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Tobacco and Alcohol Use Among Adolescents in South Africa: Shared and Unshared Risks

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Objective

Tobacco and alcohol use by adolescents are major public health concerns in South Africa. However, the extent to which key psychosocial risk factors for tobacco use and alcohol use by adolescents in South Africa are shared or unshared is unclear. This study sought to examine the shared and unshared risk factors for tobacco and alcohol use among adolescents in Johannesburg. Method: Participants comprised 736 males and females aged 12-17 years who were recruited via a household survey conducted during 2004. The participants were interviewed from a questionnaire comprising measures of personal, family (parental bonding and family legal drug use), and contextual (school and neighbourhood) factors. Separate multiple logistic regression analyses were conducted to predict lifetime alcohol use and lifetime tobacco use from variables within each domain (personal, family, and contextual), controlling for demographic factors. Results: Personal, family (parental bonding), and contextual factors (school factors) were primarily shared risk factors for tobacco and alcohol use, while family legal drug use and neighbourhood factors were largely unshared. Conclusions: Interventions addressing personal, parenting and schooling factors are likely to impact on preventing both tobacco and alcohol use, whereas interventions focused on ameliorating family drug use and neighbourhood factors may need to be more substance-specific.

Tobacco and alcohol use are preventable causes of death world-wide with just under 6 million deaths attributable to cigarette smoking (Eriksen, Mackay & Ross, 2012), and 3.3 million attributable to alcohol use (WHO, 2014) each year. The use of these substances by adolescents constitutes a major public health problem globally (Hipple et al., 2011; WHO, 2014) as well as in South Africa (Seggie, 2012; Ramsoomar & Morojele, 2012). Tobacco use is associated with both short- and long-term negative consequences including various forms of cancer, cardiovascular disease and cognitive impairment (Hipple et al., 2011).

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Alcohol use among adolescents is often associated with injuries, violence, crime and other risky behaviours, as well as later physical illnesses and alcohol use disorders (Boden, Fergusson & Horwood, 2013; Morojele & Brook, 2006; Patrick & Schulenberg, 2011; Swahn & Donovan, 2005). Research has shown that tobacco and alcohol use tend to co-occur among adolescents in South Africa (e.g. Brook et al., 2011; Flisher et al., 1996). However, with a few exceptions (e.g. Morojele et al., 2002), studies in South Africa have seldom examined the extent to which the determinants of alcohol and tobacco use, within key domains (personal, familial and contextual), are shared or unshared.

Identification of the shared and unshared risk factors for the use of tobacco and alcohol is important from a developmental perspective, for describing the common (and uncommon) aetiological pathways to tobacco and alcohol use, as well as the consequences of tobacco and alcohol use. Such information is also useful for informing policies and prevention and treatment programs to address tobacco and alcohol use among adolescents in South Africa. Where the predictors of these two behaviours are shared, preventive interventions that target those shared risk factors should have an impact on the use of both substances, whereas where they are unshared, substance-specific interventions would be more appropriate.

The theoretical framework for the present research is Family Interactional Theory (FIT; Brook et al., 1990). FIT posits that there is a developmental progression from parent to child, which is mediated by the parent-child relationship. According to FIT, parental substance use and/or psychopathology may undermine the development of a close, non-conflictual mutual parent-child attachment. Children with a weaker and more distant parental bond, will in turn, be less likely to identify with and model parental pro-social behaviours and, consequently, more inclined to have maladaptive personal attributes and to use psychoactive substances (e.g. Brook et al., 1990). In addition to parental factors, FIT also recognizes the role of personal and contextual (i.e. school and neighbourhood) factors in adolescents' substance use behaviours. Brook and her colleagues have further indicated that to fully understand the family it is important to take cognizance of the neighbourhood or ecological context (including school environments for adolescents) in which the family is situated and operates (Brook et al., 2002). Their research has indicated how neighbourhood factors can impact on the parent-child relationship and adolescents' personal attributes (Brook et al., 2002). In this paper, we extend FIT to an ethnically diverse sample of adolescents living in South Africa. Although the applicability of FIT has been demonstrated in a number of different cultural settings in the U.S. and Colombia, South America (Brook et al., 1999), some differences in the applicability of the tenets of FIT can be expected given the particular cultural and socio-economic conditions experienced by children in South Africa (compared to the U.S.), including high levels of socio-economic inequality, violence, poverty, unemployment, single parent households, HIV and other infectious diseases (Mayosi et al., 2012; Ward, Dawes, & Matzopoulos, 2012), many of which are likely to impact on optimal family functioning (Coetzee et al., 2014; Ward et al., 2012).

