping use patterns and attitude
Religious involvement	P	Greydanus & Patel, 2005	Religious involvement lower chances of substance abuse
	P	Beyers et al., 2004	Protective factors associated with an individual include religiosity
	P	Kliewer & Murrelle, 2007	Parental religiosity through influence on religiosity in adolescents acts as a protective factor
Conformity or moral order	P	Greydanus & Patel, 2005	A personal sense of morality lower chances of substance abuse
Living situation	R	Challier et al., 2000	Inadequate living standards favour substance use
	R	Challier et al., 2000	Smoking, alcohol and other substance use are more associated with urbanisation that economic status
Stressful events	R	Hawkins & Catalano, 2005	Transitions and mobility are a risk factor for substance abuse
	R	Greydanus & Patel, 1999	Divorce or separation of parents is a risk factor for substance abuse
Individual psychopathology	R	Hawkins & Catalano, 2005	Early and persistent antisocial behaviour for substance abuse
	R	Hawkins & Catalano, 2005	Rebelliousness is a predisposing factor to substance use amongst the youth
	R	Harachi et al., 1996	High risk of substance abuse and experimentation are associated with early and possibly persistent behaviour problems
Adolescent substance use	R	Hawkins & Catalano, 2005	Early initiation of the problem behaviour is a risk factor for substance abuse

Consequently, there is an increasing recognition of the key role of family in both prevention and intervention through risk reduction, or promotion of protection and resilience. The family is important in socialisation at home and during school periods and it remains the main holding environment for the support of the developing adolescent (Fleming, Catalano, Oxford & Harachi, 2002). A well-functioning family environment also provides safety and support for teenagers (CSRP, 2011). Drug abuse is therefore seen as a manifestation of the underlying problems within the family. The influence upon the offspring by parents may play an equally important role on substance use as peer influence (Baumann, Spitz, Predine, Choquet & Chau, 2007).

Family based interventions have high impact and more sustainability when compared with strategies based on other important risk factors for substance abuse (UNODC, 2009; Spooner, Hall & Lynskey, 2001). Family intervention may form an important early intervention especially for at risk families as a low cost measure when viewed in the long run together with multiple additional benefits against co-occurring delinquent behaviours (Spooner et al., 2001). Family and network approaches work in synergy with other interventions leading to improved outcomes when compared to individual interventions (Velleman et al., 2005).

Family dynamics, friends, communities, workplace, governmental policies and services, and the broader economic and social environment may affect family well-being in an 'ecological' manner (Stevens, Dickson & Poland, 2005). Family functioning may in turn highly affect adolescent substance abuse. Mitigation strategies should therefore in addition to addressing the drug user also focus on entities within family as well as the environment surrounding the user (UNODC, 2009).

Intervention and prevention approaches

Most programmes aimed at prevention of substance abuse have particularly been focused at children and adolescents (Arthur et al., 2002). The change from primary to secondary school is an important intervention point because at this stage, there are changes in peer and family relationships, and a markedly independent nature of the academic programs (Petrie, Bunn & Byrne, 2006). Prevention of initiation targeting different phases of development is therefore more cost-effective than latter intervention after use patterns have been established (Beyers et al., 2004; Guo et al., 2000). Prevention strategies should consider both the type of substance used and the mode of use. This is especially important because early alcohol and tobacco use

initiation is a risk factor for the initiation of other illicit drug use (Kandel, 1975; Guo et al., 2000; Peltzer et al., 2010). Despite the universal uniformity in substance use, patterns vary geographically (Foxcroft & Tsertsvadze, 2011). The focus must not only be on prohibition but also harm minimisation (CSRP, 2011). Various theoretical paradigms form an important basis of intervention and prevention approaches for substance abuse particularly with respect to children and adolescents.

Theoretical frame works for prevention strategies

The Ecological System Theory was described by Bronfenbrenner (1979) in relation to substance abuse. It proposes that human behaviour can be explained using layers of systems and their interactions around the person. These systems include: microsystems (the person's immediate environment, for example family, peer group, school and neighbourhood); mesosystem (interrelations between microsystems); exosystem (external settings that do not involve the person as an active participant but still affect the person, or is affected by the person); macrosystem (larger cultural and the underlying ideological context); and chronosystem (the effect of time or the dimension of life span). Substance abuse is mediated by an interaction between the layers (Stormshak & Dishon, 2009). For effective intervention and prevention, deterrence efforts must focus on the relevant layers (Vimpani, 2005). Restructuring the settings or environment where the person lives, can shape the individual's behaviour, and such an environmental approach can be used in reduction of both substance supply and demand.

The following prevention strategy of substance abuse amongst the youth given by Randall and Cunningham (2003) targeted the relevant layers:

- individual level - experimentation with substances (microsystem),
- family level -effective parental monitoring (exosystem),
- school level-attachment to school (exosystem) and
- political, economic or cultural level-promotion of healthy living style (macrosystem).

This theory lays an important base in understanding the interaction between risk and protective factors for problem behaviours at various levels.

Adverse influence by peers, family, school, and neighbourhood on adolescents necessitates a change in the environmental contexts wherein the adolescents live (Randall & Cunningham,

2003). Effective prevention and intervention measures should therefore consider "ecological validity".

The Broken Windows Theory was proposed in criminology by Kelling and Wilson (1982) to curb minor offences in individuals before they advance to major offences. This theory has been applied in substance abuse deterrence (CSRP, 2011). It is important to employ preventive measures to prevent initiation and to early recognise a substance abuse problem. Like the early fixing of a broken window to avoid deterioration, timely rectification of substance abuse may stop deterioration.

Public Health Model proposes that actions by individuals result from interactions amongst the environment (physical and social context), the person (host), and the agent (substance) (Community Anti-Drug Coalitions of America [CADCA], 2008). Interventions are organised in a continuum of three levels: primary aimed at prevention of initiation; secondary measures to arrest use progression for individuals at the initial stage of substance abuse; and tertiary stage aimed at amelioration of the negative effects of substance use, rehabilitation and prevention of relapse (CSRP, 2011).

Universal Prevention Strategy

Universal Prevention Strategy aims at preventing initiation or delay in substance abuse for the whole population by creating awareness and problem prevention skills. Strategies are disseminated to the entire group without prior screening for risk factors. However substance use risk may greatly vary (Foxcroft & Tsertsvadze, 2011). Some of the strategies include drug free strategies in schools and media awareness programmes such as 'Guiding Good Choice' by Hawkins et al. (2005). The universal prevention approach becomes desirable when the extent of problem is not known and is within a large population.

Universal prevention strategies for reduction in incidences of delinquency including substance abuse within the family include nurturance of behaviour, parental monitoring, parental support and creating boundaries and rules. Positive parenting may encourage children to resist external influences and adopt positive behaviours prevalent within their families. Family based and school based prevention methods differ in that family approach deals indirectly with the target group through parents and family members as opposed to school based approach where intervention is made directly through peer groups. Parental awareness of the associations and the frequency of meeting with other addicted children is

important because the children may be influenced into substance use through peer pressure (Foxcroft & Tsertsvadze, 2011).

Family based prevention in the long and short run, deals not only with prevention of a single behaviour but also a range of problems emanating from substance abuse. This has an impact on a range of problematic behaviours such as use of harder drugs, antisocial behaviours and over indulgence in alcohol. Even though such family based programmes for substance abuse prevention involve small groups (the family unit), it has been proposed that their economic importance may be high (Foxcroft & Tsertsvadze, 2011).

The social development model (SDM)

SDM involves a general theory of adolescent antisocial behaviour, which encompasses both risk and protective factors within the four contexts including parents, peers, schools and community (Catalano & Hawkins, 1996). Variation exists in the magnitude of effects associated with relations and risk factors are generally more influential than protective factors (Kliewer & Murrelle, 2007). Many reports have proposed that family or school factors are some of the strongest predictors of adolescent outcomes (Kliewer & Murrelle, 2007; Cleveland et al., 2008; Table 1, p. 12).

Federal, state and community based prevention programmes

Longitudinal studies have consistently and strongly revealed a direct relationship between exposure to risk factors and the likelihood of a variety of behavioural problems (Bry, McKeon & Pandina, 1982; Newcomb & Felix-Ortiz, 1992). It has been proposed that the number of present risk factors better predicts problem behaviours than the individual risk factors (Sameroff Bartko, Baldwin, Baldwin & Seifer, 1998). Such evidence has been the basis of federal, state, and community based prevention strategies which involve risk and protective factors as indicators during prevention needs assessment (Arthur et al., 2002). Despite inter-country differences in policy emphasis, the factors influencing substance abuse amongst the youth are generally similar (Beyers et al., 2004).

Parental role and communication skills for high-risk and substance abusing families and strict law enforcement are the most common drug use preventive measures in many countries. Training towards improved family functioning are common approaches in United Kingdom, United States, Australia and Canada where different government authorities are in charge.

Parents are seen as beneficial "first person" to talk to their children about negative consequences on drug use (UNODC, 2009).

Change in the environmental contexts including of peers, family, school, and neighbourhood factors are recommended (Randall & Cunningham, 2003). Family skills training programmes are regarded among the most successful measures for substance prevention (UNODC, 2009).

Substance use situation in South Africa

There is a continuous rise in use of Alcohol and other Drugs (AODs) amongst South African adolescents and high school students show high prevalence in alcohol abuse making alcohol the most commonly abused substance (Peltzer et al., 2010). Prevalence in the use of cannabis among adolescents was 2% to 9% and among adults 2%, cocaine/ crack (0.3%), mandrax/ sedatives (0.3%), club drugs/ amphetamine-type stimulants (0.2%), opiates (0.1%) and hallucinogens (0.1%). The primary illicit substance at admission to South African drug treatment centres was cannabis (16.9%), methamphetamine (Tik) (12.8%), crack/ cocaine (9.6%), cannabis and mandrax (3.4%), heroin/ opiates (9.2%), and prescription and OTC (2.6%) (Peltzer et al., 2010). In a similar scenario to Europe and the USA the most commonly used illicit substance among high school students is cannabis (Johnston, O'Malley & Bachman, 2000). Even though there has been an increase in substance abuse treatment related admissions, illicit drug use amongst the adolescents in South Africa is comparatively lower than that of USA and Australia (Peltzer et al., 2010).

However, the South African Community Epidemiology Network on Drug Use (SACENDU) project reveals that AOD use by South African adolescents may increase the burden on the health, social wellbeing, and criminal justice apparatus of the country. There is multiple evidence of high prevalence in substance use amongst the youth including high numbers of adolescent patients who are treated at trauma units whose tests reveal alcohol or other drugs (Peltzer et al., 2010). There is a high frequency of individuals involved in criminal justice system below 20 years of age who test positive for illicit drugs (Peltzer et al., 2010).

Similar to other international patterns on alcohol use among adolescents, prevalence in binge-drinking intensifies with age irrespective of gender though prevalence is much lower for females (Johnston, O'Malley, Bachman & Schulenberg, 2012). There was a significant relationship between monthly alcohol use and poor performance in academics (Flisher, Townsend, Chikobvu, Lombard & King, 2010). Additionally, an association was found

between binge-drinking and high risk sexual conduct (Flisher, Mathews, Mukoma & Lombard, 2006). Such association between binge-drinking and high risk sexual conduct calls for intervention due to the possible effect on HIV infection among young people in South Africa (Taylor, Dlamini, Kagoro, Jinabhai & De Vries, 2003).

With close to half of the South African population consisting of youth 20 years old or younger (Statistics South Africa, 2012), it is important to pay attention to the use of AODs by this group due to the possible effect on the country's socio-economic development (Parry & Bennetts, 1998).

Summary and Gaps in Knowledge

Substance use amongst adolescents is a common cause of a number of deleterious effect on individual health and well-being, society health, safety and economy of many governments in both developed and developing countries (Greydanus & Patel, 2005; National Research Council, 1993; Fothergill & Ensminger, 2006; Challier et al., 2000; Beyers et al., 2004; Gil et al., 2002). Like in many other behavioural problems, substance use problems rise to a peak during adolescence and decline as adolescents transition to adulthood (Arthur et al., 2002). The study of epidemiology and aetiology of substance abuse is an important guide for the development of prevention and treatment interventions (Greydanus & Patel, 2005). This is because amongst individuals who initially use a substance, not all progress to abuse and addiction and this has raised query on the relationship between biological properties and substance dependency. Theoretical frame works which form an important basis of intervention and prevention approaches for substance abuse particularly with respect to children and adolescents are discussed. Family intervention may form an important early intervention especially for at risk families. This is a low cost measure when viewed in the long run and is accompanied by multiple additional benefits against co-occurring delinquent behaviours (Spooner et al., 2001). From the foregoing, effective substance abuse prevention should take into account both risk and protective factors (Harachi et al., 1996; Hawkins & Catalano, 2005). Strategies aimed at minimisation of risk factors and underlying problems as well as increasing the protective factors have shown high impact not only on substance abuse but also on other adolescent behavioural problems. Continuous study of risk elements targeting different cultures and social groups and mixture of society has therefore been recommended (Maddahian, Newcomb & Bentler, 1988). One of the most important among the risk and protective factors acknowledged in almost every psychological theory on the

subject of adolescent problem behaviour is family (Bry, Catalano, Kumpfer, Lochman & Szapocznik, 1998). Few family centred prevention programmes for adolescents have been developed and tested, despite epidemiologic research highlighting the emergence and escalation of substance use related conduct problems (Brody, Chen, Kogan, Yu, Molgaard, DiClemente & Wingood, 2012).

A continuous rise in use of Alcohol and other Drugs (AODs) amongst South African adolescents and high school students has been reported (Peltzer et al., 2010). There is however, a local research gap about how the above family antecedent factors interact with each other in their effect on substance abuse by adolescents. The role of family both as a potential root cause and solution to the problem of drug use should be investigated.

PRIMARY THEORETICAL FRAMEWORK

This section discusses the theoretical framework adopted in this study. The social development model and the associated theories, social learning theory and social control theory are discussed as well as their roles as foundations of risk and protective factor based interventions against substance use.

The Social Development Model

A theory of causation and prevention is an important prerequisite to an intervention strategy that seeks to mitigate upon risk factors while at the same time enhancing protective factors (Hawkings, 1992). The social development model is one such foundation to delinquency and substance use prevention efforts (Kazdin, 1990; Hawkins et al., 1992). The social development model integrates control theory (Hirschi, 1969) and social learning theory (Bandura, 1977), to emphasize the role of bonding to family, school, and peers as a protection against the development of conduct problems, school misbehaviour, truancy, and substance use.

The social development model postulates about the source of bonding to a social unit. Interactions among (i) prospects for participation available in each social unit, (ii) the skills that individuals possess and may exploit in these social units, and (iii) the positive reinforcement offered in these units are hypothesized to result in social bonds of attachment, commitment, and belief in the values of the social environments where the young people develop (Hawkins et al., 1992). Explicit, theory-driven objectives of intervention elements based upon these factors include: (i) to create opportunities for pro-social activities for the

youth; (ii) to offer empowerment towards successful performance of these activities; and (iii) to offer positive reinforcement for successful contribution. The social development model therefore supports a multipronged prevention methodology which is based on risk and protective factors irrespective of social settings. The two components of social development model namely social control theory and social learning theory and their relation to substance use risk and protective factors are further discussed below.

Social Control Theory

The social control theory grew in importance as a result of conflicting quest by sociologists to explain perceptions on crime in the 1960s (Lilly, Cullen & Ball, 1995). Travis Hirschi during this phase advanced this pioneering viewpoint of control theory which he construed from existing concepts of social control. The social control theory as postulated by Hirschi affirms that bonds to family, school and other societal units will lessen an individual's tendency to deviant behaviour (Lilly et al., 1995). The social control theory proposes that when these ties are weakened deviant behaviour is exhibited (Lilly et al., 1995). Control theory contrasts other attempts to explain engagement in deviant behaviour in that the theory pursues the issue on why individuals refrain from committing crime (Akers & Sellars, 2004). The likelihood of engagement in deviant behaviour is therefore viewed as inherent in all individuals but this tendency is diminished by bonds to family and other social units.

Hirschi proposed that these bonds are based on fours aspects of social control that may interact to shield one from engaging deviant behaviour (Siegel & McCormick, 2006). These include: attachment to family and others such as friends, teachers, and co-workers; commitment such as academic and career aspirations which involves investment of time and efforts; improvement of bonds with others occupying most of an individual's time leaving little time for involvement in deviant activities; and, a belief in broader social values. Numerous studies have tested this theory amongst young people with respect to impact of bonds with family, school, community and religion on delinquent behaviour (Stone et al., 2012; Hawkins et al., 1992). Main findings and from such studies and their implications are discussed further in this section.

When viewed in terms of parental attachment, an important social control source for young people lies within the family, especially the interactions with and feelings towards parents (Stone et al., 2012). Attachment particularly to parents is a key aspect of social control theory (Henrich, Brookmeyer & Shahar, 2005). Significant negative correlation has been reported

between parental attachment and delinquency (Chapple & Hope, 2003; Henrich et al., 2005). The extent of parental supervision and support is also important. For instance, less parental monitoring in early age has been associated with increased engagement in proactive aggression and violence later on in adolescence (Brendgen, Vitaro & Lavoie, 2001; Chapple, 2003).

Adolescent attachment to school is another fundamental aspect that forms social control in Hirschi's social control theory. A substantial number of studies have attempted to evaluate the role that school attachment and school support plays on delinquent behaviour among the young people. Classroom environment characterized by stronger supportive and social interactions and fostering of stronger attachment to school were associated with less likelihood of initiation and continuation of violent behaviour (Sprott, 2004; Sprott, Jenkins & Doob, 2005; Brookmeyer, Fanti & Henrich, 2006; Resnick, Ireland & Borowsky, 2004; Banyard & Quartey, 2006). The effect of school attachment in the lives of young people also acts in interaction with role that parents play (Brookmeyer et al., 2006) as well as religiosity (Herrenkohl, Hill, Chung, Guo, Abott & Hawkins, 2003) in preventing violent offending amongst young people. Lower perceptions of neighbourhood monitoring, and diminished feelings of social responsibility have been associated with delinquency among young people (Banyard & Quartey, 2006). Community conduct norms discouraging aggression have been associated with lower engagement in aggressive behaviour even more than the effect of conduct norms and peers (Bernburg and Thorlindsson, 2005).

Mixed findings have been reported in studies seeking to measure the role of religiosity on delinquency (Benda & Turney, 2002; Herrenkohl et al., 2003; Resnick et al., 2004; Johnson, Jang, Larson & De Li, 2001; MacDonald, Piquero, Valois & Zullig, 2005; Benda & Corwyn, 2002). Religiosity as defined by extent to which individuals ascribe to the beliefs of a particular religion and are dedicated to attending associated religious events on a regular basis, may have a negative effect on delinquency (Benda & Turney 2002; Herrenkohl et al., 2003; Resnick et al., 2004) and association with delinquent peers (Johnson et al., 2001).

Others however have reported lack of support for the notion that religious involvement lowered the likelihood of delinquency (Benda & Corwyn, 2002; MacDonald et al., 2005). The strength of the social control theory in explaining more critical delinquency has been questioned by Gibbons (1994) and others who however agree that the theory may be more

effective in explaining minor offending. Social control theory in relation to substance use among the youth is discussed below.

Social control theory and substance use

Social control theory proposes that adolescent substance use emanates from social controls which are not sufficient to constrain the use of substances. Low parental monitoring fosters association with substance abusing peers which in turn predisposes adolescents to higher substance abuse (Davison, Neale & Kring, 2004; Pressley & McCormick, 2007; Rice & Dolgin, 2008, Liddle & Rowe, 2006). Privation of emotional support by parents has been associated with intensified use of tobacco, alcohol, and cannabis (Davison et al., 2004; Rice & Dolgin, 2008).

Parenting skills or parental behaviour may also be associated with substance use among adolescents (Carson, Butcher & Mineka, 2000). Higher stress and the attendant negative effects on adolescents such as increase in negative uncontrollable life events in families with an alcoholic parent often has been linked to affiliation of adolescents to substance abusing peers (Carson et al., 2000).

Parental control by the way of stipulating clear requirements for mature and responsible behaviour, but not power-assertive or authoritarian forms of instilling discipline, were associated with reduced incidence of substance use (Liddle & Rowe, 2006; Louw, van Ede & Louw, 1998; Rice, 1992).

Young people who live in a family structure characterized by the presence of both biological parents are considerably less likely to use substances and have problematic use when compared with those who do not live with both parents (Rice & Dolgin, 2008). However, factors other than family structure alone such as disruptions in the family life cycle which tend to characterise these single-parent households may explain substance abuse.

Family factors may also act as protective or mediating factors on the risk of substance abuse. As noted above, two-parent households appear protective. Some risk factors may be difficult or resistant to change and for purposes of prevention policy, protective factors which mediate or moderate the effects of exposure to risk are more appropriate (Hawkins et al., 1992). The concept of protective factors came to prominence after reports studying certain populations exposed to multiple risk factors continued to show resilience to these risks (Werner, 1989).

The concept of protective factors postulates that certain aspects mediate or moderate the impact of exposure to risk factors and in this way lower the vulnerability and enhance the resiliency of individuals at risk and in this way protects them from associated outcomes. Effective family relationships, such as involvement and communication, functional family management, support from family, or bonding to family may protect against substance use and abuse in youth across racial and cultural groups (Liddle & Rowe, 2006). Furthermore, the positive effects have been shown to persist in latter stages of life in adolescents. For instance, better family support and bonding during adolescence was reported to predict less problem alcohol use in adulthood (Rice & Dolgin, 2008).

However protective factors should not be viewed as the opposite of risk factors but as those aspects that lead to variation in consequence of exposure to risk factors. Protective factors are therefore related in a nonlinear and interactive fashion to risk factors.

Social Learning Theory

Social learning theory is a combination of cognitive learning theory (which posits that learning is influenced by psychological factors) and behavioural learning theory (Bandura, 1977). Cognitive learning theory proposes that learning is guided by psychological factors whereas behavioural learning theory supposes that learning is built upon responses to environmental stimuli. Albert Bandura combined these two theories into social learning theory which suggested four prerequisites for learning: observation (environmental), retention (cognitive), reproduction (cognitive), and motivation (both cognitive and environmental) (Bandura, 1977). The theory suggests that a process of operant conditioning enables primary learning of behaviour by shaping behaviour through its outcomes. This theory's social connection therefore emanates from the assumption that behaviour is not only learnt through direct conditioning, but also through reproduction of behaviours of others.

The importance of social groups lies in their effect on an individual as main sources of reinforcement and punishment, exposure to behavioural models and formation of conceptualizations of normative behaviour. For instance, frequent alcohol consumption may be regarded as normative by individuals raised in homes where members use alcohol frequently. Studies have reported that family and peers form the most significant of these social groups (Stone et al., 2012).

Social learning theory suggests that it is through the observation and experience with problematic behaviours and connected consequences, that the use and abuse of substances may develop. Individual norms and expectations concerning the use of substances may therefore be influenced by experiencing as well as observing reinforcement or punishment due to use of substances (Akers, Krohn, Lanza-Kaduce & Radosevich, 1979). Abstinence and initial use are influenced by interaction between these factors, which are also associated with extent of substance use after initial use. Social norms therefore may lead to unfavourable outcomes in case of abstinence in an environment where substances are commonly abused in similar manner as substance use in environments where use is reprimanded (Akers et al., 1979).

With regards to relevance of the social learning theory to substance abuse, Akers et al. (1979) reported that social learning theory may explain the fact that variables explaining social group association (especially with peers) account for most of the variance for cannabis and alcohol use. Social learning is especially significant in early stages of substance use. Social learning in relation to substance use has also been linked to influence of parental modelling on substance use. Parental and other household users of substances have been compellingly associated to early age initiation as well as continued use and abuse of substances (Stone et al., 2012).

Particular substances such as alcohol and cannabis are more frequently used in group settings (Skog, 2006), and use is associated with time spent with others (Peretti-Watel & Lorente, 2004). From the foregoing, it is therefore concluded that social learning may play a significant role in substance use and abuse.

CHAPTER 3

METHODS

INTRODUCTION

The research method is discussed in this section. The selection of samples, sampling units and characteristics of the respondents are initially described. The research procedure is then outlined and measures taken to ensure data quality is maintained during the administration of the questionnaire. Ethical issues considered during the study as well as necessary clearances are also discussed. The questionnaire is described as well as the selection and rationale behind the psychometric measures used to answer the research questions. Exploratory data analysis and the tests on appropriateness of the measurement scales are described. Multivariate and univariate models used to test the study hypothesis are outlined taking into consideration controlled variables. Research benefits and participant expectations are then discussed

Participants

The investigator personally interviewed adolescent participants with a history of substance abuse. Participants were recruited from rehabilitation centres in Pretoria, namely Staanvaas and Castle Carey, between September 2014 and June 2015 and were contacted upon ethical approval of the study. A purposeful sampling method was used to select the participants (Kerlinger & Lee, 2000; Liamputtong & Ezzy, 2005). Purposive sampling is a non-probability sampling technique whose goal is not to randomly select units from a population but to focus on particular characteristics of a population that are of interest, which will best enable you to answer your research questions. Such a study involving information rich cases offers useful manifestations of the concepts being studied and in this way useful insights can be gained while avoiding just empirical generalisations (Newman, 2000; Patton, 2001).

A total of 54 respondents were interviewed consisting of 48 males and 6 females. Participants were representative of different socio-economic backgrounds.

Procedure

The purpose of the study was first explained and any questions were responded to in order to

make respondents feel free to contribute and to provide clarity where necessary. The interviews were conducted in private boardrooms at the rehabilitation institutions during Tuesdays, the day when adolescents had free time available from therapy and other institutional activities. I personally interviewed each patient individually in order to provide a private and non-threatening environment, which was also quiet and free from interruptions. Both the respondent and interviewer exchanged booklets, and both marked the responses directly on the questionnaire. The interviewer then cross checked the responses. To pre-test the questionnaire, results and the interview process was initially evaluated after interviewing of 6 participants. This enabled me to assess any logistical problems and the adequacy of the questions and proposed analysis amongst other aspects of the study.

Ethical Considerations

Ethical clearance was first sought and awarded from the Ethics Committee of the Department of Psychology at the University of South Africa in August, 2014 after evaluation of the research proposal with respect to ethical requirements. Signed consent was sought from the participant and/ or their parents or guardians where the participants were below 17 years before proceeding with the study Annex 1(A). The participants were informed of their rights to withdraw from the study and that their privacy and confidentiality of the information was protected and measures towards this were communicated. Permissions were also sought from the rehabilitation centre management who also debriefed the student about procedures to access the participants and to perform the interviews.

Measures

Data was collected using a structured pre-tested questionnaire (Annex 2). Validated psychometric measures reported in peer reviewed journals and commonly used by other researchers were used to develop the questionnaire. Table 2 (p. 30) shows variables and components of the scales used.

Table 2 Family relations and management variables and their measures used during the study of risk and protective factors affecting adolescent substance abuse

Variable	Measures	Reference
Background Variables	Gender, age, level of education, cultural background, parental marital status, parental education, parental socio-economic status	Stone et al., 2012
Family Relations		Stone et al., 2012
Family Functioning and Conflict	Cohesion, expressiveness, conflict, intellectual-cultural orientation, active-recreational orientation, religious emphasis, organization, family sociability, external locus of control, family idealization, disengagement, democratic family style, laissez-faire family style, authoritarian family style, enmeshment	Bloom, 1985
Family bonding and support	Companionship, conflict, instrumental aid, antagonism, intimate disclosure, nurturance, affection, reassurance of worth, relative power, reliable alliance	Furman & Buhrmester, 1985
Family Management		Stone et al., 2012
Parental monitoring	Monitoring	Arria et al., 2008
	Delinquency	Steinberg, Fletcher and Darling, 1994
Discipline and Behavioural Control	Sharing, control through guilt, strictness, expression of affection, emotional support, parental direction, sharing, moderate autonomy, lax discipline, positive evaluation, negative evaluation, irritability, extreme autonomy	Schaefer, 1965; Avgar, Bronfenbrenner & Henderson, 1977
Parental rewards	Good behaviour, achievement	Guo et al., 2001
Substance use		
Adolescent and parental substance use	Intensity and frequency of alcohol use, frequency of other substance use, age at initiation of use	Roche, Ahmed & Blum, 2008

As a pre-test of the questionnaire, results and the interview process was initially evaluated after interviewing of 6 participants to assess any logistical problems and the adequacy of the questions and proposed analysis amongst other aspects of the study. No changes to the questionnaire were deemed necessary after this evaluation.

Background variables

Background variables such as ethnicity, gender, parental education, parental marital status and income/ socioeconomic status have been shown to influence substance use and abuse (Stone et al., 2012). These variables were factored in during data analysis. Those background variables influencing the results significantly will be controlled for their effect on study variables.

Youth and parental substance use

The frequency at which tobacco, alcohol, cannabis, and other illicit drugs are used was measured. Frequency of illicit drug use was measured using an open-ended questionnaire which was used to enquire use for the past 2 years for nonmedical purposes of either any of the drugs including amphetamines, barbiturates, cocaine, heroin, LSD or other psychedelics and tranquilizers. Response categories included: 7 = everyday or almost every day; 6 = 3 to 5 days a week; 5 = 1 or 2 days a week; 4 = 2 or 3 days a month; 3 = once a month or less; 2 = 1 or 2 days in the past 12 months; 1 = never (Roche et al., 2008).

Family Relations

Respondents reported on their perception of family conflict (family conflict, parent–parent conflict, family-adolescent conflict) and family functioning based on the scale from Bloom's Family Processes Scale (BFPS) (Bloom, 1985). Fifteen scales were used and questions included examples such as: family members really help and support one another, there is a feeling of togetherness in our family, our family does not do things together and we really get along well with each other. The Network of Relationships Social Provision version (NRI-SPV) (Furman & Buhrmester, 1985) was used to measure family bonding and support by respondents answering questions about their relationship with the mother/ mother figure (where present), father or father figure (where present) and family as a whole. The NRI-SPV (Furman & Buhrmester, 1985) has ten scales with three items per scale which assess 7 support features, 2 negative interaction features, and relative power. The negative interaction features were reverse coded before

analysis. Typical questions included: how often the adolescent spent fun time with this person; how often the adolescent and this person go places and do things together and how often one plays around and have fun with this person.

Family management

Family management is a broad concept which encompasses (i) parental monitoring, (ii) discipline, (iii) behavioural control, and also (iv) the reward system set in place by parents to reinforce good behaviours (Stone et al., 2012).

Parental monitoring was assessed using parental monitoring measurement tool by Arria et al. (2008) consisting of nine questions on a four point scale. Adolescents were asked to recall their high school experiences and rate on a four point scale responses to questions such as: when one got home from school, how often was an adult there within an hour of you getting home, when one went to parties, how often was a supervising adult present at the party and when one wanted to go to a party, how often did parents confirm that an adult would supervise the party. This tool was modified to include predictors of delinquency in adolescents as proposed by Steinberg et al. (1994). The scale contains items which include questions on the child's perception of parental rule-setting, supervision, consequences and monitoring which are scored on five-point scale per item.

Parental discipline and behavioural control was measured using the Children's Report of Parental Behaviour Inventory (Schaefer, 1965) that assess consistency of discipline and rule enforcement (30 items each for mother and father). Correlation was analysed between maternal and paternal support. The use of power-assertive techniques by parents to control their children was also measured as sum of paternal and maternal scores on five-item maternal and paternal discipline scales (Avgar et al., 1977). The higher the score, the greater the degree of disciplinary measures used. Parental rewards was measured by asking how often parents rewarded good behaviour and achievement and responses were either 'Never', 'Often', or 'Always'.

Data Analyses

Consultation with a statistician was sort throughout the study. The risk or protective factors were assessed for their impact on intensity of substance use. Field trials of the original and other

studies documented good validity for all of the diagnostic scales considered in this study. Reliability of the scales was therefore assessed by analysing Cronbach's Alpha of all constructs. Exploratory data analysis was performed by cross tabulation of predictor and response variables and exploration of their interrelations. Modelling was done in two stages: (1) exploration of the univariate impact of each family management or relationship factor; and (2) multivariate impact of all factors. In the first part, multiple logistic regressions (Agresti, 2002; Molenberghs & Verbeke, 2005) were conducted to explore the risk or protective effect of each family factor towards drug abuse, controlling for effect of demographic and socio-economic characteristics. Each factor was entered into the model separately to study its univariate impact on substance abuse. Adjusted odds ratios with *p*-values and 95% confidence intervals were obtained to compare the influence of the family characteristics. An odd ratio quantifies how strongly the presence or absence of property A is associated with the presence or absence of property B in a given population. An odds ratio greater than 1 indicates that the condition or event is more likely to occur in the first group.

In the second part, all family management and relationship variables and controlled variables were incorporated into a single logistic regression model in an exploratory manner. A backward elimination was applied to remove those variables with less explanatory power towards the substance use, according to their *p*-values. The final model was one in which all remaining family factors were significant.

Research Benefits

Expectations were outlined prior to interviews that participants would not receive monetary incentives from the study. Participants, parents or guardians were instead informed that participation in the study provided information which would be beneficial for them and many other adolescents when applied for formulation of policy and/ or associated programmes. Participants were informed that the information will be useful in determining which family based considerations are important for effective and efficient preventative approach to reduce the risk and enhance protective factors for substance abuse in adolescents.

CHAPTER 4

RESULTS

INTRODUCTION

This chapter presents the main findings of the study. Treatment of substance use data is first outlined. Tests for reliability of the measures are then discussed. The first data analysis section presents an exploratory analysis of the data. Finally, further data analysis by use of logistic regression modelling is discussed and results are presented.

Parental and Adolescent Substance use Measures

According to substance use theory by Kandel (1975), individuals are likely to progress from a stage of no substance use, to a legal substance, cannabis and finally illicit substances in that order (also confirmed by Mackesy-Amiti, Fendrich & Goldstein, 1997). Frequency and intensity of adolescent alcohol and tobacco use was therefore combined into adolescent alcohol and tobacco use intensity values respectively. Combined scores representing "other illicit substance use" were calculated from frequency of the use of amphetamines, barbiturates, cocaine, heroin, LSD or other psychedelics, tranquilizers and other substances. Parental substance use was calculated either as legal substance use, combining alcohol and tobacco use, or illicit substance use with combined scores from the rest of the substances.

Reliability of the measurements

Testing the reliability of the constructs, or dimensions in the questionnaire, item analysis was undertaken to assess the reliability of the different dimensions or constructs in the questionnaire via Cronbach's Alpha values.

Reliability refers to the consistency of the measurements, or the degree to which an instrument measures the same way each time it is used under the same conditions with the same subjects (Nunnally, 1978). The overall Cronbach's Alpha value for reliability can be interpreted as follows: Cronbach's Alpha above 0.8 represent good reliability, Cronbach's Alpha between 0.6 and 0.8 represent acceptable reliability and Cronbach's Alpha below 0.6 represent unacceptable

reliability. Some authors use another cut-off of 0.7, which is suggested by Nunnally (1978) for acceptable reliability.

Reliabilities of the constructs are summarized in Tables 3 to 7, while reliabilities of specific questions are presented in Annex 4. An example of interpretation is a test for the reliability of the construct "Cohesion" (Annex 4). The overall Cronbach Alpha for the construct "Cohesion" can be seen beneath the heading: raw Alpha: 0.78. Considering reliability of individual items, the "reliability if an item is dropped" indicates the change in the overall Cronbach's Alpha value, should the corresponding item be removed from the construct. If the individual Cronbach Alpha is higher (usually at least 2-4%) than the overall Cronbach Alpha (entire set) and the "Corrected Item-total correlation" is low or negative (below 0.1) then this individual item could be removed. The item statistics with the column "r.drop" indicates the correlation of the specific item (or question) with the total correlation of all the questions (Annex 4). The higher this correlation the 'better' this item or question forms part of the construct. In our case of "Cohesion" no items qualify for removal. A reliable Cronbach Coefficient Alpha value therefore confirms that the individual items of a dimension measured the same dimension or concept/s consistently.

EXPLORATORY ANALYSIS OF THE DATA

In preparation for statistical modelling, it is important to conduct a comprehensive exploration of the data. This ensures an in-depth understanding of the data that at hand, and not only guides statistical modelling, but also helps in contextualizing the statistical modelling results.

The exploratory data analyses to be conducted generally depend on the type of data at hand, as well as the planned statistical modelling. In general, frequencies, percentages, measures of central tendency, and graphs, are excellent exploratory data analyses tools, and are virtually an indispensable component of exploratory data analyses.

Demographic and Socio-Economic Characteristics

Data was extrapolated from 54 respondents. Eighty nine per cent of the respondents were males and respondent's age range was 14-20. The median age was 18 with a mode of 20. The majority of respondents (n=15, 27.8%) were 20 years old, followed by ages 17 (n=13, 24.1%) and 18 (n=7, 13%).

When level of education was considered, 66.7% (n=36) were educated to “further education and training” (grades 10-12) while 24.1% (n=13) to secondary grades 7-9. The median level of education was further education and training and this was also the mode. When ethnicity was considered, 54% (n=29) of respondents were black, 31.5% (n=17) white and 14.8% (n=8) coloured.

Categorisation of marital status of parents showed that 35.2% (n=19) were married with majority (64.8%) in the other categories consisting of single parents (n=15, 27.8%). The median level of maternal education was “further education and training (grades 10-12)”, this category was also the modal class (n=22, 41.5%) of maternal education. Maximum maternal education level was bachelor’s degree (n=12, 22.6%). The median level of paternal education was “further education and training”, representing the class where majority (n=19, 34.6%) of fathers were classified while highest level of paternal education level was “doctorate” (2 fathers, 3.8%). Median maternal employment status was “employed full time” which was also the modal (n=31, 57.4 %) status. The next highest proportion (n=14, 25.9 %) of mothers was unemployed. The career of majority of the mothers was business (n=3, 5.6%) followed by attorney, police, teachers (all consisting of n=2, 3.7% respondents). The median employment status of fathers was “employed full time” which was also the mode (n=33, 60.9%) while next highest category (n=13, 23.9%) consisted of self-employed category. The career of the majority of fathers was in teaching (n=5, 9.3%), followed by social workers, police, sales persons, nurses and business (all consisting of n=2, 3.7% respondents).

Adolescent and parental substance use

Tobacco use

The majority of respondents (n=47, 87%) smoked every day or almost every day and the next highest proportion represented those who never smoked (n=3, 5.6%). Those who smoke most frequently smoke 10 or more times per day (n=36, 66.7%) followed by 3 to 5 and 7 or 9 (both at n=4, 7.4%) times per day. Whereas majority of the fathers never smoke (n=33, 63.5%), 25 % (n=13) smoke every day or almost every day. In a similar trend, the majority of mothers never smoke (n=27, 56.3%) but 35.4 % smoke every day or almost every day. Amongst the mothers who smoke, 33.3% (n=16) smoke 10 or more cigarettes per day.

The period since initiation of smoking varied between 0.5 to 16.7 years and majority reported having smoked for 5 years (n=9, 17.3%). Another 11.5% (n=6) of respondents reported having smoked for 1, 2, 6 and 8 years. The age at beginning of smoking varied between 6.7 and 17.5 years. Most respondents started smoking at age 12 (n=15, 28.8%), followed by ages 13 (n=9, 17.3%), 16 (n=7, 13.5%) and 15 (n=6, 11.5%).

Alcohol use

Most respondents use alcohol once a month or less (n=13, 24.1%), followed by those who never drink. Amongst those who use alcohol, 20.4% (n=11) drink 2 to 3 days a month, while a similar proportion (20.4%, n= 11) drink every day or almost every day. The majority of adolescents that use alcohol drink 7 or 9 units a week (n=12, 22.2%) followed by 5 or 6 (n=12, 22%) and 1 or 2 (n=8, 14.8%). The majority adolescents have used alcohol for 5 years (n=6, 18.2%), followed by 15 years (n=4, 12.1%) and 8 years (n=3, 9.1%). The majority of adolescents started taking alcohol at age 10 (n=6, 19%) followed by12 (n=6, 18.8%) and 13 (n=4, 12.5%).

Most fathers do not use alcohol (n=23, 44.2%). Amongst fathers who use alcohol, 11.5% (n=6) have used alcohol for 1 or 2 days in the past 12 months or 1 or 2 days in a week. Most fathers (n=6, 11.5%) use 5 or 6 units of alcohol in a typical drinking session. Most mothers never drink (n=17, 36.2%) and the proportion of this group is followed by those who drink every day or almost every day (n=9, 19.1%) and 2 or 3 days a month (n=7, 14.9%). Amongst those mothers that use alcohol, majority take 7 or 9 (n=9, 18.8%) in a session followed by 10 or more (n=8, 16.7%).

Cannabis use

The majority of respondents (n=34, 63%) use cannabis every day or almost every day though the next highest prevalence was 16.7% (n=9) who never use cannabis. Only 1 (1.9%) mother and father were reported to have used cannabis.

Other illicit substance use

While 74.1% (n=40) of adolescents never use amphetamines, 5.6% (n=3) use it every day or almost every day, 2 or 3 days a month, and 1 or 2 days in the past 12 months. No father used amphetamines while 2 mothers (n=2, 3.8%) were reported as active users. Whereas 92.6%

adolescents never use barbiturates, 1 respondent (n=1, 1.9%) reported use of barbiturates 2 or 3 days a month, 1 respondent (n=1, 1.9%) reported use of barbiturates 1 or 2 days a week and 1 respondent (n=1, 1.9%) reported use of barbiturates every day or almost every day. No father used barbiturates but 1 mother (n=1, 1.9%) was reported to use barbiturates once a month or less. Slightly more than half 31, 57.4% of the adolescents never use cocaine. Amongst the 42.6% (n=23), who reported having used cocaine, 11.1% (n=6) reported every day or almost every day use. One mother and father use cocaine every 1 or 2 days in the past 12 months for the mother and every day or almost every day for the father. The proportion of adolescents using heroin was 38.9% (n=21) with majority reporting use every day or almost every day (n=12, 22.2%), 2 or 3 days a month (n=3, 5.6%) and 1 or 2 days a week (n=3, 5.6%). Both parents never used heroin. Whereas use of LSD or other tranquilizers was reported for only one mother (1.9%), 22.2% (n=12) adolescents used LSD or other tranquilizers. Other substances used amongst the respondents included "Nyaope" (n=12, 22.2%) and Khat (n=8, 14.8%).

ORDINAL REGRESSION MODELLING

Ordinal logistic regression is used to predict an ordinal dependent variable given one or more independent variables. Tests for assumptions were first made. The first assumption is that there is no multicollinearity. Multicollinearity occurs when there are two or more independent variables that are highly correlated with each other. The other assumption is that there are proportional odds**,** which is a key assumption of this type of ordinal logistic regression model. This assumption was tested in SPSS using a full likelihood ratio test, which compares the residual of the fitted location model to a model with varying location parameters.

Cumulative odds ordinal logistic regressions with proportional odds were run to determine the effects of family management and relation variables controlling for demographic and socio-economic characteristics on adolescent substance use. Modelling was first performed for each independent variable against adolescent alcohol, tobacco, cannabis and other illicit substance use. Variables that were significantly different at a screening p-value ≤ 0.1 were entered in multiple ordinal logistic regression models controlling for significant demographic and socio-economic characteristics. The model was further considered to statistically significantly predict the dependent variable over and above the intercept-only model whenever p-values were ≤ 0.05.

Adjusted odds ratios with *p*-values and 95% confidence intervals were obtained to compare the influence of the family characteristics.

In the second part, all family management and relationship variables and controlled variables were incorporated into a single logistic regression model for each of the descriptors the family management and relationship variables in an exploratory manner. A backward elimination was applied to remove those variables with less explanatory power towards the substance use, according to their *p*-values. The final model was one in which all remaining family factors were significant.

The proportional odds assumptions were assessed using a full likelihood ratio test comparing the fitted model to a model with varying location parameters where *p*-values greater than 0.05 are considered acceptable. Deviance and Pearson goodness-of-fit tests were performed with an indication that the model was a good fit to the observed data whenever p- value was greater than 0.05.

1. DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Adolescent Substance use by Gender

The odds ratio of males using cannabis was 5.035 (95% CI, 1.012 to 25.05) times that of females, a statistically significant effect, $\chi^2(1) = 3.9$, $p = 0.048$. Gender did not have a statistically significant prediction of higher adolescent alcohol use (Wald $\chi^2(1) = 1.065$, $p = 0.302$), tobacco use (Wald $\chi^2(1) = 1.135$, $p = 0.287$) and other illicit substance (Wald $\chi^2(1) = 1.033$, $p = 0.309$).

Adolescent Substance Use with Age

The model statistically significantly predicted adolescent cannabis use over and above the intercept-only model, $\chi^2(1) = 3.968$, $p = 0.046$. An increase in age (expressed in years) was associated with an 0.738 (95% CI, 0.536 to 1.016) increase in the odds of higher cannabis use, Wald $\chi^2(1) = 3.460$, p = 0.063. This is equivalent to a 1.36 (95% CI, 0.984 to 1.87) decrease in odds of higher cannabis increase with increase in age.

The model did not significantly predict adolescent substance use over and above the intercept-only model with age for alcohol, (Wald $\chi^2(1) = 1.901$, $p = 0.168$), tobacco (Wald $\chi^2(1) = 0.263$, $p = 0.608$), and other illicit substance **(**Wald $\chi^2(1) = 0.084$, $p = 0.771$).

Adolescent Substance Use by Education

The model statistically significantly predicted tobacco use versus education over and above the intercept-only model, $\chi^2(3) = 11.209$, $p = 0.011$. The odds of being in a higher category of tobacco use for those at education levels "reception to grade 6", "junior secondary grades", and "further education and training" when compared with those at "certificate and diploma" level were 44.127 (95% CI, 0.926 to 2102.424; Wald $\chi^2(1) = 3.690$, $p = 0.055$), 219.014 (95% CI, 5.723 to 8381.866; Wald $\chi^2(1) = 8.399$) and 43.894 (95% CI, 2.063 to 934.066; $\chi^2(1) = 5.876$, $p = 0.015$) respectively.

The model did not statistically significantly predict adolescent substance use over and above the intercept-only model for alcohol, (Wald $\chi^2(3) = 2.996$, $p = 0.392$), cannabis (Wald $\chi^2(3) = 3.009$, $p = 0.390$) and other illicit substance (Wald $\chi^2(3) = 0.147$, $p = 0.986$).

Adolescent Substance Use by Ethnicity

The model significantly predicted alcohol use with ethnicity over and above the intercept-only model, $\chi^2(2) = 13.405$, $p = 0.001$. The odds ratio of being in a higher category of the alcohol use for coloured respondents was 15.637 (95% CI, 2.880 to 84.888) times that of white respondents, Wald $\chi^2(1) = 10.149$, $p = 0.001$ and 13.578 (95% CI, 2.763 to 66.735) times compared to black respondents, Wald $\chi^2(1) = 10.310$, $p = 0.001$.

The model did not significantly predict substance use with ethnicity over and above the intercept-only model, for tobacco use (Wald $\chi^2(2) = 2.335$, $p = 0.308$), cannabis use (Wald $\chi^2(2) = 0.205$, $p = 0.903$), and other illicit substance (Wald $\chi^2(2) = 0.066$, $p = 0.968$).

Adolescent Substance use by Marital Status of Parent

The model significantly predicted cannabis use with marital status of parents over and above the intercept-only model, $\chi^2(4) = 7.646$, $p = 0.105$. The odds ratio of being in a higher category of cannabis use for adolescents from separated parents was 0.075 (95% CI, 0.926 to 2102.424),

than that of divorced parents, Ward $\chi^2(1) = 4.740$, $p = 0.029$. This represents a 13.33 increase in odds of cannabis use for respondents from divorced families.

The model did not significantly predict substance use with parental marital status over and above the intercept-only model, for alcohol (Wald $\chi^2(4) = 1.289$, $p = 0.863$), tobacco (Wald $\chi^2(4) = 2.000$, $p = 0.736$), and other illicit substance (Wald $\chi^2(4) = 3.020$, $p = 0.554$).

Adolescent substance Use by Parental Education

The final model did not significantly predict substance use with parental education over and above the intercept-only model, for alcohol (Wald $\chi^2(4) = 3.335$, $p = 0.503$), tobacco ($\chi^2(4) = 4.158$, $p = 0.385$), cannabis (Wald $\chi^2(4) = 2.958$, $p = 0.565$) and other illicit substance (Wald $\chi^2(4) = 5.372$, $p = 0.251$).

Parental Employment Status

Parental employment status was modelled separately for maternal and paternal employment status since there were no significant (p= 0.237) correlations between the two.

Substance use by Maternal Employment Status

The final model significantly predicted cannabis (Wald $\chi^2(3) = 8.455$, $p = 0.037$) and illicit substance use (Wald $\chi^2(3) = 6.959$, $p = 0.073$) over and above the intercept-only model. The odds of being in a higher category of the cannabis use for adolescents from unemployed and full time employed mothers was 15.449 (95% CI, 1.398 to 170.749; Ward $\chi^2(1) = 4.987$, $p = 0.026$) and 12.764 (95% CI, 1.331 to 122.377; Ward $\chi^2(1) = 4.876$, $p = 0.027$) times respectively than those from self-employed mothers.

The odds ratio of being in a higher category of the illicit substance use for adolescents from unemployed and part time employed mothers was 10.289 (95% CI, 0.834 to 126.872; , $\chi^2(1) = 3.308$, $p = 0.069$) and 28.888 (95% CI, 1.251 to 667.184; $\chi^2(1) = 4.409$, $p = 0.036$) respectively than those from self-employed mothers.

The model did not significantly predict substance use with maternal employment status over and above the intercept-only model for alcohol use (Wald $\chi^2(3) = 2.112$, $p = 0.550$) and tobacco use ($\chi^2(3) = 3.986$, $p = 0.263$).

Substance use by Paternal Employment Status

The model did not significantly predict substance use with paternal employment status over and above the intercept-only model, for alcohol (Wald $\chi^2(3) = 3.346$, $p = 0.341$), tobacco (Wald $\chi^2(3) = 2.711$, $p = 0.438$), cannabis (Wald $\chi^2(3) = 0.266$, $p = 0.966$) and other illicit substance use (Wald $\chi^2(3) = 0.746$, $p = 0.862$).

Adolescent Alcohol and Tobacco Use with Period used

The final model did not significantly predict alcohol (Wald, $\chi^2(1) = 0.187$, $p = 0.665$) and tobacco (Wald $\chi^2(1) = 0.000$, $p = 0.999$) use over and above the intercept-only model.

2. FAMILY RELATIONS

Results from ordinal logistic regression analysis of the impact of family relations variables on adolescent substance use are presented in Table 3 (p. 44) and Table 4 (p.49). This section outlines statistically significant results.

2.1 Family Functioning and Conflict

Family functioning and conflict against alcohol use

The odds ratio of being in a higher category of alcohol use amongst adolescents from families rated for expressiveness at levels 1, 2, and 3 was 0.021 (95% CI, 0.834 to 126.872; Wald $\chi^2(1) = 5.236$, $p = 0.022$), 0.103 (95% CI, 1.251 to 667.184; Wald $p = 0.029$ and $\chi^2(1) = 3.784$), and 0.146 (95% CI, 1.251 to 667.184; Wald $\chi^2(1) = 3.784$, $p = 0.052$) higher than level 4 respectively. Adolescents from families at expression level 1, 2 and 3 were therefore 4.76, 9.71 and 6.85 times less likely to use alcohol when compared to those at level 4.

The odds ratio of being in a higher category of alcohol use for adolescents from democratic family style levels 2 and 3 was 0.50 (95% CI, 0.005 to 0.547; Wald $\chi^2(1) = 6.021$, $p = 0.014$) and 0.037 (95% CI, 0.003 to 0.419; Wald $\chi^2(1) = 7.082$, $p = 0.008$) than level 4 respectively. Adolescents living in families at categories 2 and 3 of democratic style were therefore 2 and 27 times respectively at less odds of alcohol use when compared with those at level 4.

The odds ratio of alcohol use among adolescents living in families at laissez faire family style level 1 and 2 was 0.064 (95% CI, 0.009 to 0.472; Wald $\chi^2(1) = 7.256$, $p = 0.007$) and 0.109 (95%

CI, 0.023 to 0.512; Wald $\chi^2(1) = 7.865$, $p = 0.005$) times respectively that of level 4. Adolescents living in laissez faire families categorised at levels 1 and 2 were therefore 15.625 and 9.17 times less likely to use alcohol than those at levels 4.

Table 3 Results from ordinal logistic regression predicting substance use in adolescents given family relation variables family functioning and conflict

Family functioning and conflict variable	Substance	Cronbach Aplha	Cells Zero Frequencies	Model Fit	Goodness of Fit	
					Pearson	Deviance
Cohesion		0.78				
	Alcohol		6 (28.6%)	$\chi^2(2) = 0.698$, $p = 0.705$.b	0.646c	0.603e
	Tobacco		4 (26.7%)	$\chi^2(2) = 1.527$, $p = 0.466$.b	0.464c	0.473e
	Cannabis		7 (38.9%)	$\chi^2(2) = 0.125$, $p = 0.939$.b	0.048c	0.112e
	Other substance		5 (33.3%)	$\chi^2(2) = 2.375$, $p = 0.305$.b	0.125c	0.059e
Expressiveness		0.7				
	Alcohol		10 (35.7%)	$\chi^2(3) = 7.856$, $p = 0.049$.a	0.955c	0.912e
	Tobacco		9 (45.0%)	$\chi^2(3) = 4.487$, $p = 0.213$.b	0.745c	0.684e
	Cannabis		11 (45.8%)	$\chi^2(3) = 2.065$, $p = 0.559$.b	0.191c	0.350e
	Other substance		8 (40.0%) cells	$\chi^2(3) = 7.112$, $p = 0.068$.b	0.641c	0.668e
Conflict		0.6				
	Alcohol		10 (35.7%)	$\chi^2(3) = 0.536$, $p = 0.911$.b	0.139c	0.071e
	Tobacco		9 (45.0%)	$\chi^2(3) = 6.191$, $p = 0.103$.b	0.267c	0.330e
	Cannabis		9 (37.5%)	$\chi^2(3) = 5.023$, $p = 0.170$.b	0.188c	0.377e
	Other substance		3 (20.0%)	$\chi^2(2) = 7.231$, $p = 0.027$.a	0.781c	0.704e

Intellectual-cultural orientation		0.43				
	Alcohol		NR	NR	NR	NR
	Tobacco		NR	NR	NR	NR
	Cannabis		NR	NR	NR	NR
	Other substance		NR	NR	NR	NR
Active-recreational orientation		0.6				
	Alcohol		14 (50.0%)	$\chi^2(3) = 0.561$, $p = 0.905$.b	0.392c	0.267e
	Tobacco		10 (50.0%)	$\chi^2(3) = 1.048$, $p = 0.790$.b	0.158c	0.135e
	Cannabis		10 (41.7%)	$\chi^2(3) = 2.478$, $p = 0.479$.b	1.000c	1.000e
	Other substance		10 (50.0%)	$\chi^2(3) = 1.088$, $p = 0.780$.b	0.370c	0.232e
Religious emphasis		0.41				
	Alcohol		NR	NR	NR	NR
	Tobacco		NR	NR	NR	NR
	Cannabis		NR	NR	NR	NR
	Other substance		NR	NR	NR	NR
Organization		0.67				
	Alcohol		10 (35.7%)	$\chi^2(3) = 0.431$, $p = 0.934$.b	0.569c	0.366e
	Tobacco		10 (50.0%)	$\chi^2(3) = 4.840$, $p = 0.184$.b	0.338c	0.449e
	Cannabis		12 (50.0%)	$\chi^2(3) = 2.888$, $p = 0.409$.b	0.000d	0.051f
	Other substance		8 (40.0%)	$\chi^2(3) = 2.947$, $p = 0.400$.b	0.396c	0.499e
Family sociability		0.6				

	Alcohol		8 (28.6%)	$\chi^2(3) = 4.642$, $p = 0.200$.b	0.776c	0.556e
	Tobacco		8 (40.0%)	$\chi^2(3) = 2.688$, $p = 0.442$.b	0.827c	0.819e
	Cannabis		10 (41.7%)	$\chi^2(3) = 1.751$, $p = 0.626$.b	0.308c	0.420e
	Other substance		7 (35.0%)	$\chi^2(3) = 6.339$, $p = 0.096$.b	0.288c	0.148e
External locus of control		0.6				
	Alcohol		9 (32.1%)	$\chi^2(3) = 3.170$, $p = 0.366$.b	0.856c	0.847e
	Tobacco		9 (45.0%)	$\chi^2(3) = 1.606$, $p = 0.658$.b	0.484c	0.371e
	Cannabis		13 (54.2%)	$\chi^2(3) = 4.214$, $p = 0.239$.b	0.035d	0.066e
	Other substance		7 (35.0%)	$\chi^2(3) = 1.217$, $p = 0.749$.b	0.897c	0.815e
Family idealization		0.74				
	Alcohol		8 (28.6%)	$\chi^2(3) = 6.578$, $p = 0.087$.b	0.164c	0.045f
	Tobacco		7 (35.0%)	$\chi^2(3) = 1.755$, $p = 0.625$.b	0.387c	0.328e
	Cannabis		8 (33.3%)	$\chi^2(3) = 1.552$, $p = 0.670$.b	0.606c	0.409e
	Other substance		5 (25.0%)	$\chi^2(3) = 7.940$, $p = 0.047$.a	0.473c	0.365e
Disengagement		0.43				
	Alcohol		NR	NR	NR	NR
	Tobacco		NR	NR	NR	NR
	Cannabis		NR	NR	NR	NR
	Other substance		NR	NR	NR	NR
Democratic family		0.6				

style						
	Alcohol		11 (39.3%)	$\chi^2(3) = 9.985$, $p = 0.0.019$.a	0.595c	0.521e
	Tobacco		8 (40.0%)	$\chi^2(3) = 2.516$, $p = 0.472$.b	0.825c	0.746e
	Cannabis		10 (41.7%)	$\chi^2(3) = 3.094$, $p = 0.377$.b	0.766c	0.856e
	Other substance		8 (40.0%)	$\chi^2(3) = 7.005$, $p = 0.072$.b	0.472c	0.337e
Laissez-faire family style		0.66				
	Alcohol		6 (21.4%)	$\chi^2(3) = 10.866$, $p = 0.012$.a	0.523c	0.426e
	Tobacco		7 (35.0%)	$\chi^2(3) = 8.216$, $p = 0.041$.a	0.942c	0.849e
	Cannabis		8 (33.3%)	$\chi^2(3) = 2.484$, $p = 0.478$.b	0.281c	0.182e
	Other substance		6 (30.0%)	$\chi^2(3) = 3.990$, $p = 0.263$.b	0.641c	0.459e
Authoritarian family style		0.5				
	Alcohol		NR	NR	NR	NR
	Tobacco		NR	NR	NR	NR
	Cannabis		NR	NR	NR	NR
	Other substance		NR	NR	NR	NR
Enmeshment		0.77				
	Alcohol		6 (21.4%)	$\chi^2(3) = 1.341$, $p = 0.719$.b	0.368c	0.150e
	Tobacco		8 (40.0%)	$\chi^2(3) = 5.751$, $p = 0.124$.b	0.622c	0.422e
	Cannabis		9 (37.5%)	$\chi^2(3) = 1.881$, $p = 0.597$.b	0.545c	0.404e
	Other substance		5 (25.0%)	$\chi^2(3) = 1.505$, $p = 0.681$.b	0.539c	0.394e

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). *p*-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (d: Model not good fit $p < 0.5$).