Although there is limited literature on the shared and unshared risks for tobacco and alcohol use in South Africa, a few studies among adolescent samples in South Africa, as elsewhere, have indicated that personal and behavioural attributes are related to adolescents' smoking behaviour (e.g. tolerance of deviance, deviant behaviour, depressive mood and low ego

integration; e.g. Boisvert et al., 2013; Chang et al., 2005; Dierker et al., 2005; Morojele et al., 2002). Many of these personal and behavioural risk factors have also been implicated in adolescents' alcohol use (Best et al., 2006; Morojele et al., 2002; Nguyen et al., 2012).

Regarding the contextual domain, school factors such as failure in school, which may be manifested in suspension, dropping out, or low commitment to school, are interpreted as evidence of a weak bond to conventional society, and may be associated with tobacco and alcohol use (Townsend, Flisher, & King, 2007; Morojele et al., 2001). Dissatisfaction with school is also associated with lower expectations for and achievement in school, which are also related to adolescent smoking behaviour (Bergen et al., 2005) and alcohol use (Best et al., 2006; Morojele et al., 2001).

Neighbourhood factors which tend to be associated with adolescents' tobacco and alcohol use include the accessibility of these legal substances in one's community or the density of outlets that sell them (Henriksen et al., 2008; Parry et al., 2004), the extent of neighbourhood cohesion or disorganization (Winstanley et al., 2008), the extent of community violence (Nebbitt et al., 2012), and subjective adult norms, antisocial adult behaviour and community affirmation (Bendtsen et al., 2013; King et al., 2003; Onya et al., 2012).

The present study builds on previous research (Flisher et al., 2003; Morojele et al., 2002), but departs from it in its examination of the shared and unshared risk factors associated with adolescents' tobacco and alcohol use in one analysis in a community sample of adolescents. We focus on both tobacco and alcohol use, as they are highly associated with morbidity and the risk for addiction (Hipple et al., 2011; WHO, 2014). Given the increasing prevalence of alcohol use among adolescents (especially females) in South Africa (Ramsoomar & Morojele, 2012; Reddy et al., 2013a) and the concerning levels of tobacco use among this group (Reddy et al., 2013a; b), these behaviours are likely to have increasingly serious adverse effects on public health.

Knowledge gained from this study will be particularly useful for providing insights into where interventions for each type of behaviour should be most focused. No doubt, risk factors that are shared (common to both alcohol and tobacco use) can be targeted in order to impact both behaviours. On the other hand, risk factors that are unique to one particular behaviour (unshared) should be the focus of substance-specific interventions.

The study's additional strengths are its assessment of multiple risk factors, inclusion of an ethnically diverse sample, and use of a community-based (rather than a school-based) sample of adolescents in Johannesburg, South Africa. Consistent with FIT, we hypothesized the following: (a) frequency of tobacco and alcohol use are significantly related; (b) personal risk factors for tobacco use and alcohol use are shared; (c) family risk factors for tobacco use and alcohol use are both shared and unshared; (d) school risk factors for tobacco use and alcohol use are both shared and unshared; and (e) neighbourhood risk factors are mainly unshared, and more likely to predict alcohol use than tobacco use.

Method

Participants

Measures—The participants responded to questions in a structured questionnaire. The dependent and independent variables were as follows:

Dependent variables: The dependent variables were lifetime alcohol use and lifetime cigarette smoking. For each variable, the participants who reported having **engaged** in the behaviour (i.e. ever smoked at least a few puffs of cigarettes in their lifetime, for cigarettes; or ever consumed beer, wine, spirits, home brew or other forms of alcohol, for alcohol consumption) were given a score of “1”, and those who reported never having engaged in the behaviour were given a score of “0”.

Independent variables: Table 1 shows the measures that assessed the independent variables within the demographic, personal, family (parental bonding and family legal drug use), and contextual (school and neighbourhood) factors domains. The number of items, the source, and Cronbach's alpha for each scale are shown in the table.

Sociodemographic factors: The sociodemographic factors included age, gender, ethnicity and socioeconomic status. Options on the ethnicity variable were being black, ‘coloured,’ white or Indian. Household amenities (a proxy measure for socioeconomic status) was a composite measure summing respondents' scores on questions asking about the presence of 12 amenities in their household. The higher the score, the greater the number of amenities.