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (f: Model not good fit $p < 0.5$).

NR: item not reliable as tested using Cronbach Alpha

Table 4 Results from ordinal logistic regression predicting substance use in adolescents given family relation variables family bonding and support

Family bonding and support variable	Substance	Cronbach Aplha	Cells Zero Frequencies	Model Fit	Goodness of Fit	
					Pearson	Deviance
Companionship		M, 0.74; F, 0.87; WF, 0.79				
	Alcohol		7 (25.0%)	$\chi^2(3) = 1.300$, $p = 0.729$.b	0.443c	0.138e
	Tobacco		5 (25.0%)	$\chi^2(3) = 1.821$, $p = 0.610$.b	0.716c	0.511e
	Cannabis		8 (33.3%)	$\chi^2(3) = 2.513$, $p = 0.473$.b	0.596c	0.310e
	Other substance		7 (35.0%)	$\chi^2(3) = 2.587$, $p = 0.478$.b	0.210c	0.101e
Conflict		M, 0.81; F, 0.87, WF, 0.8				
	Alcohol		7 (25.0%)	$\chi^2(3) = 8.382$, $p = 0.039$.a	0.641c	0.462e
	Tobacco		8 (40.0%)	$\chi^2(3) = 0.676$, $p = 0.879$.b	0.790c	0.555e
	Cannabis		10 (41.7%)	$\chi^2(3) = 1.831$, $p = 0.608$.b	0.049d	0.028f
	Other substance		5 (25.0%)	$\chi^2(3) = 3.699$, $p = 0.296$.b	0.223c	0.184e
Instrumental Aid		M, 0.79; F, 0.91; WF, 0.71				
	Alcohol		12 (34.3%)	$\chi^2(3) = 0.555$, $p = 0.968$.b	0.601c	0.472e
	Tobacco		13 (52.0%)	$\chi^2(3) = 8.606$, $p = 0.072$.a	0.080c	0.171e

	Cannabis		12 (40.0%)	$\chi^2(3) = 7.048$, $p = 0.133$.b	0.990c	0.939e
	Other substance		11 (44.0%)	$\chi^2(3) = 2.832$, $p = 0.586$.b	0.007d	0.262e
Antagonism		M, 0.85; F, 0.75; WF, 0.74				
	Alcohol		5 (17.9%)	$\chi^2(3) = 2.068$, $p = 0.558$.b	0.259c	0.185e
	Tobacco		9 (45.0%)	$\chi^2(3) = 6.595$, $p = 0.086$.b	0.139c	0.109e
	Cannabis		7 (29.2%)	$\chi^2(3) = 7.394$, $p = 0.060$.b	0.994c	0.981e
	Other substance		6 (30.0%)	$\chi^2(3) = 2.790$, $p = 0.425$.b	0.220c	0.165e
Intimate Disclosure		M, 0.88; F, 0.88; WF, 0.8				
	Alcohol		7 (25.0%)	$\chi^2(3) = 7.390$, $p = 0.060$.a	0.861c	0.827e
	Tobacco		6 (30.0%)	$\chi^2(3) = 0.083$, $p = 0.994$.b	0.440c	0.323e
	Cannabis		9 (37.5%)	$\chi^2(3) = 2.603$, $p = 0.457$.b	0.466c	0.238e
	Other substance		5 (25.0%)	$\chi^2(3) = 3.439$, $p = 0.329$.b	0.709c	0.609e
Nurturance		M, 0.8; F, 0.85; WF, 0.82				
	Alcohol		11 (31.4%)	$\chi^2(4) = 5.319$, $p = 0.256$.b	0.830c	0.696e
	Tobacco		11 (44.0%)	$\chi^2(4) = 5.382$, $p = 0.250$.b	0.448c	0.234e

	Cannabis		12 (40.0%)	$\chi^2(4) = 1.529$, $p = 0.821$.b	0.718c	0.594e
	Other substance		10 (40.0%)	$\chi^2(4) = 2.732$, $p = 0.604$.b	0.704c	0.513e
Affection		M, 0.87; F, 0.86; WF, 0.86				
	Alcohol		9 (25.7%)	$\chi^2(4) = 10.773$, $p = 0.029$.a	0.934c	0.822e
	Tobacco		10 (40.0%)	$\chi^2(4) = 3.134$, $p = 0.536$.b	0.444c	0.328e
	Cannabis		15 (50.0%)	$\chi^2(4) = 7.728$, $p = 0.102$.a	0.380c	0.242e
	Other substance		7 (28.0%)	$\chi^2(4) = 2.682$, $p = 0.612$.b	0.588c	0.722e
Reassurance of Worth		M, 0.87; F, 0.85; WF, 0.82				
	Alcohol		12 (34.3%)	$\chi^2(4) = 7.198$, $p = 0.126$.a	0.049c	0.106e
	Tobacco		11 (44.0%)	$\chi^2(4) = 4.999$, $p = 0.287$.b	0.555c	0.585e
	Cannabis		13 (43.3%)	$\chi^2(4) = 5.603$, $p = 0.231$.b	0.651c	0.534e
	Other substance		9 (36.0%)	$\chi^2(4) = 5.803$, $p = 0.214$.b	0.377c	0.302e
Relative Power		M, 0.54; F, 0.79; WF, 0.64				
	Alcohol		6 (21.4%)	$\chi^2(3) = 1.129$, $p = 0.770$.b	0.620c	0.321e
	Tobacco		8 (40.0%)	$\chi^2(3) = 3.095$, $p = 0.377$.b	0.330c	0.267e

	Cannabis		10 (41.7%)	$\chi^2(3) = 3.971$, $p = 0.265$.b	0.921c	0.763e
	Other substance		6 (30.0%)	$\chi^2(3) = 2.575$, $p = 0.462$.b	0.677c	0.677e
Reliable Alliance		M, 0.88; F, 0.93; WF, 0.88				
	Alcohol		11 (31.4%)	$\chi^2(4) = 5.154$, $p = 0.272$.b	0.198c	0.104e
	Tobacco		11 (44.0%)	$\chi^2(4) = 6.744$, $p = 0.150$.b	0.384c	0.302e
	Cannabis		13 (43.3%)	$\chi^2(4) = 6.601$, $p = 0.159$.b	0.854c	0.679e
	Other substance		8 (32.0%)	$\chi^2(4) = 5.177$, $p = 0.270$.b	0.439c	0.303e

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). *p*-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (d: Model not good fit $p < 0.5$).

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (f: Model not good fit $p < 0.5$).

M: mother. F: father. WF: whole family

Impact of expressiveness, democratic family style, laissez faire family style on alcohol use and their interactions were modelled controlling for ethnicity. The final model statistically significantly predict alcohol use over and above the intercept-only model, Walds $\chi^2(4) = 21.114$, $p = 0. < 0.001$. The model was a good fit to the observed data as indicated by the Pearson goodness-of-fit test ($\chi^2(187) = 211.25$, $p = 0.924$) and deviance goodness-of-fit test ($\chi^2(187) = 117.99$ $p = 0.998$). The assumption of proportional odds was met, as assessed by a full likelihood ratio test comparing the residual of the fitted location model to a model with varying location parameters, $\chi^2(25) = 26.356$, $p = 0.154$. Interaction between expressiveness, democratic family style and laissez faire family style statistically significantly predicted of higher adolescent alcohol use Wald $\chi^2(1) = 7.532$, $p = 0.006$. The odds ratio of being in a higher category of the alcohol use was 1.162 (95% CI, 1.044 to 1.293).

Impact of laissez faire family style on tobacco use was modelled controlling for education. There were no significant interactions. The final model with main effects significantly predict the dependent variable over and above the intercept-only model, Walds $\chi^2(6) = 17.053$, $p = 0.009$. The Pearson goodness-of-fit test ($\chi^2(34) = 17.917$, $p = 0.989$) and deviance goodness-of-fit test ($\chi^2(34) = 18.369$, $p = 0.987$) indicated that the model was a good fit to the observed data. The assumption of proportional odds was met, as assessed by a full likelihood ratio test comparing the residual of the fitted location model to a model with varying location parameters, $\chi^2(18) = 12.066$, $p = 0.844$. Laissez faire family style controlling for education statistically significantly predicted higher adolescent alcohol use, Wald $\chi^2(1) = 4.987$, $p = 0.026$. The odds of using tobacco more frequently increased by 2.8 (95% CI, 1.134 to 6.912) with each increase in laissez faire family style measure.

Family functioning and conflict against other illicit substance use

The odds ratio of using illicit substance at a higher frequency for adolescents whose families were categorised at conflict levels 1 and 2 was 0.202 (95% CI, 0.051 to 0.796; Wald $\chi^2(1) = 5.219$, $p = 0.022$) and 0.217 (95% CI, 0.060 to 0.779; $\chi^2(1) = 5.492$, $p = 0.019$) than level 3 respectively. Adolescents living in families at conflict levels 1 and 2 were therefore about 5 times less likely to use illicit substances than those at levels 3.

The impact of conflict, family idealization on use of other illicit substances was assessed

controlling for maternal employment status. The Pearson goodness-of-fit ($\chi^2(37) = 26.273$, $p = 0.905$) and deviance goodness-of-fit ($\chi^2(37) = 31.485$, $p = 0.987$) tests indicated that the model was a good fit to the observed data. Conflict statistically significantly predicted higher adolescent illicit substance use controlling for maternal employment status (Wald $\chi^2(3) = 7.852$, $p = 0.049$) and the odds ratio of being in a higher category of the illicit substance use changed by 13.682 (95% CI, 1.078 to 173.669) with each increase in conflict.

2.2 Family Bonding and Support

Family bonding and support versus alcohol use

The odds ratio of being in a higher category of adolescent alcohol use at family bonding and support as measured by conflict level 2 was 0.243 (95% CI, 0.058 to 1.020; Wald $\chi^2(1) = 3.734$, $p = 0.053$) compared to conflict level 4.

The odds ratio of being in a higher category of alcohol use at intimate disclosure levels 1, 2, and 3 was 9.811 (95% CI, 0.947 to 101.592; Wald $\chi^2(1) = 3.666$, $p = 0.056$), 18.513 (95% CI, 1.648 to 207.982; Wald $\chi^2(1) = 5.592$, $p = 0.018$), and 17.539 (95% CI, 1.623 to 189.575; Wald $\chi^2(1) = 5.563$, $p = 0.018$) respectively higher than that of level 4.

The odds of using alcohol more frequently among adolescents whose families were at affection levels 1, 3 and 4 were 8.303 (95% CI, 0.874 to 78.837; Wald $\chi^2(1) = 3.397$, $p = 0.065$), 7.280 (95% CI, 1.765 to 30.034; Wald $\chi^2(1) = 7.537$, $p = 0.006$), and 4.483 (95% CI, 1.128 to 17.816; Wald $\chi^2(1) = 4.541$, $p = 0.033$) respectively than those of level 5.

The odds of being in a higher category of alcohol use at reassurance of worth levels 2 and 3 was 9.871 (95% CI, 1.158 to 84.119; Wald $\chi^2(1) = 4.387$, $p = 0.036$), and 7.089 (95% CI, 0.862 to 58.276; Wald $\chi^2(1) = 4.541$, $p = 0.068$) respectively versus those of level 5.

Impact on adolescent alcohol use by family bonding and support as measured using conflict, intimate disclosure, affection and reassurance of worth were measured controlling for ethnicity. The Pearson goodness-of-fit test ($\chi^2(257) = 501.40$, $p = 1.000$) and deviance goodness-of-fit tests ($\chi^2(257) = 133.884$, $p = 0.521$) indicated that the model was a good fit to the observed data. Ethnicity, conflict and reassurance of worth interactively statistically significantly predicted higher adolescent alcohol substance use (Wald $\chi^2(3) = 17.910$, $p < 0.001$). The odds ratio of being

in a higher category of the alcohol use changed by 0.055 (95% CI, 0.008 to 0.376) for each change in these family relations variables.

Family bonding and support versus tobacco use

The odds ratio of being in a higher category of tobacco use for instrumental aid level 3 was 48.94 (95% CI, 0.971 to 2467.48; Wald $\chi^2(1) = 3.783$, $p = 0.052$) when compared to level 5.

Instrumental aid was also modelled against tobacco use controlling for education. The model was a good fit to the observed data as assessed using Pearson goodness-of-fit ($\chi^2(37) = 22.395$, $p = 0.972$) and deviance goodness-of-fit ($\chi^2(37) = 22.343$, $p = 0.973$) tests. Though the final model statistically significantly predicted tobacco use over and above the intercept-only model (Walds $\chi^2(4) = 11.369$, $p = 0.023$), instrumental aid controlling for education did not statistically significantly predict higher adolescent tobacco substance use (Wald $\chi^2(1) = 0.169$, $p = 681$).

Family bonding and support against cannabis use

The odds of being in a higher category of cannabis use at affection level 3 were 10.823 (95% CI, 1.081 to 108.400; Wald $\chi^2(1) = 4.104$, $p = 0.0043$) higher than affection those level 5.

Impact of affection on adolescent cannabis use was assessed controlling for gender, age, marital status of parents and maternal employment status. Pearson goodness-of-fit ($\chi^2(200) = 135.221$, $p = 0.676$) and deviance goodness-of-fit ($\chi^2(200) = 83.456$, $p = 0.417$) tests indicated that the model was a good fit to the observed data. The final model significantly predicted the cannabis use over and above the intercept-only model, Walds $\chi^2(10) = 18.879$, $p = 0.042$. Affection status however did not statistically significantly predict higher adolescent cannabis substance use (Wald $\chi^2(1) = 0.251$, $p = 617$ when marital status of parent and maternal employment were controlled for.

3. FAMILY MANAGEMENT VARIABLES

The results from ordinal logistic regression assessing the impact of family management variables on adolescent substance use are presented in Tables 5, 6 and 7. This section presents those results that were statistically significant.

3.1 Parental monitoring

Table 5 (p. 58) shows results from ordinal logistic regression predicting substance use in adolescents with changes in parental monitoring. The odds of using alcohol more frequently with parental monitoring as measured by parental knowledge of adolescent activities category 1 were 3.868 (95% CI, 0.942 to 15.885; $\chi^2(1) = 3.523$, $p = 0.061$) more than those of level 3.

Parental monitoring as measured by parental knowledge of adolescent activities controlling for ethnicity significantly predicted higher adolescent alcohol use (Wald $\chi^2(1) = 4.119$, $p = 0.042$). The final model significantly predicted the dependent variable over and above the intercept-only model, Walds $\chi^2(1) = 3.964$, $p = 0.046$. The odds of using alcohol more frequently changed by 0.556 (95% CI, 0.312 to 0.991) with increasing parental knowledge of adolescent activities. This represents a 1.8 times decrease in odds of using alcohol more frequently with each increase in level of parental knowledge of adolescent activities.

Impact of after school recall of parental monitoring on use other illicit substance was tested controlling for maternal employment status. The Pearson goodness-of-fit ($\chi^2(52) = 30.079$, $p = 0.578$) and deviance goodness-of-fit tests ($\chi^2(52) = 32.559$, $p = 0.626$) indicated that the model was a good fit to the observed data. The final model statistically significantly predicted the dependent variable over and above the intercept-only model, Walds $\chi^2(4) = 11.323$, $p = 0.023$.

The odds of using alcohol more frequently changed by 0.428 (95% CI, 0.238 to 0.975) with increasing parental knowledge of adolescent activities. The odds of using alcohol more frequently therefore decreased by 2.3 with every increase in measure of parental knowledge of adolescent activities.

3.2 Discipline and Behavioural Control

Table 6 (p. 60) shows results from ordinal logistic regression predicting substance use in adolescents as influenced by discipline and behavioural control.

Discipline and behavioural control against alcohol use

The odds of consuming alcohol more frequently at sharing level 1 were 6.447 (95% CI, 1.642 to 25.313; $\chi^2(1) = 7.131$, $p = 0.008$) more than those of sharing level 2. The odds of being in a higher category of the alcohol use at level 1 of adolescent behavioural control through guilt level

1 were 12.782 (95% CI, 1.418 to 115.217; Wald $\chi^2(1) = 5.159$, $p = 0.023$) times when compared to level 2.

When parental strictness was measured at level 1, the odds ratio of more frequent consumption of alcohol were 3.646 (95% CI, 1.204 to 11.039; Wald $\chi^2(1) = 5.239$, $p = 0.022$) more than those for strictness at level 2. The odds ratio of being in a higher frequency of alcohol consumption versus affection level 1 were 3.349 (95% CI, 1.092 to 10.275; Wald $\chi^2(1) = 4.467$, $p = 0.035$) more than at level 2.

Sharing (Wald $\chi^2(1) = 6.872$, $p = 0.009$), control through guilt (Wald $\chi^2(1) = 5.032$, $p = 0.025$), strictness (Wald $\chi^2(1) = 7.851$, $p = 0.005$) and affection (Wald $\chi^2(1) = 6.421$, $p = 0.011$) statistically significantly predicted adolescent alcohol use controlling for ethnicity.

Discipline and behavioural control against cannabis use

When use of cannabis was considered, the odds of higher frequency of using with respect to emotional support level 1 were 3.7 (95% CI, 0.966 to 14.169; Wald $\chi^2(1) = 3.648$, $p = 0.056$) times those of level 2. The odds of using cannabis more frequently versus positive evaluation level 1 were 3.723 (95% CI, 1.027 to 13.492; Wald $\chi^2(1) = 4.005$, $p = 0.045$) more than positive evaluation level 2.

Adolescent cannabis use as influenced by emotional support and positive evaluation was assessed controlling for gender, age, marital status of parent and maternal employment status. The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi^2(156) = 147.931$, $p = 0.948$. The deviance goodness-of-fit test also indicated that the model was a good fit to the observed data, $\chi^2(156) = 73.520$, $p = 0.471$. Only emotional support statistically significantly predicted adolescent cannabis use, ($\chi^2(4) = 10.176$, $p = 0.038$) when maternal employment was controlled for.

Discipline and behavioural control against other illicit substance use

The odds ratio of adolescents using illicit substances more frequently at negative evaluation level 1 were 5.313 (95% CI, 0.891 to 31.670; Wald $\chi^2(1) = 3.362$, $p = 0.067$) times those of level 2.

Table 5 Results from ordinal logistic regression predicting substance use in adolescents given family management variable parental monitoring

Parental monitoring variable	Substance	Cronbach Aplha	Cells Zero Frequencies	Model Fit	Goodness of Fit	
					Pearson	Deviance
Parental knowledge		0.84				
	Alcohol		4 (19.0%)	$\chi^2(2) = 4.271$, $p = 0.118$.a	0.329c	0.147e
	Tobacco		4 (26.7%)	$\chi^2(2) = 2.460$, $p = 0.292$.b	0.228c	0.188e
	Cannabis		5 (27.8%)	$\chi^2(2) = 0.668$, $p = 0.716$.b	0.710c	0.440e
	Other substance		3 (20.0%)	$\chi^2(2) = 0.206$, $p = 0.902$.b	0.562c	0.515e
Adolescent recall		0.84				
	Alcohol		15 (42.9%)	$\chi^2(4) = 1.833$, $p = 0.767$.b	0.111c	0.036f
	Tobacco		11 (44.0%)	$\chi^2(4) = 3.737$, $p = 0.443$.b	0.215c	0.161e
	Cannabis		15 (50.0%)	$\chi^2(4) = 2.252$, $p = 0.690$.b	0.005d	0.098e
	Other substance		9 (36.0%)	$\chi^2(4) = 6.915$, $p = 0.140$.a	0.849c	0.772e

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). *p*-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (d: Model not good fit $p < 0.5$).

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (f: Model not good fit $p < 0.5$).

Table 6 Results from ordinal logistic regression predicting substance use in adolescents given family management variables discipline and behavioural control

Discipline and behavioural control variable		Cronbach Aplha	Cells Zero Frequencies	Model Fit	Goodness of Fit	
					Pearson	Deviance
Sharing		M, 0.73; F, 0.71				
	Alcohol		2 (14.3%)	$\chi^2(1) = 7.131$, $p = 0.008$.a	0.037d	0.104e
	Tobacco		3 (30.0%)	$\chi^2(1) = 2.117$, $p = 0.146$.b	0.226c	0.294e
	Cannabis		3 (25.0%)	$\chi^2(1) = 0.655$, $p = 0.418$.b	0.388c	0.206e
	Other substance		2 (20.0%)	$\chi^2(1) = 0.394$, $p = 0.530$.b	0.286c	0.192e
Control through guilt		M, 0.5; F, 0.6				
	Alcohol		5 (35.7%)	$\chi^2(1) = 5.159$, $p = 0.0.23$.a	0.266c	0.469e
	Tobacco		4 (40.0%)	$\chi^2(1) = 0.2.592$, $p = 0.107$.b	1.000c	1.000e
	Cannabis		4 (33.3%)	$\chi^2(1) = 0.068$, $p = 0.795$.b	0.918c	0.836e
	Other substance		3 (30.0%)	$\chi^2(1) = 0.457$, $p = 0.553$.b	0.849c	0.755e
Strictness		M, 0.64; F, 0.82				
	Alcohol		1 (7.1%)	$\chi^2(1) = 5.239$, $p = 0.022$.a	0.408c	0.372e
	Tobacco		3 (30.0%)	$\chi^2(1) = 2.600$, $p = 0.107$.b	0.369c	0.288e

	Cannabis		3 (25.0%)	$\chi^2(1) = 0.052$, $p = 0.820$.b	0.148c	0.068e
	Other substance		2 (20.0%)	$\chi^2(1) = 2.783$, $p = 0.095$.b	0.784c	0.645e
Affection		M, 0.72; F, 0.75				
	Alcohol		2 (14.3%)	$\chi^2(1) = 4.467$, $p = 0.035$.a	0.513c	0.415e
	Tobacco		1 (10.0%)	$\chi^2(1) = 0.137$, $p = 0.711$.b	0.596c	0.437e
	Cannabis		1 (8.3%)	$\chi^2(1) = 1.968$, $p = 0.161$.b	0.679c	0.538e
	Other substance		3 (30.0%)	$\chi^2(1) = 2.443$, $p = 0.118$.b	0.087c	0.037f
Emotional support		M, 0.81; F, 0.85				
	Alcohol		1 (7.1%)	$\chi^2(1) = 2.405$, $p = 0.121$.b	0.868c	0.818e
	Tobacco		2 (20.0%)	$\chi^2(1) = 0.764$, $p = 0.382$.b	0.665c	0.559e
	Cannabis		2 (16.7%)	$\chi^2(1) = 3.648$, $p = 0.056$.a	0.630c	0.424e
	Other substance		3 (30.0%)	$\chi^2(1) = 1.156$, $p = 0.282$.b	0.296c	0.177e
Parental direction		M, 0.83; F, 0.85				
	Alcohol		1 (7.1%)	$\chi^2(1) = 0.349$, $p = 0.555$.b	0.739c	0.640e
	Tobacco		2 (20.0%)	$\chi^2(1) = 0.054$, $p = 0.816$.b	0.238c	0.148e
	Cannabis		1 (8.3%)	$\chi^2(1) = 0.086$, $p = 0.769$.b	0.779c	0.671e
	Other substance		3 (30.0%)	$\chi^2(1) = 1.375$, $p = 0.241$.b	0.395c	0.235e
Negative evaluation		M, 0.54; F, 0.64				

	Alcohol		3 (21.4%)	$\chi^2(1) = 1.352$, $p = 0.245$.b	0.626c	0.454e
	Tobacco		2 (20.0%)	$\chi^2(1) = 0.158$, $p = 0.691$.b	0.601c	0.446e
	Cannabis		2 (16.7%)	$\chi^2(1) = 0.016$, $p = 0.900$.b	0.433c	0.426e
	Other substance		3 (30.0%)	$\chi^2(1) = 3.362$, $p = 0.067$.a	0.914c	0.834e
Moderate autonomy		M, 0.65; F, 0.63				
	Alcohol		1 (7.1%)	$\chi^2(1) = 0.553$, $p = 0.457$.b	0.846c	0.791e
	Tobacco		1 (10.0%)	$\chi^2(1) = 0.052$, $p = 0.820$.b	0.687c	0.596e
	Cannabis		2 (16.7%)	$\chi^2(1) = 0.671$, $p = 0.413$.b	0.591c	0.409e
	Other substance		3 (30.0%)	$\chi^2(1) = 0.076$, $p = 0.783$.b	0.088c	0.047e
Lax discipline		M, 0.54; F, 0.78				
	Alcohol		3 (21.4%)	$\chi^2(1) = 0.609$, $p = 0.435$.b	0.147c	0.122e
	Tobacco		1 (12.5%)	$\chi^2(1) = 0.123$, $p = 0.726$.b	0.671c	0.556e
	Cannabis		2 (16.7%)	$\chi^2(1) = 0.647$, $p = 0.421$.b	0.508c	0.395e
	Other substance		0	$\chi^2(1) = 0.101$, $p = 0.750$.b	0.583c	0.582e
Positive evaluation		M, 0.72; F, 0.87				
	Alcohol		2 (14.3%)	$\chi^2(1) = 0.932$, $p = 0.334$.b	0.427c	0.309e
	Tobacco		2 (20.0%)	$\chi^2(1) = 4.005$, $p = 0.045$.b	0.144c	0.051e

	Cannabis		3 (25.0%)	$\chi^2(1) = 0.101$, $p = 0.750$.b	0.583c	0.582e
	Other substance		3 (30.0%)	$\chi^2(1) = 0.548$, $p = 0.459$.b	0.038d	0.016f
Irritability		M, 0.5; F, 0.41		NR	NR	NR
Extreme autonomy		M, 0.75; F, 0.72				
	Alcohol		2 (14.3%)	$\chi^2(1) = 0.005$, $p = 0.941$.b	0.589c	0.428e
	Tobacco		1 (10.0%)	$\chi^2(1) = 0.018$, $p = 0.893$.b	0.793c	0.734e
	Cannabis		2 (16.7%)	$\chi^2(1) = 1.032$, $p = 0.310$.b	0.650c	0.455e
	Other substance		3 (30.0%)	$\chi^2(1) = 0.064$, $p = 0.801$.b	0.028d	0.014f

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). *p*-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (d: Model not good fit $p < 0.5$).

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$ (f: Model not good fit $p < 0.5$).

NR: item not reliable as tested using Cronbach Alpha. M: mother. F: mother.

The impact of negative evaluation by parents on adolescent illicit substance use was assessed, controlling for maternal employment status. The Pearson goodness-of-fit ($\chi^2(4) = 8.787$, $p = 0.067$) and deviance goodness-of-fit test ($\chi^2(20) = 18.284$, $p = 0.914$) tests indicated that the model was a good fit to the observed data. The final model significantly predicted the dependent variable over and above the intercept-only model, Walds $\chi^2(4) = 10.176$, $p = 0.038$. The odds ratio of being in a higher category of illicit substance use changed by 0.184 (95% CI, 0.028 to 1.192) with each unit increase in negative evaluation. This represents a 5.43 decrease in the frequency of illicit substance use with each unit increase in negative evaluation.

The impact of discipline and behavioural control on adolescent cannabis use was tested controlling for gender, age, marital status of parent and maternal employment status. The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $\chi^2(97) = 82.565$, $p = 0.851$. The deviance goodness-of-fit test also indicated that the model was a good fit to the observed data, $\chi^2(97) = 44.453$, $p = 0.458$. The final model indicated that discipline and behavioural control and when maternal employment and marital status is controlled for did not statistically significantly predict higher adolescent illicit substance use (Wald $\chi^2(1) = 1.261$, $p = 0.261$).

3.3 Parental Rewards

Table 7 (p. 66) depicts results from ordinal logistic regression predicting influence of parental rewards on substance use in adolescents. The odds ratio using alcohol more frequently when parental rewards were rated at level 1 were 4.164 (95% CI, 1.133 to 15.302; Wald $\chi^2(1) = 4.616$, $p = 0.032$) times those of level 3. The impact of parental rewards on adolescent alcohol use was assessed controlling for ethnicity. Parental rewards when ethnicity was controlled for did not statistically significantly predict higher adolescent alcohol use Wald $\chi^2(1) = 1.714$, $p = 0.191$.

4. PARENTAL SUBSTANCE USE

Results from ordinal logistic regression assessing the impact of parental substance use on adolescent substance use are presented in Table 8 (p. 67). When parental legal substance use was considered, the levels 1 and 2 translated to 0.073 (95% CI, 0.010 to 0.525; Wald $\chi^2(1) = 6.751$, $p = 0.009$) and 0.108 (95% CI, 0.012 to 1.000; Wald $\chi^2(1) = 3.841$, $p = 0.050$) times

illicit substance use amongst adolescents than level 6 respectively. This represents as 13.7 and 9.26 decrease in adolescent illicit substance at parental legal substance use levels 1 and 2 respectively when compared with parental legal substance use level 6.

Table 7 Results from ordinal logistic regression predicting substance use in adolescents given family management variables parental rewards

Substance	Cronbach Aplha	Cells Zero Frequencies	Model Fit	Goodness of Fit	
				Pearson	Deviance
	0.718				
Alcohol		3 (14.3%)	$\chi^2(2) = 4.768$, $p = 0.092$.a	0.355c	0.259e
Tobacco		2 (13.3%)	$\chi^2(2) = 0.058$, $p = 0.972$.b	0.859c	0.761e
Cannabis		4 (22.2%)	$\chi^2(2) = 1.991$, $p = 0.370$.b	0.249c	0.141e
Other substance		3 (20.0%)	$\chi^2(2) = 4.296$, $p = 0.117$.b	0.707c	0.566e

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). *p*-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$.

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$.

Table 8 Results from ordinal logistic regression predicting substance use in adolescents given parental substance use

Independent variate	Substance	Cells Zero Frequencies	Model Fit	Goodness of Fit	
				Pearson	Deviance
Parental legal substance					
	Adolescent Alcohol	17 (40.5%)	$\chi^2(5) = 7.068$, $p = 0.216$.a	0.182c	0.098e
	Adolescent Tobacco	14 (46.7%)	$\chi^2(5) = 0.919$, $p = 0.969$.b	0.184c	0.204e
	Cannabis	16 (44.4%)	$\chi^2(5) = 3.097$, $p = 0.685$.b	0.114c	0.096e
	Other substance	8 (33.3%)	$\chi^2(5) = 7.075$, $p = 0.215$.b	0.462c	0.410e
Parental illicit substance					
	Adolescent Alcohol	6 (42.9%)	$\chi^2(1) = 3.517$, $p = 0.061$.b	1.000c	1.000e
	Adolescent Tobacco	4 (40.0%)	$\chi^2(1) = 0.470$, $p = 0.470$.b	1.000c	1.000e
	Cannabis	5 (41.7%)	$\chi^2(1) = 0.917$, $p = 0.338$.b	1.000c	1.000e
	Other substance	3 (37.5%)	$\chi^2(1) = 0.105$, $p = 0.746$.b	0.474c	0.400e

a: The final model statistically significantly predicted the dependent variable over and above the intercept-only model, $p \leq 0.1$. (b: The final model did not statistically significantly predict $p > 0.1$). p-level of 0.1 was used during univariate analysis variable screening to select variables for further multivariate analysis.

c: The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$.

e: The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $p \geq 0.5$.

When regression modelling was performed on parental legal substance use against illicit substance use controlling for ethnicity, the model statistically significantly predicted higher adolescent alcohol substance use (Wald $\chi^2(1) = 5.604$, $p = 0.0.018$). Both Pearson goodness-of-fit ($\chi^2(87) = 108.312$, $p = 0.06$) and deviance goodness-of-fit ($\chi^2(87) = 78.337$, $p = 0.735$) tests indicated that the model was a good fit to the observed data. The odds of being in a higher category of alcohol use increased by 1.506 (95% CI, 1.073 to 2.114) with each increase in frequency category of illicit substance use by parents.

CHAPTER SUMMARY

The data analysis approach adopted and the main findings of the study were presented in this chapter. Unreliable measures were first detected and excluded from further analysis. A comprehensive exploration of the data enabled an in-depth understanding of the data, which helped in this section and during discussion of the results in contextualizing the statistical modelling results. Cumulative odds ordinal logistic regressions with proportional odds were run for individual factors and then for combinations of significant factors to determine the effects of family management and relation variables controlling for demographic and socio-economic characteristics on adolescent substance use.

Various demographic and socio-economic characteristics of families influenced substance use outcomes in a manner which varied from one substance to another. Some of the significant demographic and socio-economic characteristics affected the magnitude or statistical significance of protective or risk impact of specific family management and relations factors when they were controlled for. For example, even though lower levels of affection were significantly associated with higher levels of cannabis use, this effect was not statistically significant when marital status of parents and maternal employment status were controlled for.

Risk and protective impact of family management, family relations as well as demographic and socio-economic characteristics on substance use among the respondents varied from substance to substance. Demographic and socio-economic characteristics, family management and relations risk and protective factors in some instances acted interactively. There was an interactive effect on adolescent alcohol use between expressiveness, democratic family style and laissez faire family style even when ethnicity was controlled for. When education was controlled for,

instrumental aid, positive evaluation, discipline and behavioural control and parental rewards were not significantly associated with adolescent substance use.

CHAPTER 5

DISCUSSIONS

INTRODUCTION

Substance use and abuse preventative approaches are a promising, efficient and potentially effective mitigation strategy to substance abuse, especially in the adolescent stage where initiation is common, and threatens further persistence of substance use and problematic use. A major prevention strategy is the reduction in risk and enhancement of promotive or protective factors in individuals and the environment surrounding them during their growth and development (O'Connell et al., 2009). Despite this promising strategy, few studies focus on family predictors of substance use despite evidence supporting the potential of family predictors in substance use prevention based on the role these predictors may play as reported in studies incorporating the parent-child relationships. Furthermore, risk and protective factors may be influenced by cultural groupings (Brook et al., 2006). This study set out to evaluate the hypothesis that South African adolescents living in families with more favourable relations and management practices are less likely to engage in substance abuse than those who live in families with less favourable family environments. The results are discussed here with relation to other studies, underlying theoretical background to various trends revealed by the results, as well as further considerations to make when interpreting the results. Statistically significant risk and protective factors are presented and discussed.

The hypothesis studied is based on a social development model, which postulates that children learn behavioural patterns from their social environment - including family, school, peers and community institutions either in a prosocial or an antisocial pathway. Competent socialisation, irrespective of pathway, leads to the development of a social bond between the individual and the socializing unit. This social bond may directly affect the behaviour of an individual. A pro-social bond may inhibit deviant behaviour when it defines benefits an individual gets from living up to the norms and values of the socializing unit (Guo et al., 2001).

This study focused on adolescents - persons over the age of 10 but less than 20 years old (WHO, 1999; Parry et al., 2004) because early adolescence is a critical transition period where biological, cognitive, and social changes expose individuals to a range of risk behaviours,

including sexual initiation, truancy, and alcohol use. Coping strategies to such exposures vary depending on family socialisation (Roche et al., 2008). Such adolescent problem behaviours including substance abuse, delinquency, teen pregnancy, school drop-out, and violence can be predicted by a series of risk and protective factors (Hawkins & Catalano, 2005).

The study assessed tendency for adolescents to take up behavioural patterns by assessing impact of risk and protective factors on adolescent substance use. A risk factor, on one hand, can be defined as a variable that significantly predicts if an individual is likely to develop a disorder or disease. Mrazek and Haggerty (1994) proposed that for a variable to be a risk factor, it must be associated with enhanced probability of disorder and must antedate the onset of disorder. Risk factors can therefore be defined as "those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will develop a disorder" (Mrazek & Haggerty 1994: 127). From the foregoing definitions, substance use risk factors are those aspects that increase the risk or likelihood of emergence or continuation of adolescent problem behaviours in adolescence and young adulthood (Hawkins et al., 1992; Muisener, 1994; Arthur et al., 2002).

Protective factors, on the other hand, are those variables that decrease the chances of problem behaviour either directly or by mediating or moderating the effect of exposure to risk factors (Fraser, 1997; Luthar & Zigler, 1991; Werner & Smith, 1992; Arthur et al., 2002). Protective factors therefore buffer adolescents from exposure to risks and reduce the likelihood of acquiring such behaviours (Hawkins et al., 1992; Muisener, 1994). Whereas risk factors act as predictors of the problems, the presence of protective factors may neutralize the "harm" associated with risk factors (CSRP, 2011). This is because different types of risky activities share similar antecedents and serve comparable psychosocial functions (Maggs, Frome, Eccles & Barber, 1997).

Risks and protective factors involve four youth environmental contexts including peer and individual, school, family, and the community (Hawkins & Catalano, 2005). Studies have shown that family or school factors are some of the strongest predictors of adolescent outcomes (Cleveland et al., 2008). Such factors include family history of the problem behaviour, family management problem, family conflict, favourable parental attitudes and involvement in the problem behaviour (Hawkins et al., 1992; Muisener, 1994). The key role of family is

increasingly becoming recognized in both substance use prevention and intervention strategies through risk reduction, or promotion of protection and resilience (CSRP, 2011).

The dynamic nature of society and new trends in substance use necessitate the identification of risk factors as an on-going process. Treatment programmes and models too should be revised according to the patterns of risk elements in different cultures and social groups in society (Maddahian et al., 1994).

Data analysis, results and this discussion section adopted an organization of adolescent substance use measures according to substance use progress theory by Kandel (1975) where substances are categorised as alcohol, tobacco, cannabis and other illicit substances. Parental substance are presented either as legal substance use (alcohol and tobacco use), or illicit substance use. Results from exploration of the data are initially discussed followed by discussion of the statistical modelling results.

Demographic and Socio-Economic Characteristics

Demographic and socio-economic attributes of families have been proposed as important factors influencing substance use outcomes. Even though the ability to meet basic needs in the family is important in building family well-being, the balance between family time and income is a challenge especially for low income and single-parent families (Stevens et al., 2005). Poor access to education, health services, housing, and transportation - as well as societal and cultural values on materialism may compound challenges posed to family functioning by lack of parenting and communication skills within the family (Stevens et al., 2005; CSRP, 2011).

The median age of respondents in this study was 18, with a mode of 20, with majority of respondents being 20 years old, followed by ages 17 and 18. The use and abuse of substances has been reported to be highest in young adults between age 18 and 26. This stage is characterized by rapid change to a new social phase where individuals have greater freedom and less social control when compared to the experience during childhood (Stone et al., 2012). Problems associated with the greater freedom and less social control may hinder effectiveness in commencement of adult roles and responsibilities and therefore pose potentially negative effect on individuals in the long-term (Stone et al., 2012).

Adolescent and parental substance use

Prevention strategies should consider patterns consisting of both the type of substance used and the mode of use. Despite the universal uniformity in substance use, such patterns vary geographically (Foxcroft & Tsertsvadze, 2011). The most intensely used substances by respondents in this study were tobacco, cannabis, cocaine, heroin and alcohol in decreasing order of use intensity. The current study showed that the majority of respondents smoked every day, or almost every day, with the majority in this category smoking 10 or more times per day. Similar findings have been reported in other studies, for instance, cannabis has been reported as one of the most commonly used illicit substance among adolescents in South Africa (Parry et al., 2004). These substances are also characterized by highest tendencies to continued use. The National Institute on Drug Abuse (1995) studied the neurobiological and neurochemical nature of addiction by assessing the degree of discontinuation of use of alcohol, cannabis, LSD, heroin, cocaine and inhalants for a senior class. This study revealed that a considerable section of users continued to use these substances and only use of inhalants was most discontinued. The current study revealed in similar findings that continued use was more likely for tobacco (in cigarettes), alcohol, cannabis, and cocaine in decreasing order of prevalence. Tobacco, alcohol and cannabis therefore form some of the most used substances (Kliewer & Murrelle, 2007).

Tobacco use

The study found that the period of life as measured by number of years the substance is used for tobacco varied between 0.5 to 16.7 years, with the majority of respondents having smoked for 5 years (17.3%) followed by 1, 2, 6 and 8 years for 11.5% of respondents. This scenario might have a significant implication on the increase in substance dependence as it has been shown that adolescents who have used substances in the past one year may be at a higher risk of dependence than any other age category due to uncertainties in physical environment, social environment and life challenges (Challier et al., 2000). Age at beginning of smoking varied between 6.7 and 17.5 years. The majority of respondents started smoking at age 12 (28.8%), followed by ages 13 (17.3%), 16 (13.5%) and 15 (11.5%). Challier et al. (2000) also reported that about 77% of current smokers reported first smoking at age 15 or younger. Despite a decrease in substance use rates for all age groups, it increased for individuals aged 12 to 17 and 18 to 25 (Arthur et al., 2002).

Early age prevention strategies targeting these age groups where initiation to substance use is prevalent may therefore be optimum in fostering the avoidance of first experience with substances especially tobacco or alcohol (Challier et al., 2000; Arthur et al., 2002).

Alcohol use

Alcohol is one of the most commonly used, accepted, and abused substances in society (Greydanus & Patel, 2005). Most adolescents (n=13, 24.1%) reported to have used alcohol at a frequency of once a month or less. This prevalence of 24.1% in alcohol use is slightly greater than that from a study by Grant et al. (1994) who reported a 16% prevalence in alcohol use among youth aged 18-29. The study also found that the majority of adolescents started taking alcohol at age 10 (n=6, 19%) followed by age 12 (n=6, 18.8%) and age 13 (n=4, 12.5%). This 10-13 years range in age at substance use initiation is also similar to results where the average initial exposure to alcohol was 12 years of age in the United States (Greydanus & Patel, 2005).

Cannabis use

The current study revealed that the majority of respondents (n=34, 63%) use cannabis every day or almost every day. Furthermore cannabis is the most frequently used amongst illicit substances and is a common part of substances used by multi-substance users in the United States (Arthur et al., 2002).

The high acceptance in cannabis use was further supported by the fact that only 16.7% of adolescents never used cannabis. Societal attitudes tend to be more accepting of cannabis use than of other illicit substance use. It has therefore been observed that substance use progresses sequentially beginning with the use of legal substances, followed by the use of cannabis (Mackesy-Amiti et al., 1997). The high cannabis use prevalence may however be associated with increased incidence of deviance albeit less than that associated with the use of illicit substances. Cannabis use initiators tend to be less deviant as measured using various psychosocial factors than initiators of other illicit substance use, but more deviant than those who do not initiate illicit substance use amongst adolescents and adults (Yamaguchi & Kandel, 1984; Kandel & Davies, 1992).

ORDINAL REGRESSION MODELLING

Cumulative odds ordinal logistic regressions with proportional odds enabled the assessment of risk or protective effects of family management and relation variables against adolescent substance use while controlling for demographic and socio-economic characteristics (Table 9-11).

Adolescent use of one substance in comparison with use of other substances

There was a 1.6 and 2.7 times increase in the odds of higher illicit substance use with increase in frequency of alcohol and tobacco use respectively. Cannabis use, however, did not significantly predict use of other substances. An increase in frequency of illicit substance use was associated with a 1.4 increase in the odds of higher alcohol use. Such increase in use of one group of substance with increasing use of other substance has also been reported. The risk of cannabis use was found to be 65 times higher amongst individuals who have smoked or drank while the risk of initiation into cocaine increases 104 times higher with increase in use of cannabis (National Institute on Drug Abuse, 1995; AAPCSA, 1999). A distinction of substance types when addressing risk factors is therefore important. It is for instance important when addressing risk factors to distinguish between variables which are risk factors for adolescent illicit substance and alcohol use (Donovan, 2004).

DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Table 9 (p. 76) presents demographic and socio-economic protective or risk factors with significant influence on substance use among the adolescents. Though results varied from one substance to another, risk factors for substance use included being male, younger age, being in lower education grades, coloured ethnicity, adolescents from divorced parents and unemployed or fully employed mothers. Protective factors included being female, older age adolescent, accomplishment of higher education levels (certificate and diploma), white or black ethnicity and adolescents from self-employed mothers.

Table 9 Protective or risk influence of demographic and socio-economic characteristics on substance use

Variable category or Factor	Substance	Level or Category	Change in odds	Baseline category
Gender	Cannabis	Males	5 times higher	Females
Age	Cannabis	Lower age	1.4 times decrease	Higher age
Education level	Tobacco	Reception to grade 6	44 times higher	Certificate and diploma
		Junior secondary grades	219 times higher	Certificate and diploma
		Further education and training	44 times higher	Certificate and diploma
Ethnicity	Alcohol	Coloured	16 times higher	White
		Coloured	14 times higher	Black
Parent Marital Status	Cannabis	Divorced	13 times higher	Separated parents
Maternal Employment Status	Cannabis	Unemployed	16 times higher	Self-employed
		Full-time employed	13 times higher	Self-employed
	Illicit substance	Unemployed	10 times higher	Self-employed
		Full-time employed	29 times higher	Self-employed
Parental substance use	Illicit substance	Level 1	14 times lower	Level 6

Level 2	9 times lower	Level 6
All	1.5 times change controlling for ethnicity	All

Adolescent Substance use by Gender

The majority of respondents (89%) in this study were males. The odds of cannabis use by males were statistically higher and 5 times that of females. Previous research has suggested higher substance use among males that females. The frequency and intensity of smoking, alcohol and other substance use have been reported to be higher in males than in females (Challier et al., 2000; Locke & Newcomb, 2004). The adverse effects and proportion of substance use burden pertaining to the youth are also higher in males than females with greater than 25% male and around 10% female mortality being attributed to alcohol (Foxcroft & Tsertsvadze, 2011). According to the social development model, one of the three exogenous constructs affecting socialisation is position in the social structure which includes gender. Another possible explanation behind higher substance burden in males than females is gender development theory which suggests that family socialisation processes would be more strongly linked with the risk-taking behaviours of adolescent females when compared to males (Roche et al., 2008). However in this study, gender was not associated with a statistically significant prediction of adolescent alcohol, tobacco use and other illicit substance use.

Adolescent Substance use with Age

Early initiation of the problem behaviour is a risk factor for substance use (CSRP, 2011). An increase in age of the adolescents was associated with 1.4 times decrease in odds of higher cannabis use. In contrast, behavioural problems increase by almost two-fold between ages 9 and 15 and initiation of substance use in younger adolescent years (prior to age 15) was cited as the greatest risk for long-lasting problematic substance abuse (Brody et al., 2008; Greydanus & Patel, 2005). Early adolescence therefore forms an important developmental period for prevention of initiation and establishment of substance use and as well as other behavioural problems (Brody et al., 2008; King & Chassin, 2004). Age did not significantly predict adolescent use of alcohol, tobacco and other illicit substances in the current study.

Adolescent Substance use by Education

The level of education for 66.7% of respondents was “further education and training” (grades 10-12) and 24.1% were educated to secondary grades 7-9. The odds of using tobacco more intensely with changes in education levels were significant and adolescents at “reception to grade 6”,

“junior secondary grades”, and “further education and training” were 44, 219 and 44 times more likely to use tobacco than respondents at “certificate and diploma” level. The odds of substance use for those adolescents at lower level education levels are therefore much higher than those at higher levels. High risk of substance abuse and experimentation has been associated with low commitment to school and academic failure especially in late elementary school (Harachi et al., 1996; CSRP, 2011). Academic success, education in good schools and high intelligence were reported as protective factors against substance use (Greydanus & Patel, 2005). Substance use further exacerbates this situation in that adolescent who use substances are also more likely to drop out of high school (Mensch & Kandel, 1988; Maggs et al., 1997; Parry et al., 2004). In this study, the odds of substance use for adolescents in junior secondary grades were highest (219 times) compared with those at certificate and diploma levels. In similar results, a continuous rise in use of AODs amongst South African adolescents has been reported with high school students showing high levels of alcohol abuse (Parry et al., 2004). Results from the “Future National Survey” of secondary school students reported that about 52%, 71% and 80% of 8th, 10th and 12th grade students respectively had used alcohol at some life period (Johnston et al., 2000). Differences in main patterns therefore become apparent during middle school a period at which preventive interventions may reduce the risk of latter alcohol abuse and dependence (Guo et al., 2000). Low bonds to school on the other hand are associated with higher risk of substance and alcohol use by adolescents and adults (Li, Feigelman & Stanton, 2000; Fothergill & Ensminger, 2006). Childhood and adolescent risk of later alcohol abuse and dependence may therefore be reduced and protection enhanced by early establishment and maintenance of strong bonds to school (Guo et al., 2001). The protective impact of educational achievement is higher that of ethnicity (Crum & Anthony, 2000; Fothergill & Ensminger, 2006).

Adolescent Substance use by Ethnicity

Alcohol use significantly differed by adolescent ethnicity, whereby the odds of higher frequency of alcohol use for coloured respondents was 16 times and 14 times higher than that of white and black respondents respectively. However, risk factors have been reported as uniform in all ethnic groups (Fleming et al., 2002; CSRP, 2011). The differences in odds of substance use with ethnicity despite uniformity of risk factors can be viewed from the perspective of the social development model which identifies ethnicity as part of position in the social structure. Position

in social structure is one of three exogenous constructs that affects socialisation processes including behavioural and substance use problems (Guo et al., 2001).

Adolescent Substance use by Marital Status of Parent

The marital status of respondents' parents consisted of 35.2% married parents, with single parents composing 27.8% of respondents' parents. Cannabis use among adolescents was significantly associated with marital status of parents with the odds ratio of being in a higher category of cannabis use increasing 13 times for divorced parents when compared to separated parents. Unstable families including those characterized by poor marital relationship, family crisis, divorce and single-parent families may be part of main or interacting factors influencing substance use as well as other adolescent behavioural issues (CSRP, 2011; Greydanus & Patel, 2005; Maggs et al., 1997). Such changes in family structure have been termed as "Dramatic Family Crisis" which refers to the sudden and catastrophic change in a family such as change of a family's social economic status, death, divorce, terminal disease within the family, separation, relocation of the family and remarriage (Muisener, 1994). In similar results to those of this study, single parenthood is viewed as one of the favourable conditions for substance use in addition to other family factors including inadequate living standards and use of substances by family members (Challier et al., 2000). Substance use statistics from China indicate that substance use is more prevalent amongst youth not living with either of their parents (CSRP, 2011).

However, even in the absence of a biological parent, attachment to, a sense of belonging and closeness to at least one surrogate care-giver may play a mentoring role (UNODC, 2009; CSRP, 2011). Variation in impact of parental gender has also been reported (CSRP, 2011; Hemovich & Crano, 2009). A maternal hypothesis has been suggested which postulates that as a result of better overall supervision and stronger affective bonds, children living with the mothers are less likely to engage in delinquent behaviour compared to those living with their fathers. The same-sex hypothesis proposes that same-sex parent-child pairings are associated with strongest protection of children against substance use (Hemovich & Crano, 2009). Protective effect as proposed by maternal hypothesis can however be explained by the weaker direct and indirect controls instituted by single fathers rather than family structure (Demuth & Brown, 2004). Even in the absence of a resident father, closer bonds with adolescents result in more benefits than a weak bond with a resident father (Booth, Scott & King, 2010; CSRP, 2011).

Adolescent substance use by Parental Education

Further education and training (grades 10-12) was the highest level of education achieved by the majority of mothers (41.5%) and fathers (34.6%). Higher parental education and incomes have been associated with improved ability to provide such material support such as college tuition, giving their children more life options (Maggs et al., 1997). However, the models showed that parental education in this study did not statistically significantly predict substance use among the respondents.

Parental Employment Status

Median maternal (57.4%) and paternal (60.9%) employment status, which was also the modal category was "employed full time". There were, however, differences in the influence of maternal and paternal employment status on substance use in adolescents. The final model significantly predicted the relationships between cannabis and illicit substance use with employment status of the mothers. The odds of higher frequency of cannabis and illicit substance use for adolescents from unemployed (16 times for cannabis and 10 times for illicit substance use) and full time employed (13 times for cannabis and 29 times for illicit substance use) mothers was higher than those from self-employed mothers. Given maternal role in family management, this trend may be due to either low income among unemployed mothers or long working hours for the full time employed mothers leading to limited family time, little attention to young people and poor attachment with parents or significant others (CSRP, 2011).

Unemployment is associated with meagre resources and a sense of despair, which may make individuals more vulnerable to substance abuse (Engels et al., 2005; Fothergill & Ensminger, 2006). Poverty may indirectly affect substance use by increasing parental stress which leads to a decreased quality of parenting (Fothergill & Ensminger, 2006). On the other hand, teenagers from higher social economic families may also be vulnerable to substance abuse due to family functionality problems (Skagen & Fisher, 1989). The "existential/ boredom hypothesis" states that "Life for young people growing up in affluent families is often barren in the sense that meaningful responsibilities and accomplishments are often lacking" hence the young person's sense of identity is intruded upon (Skagen & Fisher, 1989: 137). This "instability in identity" may be a precursor of substance abuse (Skagen & Fisher, 1989; Muisener, 1994). Parental support or extensive social and employment networks present social resources that may act as a

buffer against some of the impacts of adolescent risk (Maggs et al., 1997). However paternal employment status was not a statistically significant predictor of substance use in the current study.

2. FAMILY RELATIONS

Family characteristics, especially parent-child relationships, may exert important influences on the risk of underage substance use (Arria et al., 2008). This study revealed several family relations risk and protective factors against substance use (Table 10, p. 83). These factors were classified as either family functioning and conflict or family bonding and support.

Table 10 Protective or risk influence of family relations on substance use

Variable category or Factor	Substance	Level or Category	Change in odds	Baseline category	Multivariate or Controlled Effect
Family Functioning and Conflict					
Expression	Cannabis	Level 1	4.8 times less	Level 4	Significant influence of expressiveness, democratic family style and laissez faire family style statistically controlling for ethnicity
		Level 2	10 times less	Level 4	
		Level 3	6.9 times less	Level 4	
Democratic style	Alcohol	Level 2	2 times less	Level 4	
		Level 3	27 times less	Level 4	
Laissez faire style	Alcohol	Level 1	15.6 times less	Level 4	
		Level 2	9.2 times less	Level 4	
Conflict	Illicit substance	Level 1	5 times less	Level 3	14 times controlling for maternal employment status
		Level 2	5 times less	Level 3	
Family Bonding and support					
Conflict	Alcohol	Level 2	4 times less	Level 4	Interactive effect with ethnicity and reassurance of worth
Intimate disclosure	Alcohol	Level 1	9 times higher	Level 4	
		Level 2	19 times higher	Level 4	

		Level 3	18 times higher	Level 4	
Affection	Alcohol	Level 1	8 times higher	Level 5	
		Level 3	7 times higher	Level 5	
		Level 4	5 times higher	Level 5	
	Cannabis	Level 3	11 times higher	Level 5	Not significant when marital status of parent and maternal employment was controlled for
Reassurance of worth	Alcohol	Level 2	10 times higher	Level 5	Interactive effect with ethnicity and conflict
		Level 3	7 times higher	Level 5	
Instrumental aid	Tobacco	Level 3	49 times higher	Level 5	Not significant when education was controlled for

Significant family functioning and conflict risk factors included higher levels of expression, family democratic style levels, laissez faire family style and family conflict. Family bonding and support risk factors influencing substance use included higher levels of conflict, lower levels of intimate disclosure, affection, reassurance of worth, instrumental aid and affection. The protective or risk impact of these factors varied from substance to substance.

2.1 Family Functioning and Conflict

Family remains the main holding environment supporting the development of adolescents. Teenagers who grow up in a well-functioning family environment enjoy the continuous safety and support of a firm but flexible family environment. Additionally, a well-functioning family setting provides a forum to appropriately express a wide range of feelings as well as a clear sense of proactively dealing with issues that arise in the family (Muisener, 1994).

Family functioning significantly affects the well-being of individuals in a family (Stevens et al., 2005). This family functioning will in turn significantly affect adolescent substance abuse and mitigation efforts should therefore be focused on not only the substance user, but also at addressing entities within family as well as their surrounding (UNODC, 2009; CSRP, 2011). Despite the family being a normal transition, family functioning can be affected by developmental crisis (Muisener, 1994). Dysfunctional families are a continually distressing environment nurturing a high possibility of substance abuse initiation and continuation (Muisener, 1994). Less cohesion as well as emotional uncertainty in the family may also have an impact similar to depression as a risk factor for deviant behaviour and substance use (Locke & Newcomb, 2004).

Family functioning and conflict against alcohol use

The risk of higher frequency of alcohol use in adolescents from families characterized by parental monitoring at level one was 4 times more than those of level three. Even when ethnicity was controlled for, parental knowledge of adolescent activities significantly predicted higher adolescent alcohol use. Each increase in level of parental knowledge of adolescent activities was associated with 1.8 times decrease in odds of more frequently alcohol use. Expressiveness, democratic family style and laissez faire family style also interactively predicted higher adolescent alcohol use controlling for ethnicity. Correlation was previously reported between

enhanced parental monitoring and supervision with less high school alcohol consumption, independent of sex, ethnicity and religiosity (Arria et al., 2008).

Adolescents living in families at levels 2 and 3 of democratic style were 2 and 27 times respectively at less odds of alcohol use when compared with those at levels 4. Adolescents living in laissez faire families categorised at levels 1 and 2 were 15.6 and 9.2 times less likely to use alcohol than those at levels 4. Extremes in both democratic and laissez faire family style may pose a risk of higher frequency of alcohol use among adolescents (Barnes, Farrell & Cairnes, 1986; Jurich, Polson, Jurich & Bates, 1985). A family order characterized by firmness and empathy by parents creates a feeling of stability and safety within the family. Both extremes where parents are either too authoritative or too laissez-faire lead to a breakdown in leadership within the family (Barnes et al., 1986; Jurich et al., 1985). This is consistent with a model by Schaefer (1987) which describes a dysfunctional yet operational triangle including an under-involved parent (the "persecutor"), an overinvolved parent ("rescuer"), and the adolescent (the "victim") (Muisener, 1994). Continuous inconsistency in setting limits may be a factor in continued child substance abuse problem (Muisener, 1994).

Family functioning and conflict against other illicit substance use

Adolescents living in families at conflict levels 1 and 2 were about 5 times less likely to use illicit substances than those at levels 3. Conflict statistically significantly predicted higher adolescent illicit substance use controlling for maternal employment status. The odds of being in a higher category of the illicit substance use changed 14 fold with each increase in conflict controlling for maternal employment status. Whereas lack of conflict between parents and adolescents protects the youth from substance use, poor parenting and high degree of family conflict appear to increase risk of problem behaviours including the abuse of alcohol and other substances (Brook et al., 1983; CSRP, 2011).

Adolescent substance use problems have been associated with negative family interaction such as conflict and poor communication (Kliewer & Murrelle, 2007; Guo et al., 2001; Loxley et al., 2004; Greydanus & Patel, 2005). Such conflict may add or hinder provision of a support environment against other sources of stress thereby increasing chances of substance or alcohol use as form of stress relief (Kliewer & Murrelle, 2007). Furthermore, whether or not the children

are directly involved in the conflict, children raised in families high in conflict are at greater risk of both delinquency and substance use (Arthur et al., 2002). Low parental conflict (parental harmony) beginning at late childhood and in adolescence may act as a protective factor which reduces alcohol problems. Parental conflict however does not appear to be a direct predictor of adolescent alcohol use, but it may act by influencing other family factors (Loxley et al., 2004). Such high levels of conflict including conflict between parents, children and family in early years of the individual mediated the link between parent antisocial behaviour (excluding parent alcohol problems) and later externalizing problems (Zhou et al., 2006). A low level of parent-child hostility is one of aspects determining effective parenting and may mediate between parental monitoring and adolescent drinking (Arria et al., 2008). Parental harmony during adolescence may therefore be a protective factor which mediates the influence of other risk factors including early age alcohol use (Loxley et al., 2004).

The impact of family conflict on substance use may be explained by Patterson, DeBaryshe and Ramsey's (1989) developmental model of antisocial behaviour which suggests that dysfunctional family developments such as family conflict, contribute towards behavioural problems in children. This escalates to rejection by less deviant peers, school failure, and consequent involvement with deviant peer groups whose norms further promote antisocial behaviours (Zhou et al., 2006). Family conflict may therefore influence both initiation and persistence of substance use (Beyers et al., 2004)

2.2 Family Bonding and support

Significant risk or protective factors against substance use associated with family bonding and support included conflict, intimate disclosure, affection, reassurance of worth and instrumental aid. The bonds between adolescents with parents and schools have commonly been cited as important in either discouraging or aiding risk behaviours including substance and alcohol use (Fothergill & Ensminger, 2006). Lower family bonding has been associated with high risk of substance abuse and experimentation, as well as reduced propensity to avoidance of substance use initiation upon exposure (Harachi et al., 1996; CSRP, 2011). The presence of positive family interactions such as family cohesion and communication has been linked to adaptive behaviours in adolescents, including lower levels of substance use and less involvement with deviant peers (Kliewer & Murrelle, 2007). Communication (related in this study to intimate disclosure and

affection) has an important influence on family characteristics and the consequent risk of underage alcohol use (Arria et al., 2008). Predisposing factors within family which lead to enhanced vulnerability to substance abuse and problematic behaviour include: low parent-child connectedness (Ackard et al., 2006), low youth satisfaction in the relationships with their parents (Pasch et al., 2010) and alienated relationship between parents and teenagers (CSRP, 2011). This in turn affects choice of friends by the youth which results in an association between poor parent-child bond and higher association with substance-use peer and vice versa (UNODC, 2009; CSRP, 2011). Even in the absence of a resident father, closer bonds of significant others with adolescents results in more benefits than a weak bond with a resident father (Booth et al., 2010). Family bonding and support from parents are protective factors associated with lower risk of not only substance use initiation but also continuation in regular use (Beyers et al., 2004). Substance use may be mediated by the quality of relationship between parent and adolescent (Baumrind, 1996). Whereas affection between parents and adolescents protects the youth from substance use, poor parenting, and a low degree of parents-children bonding appear to increase risk of problem behaviours, including the abuse of alcohol and other substances (Brook et al., 1983; CSRP, 2011). Parental skills improvement training programmes have therefore been successfully tested and implemented resulting in increased positive family attachment with adolescents which in turn was successful in reducing early adolescent substance use (Loxley et al., 2004).

Family bonding and support versus alcohol and cannabis use

Adolescents living in families characterized by lower affection levels 3 were associated with 11 times higher risk of cannabis use than those at affection level 5. Adolescents living in families characterized by lower affection levels 1, 3 and 4 were 8, 7 and 5 times respectively more likely to use alcohol than those at level 5. Adolescents from families at conflict level 2 were 4 times less likely to use alcohol when compared to those at conflict level 4. When intimate disclosure was categorised at levels 1, 2, and 3, adolescents were 9, 19 and 18 times respectively more likely to use alcohol compared to those at level 4. Reassurance of worth levels 2 and 3 were associated with 10 and 7 times higher alcohol use respectively versus those of level 5. Ethnicity, conflict and reassurance of worth interactively predicted higher adolescent alcohol use controlling for ethnicity.

Substance use may be mediated by the quality of relationship between parent and adolescent (Baumrind, 1996; CSRP, 2011). Several factors including frequent outburst of anger and hostility, cold and irresponsive relationships among family members predispose vulnerable individuals to problematic behaviour and substance abuse (Repetti, Taylor, & Seeman, 2002). Other factors include parents low in warmth and high in hostility (Melby, Conger, Conger & Lorenz, 1993; Ackard et al., 2006) and high conflict with parents and/ or within the family (Yen et al., 2007; CSRP, 2011). Low warmth and communication with parents predicted (unadjusted) illicit substance use at age 15 to 16 years though when peer influence was adjusted for, the effect was no longer significant. In a New Zealand cohort, frequent cannabis use at age 15 to 16 was predicted though unadjusted by low parental attachment at age 15 (Loxley et al., 2004). Failure to form a warm relationship during early development has been linked to poor language skills and cognitive ability as well as to inappropriate self-regulatory behaviour and substance use in early childhood (AAPCSA, 1999). Such impact in adolescent years may predict substance in later life years. For instance, a York State cohort reported higher incidences of multiple substance use at age 22 years when children had low attachment to parents at ages 14 and 16 years (Brook et al., 1998; Loxley et al., 2004).

Family bonding and support versus tobacco use

When instrumental aid was rated at level 3, adolescents were 49 times more likely to use tobacco compared to those at level 5. Parental socialisation can explain a broad range of deviant behaviour in adolescents (Baumrind, 1995). When education was controlled for, instrumental aid did not significantly predict higher adolescent tobacco use. Instrumental assistance offered by parents to their offspring includes aspects such as financial assistance or help finding employment (Maggs et al., 1997). Children who receive emotional and instrumental support and moderate levels of control from parents are less likely to be drawn into delinquency and substance use (Engels et al., 2005). This may be explained by the concept that youth who have a perception of more opportunities, from family involvement and recognition of pro-social activities are more likely to participate in such activities and less likely to use substances **(**Arthur et al., 2002).

Religiosity has been reported as a protective factor inhibiting adolescent alcohol use, future abuse and dependence (Beyers et al., 2004). Family bonding and support data for religiosity was

however not further analysed in this study because this measure did not qualify as per Cronbach Alpha diagnostics. Parental religiosity has been associated with religiosity in adolescents, more communication of values regarding behaviour to offspring as well as higher likelihood of support and monitoring of adolescents. This reduces opportunities as well as involvement in substance use (Kliewer & Murrelle, 2007). More reliable measures of religiosity could enable establish whether such trends are prevalent among the adolescents in the richly diverse religious landscape in South Africa.

3. FAMILY MANAGEMENT VARIABLES

Family management associated factors with a risk or protective effect on adolescent substance use are presented in Tables 11 (p. 92). High risk of substance use and experimentation are likely to be associated with poor family management and children brought up in such families may have reduced refusal or avoidance tendencies of substance use upon exposure (Harachi et al., 1996; CSRP, 2011; Guo et al., 2001). A history of poor family management may predict current substance use (Beyers et al., 2004). The significance of various factors in this study varied with type of substance. These factors were classified as parental monitoring, discipline, behavioural control and rewards.

3.1 Parental monitoring

Parental monitoring related risk factors for substance use included lower levels of parental knowledge of adolescent activities. Family supervision and monitoring is a part of the external constraints, one of three exogenous constructs that affect socialisation processes as proposed by the social development model (Guo et al., 2001). In the ecological system theory described by Bronfenbrenner (1979) effective parental monitoring can be classified as an exosystem (family level) which involves external settings though not involving the person as an active participant but still affect the person, or is affected by the person. Effective parenting involving parental monitoring and supervision and explicit disapproval of underage drinking may be strongly associated with less substance use among adolescents (Arria et al., 2008).

This study assessed parental monitoring by assessing responses on parental knowledge of adolescent activities as well as the adolescent recall of parental knowledge of after school activities they engaged in. When parental monitoring as measured by parental knowledge of

adolescent activities was rated at level one, adolescents were 4 times more likely to engage in alcohol use than those who scored parental monitoring at level three. This impact of parental knowledge on alcohol use was significant even when age was controlled for.

Table 11 Protective or risk influence of family management variables on substance use

Variable category or Factor	Substance	Level or Category	Change in odds	Baseline category	Multivariate or Controlled Effect
Parental Monitoring					
Parental knowledge	Alcohol	Level 1	4 times higher	Level 3	1.8 times decrease controlling for ethnicity with each increase in level of monitoring
Recall of parental monitoring after school	Illicit substance	All	2 times less	All	2.3 times decrease controlling for maternal employment status
Discipline and Behavioural Control					
Sharing	Alcohol	Level 1	7 times higher	Level 2	Together with control through guilt and affection statistically significantly predicted adolescent alcohol use controlling for ethnicity
Control through guilt	Alcohol	Level 1	13 times higher	Level 2	Together with sharing and affection statistically significantly predicted adolescent alcohol use controlling for ethnicity

Parental strictness	Alcohol	Level 1	4 times higher	Level 2	
Affection	Alcohol	Level 1	3 times less	Level 2	Together with control through guilt and sharing statistically significantly predicted adolescent alcohol use controlling for ethnicity
Emotional support	Cannabis	Level 1	4 times higher	Level 2	Significant prediction when maternal employment was controlled for
Positive evaluation	Cannabis	Level 1	4 times higher	Level 2	Not significant prediction when maternal employment was controlled for
Negative evaluation	Illicit substance	Level 1	4 times higher	Level 2	5 times decrease use with decrease in negative evaluation controlling for maternal employment status
Parental Rewards					
Parental rewards	Alcohol	Level 1	4 times higher	Level 3	Not significant prediction when ethnicity was controlled for

When age was controlled for, there was a 1.8 times decrease in odds of using alcohol more frequently with each increase in level of parental knowledge of adolescent activities. In similar results, Chilcoat and Anthony (1996) in a study on 8 to 10 year-old children during a three-year period reported 1.6-fold reduction in substance use initiation with increased levels of parental monitoring and supervision (Arria et al., 2008).

Influence of parental monitoring of adolescent activities on illicit substance controlling for maternal employment status revealed a 2.3 times decrease in substance use with every increase in measure of parental knowledge of adolescent activities. Childhood and adolescent risk of later alcohol abuse and dependence may be reduced and protection enhanced by early establishment and maintenance of close parental or other adult monitoring and supervision activities (Guo et al., 2001; Greydanus & Patel, 2005; Arthur et al., 2002; Fothergill & Ensminger, 2006; Arria et al., 2008). Parental disapproval of underage drinking and negative attitudes towards alcohol use have been associated with lower levels of alcohol use, less likelihood of association with drinking peers and higher tendency of adolescent substance use refusal (Arria et al., 2008). More parental monitoring and supervision also leads to delay in substance use initiation as well as less frequency and intensity of substance use (Loxley et al., 2004; Arria et al., 2008; Engels et al., 2005; Roche et al., 2008). Such moderation of later problematic alcohol use through influence on initiation of alcohol use by "proactive parenting" was demonstrated in a study where influence on children at ages 10 and 11 years was associated with a later age of alcohol use initiation and in turn less problematic drinking at ages 17 and 18 years (Roche et al., 2008).

In similar results to this study, when adolescents between 12 and 17 were studied, even after controlling for age, gender, drinking at baseline, being in various high-risk situations and greater monitoring lead to lower likelihood of drinking and vice versa. Enhanced parental monitoring and supervision were correlated with less high school alcohol consumption, independent of gender, ethnicity and religiosity (Arria et al., 2008).

Parental monitoring is also one of a set of universal prevention strategies within the family that may be employed to reduce incidences of substance abuse and delinquency. Universal substance use prevention strategy aims at preventing initiation or delay of substance abuse in the whole population by equipping individuals with awareness and problem prevention skills (CSRP,

2011). Important monitoring activities including parental resolutions on curfews, choice of friends, as well as routine daily activities during early adolescence are associated with less problematic drinking, fewer sex partners during early adulthood and less association with deviant peers (Roche et al., 2008).

3.2 Discipline and Behavioural Control

Discipline and behavioural control associated risk factors influencing substance use included lower levels of sharing, control through guilt, parental strictness, affection, emotional support, positive evaluation and negative evaluation. Decision making by parents, setting of rules and limits as well as monitoring define behavioural control which is a socialisation dimension associated with reduced adolescent substance use, deviance and engagement in early sexual intercourse (Roche et al., 2008). On one hand, childhood and adolescent risk of later alcohol abuse and dependence may be reduced and protection enhanced by clear family rules for behaviour characterized by low coercive punishment (Guo et al., 2001; Muisener, 1994). On the other hand, parental permissiveness to substance use in childhood or early adolescence increases the risk of early age initiation of substance use (Loxley et al., 2004). The impact of parental support on substance use may be more effective among individuals with lower behavioural under-control (King & Chassin, 2004; Zhou et al., 2006).

Various aspects may explain impact of behavioural under-control on substance use. Higher self-regulation is associated with less need for external regulation among adolescents (King & Chassin, 2004). Under-controlled individuals therefore have difficulties with self-regulation which raises their dependence upon benefits they accrue from consistent parenting when compared with their self-regulated counterparts (King & Chassin, 2004). This is because consistent and suitable disciplinary action by parents may foster internalization of social controls which diminishes association with deviant peers and all other theorized risk factors for substance use disorders. Behavioural under-controlled adolescents may also derive more stimulation from substance use and reinforcement associated with this stimulation (King & Chassin, 2004).

Substance use and dependence among the youth has been associated with low behavioural control as a result of susceptibility among such youth to deviance and use of illicit substances as well as a higher tendency to use illicit substances more than alcohol (Zhou et al., 2006).

Furthermore, an interaction between behavioural under-control and externalizing problems connected with family conflict and dysfunctional family processes have been reported (Patterson et al., 1989). This interaction has been described as “protective but reactive” because a protective factor (such as a favourable family environment) is generally beneficial, but such protective effect becomes less effective at higher levels of risk (Zhou et al., 2006).

Discipline and behavioural control against alcohol use

Parental sharing, control through guilt and affection statistically significantly predicted adolescent alcohol use even when ethnicity was controlled for. Adolescents whose parental sharing was rated at level one were 7 times more likely to use alcohol than those rated at sharing level two. Parent-child interactions devoid of closeness influence substance initiation and they are a predictor of substance use. Sharing offers a protective effect as it supports growth of adolescents in families characterized by feelings of parental trust, warmth, and involvement (Locke & Newcomb, 2004).

When behavioural control through guilt was rated at level one, adolescents were 13 times more likely to use alcohol when compared to level 2. A similar trend was observed for parental strictness where level one was associated with 4 times increase in the odds ratio of more frequent consumption of alcohol when compared to strictness level two. Parental strictness is most firmly associated with lessened youth antisocial behaviour when compared to other major protective aspects against youth antisocial behaviour including positive peer relations and behavioural control (Roche et al., 2008). Clear censure of underage drinking has been reported among other effective parenting practices with an impact on adolescent drinking reduction (Arria et al., 2008). Both attachment and control dimensions of the parent-child adolescent relationship have also been proposed to be related to adolescent substance use (Brook, Whiteman, Gordon & Cohen, 1986). Parental permissiveness, as opposed to strictness, has been shown to be related to greater substance use (Brook, Whiteman, Nomura, Gordon & Cohen, 1988; Brook et al., 1986). However, family style typified by unclear behavioural expectations, and severe or inconsistent punishment for deviant behaviour have been associated with increased risk of substance use, violence, and delinquency (Arthur et al., 2002). Authoritarianism has been reported as a family risk factor influencing substance use (Greydanus & Patel, 2005).

Adolescents who rated affection received from parents at level one were 3 times more likely to use alcohol than those who rated affection at level two. There was an interactive effect of affection, sharing and behavioural control through guilt on adolescent alcohol use controlling for ethnicity. Nurturance/ warmth and demands for responsible behaviour have been found to be important determinants of effect of parenting. High nurturance and more demands by parents lead to more authority which is a predictor of better developmental outcomes in children (Loxley et al., 2004). Emotional restraint in a family may contribute to continuity of a child's substance abuse (Arthur et al., 2002). Affection therefore works optimally in a family setting when relevant emotional expressions such as attachment and expression of anger, fear and shame are encouraged. When such an environment is stifled, suppression of anger and affective status occurs leading to absence of genuine intimacy, a common characteristic of families with substance abusing adolescents (Arthur et al., 2002). No significant impact of family structure on adolescent delinquency has been reported when family processes such as parental involvement and parent closeness were taken into account (Demuth & Brown, 2004). Indirect control which involves parent-child closeness may have a significantly higher impact on prevalence of delinquent behaviour than direct control involving parental involvement and monitoring (CSRP, 2011). The psychological and emotional presence of parents tended to have more impact than their physical presence (Demuth & Brown, 2004; CSRP, 2011).

Reduced social support, undesirable personal relationships and loneliness have been associated with alcohol use as a socially adaptive response (Locke & Newcomb, 2004). Greater closeness and connection between youth, their parents and family are associated with lower levels of substance use, risky sexual behaviour and poor school performance among the youth. Previous studies have linked parental support to greater adolescent self-regulation (Purdie, Carroll & Roche, 2004; Roche et al., 2008).

Discipline and behavioural control against cannabis use

The intensity of cannabis use for adolescents experiencing emotional support level one were 4 times those of level two. Among reported parental socializing practices associated with less substance use and other adolescent deviant behaviours include emotional and instrumental support and moderate levels of control (Baumrind, 1996; Engels et al., 2005).

Adolescents were 4 times more likely to use cannabis when positive evaluation by parents was rated at level one than level two. Among the several aspects of parent socialisation nurturing positive behavioural development in adolescents is positive evaluation which supports autonomy (Roche et al., 2008). When emotional support and positive evaluation were jointly assessed, only emotional support statistically significantly predicted adolescent cannabis use even when maternal employment was controlled for. Youths who report stronger emotional bonds to their parents or their equivalents are less likely to use substances, unless their parents do use substances. Psychosocial well-being aspects as achievement, adjustment to transitions in schools and less deviant behaviour during adolescence can be predicted by parental warmth and encouragement (Maggs et al., 1997). Positive, supportive relationships with parents may offer benefits through developmental advantages. This benefit may either be direct, by guaranteeing a foundation upon which adolescents progress to adult roles, or indirect, through positive past and current effects on adolescent adjustment and competence (Maggs et al., 1997).

Discipline and behavioural control against other illicit substance use

Adolescents receiving negative evaluation at level one were 5 times more likely to engage in illicit substance use that those at level two. In this study, negative evaluation at lower levels therefore appeared to have a protective impact on adolescent substance. This effect may be explained by a possible similar effect to that of discipline and behavioural control. There was a 5.4 times decrease in the frequency of illicit substance use with each unit increase in negative evaluation when maternal employment status was controlled for. Negative evaluation characterized by parents giving hard punishment, only keeping rules when it suits them or always trying to change adolescents, associated with unclear behavioural expectations, and severe or inconsistent punishment for deviant behaviour has been associated with increased risk of substance use, violence, and delinquency (Arthur et al., 2002**)**. Poor and negative communication in the family may lead to ineffective monitoring of adolescents behaviour (Kliewer & Murrelle, 2007).

In conclusion, discipline and behavioural control, nurturance of behaviour, creating boundaries and setting of clear rules are some of the universal prevention strategies within the family that may be employed to reduce incidences and onset of delinquency, including substance abuse through family based interventions (CSRP, 2011). Gender considerations should, however, be

taken into account because gender differences have been reported in parental monitoring where females experience more monitoring and open communication with mothers and therefore change in parental attachment is more strongly associated with behavioural change in boys compared to girls who already experience stronger attachment with mothers (Roche et al., 2008). Responses on discipline and behavioural control from parents were based on children's responses of parental behaviour. Others have reported that children's reports of parental behaviour are significantly related to other data on parent-child relationships (Schaefer, 1956).

3.3 Parental Rewards

Lower levels of parental rewards were associated with higher risk of alcohol use. There was 4 times higher frequency of alcohol use when parental rewards were rated at level one versus those of level three. However, when effect of ethnicity was controlled for, parental rewards did not significantly predict higher adolescent alcohol use. The risk of later childhood and adolescence alcohol abuse and dependence may be reduced and protection enhanced by providing appropriate parental rewards for good behaviour in children (Guo et al., 2001). Conversely, family management typified by limited and inconsistent rewards for positive behaviour is characterized by increased risk of substance use, violence, and delinquency (Arthur et al., 2002). A Seattle Social Development Project showed that rewards significantly predicted less alcohol misuse at age 18 through pro-social bonding and belief (Lonczak et al., 2001; Guo et al., 2001)

4. PARENTAL SUBSTANCE USE

Lower parental legal substance use had a protective effect against higher illicit substance use among the adolescents. There was a 13.7 and 9.26 times decrease in adolescent illicit substance use when parental legal substance use (alcohol and tobacco) was rated at levels one and two respectively when compared with parental legal substance use level six. The odds of being in a higher category of alcohol use increased 1.5 times with each increase in frequency of parental illicit substance use by parents when ethnicity was controlled for. Prior evidence indicates that children develop positive attitudes about alcohol use when their parents or other family members drink more and hold positive alcohol-related expectancies (Kliewer & Murrelle, 2007; Guo et al., 2001; Arria et al., 2008). Conversely, adolescents whose parents have negative attitudes toward alcohol and disapprove of underage drinking, show lower levels of alcohol use, are more likely

to engage with peers who do not drink and have a higher level of self-efficacy for alcohol refusal (Arria et al., 2008).

Parents who use substances may also enhance the chance of use in their children by increasing availability of substances, or through inadequate monitoring of adolescent behaviour, which increases opportunity for illicit substances and alcohol use (Kliewer & Murrelle, 2007). The influence of parental substance use also influences adolescent substance use initiation (Beyers et al., 2004). When parents approach substance use with a favourable attitude for their children from late childhood, this becomes a risk factor for early age initiation in use of the same substance and higher levels of substance use later in adolescence. For instance, favourable parental attitudes to consumption of alcohol in children at age 11 years predicted both the amount of alcohol consumed and alcohol related problems at age 15 when a range of other risk factors was adjusted for (Loxley et al., 2004). Antisocial behaviour and involvement in criminal activity by parents has also been associated with initiation of substance use among their offspring (Loxley et al., 2004).

Such favourable attitudes to substance use when combined with tolerance to children's use make children more likely to use substances (Arthur et al., 2002). This in turn exerts a ripple effect bringing undesired impact on school, work, society and the family as a whole (Gregg & Tombourou, 2003; CSRP, 2011). Substance abuse by parents or aberrant events within the family, such as sexual abuse are among other factors that constitute "Structural Family Crisis". In such situations substance use possibilities are enhanced, children identify strongly with the substance abusing parents or the parent may give an impression of permissiveness towards substance use (Muisener, 1994). The impact of parental influence on substance use may be equivalent to that of peer influence (Baumann et al., 2007; CSRP, 2011). Furthermore, systematic pairing of substance abusing parents is common and poses an enhanced risk for substance abuse by offspring (Weinberg et al., 1998). When viewed in the context of other family management and relations protective factors, family history density of alcoholism produces interactions that are protective but reactive. Firstly, higher family history density of alcoholism has been previously reported as predictive of lower adolescent family harmony leading to increased chances of substance use dependence among the youth. The protective effect of family harmony on substance dependence with or without alcohol dependence decreased with

increase in family history density of alcoholism. The protective effect of family harmony eventually ceased to be significant at high levels of family history density of alcoholism (Zhou et al., 2006). Secondly, the positive effect of low parent-child conflict on internalizing problems in offspring was less perceptible in families with higher rather than lower parental problem drinking (El-Sheikh & Flanagan 2001; Zhou et al., 2006).

Several managerial, relational and theoretical aspects have been proposed in efforts towards explaining effects of parental substance use on adolescent substance use. Firstly, Sher (1991) put forward three biopsychosocial models mediating parental alcoholism risk: (i) "deviance proneness" model predicts that poor parenting is a consequence of parental alcohol disorders; (ii) offspring of such parents also tend to exhibit behavioural under-control which he defines as an assortment of temperamental factors including impulsivity, aggressiveness, sensation seeking, and psychoticism (Sher & Trull, 1994); and (iii) the interaction between poor parenting and behavioural under-control increases the likelihood of school failure in children which then leads to substance use and use disorders (Sher, 1991; King & Chassin, 2004).

Secondly, parental alcoholism has been linked to less than optimal parenting. For instance, less parental discipline is instilled by fathers with alcohol use problems when compared to non-alcoholic fathers (DeLucia, Belz & Chassin, 2001). Lower levels of emotional support and parental monitoring have also been reported by older children of alcoholic parents (King & Chassin, 2004).

CHAPTER SUMMARY

Results on family management and relations risk and protective factors were discussed in reference to findings by other researchers as well as respective explanatory theories or concepts. Demographic and socio-economic characteristics of families influenced not only substance use outcomes but also in some cases when controlled for, they affected the magnitude or statistical significance of protective or risk impact of specific family management and relations factors. For example, even though lower levels of affection were significantly associated with higher levels of cannabis use, this effect was not statistically significant when marital status of parents and maternal employment status were controlled for. The findings also show that demographic and socio-economic characteristics, family management and relations risk and protective factors in

some instances act interactively and not in a univariate manner. Risk and protective relationships of family management and relations variables as well as demographic and socio-economic characteristics varied from substance to substance.

CHAPTER 6

CONCLUSIONS

INTRODUCTION

Reduction in risk factors and enhancement of promotive or protective factors in individuals and the environment surrounding them during their growth and development is becoming an increasingly recognised prevention approach for substance use (O'Connell et al., 2009). However, for effectiveness in the impact of this approach, continuous study of risk aspects targeting different cultures, social groups and mixture of society has therefore been recommended (Maddahian et al., 1994). This study set out to evaluate the hypothesis that South African adolescents living in families with more favourable relations and management practices are less likely to engage in substance abuse than those who live in families with less favourable family environment.

This conclusion chapter begins with a brief statement of the research problem and hypothesis guiding the study. This is followed by a summary synopsis of the major results and discussions. The importance of the study on risk and protective factors influencing substance use and how it relates to substance use prevention programmes is then pointed out. Shortcomings of this study and possible improvements as well as future studies are then suggested.

MAIN FINDINGS

The majority of the adolescent respondents studied were 20 years old, followed by ages 17 and 18. The most intensely used substances by respondents in this study were tobacco, cannabis, cocaine, heroin and alcohol in decreasing order of use intensity. Cannabis was the most highly used substance as reported by 63 % of the adolescents. This may be a reflection of a higher societal tendency to acceptance of cannabis use than of other illicit substance use though cannabis use might be associated with more deviance among adolescents and adult users than those who do not initiate use (Kandel & Davies, 1992; Yamaguchi & Kandel, 1984).

This study effectively applied cumulative odds ordinal logistic regressions with proportional odds to assess the risk or protective effects of family management and relation variables while

controlling for demographic and socio-economic characteristics on adolescent substance use. The specific protective or risk impact of these factors varied from substance to substance.

This study found out that increased alcohol and tobacco use was a risk factor for illicit substance use. Risk factors associated with demographic and socio-economic factors for substance use among the adolescents included being male, younger age, being in lower education grades, coloured ethnicity, adolescents from divorced parents and unemployed or fully employed mothers. Such factors are fixed implying that they cannot demonstrate change but mitigation efforts can be focused on adolescent demographic groups in categories at higher risk (Stone et al., 2012).

This study reports several significant family relations risk and protective factors against substance use classified as either family functioning and conflict or family bonding and support. With respect to family functioning and conflict, risk factors affecting substance use include higher levels of expression, family democratic style levels, laissez faire family style and family conflict. Family bonding and support risk factors influencing substance use include adolescents living in families characterised by increased conflict as well as lower levels of protective factors such as intimate disclosure, reassurance of worth, instrumental aid and affection.

Several family management factors, categorised as parental monitoring, discipline, behavioural control and rewards, demonstrated either risk or protective effect on adolescent substance use. Decreased parental knowledge of adolescent activities was a parental monitoring risk factor affecting adolescent substance use. Parental monitoring was also measured by adolescent responses on parental monitoring and supervision of after school activities whose lower levels were a risk factor for substance use. Several discipline and behavioural control risk factors influencing substance use by adolescents included lower levels of sharing, control through guilt, parental strictness, affection, emotional support, positive evaluation and negative evaluation. Contrary to previous studies, negative control appeared to have a protective influence against substance use which may be due to a similar influence as that of discipline and behavioural control measures (Kliewer & Murrelle, 2007). Increased practice of rewarding good behaviour in adolescents had a protective impact against substance use. Decreased frequency of parental legal substance use had a protective influence against higher substance use among adolescents.

Some factors had either interactive risk or significant protective impact on substance use or lost significance when analysed jointly with other factors such as controlled variables. The interactive effect between expressiveness, democratic family style and laissez faire family style even when ethnicity was controlled for were significantly associated with adolescent alcohol use. When education controlled variables or other factors were taken into account, instrumental aid, positive evaluation, discipline and behavioural control and parental rewards were not significantly associated with adolescent substance use.

Policy implications, considerations and limitations

It has been recommended that treatment and intervention programmes and models should be revised according to the patterns of risk elements in different cultures and social groups in society (Maddahian et al., 1994; Muisener, 1994). Such programmes can be founded on the social development model adopted in this study which is a theory of causation and prevention and an important prerequisite to an intervention strategy seeking to mitigate risk factors while at the same time enhancing protective factors (Hawkings, 1992). Theory-driven intervention elements based on this model include: (i) creation of opportunities for pro-social activities for the adolescents; (ii) offering of empowerment towards successful performance of these activities; and (iii) offering positive reinforcement for successful contribution. Protective factors buffer adolescents from exposure to risks and reduce the likelihood of acquiring such behaviours (Hawkins et al., 1992; Muisener, 1994).

Several considerations should be made when formulating such interventions. Firstly, the higher the number of risk factors and the longer the duration, the greater the impact on subsequent development of substance use problems. The cumulative effect of risk factors functions in a snowball like fashion (Loxley et al., 2004). It is therefore recommended that when formulating intervention programmes to consider combinations of above risk and protective factors rather than single ones. Some of the risk and protective factors become more important than others during the course of human development. The number of risk factors is proportional to the chance of problem behaviours but protective factors may neutralize such effects (Harachi, Ayers, Hawkins & Catalano, 1996; Patin, 2003; Arthur et al., 2002). This is an important consideration when selecting priority factors to consider in substance prevention programmes. Even though it has been shown that these factors are uniform in all racial groups (Fleming et al., 2002; CSRP,

2011), this study demonstrated that for instance when ethnicity was controlled for, parental rewards did not significantly predict higher adolescent alcohol use.

Secondly, interaction or impact of controlled factors should be taken into account when further considering interventions based on these risk or protective factors. Such trends have also been recognized by other researchers. Sher (1991) suggested that parental alcoholism affects their offspring through many diverse pathways (Sher, 1991; King & Chassin, 2004). Familial alcoholism in turn has been associated with marital conflict, negative communications within the family and conflict between parents and children (El-Sheikh & Flanagan, 2001; Zhou et al., 2006). Family cohesion and adaptability were reported to buffer the impact of parental problematic drinking and school-age children's adjustment problems (El-Sheikh & Flanagan, 2001; Zhou et al., 2006). The deviance proneness model of alcohol use proposes that parental alcoholism increases risk for alcohol use disorders in emerging adulthood through an interaction of behavioural under-control and poor parenting that produces conduct problems, emotional distress, school failure, and affiliation with a deviant peer network, resulting in elevated risk of alcohol use and associated problems (Sher, 1991; King & Chassin, 2004). Another situation is where older offspring have reported that their alcoholic parents provided less emotional support which was further associated with lowered levels of parental support and discipline, parental monitoring and behavioural control and association with deviant peer all of which have been associated with high risk of alcohol use (King & Chassin, 2004).

Another consideration that should be taken account is that some factors may have a more influential impact on substance use than others. For instance parental behavioural control has greater consequences for alcohol misuse and school dropout in early adulthood when compared to parental support (Roche et al., 2008). Protective factors may also vary in their impact depending on level of other risk or protective factors. For instance, parental support was reported as a moderator, of behavioural control in a "protective but reactive" manner. This means when behavioural under-control is low, parental support acts as buffer whose protective effects diminishes at higher levels of behavioural under-control (King & Chassin, 2004).

It should be taken into account that there are factors that may also have an impact on substance use other than family based ones. A component of the social development model, the social control theory, postulates that robust relationships with societal institutions consisting of not only

family but also school and work, reduce the possibility of engaging in deviant behaviour (Hirschi, 1969; Fothergill & Ensminger, 2006).

Adolescents that are 20 years old or younger are an important alcohol and other substance abuse prevention efforts' target as they compose almost half the South African population and this may be impacting negatively on the country's socio-economic development (Parry et al., 2004; Statistics South Africa, 2012). This group is also important with respect to the fact that an early onset age of most substance use problems is around 13-16 years (AAPCSA, 1999).

In this study, protective or risk impacts varied with type of substance. It has been suggested that prevention strategies should consider patterns consisting of both the type of substance used and the mode of use. Despite the universal uniformity in substances used, patterns of use will vary geographically (Foxcroft & Tsertsvadze, 2011).

The fact that this study focused on respondents from rehabilitation centres may serve both as a strength and a limitation. It has been suggested that studies involving information rich cases may offer useful manifestations of the concepts being studied thereby revealing useful insights while avoiding just empirical generalizations (Newman, 2000; Patton, 2001). The comparatively higher level ordinal regression models were used owing to the fact that respondents already had a history of substance use. However, different studies have reported either "protective but reactive interactions" or "classic buffering" effects of protective factors where the different levels of factors may manifest varying extent of risk among respondents (Zhou et al., 2006). Non-significant protective effects in this study where others have reported significant impact may therefore be attributed to a greater representation of the highest risk levels among the rehabilitation centre participants which may result in protective but reactive interactions whereas lower-risk samples may produce classic buffering effects. For instance, Wootton, Frick, Shelton, and Silverthorn (1997) reported a protective but reactive interaction in their study on clinical sample of young children where protective impact of effective parenting against conduct problems diminished among children with high personality risk (Zhou et al., 2006). Further sampling is recommended from other regions of South Africa with differing clusters of socio-demographic variables and a more balanced gender representation with more female participants. This will enhance the generalizability of these results to other adolescent populations from other geographic regions with different demographic characteristics.

Another limitation may be the use of children responses concerning parent behaviour. It has been postulated that the perception of a child concerning parental behaviour may be more related to the child's adjustment than is the actual behaviour of the parents. This aspect has provoked a large quantity of research on children's perceptions of parental behaviour (Schaefer, 1956).

Potentially important risk or protective family functioning and conflict based factors including intellectual-cultural orientation, religious emphasis, disengagement and authoritarian family style were excluded from analysis due to unreliability of their scales. It is recommended that these scales be further improved for consistency or other scales selected in order to reliably measure these aspects in future studies.

It can be concluded that family-based prevention programmes based upon significant risk and protective factors reported here may form a cost-effective and practical way of dealing not only with prevention of single behaviours but a range of problems emanating from substance abuse such as harder substances, antisocial behaviours and problematic substance use (CSRP, 2011). Other factors should however also be taken into account such as peers, communities, workplace, government policies and services, and the broader economic and social environment which all affect family well-being in an "ecological" manner (Stevens et al., 2005; CSRP, 2011).

CHAPTER SUMMARY

Risk and protective factors influencing substance use among South African adolescents as related to family relations and management practices are outlined. Though various demographic and socio-economic factors were also found to significantly influence substance use among the adolescents, these are among fixed factors which can be easily manipulated. Mitigation efforts can however be directed or focused on adolescent demographic groups in categories at higher risk. Policy implications, considerations and limitations are also outlined in this chapter.

With the differences in risk factors changing from culture to another, recommendations here form an important step towards the basis for a South African adolescent oriented substance use prevention programme. It is recommended to take into account interaction amongst risk or protective factors as well as the type of substance when further considering interventions based on these risk or protective factors. Studies in other geographical regions, institutions and with better gender balance are recommended to improve upon the representativeness of the results.

REFERENCES

Ackard, D., Neumark-Sztainer, D., Story, M., & Perry, C. (2006). Parent–child connectedness and behavioral and emotional health among adolescents. *American Journal of Preventive Medicine, 30*(1), 59-66.

Agresti, A. (2002). *Categorical Data Analysis*. (2nd ed.). New York: John Wiley & Sons.

Akers, R. L., Krohn, M. D., Lanza-Kaduce, L. & Radosevich, M. (1979). Social learning and deviant behavior: A specific test of a general theory. *American Psychological Review, 44*(4), 636-655.

Akers, R. L., & Sellers, C. S. (2004). *Criminological Theories: Introduction, Evaluation, and Application* (4th ed.). Los Angeles: Roxbury Publishing.

American Academy of Pediatrics Committee on Substance Abuse (AAPCSA). (1999). Marijuana: a continuing concern for pediatricians. *Pediatrics, 104*, 982-985.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.). Washington, DC: American Psychiatric Association.

Arria, A. M., Kuhn, V., Caldeira, K. M., O'Grady, K. E., Vincent, K. B., & Wish, E. D. (2008). High school drinking mediates the relationship between parental monitoring and college drinking: A longitudinal analysis. *Substance Abuse Treatment, Prevention, and Policy, 3*, 6.

Arthur, M. W., Hawkins, J. D., Pollard, J. A., Catalano, R. F., & Baglioni, A. J. Jr. (2002). Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors. The Communities That Care youth survey. *Evaluation Review, 26*(6), 575-601.

Avgar, A., Bronfenbrenner, U., & Henderson, C. R. Jr. (1977). Socialization practices of parents, teachers, and peers in Israel: Kibbutz, Moshav, and city. *Child Development, 48*, 1219-1227.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84,*191-215.

Banyard, G., & Quartey, K.A. (2006). Youth's family bonding, violence risk, and school performance: Ecological correlates of self-reported perpetration. *Journal of Interpersonal Violence, 21(10),* 1314-1332.

Barnes, G. M., Farrell, M. P., & Cairnes, A. (1986). Parental socialization factors and adolescent drinking behaviors. *Journal of Marriage and the Family, 48,* 27–36.

Baumann, M., Spitz, E., Predine, R., Choquet, M., & Chau, N. (2007). Do male and female adolescents differ in the effect of individual and family characteristics on their use of psychotropic drugs? *European Journal of Pediatrics, 166*(1), 29-35.

Baumrind, D. (1996). Parenting: The discipline controversy revisited. *Family Relations, 45,* 405-414.

Beauvais, F. (1992). The consequences of drug and alcohol use for Indian youth. *American Indian and Alaska native mental health research, 5*(1), 32-37.

Beauvais, F., & Oetting, E. R. (1986). Drug use in an alternative high school. *Journal of Drug Education, 16*(1), 43-50.

Benda, B. B., & Corwyn, R. F. (2002). The effect of abuse in childhood and in adolescence on violence among adolescents. *Youth & Society, 33*(3), 339-365.

Benda, B. B., & Turney, H. M. (2002). Youthful violence: Problems and prospects. *Child & Adolescent Social Work Journal, 19*(1), 5-34.

Bernburg, J. G., & Thorlindsson, T. (2005). Violent values, conduct norms, and youth aggression: A multi-level study in Iceland. *Sociological Quarterly, 46*(3), 457−478.

Beyers, J. M., Toumbourou, J. W., Catalano, R. F., Arthur, M. W., & Hawkins, J. D. (2004). A cross-national comparison of risk and protective factors for adolescent substance use: the United States and Australia. *The Journal of Adolescent Health, 35*(1), 3-16.

Bloom, B. L. (1985). A factor analysis of self-report measures of family functioning. *Family Process, 24*, 225-239.

Booth, A., Scott, M., & King, V. (2010). Father residence and adolescent problem behavior: are youth always better off in two-parent families? *Journal of Family Issues, 31*(5), 585-605.

Brendgen, M., Vitaro, F., & Lavoie, F. (2001). Reactive and proactive aggression: Predictions to physical violence in different contexts and moderating effects of parental monitoring and caregiving behaviour. *Journal of Abnormal Child Psychology, 29*(4), 293-304.

Brody, G. H., Chen, Y. F., Kogan, S. M., Yu, T., Molgaard, V. K., DiClemente, R. J., & Wingood, G. M. (2012). Family-centered program deters substance use, conduct problems, and depressive symptoms in black adolescents. *Pediatrics, 129*(1), 108-115.

Brody, G. H., Kogan, S. M., Chen, Y.F., & McBride, M. V. (2008). Long-term effects of the strong African American families program on youths' conduct problems. *The Journal of Adolescence, 43*(5), 474-481.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Brook, J. S., Cohen, P., & Brook, D. W. (1998). Longitudinal study of co-occurring psychiatric disorders and substance use. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*(3):322-330.

Brook, J. S., Cohen, P., & Gordon, A. S. (1983). Impact of attrition in a sample in a longitudinal study of adolescent drug use. *Psychological Reports, 53*(2), 375-378.

Brook, J. S., Morojele, N. K., Pahl, K., & Brook, D. W. (2006). Predictors of drug use among South African adolescents. *Journal of Adolescent Health, 38*, 26-34.

Brook, J. S., Whiteman, M., Gordon. A. S., & Cohen, P. (1986). Some models and mechanisms for explaining the impact of maternal and adolescent characteristics on adolescent stage of drug use. *Developmental Psychology, 22***,** 460-467.

Brook, J. S., Whiteman, M., Nomura, C., Gordon, A. S., & Cohen, P. (1988). Personality, family, and ecological influences on adolescent drug use: A developmental analysis. *Journal* of *Chemical Dependency Treatment, I* **,** 123-162.

Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology, 35*(4), 504-514.

Bry, B., Catalano, R., Kumpfer, K., Lochman, J., & Szapocznik, J. (1998). Scientific findings from family prevention intervention research. National Institute on Drug Abuse, Research Monograph Series 177: Drug Abuse through Family Interventions. US Department of Health and Human Services, National Institute of Health.

Bry, B. H., McKeon, P., & Pandina, R. J. (1982). Extent of drug use as a function of number of risk factors. *Journal of Abnormal Psychology, 91*, 273-279.

Carson, R. C., Butcher, J. N., & Mineka, S. (2000). *Abnormal psychology and modern life.* (11th ed.). London: Allyn & Bacon.

Catalano, R. F., & Hawkins, J. D. (1996). The social development model: A theory of antisocial behavior. In J. D. Hawkins (Ed.), *Delinquency and crime: current theories* (pp. 149-197). New York: Cambridge University Press.

Centre for Suicide Research and Prevention, University of Hong Kong (CSRP). (2011). A study on drug abuse among youths and family relationship. *LC Paper*,CB(2)1546/11-12(01). Retrieved May 2014, from http://www.legco.gov.hk/yr11-12/chinese/panels/ws/papers/ws0312cb2-1546-1-ec.pdf#page=1&zoom=auto,-178,842

Challier, B., Chau, N., Prédine, R., Choquet, M., & Legras, B. (2000). Associations of family environment and individual factors with tobacco, alcohol, and illicit drug use in adolescents. *European Journal of Epidemiology, 16*(1):33-42.

Chapple, C. L. (2003). Examining intergenerational violence: Violent role modeling or weak parental controls? *Violence and Victims, 18*(2), 143-162.

Chapple, C. L., & Hope, T. L. (2003). An analysis of the self-control and criminal versatility of gang and dating violence offenders. *Violence and Victims, 18*(6), 671-690.

Cleveland, M. J., Feinberg, M. E., Bontempo, D. E., & Greenberg, M. T. (2008). The role of risk and protective factors in substance use across adolescence. *The Journal of Adolescent Health, 43*(2), 157-164.

Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., …Long, B. (1993). The science of prevention.A conceptual framework and some directions for a national research program. *American Psychologist, 48*(10), 1013-1022.

Community Anti-Drug Coalitions of America (CADCA), U.S. (2008). The Coalition Impact: environmental prevention strategies. Beyond the basics: Topic-specific publications for coalitions. Retrieved April 21, 2014, from http://www.cadca.org/files/resources/Beyond_the-Basics-Environmental_Strategies-11-2010.pdf

Corroa, M. A., Guindon, G. E., Sharma, N., & Shokoohi. (2000). Tobacco control country profiles. Atlanta, GA: American Cancer Society. Retrieved May, 2014, from http://www.who.int/tobacco/statistics/country_profiles/en/TCCP2001.pdf

Crum, R. M., & Anthony, J. C. (2000). Educational level and risk for alcohol abuse and dependence: differences by race-ethnicity. *Ethnicity & Disease, 10*, 39-51.

Davison, G. C., Neale, J. M., & Kring, A. M. (2004). *Abnormal psychology.* (9th ed.). New York: John Wiley & Sons.

DeLucia, C., Belz, A., & Chassin, L. (2001). Do adolescent symptomatology and family environment vary over time with fluctuations in paternal alcohol impairment? *Developmental Psychology, 37*, 207-216.

Demuth, S., & Brown, S. (2004). Family structure, family processes, and adolescent delinquency: The significance of parental absence versus parental gender. *Journal of Research in Crime and Delinquency, 41*, 58-81.

Donovan, J. E. (2004). Adolescent Alcohol Initiation: A Review of psychosocial risk factors. *The Journal of Adolescent Health, 35*, 529.e7–529.e18.

Durlak, J. A. (1998). Common risk and protective factors in successful prevention programs. *American Journal of Orthopsychiatry, 68*(4), 512-520.

El-Sheikh, M., & Flanagan, E. (2001). Parental problem drinking and children's adjustment: Family conflict and parental depression as mediators and moderators of risk. *Journal of Abnormal Child Psychology, 29,* 417-432.

Engels, R. C., Vermulst, A. A., Dubas, J. S., Bot, S. M., & Gerris, J. (2005). Long-term effects of family functioning and child characteristics on problem drinking in young adulthood. *European Addiction Research, 11*, 32-37.

Fleming, C., Catalano, R., Oxford, M., & Harachi, T. (2002). A test of the generalizability of the social development model across gender and income groups with longitudinal data from the elementary school development period. *Journal of Quantitative Criminology, 18*(4), 423-439.

Flisher, A. J., Mathews, C., Mukoma, W., & Lombard, C. J. (2006). Secular trends in risk behaviour of Cape Town grade 8 students. *South African Medical Journal, 96*(9), 982-987.

Flisher, A. J., Parry, C. D., Evans, J., Muller, M., & Lombard, C. (2003). Substance use by adolescents in Cape Town: prevalence and correlates. *Journal of Adolescent Health, 32*, 58-65.

Flisher, A.J., Townsend, L., Chikobvu, P., Lombard, C., & King, G. (2010). Substance use and psychosocial predictors of high school dropout in Cape Town, South Africa. *The Journal of Research on Adolescence, 20*(1), 237-255.

Flisher, A. J., Ziervogel, C. F., & Charlton, D. O. (1996). Risk taking behavior of Cape Peninsula high school students: Part X. Multivariate relationships among behaviors. *South African Medical Journal, 86,* 1094-1098.

Flisher, A. J., Ziervogel, C. F., Chalton, D. O., Leger, P. H., & Robertson, B. A. (1996). Risk-taking behaviour of Cape Peninsula high-school students. Part IX. Evidence of a syndrome of adolescent risk behaviour. *South African Medical Journal, 86*(9), 1090-1093.

Fothergill, K. E., &Ensminger, M. E. (2006). Childhood and adolescent antecedents of drug and alcohol problems: A longitudinal study. *Drug Alcohol Dependence, 82*(1), 61-76.

Foxcroft, D. R., & Tsertsvadze, A. (2011). Universal family-based prevention programs for alcohol misuse in young people. *Cochrane Database of Systematic Reviews, 7*(9), CD009308.

Fraser, M. W. (1997). *Risk and resilience in childhood: An ecological perspective*. Washington, DC: NASW Press.

Furman, W. & Buhrmester, D. (1985). Children's perceptions of the personal relationships in their social networks. *Developmental Psychology, 21*, 1016-1022.

Ghandour, L. A. (2009). *Young adult alcohol involvement: the role of parental monitoring, child disclosure, and parental knowledge during childhood*. Dissertation. Johns Hopkins University.

Gibbons, D. C. (1994). *Talking About Crime and Criminals: Problems and Issues in Theory Development in Criminology*. Englewood Cliffs: Prentice-Hall Inc.

Gil, A.G., Vega, W. A., & Turner, R. J. (2002). Early and mid-adolescence risk factors for later substance abuse by African Americans and European Americans. *Public Health Reports 117*(Suppl 1), S15–S29.

Giovino, G. A., Henningfield, J. E, Tomar, S. L., Escobedo, L. G., & Slade, J. (1995). Epidemiology of tobacco use and dependence. *Epidemiologic Reviews, 17*(1), 48-65.

Grant, B. F., Harford, T. C., Dawson, D. A., Chou, P., Dufour, M., & Pickering, R. (1994). Prevalence of DSM-IV alcohol abuse and dependence: United States, 1992. *Alcohol Health and Research World, 18*, 243-248.

Gregg, M., & Toumbourou, J. (2003). Sibling peer support group for young people with a sibling using drugs: A pilot study. *Journal of Psychoactive Drugs, 35*(3), 311-319.

Greydanus, D. E., & Patel, D. R. (1999). Substance abuse: a pediatric concern. *Indian Journal of Pediatrics, 66*, 557-567.

Greydanus, D. E., & Patel, D. R. (2005). The adolescent and substance abuse: current concepts. *Disease-a-Month 200, 51*(7), 392-431.

Guo, J., Collins, L. M., Hill, K. G., & Hawkins, J. D. (2000). Developmental pathways to alcohol abuse and dependence in young adulthood. *Journal of Studies on Alcohol, 61*, 799-808.

Guo, J., Hawkins, J. D., Hill, K. G., & Abbott, R. D. (2001). Childhood and adolescent predictors of alcohol abuse and dependence in young adulthood. *Journal of Studies on Alcohol and Drugs, 62*(6), 754-762.

Harachi, T. W., Ayers, C. D., Hawkins, J. D., & Catalano, R. F. (1996). Empowering communities to prevent adolescent substance abuse: Process evaluation results from a risk- and protection focused community mobilization effort. *Journal of Primary Prevention, 16*(3), 233-254.

Hawkins, J. D., & Catalano, R. F. (2005). Investing in your community's youth: An introduction to the Communities That Care System. Retrieved May 17, 2014, from http://www.sdrg.org/ctcresource/Community%20Building%20and%20Foundational%20Material/Investing%20in%20Your%20Community%27s%20Youth.pdf

Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance-abuse prevention. *Psychological Bulletin, 112*, 64-105.

Hemovich, V., & Crano, W. (2009). Family structure and adolescent drug use: An exploration of single-parent families. *Substance Use and Misuse, 44* (14), 2099-2113.

Henrich, C. C., Brookmeyer K. A., & Shahar G. (2005). Weapon violence in adolescence: Parent and school connectedness as protective factors. *Journal of Adolescent Health, 37*(4), 306-312.

Herrenkohl, T. I., Hill, K. G., Chung, I., Guo, J., Abott, R., & Hawkins, J.D. (2003). Protective factors against serious violent behaviour in adolescence: A prospective study of aggressive children. *Social Work, 27*(3), 179-191.

Hirschi, T. (1969). *Causes of delinquency.* Berkeley: University of California Press.

Hirschi, T. (1972). Causes of delinquency. *The Journal of Human Resources, 7*(1), 119-121.

Joe-Laidler, K. A. (2005). The rise of club drugs in a heroin society: the case of Hong Kong. *Substance Use & Misuse, 40*, 1257-1278.

Johnson, B. R., Jang, S. J., Larson, D. B., & De Li, S. (2001). Does adolescent religious commitment matter? A re-examination of the effects of religiosity on delinquency. *Journal of Research in Crime and Delinquency, 38*(1), 22−44.

Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (2000). *Monitoring the future: National results in adolescent drug use: Overview of key findings, 1999*, NIH Publication No. 00-4690. Bethesda, MD: Department of Health and Human Services.

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2012). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2011*. Ann Arbor: Institute for Social Research, the University of Michigan. Retrieved May 17, 2014, from http://files.eric.ed.gov/fulltext/ED529133.pdf

Jurich, A. P., Polson, C. J., Jurich, J. A., & Bates, R. A. (1985). Family factors in the lives of drugs users and abusers. *Adolescence, 20*, 143-159.

Kandel, D. B. (1975). Stages in adolescent involvement in drug use. *Science, 190*(4217), 912-914.

Kandel, D. B., & Davies, M. (1992). Progression to regular marijuana involvement: Phenomenology and risk factors for near daily use. In M. Glantz & R. Pickens (Eds.), Vulnerability to drug abuse (pp. 211-253). Washington, DC: American Psychological Association.

Kandel, D. B., Yamaguchi, K., & Chen, K. (1992). Stages of progression in drug involvement from adolescence to adulthood: further evidence for the gateway theory. *Journal of Studies on Alcohol, 5*, 447-457.

Kazdin, A. E. (1990, June). *Prevention of conduct disorder*. Paper presented to the National Conference on Prevention Research, National Institute of Mental Health, Bethesda, Maryland.

Kellam, S. G., Koretz, D., & Moscicki, E. K. (1999). Core elements of developmental epidemiologically based prevention research. *American Journal of Community Psychology, 27*(4), 463-82.

Kelling, G., & Wilson, J. (1982). Broken Windows – The police and neighborhood safety. Retrieved April 8, 2014, from http://www.theatlantic.com/magazine/archive/1982/03/broken-windows/4465/

Kerlinger, F. N. & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Singapore: Wadsworth Thomson Learning, Inc.

King, K. M., & Chassin, L. (2004). Mediating and moderated effects of adolescent behavioural undercontrol and parenting in the prediction of drug use disorders in emerging adulthood. *Psychology of Addictive Behaviors, 18*, 239-249.

Kliewer, W., & Murrelle, L., (2007). Risk and protective factors for adolescent substance use: Findings from a study in selected Central American countries. *The Journal of Adolescent Health, 40*, 448-455.

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *The American Journal of Psychiatry, 158*, 848-856.

Liamputtong, P. & Ezzy, D. (2005). *Qualitative research methods*. (2nd ed.). New York: Oxford University Press.

Liddle, H., & Rowe, C. L. (Eds). (2006). *Adolescent substance abuse: Research and clinical advances*. New York: Cambridge University Press.

Lilly, J. R., Cullen, F. T., & Ball, R. A. (1995). *Criminological Theory: Context and Consequences* (2nd ed.). Thousand Oaks, Ca: Sage Publications.

Li, X., Feigelman, S., & Stanton, B., (2000). Perceived parental monitoring and health risk behaviours among urban low-income African–American children and adolescents. *Journal of Adolescent Health, 27,* 43-48.

Locke, T. F., & Newcomb, M. D. (2004). Adolescent predictors of young adult and adult alcohol involvement and dysphoria in a prospective community sample of women. *Prevention Science, 5*(3):151-68.

Lonczak, H. S., Huang, B., Catalano, R. F., Hawkins, J. D., Hill, K. G., Abbott, R. D.,…Kosterman, R. (2001). The social predictors of adolescent alcohol misuse: A test of the Social Development Model. *Journal of Studies on Alcohol, 62,* 179-189.

Loxley, W., Toumbourou, J., Stockwell, T. R., Haines, B., Scott, K., Godfrey, C., ….and Sanci, L. (2004). *The prevention of substance use, risk and harm in Australia: A review of the evidence.* National Drug Research Institute and the Centre for Adolescent Health. Retrieved July, 2014, from http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-publicat-document-mono_prevention-cnt.htm/$FILE/mono_prevention.pdf

Louw, D. A., van Ede, D. M., & Louw, A. E. (1998). *Human development.* (2nd ed.). Pretoria: Kagiso Publishers.

Luthar, S. S., & Zigler, E. (1991). Vulnerability and competence: A review of research on resilience in childhood. *American Journal of Orthopsychiatry 61*(1), 6-22.

MacDonald, J., Piquero, A. R., Valois, R. F., & Zullig, K. G. (2005). The relationship between life satisfaction, risk taking behaviors, and youth violence. *Journal of Interpersonal Violence 20*(11), 1495-1518.

Mackesy-Amiti, M. E., Fendrich, M., & Goldstein, P. J. (1997). Sequence of drug use among serious drug users: Typical and atypical progression. *Drug and Alcohol Dependence, 45,* 185-196.

Maddahian, E., Newcomb, M. D., & Bentler, P. M. (1988). Risk factors for substance use: ethnic differences among adolescents. *Journal of Substance Abuse, 1*(1), 11-23.

Maggs, J. L., Frome, P. M., Eccles, J. S., & Barber, B. L. (1997). Psychosocial resources, adolescent risk behavior and young adult adjustment: is risk taking more dangerous for some than others? *Journal of Adolescence, 20*(1), 103-119.

Melby, J., Conger, R. D., Conger, K. J., & Lorenz, F. O. (1993). Effects of parental behavior on tobacco use by young male adolescents. *Journal of Marriage and the Family, 55*, 439-454.

Moffitt, T. (1993). Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychological Review, 100*, 674-701.

Molenberghs, G., & Verbeke, G. (2005).*Models for Discrete Longitudinal Data*. New York: Springer.

Morojele, N. K., & Brook, J. S. (2001).Adolescent precursors of intensity of marijuana and other illicit drug use among adult initiators. *The Journal of Genetic Psychology, 162*, 430-450.

Morojele, N. K., Flisher, A. J., Muller, M., Ziervogel, C. F., Reddy, P., & Lombard, C. J. (2002). Measurement of risk and protective factors for drug use and anti-social behavior among high school students in South Africa. *Journal of Drug Education, 32*, 25-39.

Mrazek, P. J., & Haggerty, R. J. (1994). *Reducing risks for mental disorders: Frontiers for preventive intervention research*. Washington, DC: Institute of Medicine, National Academy Press.

Muisener, P. P. (1994). Family and peer relationship factors: The adolescent's interpersonal environment. In *SAGE Sourcebooks for the Human Services Series*: *Understanding and treating adolescent substance abuse.* (pp. 76-97). Thousand Oaks, CA: SAGE Publications, Inc. doi: http://dx.doi.org/10.4135/9781452232997.n5

National Institute on Drug Abuse. (1995). *Drug use among racial/ethnic minorities*. Rockville, MD: National Institute on Drug Abuse.

National Research Council. (1993). *Preventing drug abuse: What do we know*? Washington, DC: National Academy Press.

Newcomb, M. D., & Felix-Ortiz, M. (1992). Multiple protective and risk factors for drug use and abuse: Cross-sectional and prospective findings. *Journal of Personality and Social Psychology, 63*, 280-296.

Newman, W. L. (2000). *Social research methods: Qualitative and quantitative Approaches.* (4th ed.). New York: Allyn & Bacon.

Nunnally J.C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

O'Connell, M. E., Boat, T., & Warner, K. E. (2009). *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities*. Washington, DC: National Academies Press.

Parker, H. (2003). Pathology or modernity? Rethinking risk factor analyses of young drug users. *Addiction Research & Theory, 11*(3), 141-144.

Parker, H., Williams, L., & Aldridge, J. (2002). The Normalization of 'Sensible' Recreational Drug Use: Further Evidence from the North West England Longitudinal Study. *Sociology, 36*(4), 941-964.

Parry, C. D. H., & Bennetts, A. (1998). *Alcohol policy and public health in South Africa*. Cape Town: Oxford University Press.

Parry, C. D. H., Myers, B., Morojele, N. K., Flisher, A. J., Bhana, A., Donson, H., & Plüddemann, A. (2004). Trends in adolescent alcohol and other drug use: findings from three sentinel sites in South Africa (1997-2001). *The Journal of Adolescence, 27*, 429-440.

Pasch, K., Stigler, M., Perry, C., & Komro, K. (2010). Parents' and children's self-report of parenting factors: How much do they agree and which is more strongly associated with early adolescent alcohol use? *Health Education Journal, 69*(1), 31-42.

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist, 44*(2):329-235.

Patin, H., Schwartz, S., Sullivan, S., Coatsworth, J., & Szapocznik, J. (2003) Preventing substance abuse in Hispanic immigrant adolescents: An eco-developmental, parent-centered approach. *Hispanic Journal of Behavioral Sciences, 25*(4), 469-500.

Patton, M. Q. (2001). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Peltzer, K., Ramlagan, S., Johnson, B. D., & Phaswana-Mafuya, N. (2010). Illicit drug use and treatment in South Africa: a review. *Substance Use & Misuse, 45*(13), 2221-2243.

Peretti-Watel, P., & Lorente, F. O. (2004). Cannabis use, sport practice and other leisure activities at the end of adolescence. *Drug and Alcohol Dependence, 73*, 251–257.

Petrie, J., Bunn, F., & Byrne, G. (2006). Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: a systematic review. *Health Education Research, 22*(2), 177-191.

Pressley, M., & McCormick, C. B. (2007). *Child and adolescent development for educators*. New York: The Guilford Press.

Purdie, N., Carroll, A., & Roche, L. (2004). Parenting and adolescent self-regulation. *Journal of Adolescence, 27*, 663-676.

Randall, J., & Cunningham, P. (2003). Multisystemic therapy: A treatment for violent substanceabusing and substance-dependent juvenile offenders. *Addictive Behavior, 28*, 1731-1739.

Repetti, R. L., Taylor, S. E., and Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*, 330–366.

Resnick, M. D., Ireland, M., & Borowsky, I. (2004). Youth violence perpetration: What protects? What predicts? Findings from the National Longitudinal Study of adolescent health. *Journal of Adolescent Health, 35*(5), 1-10.

Rice, F. P. (1992). *The adolescent: Development, relationship and culture*. (7th ed.). London: Allyn & Bacon.

Rice, F. P., & Dolgin, K. G. (2008). *The adolescent: Development, relationships and Culture.* (12th ed.). Boston: Pearson Education, Inc.

Roche, K. M., Ahmed, S., & Blum, R. W. (2008). Enduring consequences of parenting for risk behaviors from adolescence into early adulthood. *Social Science & Medicine, 66*, 2023-2034.

Sameroff, A. J. (2000). Developmental systems and psychopathology. *Development and Psychopathology, 12*, 297-312.

Sameroff, A. J., Bartko, W. T., Baldwin, A., Baldwin, C., & Seifer, R. (1998). Family and social influences on the development of child competence.In M. Lewis & C. Feiring (Eds.), *Families, risk, and competence*, (pp. 161-185). Mahwah, NJ: Lawrence Erlbaum.

Schaefer, D. (1987). *Choices and consequences: What to do when a teenager uses alcohol/drugs*. Minneapolis, MN: Johnson Institute.

Schaefer, E. S. (1965). Children's reports of parental behavior: An inventory. *Child Development, 36*, 413-424.

Shek, D. T. (2002). Family functioning and psychological well-being, school adjustment, and problem behavior in Chinese adolescents with and without economic disadvantage. *The Journal of Genetic Psychology, 163*(4), 497-502.

Sher, K. J. (1991). *Children of alcoholics: A critical appraisal of theory and research*. Chicago: University of Chicago Press.

Sher, K. J., & Trull, T. J. (1994). Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *Journal of Abnormal Psychology, 103*, 92-102.

Siegel, L.J., & McCormick, C. (2006). *Criminology in Canada: Theories, Patterns, and Typologies* (3rd ed.). Toronto: Thompson.

Skagen, R., & Fisher, D. G. (1989). Substance use among high school students in relation to school characteristics. *Addictive Behaviors, 14*, 129-138.

Skeer, M., McCormick, M., Normand, S., Buka, S., & Gilman, S. (2009). A prospective study of familial conflict, psychological stress, and the development of substance use disorders in adolescence. *Drug and Alcohol Dependence, 104*, 65-72.

Skog, O-J. (2006). Studying cultural change: Were the changes in alcohol and coffee consumption in the nineteenth century a case of beverage substitution? *Acta Sociologica*, 49, 287-302.

Spooner, C., Hall, W., & Lynskey, M. (2001). *Structural determinants of youth drug use. Australia: Australian National Council on Drugs. Statistics Singapore*. Retrieved May, 2014, from http://addictionstudies.dec.uwi.edu/Documents/generic%20drug%20information/Stuctural_Determinants_of_Drug_Use.pdf

Sprott, J. B. (2004). The development of early delinquency: Can classroom and school climates make a difference? *Canadian Journal of Criminology and Criminal Justice, 46*(5), 553-572.

Sprott, J. B., Jenkins, J. M., & Doob, A. N. (2005). The importance of school: Protecting at-risk youth from early offending. *Youth Violence and Juvenile Justice, 3*(1), 59-77.

Statistics South Africa. 2012. *Census 2011 Statistical release*. Retrieved May, 2014, from http://www.statssa.gov.za/publications/P03014/P030142011.pdf

Steinberg, L., Fletcher, A., & Darling, N. (1994). Parental monitoring and peer influences on adolescent substance use. *Pediatrics, 93*, 1060-1064

Stephens, R. C., McBride, D. C., & Levy, J. A. (1999). Future directions in research, intervention, and prevention in the field of drug abuse. In J. A. Levy, R. C. Stephens & D. C. McBride (Ed.), *Emergent Issues in the Field of Drug Abuse (Advances in Medical*

Sociology, Volume 7) (pp.1-16). Bingley, West Yorkshire: Emerald Group Publishing Limited.

Stevens, K., Dickson, M., & Poland, M. (2005). *Focus on families: Reinforcing the importance of family*. Families with dependent children - Successful outcomes project. New Zealand: The Families Commission. Retrieved May, 2014, from http://www.familiescommission.org.nz/sites/default/files/downloads/focus-on-families.pdf

Stoelb, M. & Chiriboga, J. (1998). A process model for assessing adolescent risk for suicide. *Journal of Adolescence, 21*(4), 359-370.

Stone, A. L., Becker, L. G., Huber, A. M., & Catalano, R. F. (2012). Review of risk and protective factors of substance use and problem use in emerging adulthood. *Addictive Behaviors, 7*, 747-775.

Stormshak, E., & Dishion, T. (2009). A school-based, family-centered intervention to prevention substance use: The Family check-up. *The American Journal of Drug and Alcohol Abuse, 35*(4), 227-232.

Taylor, M., Dlamini, S. B., Kagoro, H., Jinabhai, C. C., & De Vries, H. (2003). Understanding high school students' risk behaviors to help reduce the HIV/AIDS epidemic in KwaZulu-Natal, South Africa. *Journal of School Health, 73*(3), 97-100.

Trim, R. S., Leuthe, E., & Chassin, L. (2006). Sibling influence on alcohol use in a young adult, high-risk sample. *Journal of Studies on Alcohol and Drugs, 67*, 391-398.

United Nations Office on Drugs and Crime (UNODC). (2009). Guide to implementing family skills training programmes in drug abuse prevention. Vienna: Commission on Narcotic Drugs. Retrieved May 1, 2014, from http://www.unodc.org/unodc/en/prevention/familyskillstraining.html

Velleman, R., Templeton, D. B., Copello, L., & Alex, J. (2005). The role of the family in preventing and intervening with substance use and misuse: a comprehensive review of

family interventions, with a focus on young people. *Drug and Alcohol Review, 24*(2), 93-109.

Vimpani, G. (2005). Getting the mix right: family, community and social policy interventions to improve outcomes for young people at risk of substance misuse. *Drug and Alcohol Review, 24*(2), 111-125.

Weinberg, N. Z., Rahdert, E., Colliver, J. D., & Glantz, M. D. (1998). Adolescent substance abuse: a review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*(3), 252-261.

Werner, E. E. (1989). High-risk children in young adulthood: A longitudinal study from birth to 32 years. *American Journal of Orthopsychialry, 59,* 72-81.

Werner, E. E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, NY: Cornell University Press.

Wills, T. A., McNamara, G., Vaccaro, D., & Hirky, A. E. (1996). Escalated substance use: a longitudinal grouping analysis from early to middle adolescence. *Journal of Abnormal Psychology, 105*(2), 166-180.

Wootton, J. M., Frick, P. J., Shelton, K. K., & Silverthorn, P. (1997). Ineffective parenting and childhood conduct problems: The moderating role of callous unemotional traits. *Journal of Consulting and Clinical Psychology, 65,* 301-308.

World Health Organization (WHO). (1999). Global status report on alcohol. Geneva: World Health Organization. Retrieved June, 2014, from http://www.who.int/substance_abuse/publications/en/GlobalAlcohol_overview.pdf

Yamaguchi, K., & Kandel, D. B. (1984). Patterns of drug use from adolescence to young adulthood: II. Sequences of progression. *American Journal of Public Health, 74,* 668-672.

Yen, J. Y., Yen, C. F., Chen, C. C., Chen, S. H., & Ko, C. H. (2007). Family factors of internet addiction and substance use experience in Taiwan adolescents. *Cyberpsychology and Behavior, 10*(3), 323-329.

Zhang, L., & Wieczorek, W. (1997). The impact of age of onset of substance use on delinquency. *Journal of Research in Crime and Delinquency, 34*, 253-270.

Zhou, Q., King, K. M., & Chassin, L. (2006). The roles of familial alcoholism and adolescent family harmony in young adults' substance dependence disorders: Mediated and moderated relations. *Journal of Abnormal Psychology, 115*, 320-331.

Zucker, R. A., Fitzgerald, H. E., & Moses, H. D. (1995). Emergence of alcohol problems and the several alcoholisms: A developmental perspective on etiologic theory and life course trajectory. In D. Cicchetti (Ed.), *Developmental psychopathology, Vol. 2: Risk, disorder, and adaptation* (pp. 677-711). New York: John Wiley & Sons.

Annex 1(A): Participant Consent Form

Family management and family relations risk and protective factors for substance abuse by adolescents in South Africa

I am Beatrice Muchiri, a Master of Arts in Psychology student at the University of South Africa. I am studying family environment (family management and relations) risk and protective factors that affect alcohol, tobacco and other drugs use problems amongst adolescents in South Africa.

The information you provide will be useful in determining which family based considerations are important for effective and efficient preventative approach to reduce the risk and enhance protective factors for substance abuse in adolescents.

All information you give is confidential. The information will aid in the preparation of a dissertation, but no names or identifying particulars will be included. Your answers will not be shared with anyone. Only the investigator will have access to the questionnaire once it has been completed.

You are free to refuse to be interviewed, to withdraw from the interview at any time, or to refuse to fill in a particular question or set of questions.

If there are any specific concerns, you may contact my study supervisor Prof. MMLF dos Santos through phone number 012 4298577 or email address dsantmml@unisa.ac.za

I accept to take part in the study: Yes……. No……

Name of the participant……

Signature of participant ……

Date …….....

Witnessed by interviewer (Beatrice Muchiri)…….....

Signature .....……

Date …….....

Annex 1(B): Parental/ Guardian Consent Form

Family management and family relations risk and protective factors for substance abuse by adolescents in South Africa

I am Beatrice Muchiri, a Master of Arts in Psychology student at the University of South Africa. I am studying family environment (family management and relations) risk and protective factors that affect alcohol, tobacco and other drugs use problems amongst adolescents in South Africa. I would like to request the participation of your son/ daughter in this study.

The information that he/ she provides will be useful in determining which family based considerations are important for effective and efficient preventative approach to reduce the risk and enhance protective factors for substance abuse in adolescents.

All information he/ she will give is confidential. The information will aid in the preparation of a dissertation but no names will be included. The answers will not be shared with anyone. Only the investigator will have access to the questionnaire once it has been completed.

Your son/ daughter will be notified that he/ she is free to refuse to be interviewed, to withdraw from the interview at any time, or to refuse to fill in a particular question or set of questions.

If there are any specific concerns, you may contact my study supervisor Prof. MMLF dos Santos through phone number 012 4298577 or email address dsantmml@unisa.ac.za.

I consent that my son/daughter may take part in the study Yes……. No……

Name of the parent/guardian……

Signature of parent/guardian ……

Date …….....

Witnessed by interviewer (Beatrice Muchiri)…….....……

Signature .....……

Date …….....

Annex 2: Questionnaires

TIME NOW: _____

DATE: _____

LOCATION CODE: _____

GENERAL INSTRUCTIONS

We will work through the questionnaire as follows: All your answers will be marked in my copy of the questionnaire. I will ask the questions and give you the answer choices. You will have a copy of the questionnaire so that you can follow along.

Pick the answer that is the closest to how you feel. Usually I will want you to tell me the number that goes with the answer you pick. The interview will take between thirty and forty five minutes to complete.

Please note that there are no right or wrong answers to the questions asked. If there are questions you really do not want to answer, you may skip them.

PLEASE REMEMBER THAT YOUR NAME WILL NOT BE PUT ON THIS QUESTIONNAIRE. Your answers will not be shared with anyone. Only the research staff will have access to the questionnaire once it has been completed.

Thank you for helping in this study.

Section 1: Demographic and Socio-Economic Characteristics

First we would like to ask you a few questions about yourself.

1.1. Gender: Male [ ] Female [ ]

1.1 How old are you? _____years

1.2 What is the highest level of education you have attained? _____

1.3 Which ethnicity group do you consider yourself to belong to?

Black/African	1
Coloured	2
White	3
Asian/Indian	4
Other (Please Specify)	5

1.4 What is the current marital status of your parents?

Married	1
Single	2
Separated	3
Widowed	4
Divorced	5

1.4 What is the highest level of education you parents have attained?

Mother_____ Father_____

1.5 Which of the following describes the current employment status of your parents?

	Mother	Father
Unemployed	1	1
Employed part-time	2	2
Employed full-time	3	3
Self employed	4	4

1.6 If employed, what kind of work do your parents do?

Mother _____ Father _____

Section 2: Family Functioning and Conflict

Below is a list of statements about your feelings about your family. Please indicate the extent to which you agree with each statement.

	For my family this is..			
	Very untrue	Fairly untrue	Fairly true	Very true
2.1 Cohesion				
i. Family members really help and support one another	1	2	3	4
ii. There is a feeling of togetherness in our family	1	2	3	4
iii. Our family does not do things together	1	2	3	4
iv. We really get along well with each other	1	2	3	4
v. Family members seem to avoid contact with each other when at home	1	2	3	4
2.2 Expressiveness				
i. Family members feel free to speak what is on their minds	1	2	3	4
ii. Our family does not discuss its problems	1	2	3	4
iii. Family members discuss problems and usually feel good about the solutions	1	2	3	4
iv. In our family it is important for everyone to express their opinion	1	2	3	4
v. We do not tell each other about our personal problems	1	2	3	4

2.3 Conflict

i. We fight a lot in our family	1	2	3	4
ii. Family members sometimes get so angry they throw things	1	2	3	4
iii. Family members hardly ever lose their tempers	1	2	3	4
iv. Family members sometimes hit each other	1	2	3	4
v. Family members rarely criticise each other	1	2	3	4

2.4 Intellectual-Cultural Orientation

i. We rarely go to lectures, plays, or concerts	1	2	3	4
ii. We rarely have intellectual discussions	1	2	3	4
iii. Watching TV is more important than reading in our family	1	2	3	4
iv. Family members really like music, art, and literature	1	2	3	4
v. We are very interested in cultural activities	1	2	3	4

2.5 Active-Recreational Orientation

i. We often go to movies, sports events, camping, etc	1	2	3	4
ii. Everyone in our family has a hobby or two	1	2	3	4
iii. Family members are not very involved in recreational activities outside work or school	1	2	3	4
iv. Family members sometimes attend courses or take lessons for lessons for some hobby or interest	1	2	3	4
v. Friends rarely come over for dinner or to visit				

2.6 Religious Emphasis

i. Family members attend church, synagogue, or Sunday School fairly often	1	2	3	4
ii. We do not say prayers in our family	1	2	3	4
iii. We often talk about the religious meaning of Christmas, Passover, or other holidays	1	2	3	4
iv. We do not believe in heaven or hell	1	2	3	4
v. A religious book (the Bible Koran, Bagavad Gita etc) is a very important book in our home	1	2	3	4

2.7 Organization

i. It is often hard to find things when you need them in our household	1	2	3	4
ii. Being on time is very important in our family	1	2	3	4
iii. Family members make sure their rooms are neat	1	2	3	4
iv. Dishes are usually done immediately after eating	1	2	3	4
v. We are generally pretty sloppy around the house	1	2	3	4

2.8 Family Sociability

i. We are full of life and good spirits	1	2	3	4
ii. Our family enjoy being around other people	1	2	3	4
iii. Socialising with other people often make my family uncomfortable	1	2	3	4
iv. As a family, we have a large number of friends	1	2	3	4
v. Our family like having parties	1	2	3	4

2.9 External Locus of Control

i. We encourage each other to develop in his or her own individual way	1	2	3	4
ii. We are satisfied with the way in which we live	1	2	3	4

iii. Our decisions are not our own, but are forced upon us by things beyond our control	1	2	3	4
iv. Our family has more than its share of bad luck	1	2	3	4
v. My family feel that they have very little influence over the things that happen to them	1	2	3	4

2.10 Family Idealization

i. I do not think any family could live together with greater harmony than my family	1	2	3	4
ii. I do not think anyone could possibly be happier than my family and I when we are together	1	2	3	4
iii. My family have all the qualities I've always wanted in a family	1	2	3	4
iv. Our family is as well adjusted as any family in this world can be	1	2	3	4
v. My family could be happier than it is	1	2	3	4

2.11 Disengagement

i. It is difficult to keep track of what other family members are doing	1	2	3	4
ii. In our family we know where all family members are at all times	1	2	3	4
iii. Family members do not check with each other when making decisions	1	2	3	4
iv. Family members are extremely independent	1	2	3	4
v. Family members are expected to have the approval of others before making decisions	1	2	3	4

2.12 Democratic Family Style

i. Family members make the rules together	1	2	3	4
ii. Family members feel they have no say in solving problems	1	2	3	4
iii. Each family members have at least some say in major family decisions	1	2	3	4
iv. Parents and children in our family discuss together the method of punishment	1	2	3	4
v. In our family, parents do not check with the children before making important decisions	1	2	3	4

2.13 Laissez-Faire Family Style

i. Members of our family can get away with almost anything	1	2	3	4
ii. Family members are not punished or reprimanded when they do something wrong	1	2	3	4
iii. It is unclear what will happen when rules are broken in our family	1	2	3	4
iv. It is hard to know what the rules are in our family because they always change	1	2	3	4
v. There is strong leadership in our family	1	2	3	4

2.14 Authoritarian Family Style

i. Parents make all of the important decisions in our family	1	2	3	4
ii. There is strict punishment for breaking rules in our family	1	2	3	4
iii. Family members are severely punished for anything they do wrong	1	2	3	4
iv. There are very few rules in our family	1	2	3	4
v. Nobody orders anyone around in our family	1	2	3	4

2.15 Enmeshment

i. Family members find it hard to get away from each other	1	2	3	4
ii. It is difficult for family members to take time away from the family	1	2	3	4
iii. Family members feel pressured to spend most free time together	1	2	3	4

iv. Family members feel guilty if they want to spend some time alone	1	2	3	4
v. It seems like there is never any place to be alone in our house	1	2	3	4

3. Family bonding and support

Everyone has a number of people who are important in his or her life. These questions ask about your relationships with whole family, your mother figure and your father figure.

- Circle the **mother figure** you will be describing. (If you have both, choose the one you think of as your primary mother figure.)

A. Biological/Adopted Mother
B. Step-Mother (or Father's Significant Other)
C. Other _____

- Circle the **father figure** you will be describing. (If you have both, choose the one you think of as your primary father figure.)

A. Biological/Adopted Father
B. Step-Father (or Mother's Significant Other)
C. Other _____

			Little or None	Some-what	Very Much	Extremely much	The Most
3.1 Companionship (COM)							
i.	How often do you spend fun time with this person?	Mother	1	2	3	4	5
		Father	1	2	3	4	5
		Whole family	1	2	3	4	5
ii.	How often do you and this person go places and do things together?	Mother	1	2	3	4	5
		Father	1	2	3	4	5
		Whole family	1	2	3	4	5
iii.	How often do you play around and have fun with this person?	Mother	1	2	3	4	5
		Father	1	2	3	4	5
		Whole family	1	2	3	4	5
3.2 Conflict (CON)							
i.	How often do you and this person disagree and quarrel with each other?	Mother	1	2	3	4	5
		Father	1	2	3	4	5
		Whole family	1	2	3	4	5
ii.	How often do you and this person get mad at or get in fights with each other?	Mother	1	2	3	4	5
		Father	1	2	3	4	5

	Whole family	1	2	3	4	5
iii. How often do you and this person argue with each other?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.3 Instrumental Aid (AID)						
i. How much does this person teach you how to do things that you don't know?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How much does this person help you figure out or fix things?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. How much does this person help you when you need to get something done?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.4 Antagonism (ANT)						
i. How much do you and this person get on each other's nerves?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How much do you and this person get annoyed with each other's behaviour?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. How much do you and this person hassle or nag one another?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.5 Intimate Disclosure (DIS)						
i. How often do you tell this person things that you don't want others to know?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How often do you tell this person everything that you are going through?	Mother	1	2	3	4	5
	Father	1	2	3	4	5

	Whole family	1	2	3	4	5
iii. How often do you share secrets and private feelings with this person?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.6 Nurturance (NUR)						
i. How much do you help this person with things she/he can't do by her/himself?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How much do you protect and look out for this person?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. How much do you take care of this person?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.7 Affection (AFF)						
i. How much does this person like or love you?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How much does this person really care about you?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. How much does this person have a strong feeling of affection (loving or liking) toward you?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.8 Reassurance of Worth (WOR)						
i. How much does this person treat you like you're admired and respected?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How much does this person treat you like you're good at many things?	Mother	1	2	3	4	5
	Father	1	2	3	4	5

	Whole family	1	2	3	4	5
iii. How much does this person like or approve of the things you do?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
3.9 Relative Power (POW)						
i. Who tells the other person what to do more often, you or this person?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. Between you and this person, who tends to be the BOSS in this relationship?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. In your relationship with this person, who tends to take charge and decide what should be done?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
4.0 Reliable Alliance (ALL)						
i. How sure are you that this relationship will last no matter what?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
ii. How sure are you that your relationship will last in spite of fights?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5
iii. How sure are you that your relationship will continue in the years to come?	Mother	1	2	3	4	5
	Father	1	2	3	4	5
	Whole family	1	2	3	4	5

4 Parental Monitoring

Thinking back over your last year in high school…	Never	Rarely	Sometimes	Often	Always
4.1 When you got home from school, how often was an adult there within an hour of you getting home?	1	2	3	4	5
4.2 When you went to parties, how often was a supervising adult present at the party?	1	2	3	4	5
4.3 When you wanted to go to a party, how often did your parents confirm that an adult would supervise the party?	1	2	3	4	5

4.4 How often would your parents know if you came home an hour or more late on weekends?	1	2	3	4	5
4.5 When you broke a rule set by your parents, for example, coming home past curfew, did your parents take away privileges?	1	2	3	4	5
4.6 How often before you went out would you tell your parents when you would be back?	1	2	3	4	5
4.7 When your parents were not home, how often would you leave a note for them about where you were going?	1	2	3	4	5
4.8 When you went out and your plans unexpectedly changed, how often did you call your parents to let them know?	1	2	3	4	5
4.9 When you went out, how often did you let your parents know where you planned to go?	1	2	3	4	5
How much do your parents really know……	Don't know	Know a little	Know a lot		
4.10 Who your friends are?	1	2	3		
4.11 Where you go at night?	1	2	3		
4.12 How you spend your money?	1	2	3		
4.13 What you do with your free time?	1	2	3		
4.14 Where you are after school?	1	2	3		

5. Discipline and Behavioural Control

My mother (or figure)…/ **Father (or figure)**		Not like	Somewhat like	A lot like
5.1…makes me feel better after talking over my worries with her.	Mother	0	1	2
	Father			
5.2…tells me all of the things he has done for me.	Mother	0	1	2
	Father			
5.3…believes in having a lot of rules and sticking with them.	Mother	0	1	2
	Father			
5.4…smiles at me very often.	Mother	0	1	2
	Father			
5.5…says if I really cared for her, I would not do things that cause her to worry.	Mother	0	1	2
	Father			
5.6…insists that I must do exactly as I am told.	Mother	0	1	2
	Father			
5.7…is able to make me feel better when I am upset.	Mother	0	1	2
	Father			
5.8…is always telling me how I should behave	Mother	0	1	2

	Father			
5.9…is very strict with me.	Mother	0	1	2
	Father			
5.10…enjoys doing things with me.	Mother	0	1	2
	Father			
5.11…would like to be able to tell me what to do all the time.	Mother	0	1	2
	Father			
5.12…gives hard punishments.	Mother	0	1	2
	Father			
5.13…cheers me up when I am sad.	Mother	0	1	2
	Father			
5.14…wants to control whatever I do.	Mother	0	1	2
	Father			
5.15…is easy with me.	Mother	0	1	2
	Father			
5.16…gives me a lot of care and attention.	Mother	0	1	2
	Father			
5.17…is always trying to change me.	Mother	0	1	2
	Father			
5.18…lets me off easy when I do something wrong.	Mother	0	1	2
	Father			
5.19…makes me feel like the most important person in her life.	Mother	0	1	2
	Father			
5.20…only keeps rules when it suits her.	Mother	0	1	2
	Father			
5.21…gives me as much freedom as I want.	Mother	0	1	2
	Father			
5.22…believes in showing her love for me.	Mother	0	1	2
	Father			
5.23…is less friendly with me if I do not see things her way.	Mother	0	1	2
	Father			
5.24…lets me go anyplace I please without asking	Mother	0	1	2
	Father			
5.25…often praises me.	Mother	0	1	2

	Father			
5.26…will avoid looking at me when I have disappointed her.	Mother	0	1	2
	Father			
5.27…lets me go out any evening I want.	Mother	0	1	2
	Father			
5.28…is easy to talk to.	Mother	0	1	2
	Father			
5.29…if I have hurt her feelings, stops talking to me until I please her again.	Mother	0	1	2
	Father			
5.30…lets me do anything I like to do.	Mother	0	1	2

6. Parental rewards

	Never	Often	Always
6.1 How often do parents reward good behaviour	1	2	3
6.2 How often do parents reward achievement	1	2	3

7. Adolescent and parental substance use

The questions in this section are about substance use by you or your parent/s. Response to parent use is when you are aware of their use.

7.1 Tobacco

7.1.1 How often do or your parent smoke?

		Parent	
	Self	Mother	Father
Never	1	1	1
1 or 2 days in the past 12 months	2	2	2
Once a month or less	3	3	3
2 or 3 days a month	4	4	4
1 or 2 days a week	5	5	5
3 to 5 days a week	6	6	6
Every day or almost every day	7	7	7

7.1.2 How many cigarettes do you or parent smoke on a typical day when you or parent smoke?

		Parent	
	Self	Mother	Father
None	1	1	1
1 or 2	2	2	2
3 or 4	3	3	3
5 or 6	4	4	4
7 or 8	5	5	5
9 or 10	6	6	6
10 or more	7	7	7

7.2.3 Please indicate when you started smoking. Year_____Month_____ Date (if recalled)_____

7.2 Alcohol

7.2.1 How often do or your parent consume alcohol containing beverage?

		Parent	
	Self	Mother	Father
Never	1	1	1
1 or 2 days in the past 12 months	2	2	2
Once a month or less	3	3	3
2 or 3 days a month	4	4	4
1 or 2 days a week	5	5	5
3 to 5 days a week	6	6	6
Every day or almost every day	7	7	7

7.2.2 How many alcoholic drinks do you or parent take on a typical day when you or parent drink?

		Parent	
	Self	Mother	Father
None	1	1	1
1 or 2	2	2	2
3 or 4	3	3	3
5 or 6	4	4	4
7 or 8	5	5	5
9 or 10	6	6	6
10 or more	7	7	7

7.2.3 Please indicate when you started taking alcohol. Year_____Month_____ Date (if recalled)_____

7.3 Other substances

		Never	1 or 2 days in the past 12 months	Once a month or less	2 or 3 days a month	1 or 2 days a week	3 to 5 days a week	Every day or almost every day
Cannabis	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7
Amphetamines	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7
Barbiturates	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7
Cocaine	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7

Heroin	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7
LSD or other psychedelics and tranquilizers	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7
Other substances (please specify)	Self	1	2	3	4	5	6	7
	Mother	1	2	3	4	5	6	7
	Father	1	2	3	4	5	6	7

7.3.3 Please indicate when you started taking this substance:

(i) Name_____ Year_____Month_____ Date (if recalled)_____

(ii) Name_____ Year _____ Month _____ Date (if recalled)_____

(iii) Name_____ Year _____ Month _____ Date (if recalled)_____

THANK YOU VERY MUCH

Annex 3: Data quality

Data quality was ensured in a number of ways

- The survey was carried out in privacy and an environment which enabled the respondent to feel free to contribute.
- The questionnaire was pretested and adjusted accordingly to make it practical
- The information was also be verified by verification of outlying data
- Data cleaning was done to ensure that the data analysis is accurate

Annex 4: Reliability of items of the constructs

Where removal of items is warranted, the following superscripts lower case letters and removal reasons are included after the items:

[a] Remove item. Removal increases the overall Alpha to or beyond acceptable 0.6.

[b] Recommend removal of item- significantly higher reliability (usually at least 2-4%) if dropped and low r.drop value

[c] Remove response. Cronbach's Alpha below 0.6 - unacceptable reliability and cannot be improved beyond 0.6 by removal of any of the items.

Questionnaire Section 2: Family Functioning and Conflict

	Overall Cronbach Alpha	Reliability if dropped: raw Alpha	r.cor	r.drop
2.1 Cohesion	0.78			
i. Family members really help and support one another		0.71	0.77	0.63
ii. There is a feeling of togetherness in our family		0.67	0.87	0.74
iii. Our family does not do things together		0.75	0.55	0.51
iv. We really get along well with each other		0.69	0.77	0.67
v. Family members seem to avoid contact with each other when at home		0.83	0.30	0.27
2.2 Expressiveness				
	0.7			
i. Family members feel free to speak what is on their minds		0.7	0.58	0.32
ii. Our family does not discuss its problems		0.64	0.69	0.49
iii. Family members discuss problems and usually feel good about the solutions		0.56	0.82	0.67
iv. In our family it is important for everyone to express their opinion		0.70	0.60	0.35
v. We do not tell each other about our personal problems		0.65	0.68	0.47
2.3 Conflict				
	0.6			

i. We fight a lot in our family		0.38	0.78	0.62
ii. Family members sometimes get so angry they throw things		0.46	0.6857	0.5072
iii. Family members hardly ever lose their tempers[b]		0.70	0.0089	0.0051
iv. Family members sometimes hit each other		0.41	0.7821	0.6184
v. Family members rarely criticise each other		0.66	0.1599	0.1164

2.4 Intellectual-Cultural Orientation[c]

	0.43			
i. We rarely go to lectures, plays, or concerts		0.50	0.074	0.034
ii. We rarely have intellectual discussions		0.47	0.200	0.073
iii. Watching TV is more important than reading in our family		0.41	0.278	0.180
iv. Family members really like music, art, and literature		0.15	0.770	0.514
v. We are very interested in cultural activities		0.25	0.648	0.372

2.5 Active-Recreational Orientation

	0.54			
i. We often go to movies, sports events, camping, etc		0.34	0.69	0.507
ii. Everyone in our family has a hobby or two		0.36	0.66	0.482
iii. Family members are not very involved in recreational activities outside work or school		0.43	0.49	0.373
iv. Family members sometimes attend courses or take lessons for lessons for some hobby or interest[a]		0.60	0.18	0.084
v. Friends rarely come over for dinner or to visit		0.59	0.21	0.115

2.6 Religious Emphasis[c]

	0.41			
i. Family members attend church, synagogue, or Sunday School fairly often		0.30	0.45	0.298
ii. We do not say prayers in our family		0.4	0.24	0.152
iii. We often talk about the religious meaning of Christmas, Passover, or other holidays		0.47	0.18	0.066
iv. We do not believe in heaven or hell		0.43	0.25	0.116
v. A religious book (the Bible Koran, Bagavad Gita etc) is a very important book in our home		0.13	0.68	0.47

2.7 Organization

	0.6			
i. It is often hard to find things when you need them in our household		0.65	0.25	0.19
ii. Being on time is very important in our family		0.43	0.72	0.58
iii. Family members make sure their rooms are neat		0.49	0.75	0.53
iv. Dishes are usually done immediately after eating		0.49	0.69	0.48
v. We are generally pretty sloppy around the house[b]		0.67	0.21	0.17

2.8 Family Sociability

	0.59			
i. We are full of life and good spirits		0.47	0.59	0.48
ii. Our family enjoy being around other people		0.54	0.47	0.33
iii. Socialising with other people often make my family uncomfortable		0.67	0.12	0.046
iv. As a family, we have a large number of friends		0.33	0.82	0.66
v. Our family like having parties		0.57	0.39	0.28

2.9 External Locus of Control

	0.48			
i. We encourage each other to develop in his or her own individual way		0.43	0.37	0.25
ii. We are satisfied with the way in which we live		0.56	0.065	0.038
iii. Our decisions are not our own, but are forced upon us by things beyond our control		0.46	0.30	0.21
iv. Our family has more than its share of bad luck		0.26	0.69	0.46
v. My family feel that they have very little influence over the things that happen to them		0.36	0.57	0.36

2.10 Family Idealization

	0.74			
i. I do not think any family could live together with greater harmony than my family		0.74	0.46	0.380
ii. I do not think anyone could possibly be happier than my family and I when we are together[b]		0.62	0.76	0.679
iii. My family have all the qualities I've always wanted in a family		0.57	0.90	0.787
iv. Our family is as well adjusted as any family in this world can be		0.65	0.76	0.611
v. My family could be happier than it is		0.81	0.12	0.088

2.11 Disengagement[c]

	0.43			
i. It is difficult to keep track of what other family members are doing		0.36	0.35	0.244
ii. In our family we know where all family members are at all times		0.27	0.52	0.357
iii. Family members do not check with each other when making decisions		0.39	0.36	0.207
iv. Family members are extremely independent		0.35	0.42	0.267
v. Family members are expected to have the approval of others before making decisions		0.49	0.13	0.067

2.12 Democratic Family Style

	0.6			
i. Family members make the rules together		0.4	0.71	0.57
ii. Family members feel they have no say in solving problems		0.58	0.37	0.27
iii. Each family members have at least some say in major family decisions		0.59	0.55	0.42
iv. Parents and children in our family discuss together the method of punishment		0.59	0.37	0.26
v. In our family, parents do not check with the children before making important decisions		0.59	0.37	0.25

2.13 Laissez-Faire Family Style

	0.58			
i. Members of our family can get away with almost anything		0.42	0.68	0.512
ii. Family members are not punished or reprimanded when they do something wrong		0.49	0.59	0.395
iii. It is unclear what will happen when rules are broken in our family		0.54	0.38	0.3
iv. It is hard to know what the rules are in our family because they always change		0.45	0.59	0.463
v. There is strong leadership in our family[b]		0.66	0.15	0.049

2.14 Authoritarian Family Style[c]

	0.5			
i. Parents make all of the important decisions in our family		0.52	0.21	0.13
ii. There is strict punishment for breaking rules in our family		0.4	0.48	0.33
iii. Family members are severely punished for anything they do wrong		0.49	0.31	0.19
iv. There are very few rules in our family		0.32	0.6	0.43
v. Nobody orders anyone around in our family		0.44	0.38	0.27

2.15 Enmeshment

	0.77			
i. Family members find it hard to get away from each other		0.71	0.66	0.58
ii. It is difficult for family members to take time away from the family		0.70	0.73	0.62
iii. Family members feel pressured to spend most free time together		0.73	0.59	0.52
iv. Family members feel guilty if they want to spend some time alone		0.71	0.69	0.39
v. It seems like there is never any place to be alone in our house		0.77	0.45	0.39

Questionnaire Section 3: Family bonding and support

		Overall Cronbach Aplha	Reliability if dropped: raw Alpha	r.cor	r.drop
3.1 Companionship (COM)					
iv. How often do you spend fun time with this person?	Mother	0.74	0.67	0.64	0.55
	Father	0.87	0.69	0.94	0.88
	Whole family	0.79	0.71	0.74	0.63
v. How often do you and this person go places and do things together?	Mother		0.69	0.61	0.53
	Father		0.84	0.80	0.73
	Whole family		0.62	0.82	0.73
vi. How often do you play around and have fun with this person?	Mother		0.59	0.72	0.61
	Father		0.89	0.73	0.67

	Whole family		0.81	0.61	0.54
3.2 Conflict (CON)					
iv. How often do you and this person disagree and quarrel with each other?	Mother	0.81	0.86	0.58	0.54
	Father	0.87	0.79	0.87	0.77
	Whole family	0.8	0.76	0.69	0.62
v. How often do you and this person get mad at or get in fights with each other?	Mother		0.71	0.80	0.70
	Father		0.71	0.93	0.86
	Whole family		0.68	0.77	0.68
vi. How often do you and this person argue with each other?	Mother		0.62	0.86	0.77
	Father		0.92	0.66	0.62
	Whole family		0.73	0.71	0.63
3.3 Instrumental Aid (AID)					
iv. How much does this person teach you how to do things that you don't know?	Mother	0.79	0.69	0.75	0.66
	Father	0.91	0.86	0.89	0.85
	Whole family	0.71	0.69	0.57	0.48
v. How much does this person help you figure out or fix things?	Mother		0.69	0.74	0.66
	Father		0.86	0.88	0.84
	Whole family		0.64	0.62	0.52
vi. How much does this person help you when you need to get something done?	Mother		0.77	0.65	0.59
	Father		0.90	0.83	0.79
	Whole family		0.55	0.71	0.60

3.4 Antagonism (ANT)					
iv. How much do you and this person get on each other's nerves?	Mother	0.85	0.81	0.76	0.70
	Father	0.75	0.70	0.64	0.56
	Whole family	0.74	0.71	0.61	0.52
v. How much do you and this person get annoyed with each other's behaviour?	Mother		0.80	0.78	0.71
	Father		0.62	0.71	0.62
	Whole family		0.55	0.76	0.66
vi. How much do you and this person hassle or nag one another?	Mother		0.76	0.81	0.75
	Father		0.68	0.65	0.57
	Whole family		0.70	0.63	0.54
3.5 Intimate Disclosure (DIS)					
iv. How often do you tell this person things that you don't want others to know?	Mother	0.88	0.86	0.78	0.74
	Father	0.88	0.91	0.70	0.67
	Whole family	0.8	0.78	0.66	0.59
v. How often do you tell this person everything that you are going through?	Mother		0.79	0.86	0.81
	Father		0.80	0.87	0.80
	Whole family		0.67	0.79	0.71
vi. How often do you share secrets and private feelings with this person?	Mother		0.84	0.82	0.76
	Father		0.77	0.90	0.84
	Whole family		0.73	0.73	0.65
3.6 Nurturance (NUR)					
iv. How much do you help this person with things she/he can't do by her/himself?	Mother	0.8	0.78	0.67	0.61
	Father	0.48	0.29	0.83	0.52
	Whole family	0.82	0.51	0.46	
v. How much do you protect and look out for this person?	Mother		0.70	0.76	0.68

	Father		0.34	0.79	0.46
	Whole family		0.61	0.78	0.66
vi. How much do you take care of this person?[a]	Mother		0.71	0.75	0.67
	Father	j	0.85	0.39	0.35
	Whole family		0.59	0.79	0.68
3.7 Affection (AFF)					
iv. How much does this person like or love you?	Mother	0.87	0.81	0.83	0.75
	Father	0.86	0.84	0.81	0.72
	Whole family	0.86	0.81	0.82	0.73
v. How much does this person really care about you?	Mother		0.76	0.88	0.82
	Father		0.70	0.92	0.86
	Whole family		0.70	0.92	0.85
vi. How much does this person have a strong feeling of affection (loving or liking) toward you?	Mother		0.88	0.73	0.69
	Father		0.89	0.71	0.65
	Whole family		0.89	0.69	0.64
3.8 Reassurance of Worth (WOR)					
iv. How much does this person treat you like you're admired and respected?	Mother	0.87	0.79	0.87	0.77
	Father	0.85	0.76	0.87	0.77
	Whole family	0.82	0.68	0.88	0.73
v. How much does this person treat you like you're good at many things?	Mother		0.70	0.93	0.86
	Father		0.69	0.91	0.83
	Whole family		0.59	0.94	0.83
vi. How much does this person like or approve of the things you do?	Mother		0.92	0.66	0.62
	Father		0.91	0.63	0.59
	Whole family		0.93	0.52	0.48

3.9 Relative Power (POW)					
iv. Who tells the other person what to do more often, you or this person?	Mother[c]	0.54	0.54	0.40	0.30
	Father	0.79	0.78	0.64	0.56
	Whole family	0.64	0.57	0.54	0.43
v. Between you and this person, who tends to be the BOSS in this relationship?	Mother		0.42	0.51	0.37
	Father		0.75	0.68	0.59
	Whole family		0.43	0.66	0.53
vi. In your relationship with this person, who tends to take charge and decide what should be done?	Mother		0.37	0.55	0.40
	Father		0.59	0.83	0.74
	Whole family		0.61	0.50	0.40
4.0 Reliable Alliance (ALL)					
iv. How sure are you that this relationship will last no matter what?	Mother	0.88	0.81	0.86	0.80
	Father	0.93	0.89	0.93	0.89
	Whole family	0.88	0.82	0.85	0.80
v. How sure are you that your relationship will last in spite of fights?	Mother		0.82	0.85	0.79
	Father		0.89	0.92	0.88
	Whole family		0.86	0.80	0.75
vi. How sure are you that your relationship will continue in the years to come?	Mother		0.87	0.77	0.73
	Father		0.93	0.85	0.83
	Whole family		0.83	0.83	0.78

Questionnaire 4: Parental Monitoring

	Overall Cronbach Aplha	Reliability if dropped: raw Alpha	r.cor	r.drop
Thinking back over your last year in high school…				
	0.84			
4.1 When you got home from school, how often was an adult there		0.85	0.40	0.36

within an hour of you getting home?				
4.2 When you went to parties, how often was a supervising adult present at the party?		0.83	0.57	0.51
4.3 When you wanted to go to a party, how often did your parents confirm that an adult would supervise the party?		0.81	0.75	0.68
4.4 How often would your parents know if you came home an hour or more late on weekends?		0.82	0.70	0.64
4.5 When you broke a rule set by your parents, for example, coming home past curfew, did your parents take away privileges?		0.84	0.53	0.46
4.6 How often before you went out would you tell your parents when you would be back?		0.82	0.64	0.59
4.7 When your parents were not home, how often would you leave a note for them about where you were going?		0.83	0.56	0.49
4.8 When you went out and your plans unexpectedly changed, how often did you call your parents to let them know?		0.82	0.69	0.63
4.9 When you went out, how often did you let your parents know where you planned to go?		0.81	0.77	0.69
How much do your parents really know……				
	0.84			
4.10 Who your friends are?		0.84	0.52	0.47
4.11 Where you go at night?		0.78	0.78	0.71
4.12 How you spend your money?		0.81	0.69	0.62
4.13 What you do with your free time?		0.80	0.73	0.66
4.14 Where you are after school?		0.78	0.79	0.72

Questionnaire Section 5: Discipline and Behavioural Control

My mother (or figure)…/ **Father (or figure)**		Construct	Overall Cronbach Aplha	Reliability if dropped: raw alpha	r.cor	r.drop
5.1…makes me feel better after talking over my worries with her.	Mother	sharing	0.73	0.69	0.60	0.52
	Father		0.71	0.72	0.52	0.45
5.2…tells me all of the things he has done for me.	Mother	Control guilt[c]	0.5	0.31	0.51	0.36
	Father		0.6	0.28	0.70	0.55

5.3…believes in having a lot of rules and sticking with them.	Mother	Strictness	0.64	0.49	0.61	0.49
	Father		0.82	0.74	0.79	0.70
5.4…smiles at me very often.	Mother	affection	0.72	0.56	0.66	0.56
	Father		0.75	0.6	0.7	0.6
5.5…says if I really cared for her, I would not do things that cause her to worry.	Mother	Control guilt		0.46	0.39	0.27
	Father			0.59	0.47	0.34
5.6…insists that I must do exactly as I am told.	Mother	Strictness		0.57	0.54	0.43
	Father			0.67	0.85	0.76
5.7…is able to make me feel better when I am upset.	Mother	Emotional support	0.81	0.72	0.76	0.67
	Father		0.85	0.73	0.84	0.77
5.8…is always telling me how I should behave	Mother	Parental direction	0.83	0.72	0.82	0.75
	Father		0.85	0.80	0.77	0.70
5.9…is very strict with me.	Mother	Strictness		0.56	0.54	0.44
	Father			0.85	0.63	0.58
5.10…enjoys doing things with me.	Mother	Sharing		0.63	0.67	0.57
	Father			0.53	0.72	0.61
5.11…would like to be able to tell me what to do all the time.	Mother	Parental direction		0.76	0.78	0.70
	Father			0.72	0.85	0.78
5.12…gives hard punishments.	Mother[c]	Neg evaluation	0.54	0.43	0.49	0.36
	Father		0.64	0.62	0.48	0.39
5.13…cheers me up when I am sad.	Mother	Emotional support		0.65	0.82	0.74
	Father			0.79	0.77	0.71

5.14…wants to control whatever I do.	Mother	Parental direction		0.82	0.69	0.63
	Father			0.83	0.72	0.66
5.15…is easy with me.	Mother	Moderate autonomy	0.65	0.49	0.6	0.49
	Father		0.63	0.46	0.58	0.46
5.16…gives me a lot of care and attention.	Mother	Emotional support		0.82	0.62	0.57
	Father			0.83	0.73	0.67
5.17…is always trying to change me.	Mother	Neg evaluation		0.49	0.43	0.32
	Father			0.48	0.61	0.48
5.18…lets me off easy when I do something wrong.	Mother	Lax discipline		0.38	0.51	0.38
	Father			0.64	0.73	0.64
5.19…makes me feel like the most important person in her life.	Mother	Pos evaluation	0.72	0.56	0.66	0.56
	Father		0.87	0.77	0.83	0.77
5.20…only keeps rules when it suits her.	Mother	Negative evaluation		0.40	0.51	0.38
	Father			0.50	0.59	0.47
5.21…gives me as much freedom as I want.	Mother	Moderate autonomy	0.49	0.6	0.49	0.49
	Father			0.46	0.58	0.46
5.22…believes in showing her love for me.	Mother	affection		0.56	0.66	0.56
	Father			0.6	0.7	0.6
5.23…is less friendly with me if I do not see things her way.	Mother[c]	Irritability	0.5	0.37	0.51	0.37
	Father[c]		0.41	0.3	0.44	0.3
5.24…lets me go any place I please without asking	Mother	Extreme autonomy	0.75	0.61	0.7	0.61

	Father		0.72	0.56	0.66	0.56
5.25…often praises me.	Mother	Positive evaluation		0.56	0.66	0.56
	Father			0.77	0.83	0.77
5.26…will avoid looking at me when I have disappointed her.	Mother	Control guilt		0.41	0.44	0.31
	Father			0.60	0.46	0.34
5.27…lets me go out any evening I want.	Mother[c]	Lax discipline	0.54	0.38	0.51	0.38
	Father		0.78	0.64	0.73	0.64
5.28…is easy to talk to.	Mother	sharing		0.61	0.69	0.58
	Father			0.60	0.66	0.55
5.29…if I have hurt her feelings, stops talking to me until I please her again.	Mother	Irritability		0.37	0.51	0.37
	Father			0.3	0.44	0.3
5.30…lets me do anything I like to do.	Mother	Extreme autonomy		0.61	0.7	0.61
				0.56	0.66	0.56