Personal factors: The personal attributes domain consisted of six measures that assessed both internalizing processes (i.e. tolerance of deviance, depression, interpersonal difficulty and ego integration) and externalizing behaviours (i.e. self-deviance and committing acts of violence).

Family factors: The family domain comprised two sub-domains: parental bonding and family legal drug use. Among the parental bonding factors we assessed adolescents' perceptions of their relationship with each parent in terms of the degree to which there were rules, the degree of warmth (parental affection and child-centeredness), and the degree of parent-child conflict. The family legal drug use variables assessed the adolescents' mothers', fathers' and siblings' extent of involvement in tobacco use and alcohol use (See Table 1).

School factors: We assessed four separate school-related factors: satisfaction with school, school suspension, school drop-out and school environment.

Neighbourhood factors: This domain comprised four scales: violence towards the adolescent (victimization), neighbourhood cohesion, availability of alcohol, and availability of tobacco.

Procedure

The participants were recruited via a household survey that was conducted in 2004. A three-stage sampling procedure was used to obtain the sample. This procedure involved sampling

communities (census enumeration areas), followed by households, followed by adolescents in the households. One eligible adolescent (aged 12-17 years) was randomly selected from each household.

The participants were interviewed by trained interviewers, most of whom were of the same gender and ethnicity as the participants. The interviews were conducted in the participants' language of choice (i.e. English, Afrikaans, seSotho, or isiZulu). The participants provided informed consent prior to being interviewed and were assured that their answers would be confidential. The study was approved by the Institutional Review Board of the New York University School of Medicine in the United States and by the Ethics Committee of the Faculty of Health Sciences at the University of Pretoria in South Africa.

Statistical Analyses

To test the first hypothesis that the frequency of tobacco and alcohol use are related, we conducted a Chi-square test. To test the remaining hypotheses, we conducted separate multiple logistic regression analyses to predict lifetime alcohol use and lifetime tobacco use from the variables within each of the five domains i.e. personal, parental bonding, family legal drug use, school and neighbourhood factors. In these analyses, we controlled for age, gender, ethnicity, and SES.

Results

The participants comprised 736 males and females between the ages of 12 and 17 years, with a mean age of 14.6 years (S.D. = 1.68) in Johannesburg, South Africa. Just over one third were “black African” (30.4%), 30.4% were “coloured” (of ‘mixed’ heritage), 26.5% were “Indian”, and 7.7% were “white”. Their self-reported religious affiliations differed by ethnicity. The black African adolescents were mainly Christian (52.4%) or attended African-initiated churches (15.7%); the coloured participants were mainly Christian (50.9%), Muslim (9.9%) or had a non-specified religious affiliation (34.2%); the white adolescents were mainly Christian (77.8%) or of a non-specified religious affiliation (16.7%), and the Indian participants were mainly Muslim (57.7%), Hindu (29.4%), Christian (3.6%) or of a non-specified religious affiliation (7.7%). On average, the participants lived with five other people in their households (ranging from 0-20). About half of them (370) lived with both biological parents (50.3%), about one third (34.1%) lived with only one biological parent, and 115 (15.6%) lived with neither biological parent. The majority of the participants (96.2%) were enrolled in school at the time of the interviews, and a small minority (5.6%) reported having dropped out of school at least once in their lifetime.

In total 322 (44%) and 186 (25.4%) of the adolescents reported lifetime tobacco and alcohol use, respectively. Additionally, 359 (49%), 51 (7%), 185 (25%), and 135 (19%) of the adolescents reported never having used alcohol or cigarettes, having used only alcohol, having used only cigarettes, and having used both alcohol and cigarettes, respectively. The hypothesis that the frequency of tobacco use and alcohol use would be related was confirmed: Chi-square = 83.8; df = 1; $p < .001$.

Table 2 shows the results of the univariate logistic regression analyses predicting lifetime tobacco use and alcohol use from the demographic variables. As shown, age (i.e. older) was associated with a greater probability of both alcohol and tobacco use. Gender (i.e. being male) was associated with lifetime tobacco use but not alcohol use. Ethnicity was associated with both lifetime tobacco use and alcohol use. Specifically, coloured, white and Indian participants were significantly more likely than the black participants to report having used tobacco in their lifetime. For alcohol use, the Indian adolescents were significantly less likely to have used alcohol than the black adolescents; but there were no significant differences in the rates of alcohol use between the white and black adolescents, and between the coloured and black adolescents. Finally, socio-economic status was associated with lifetime tobacco use, but not with lifetime alcohol use.

Tables 3 to 5 show the results of the multiple logistic regression analyses for predicting lifetime cigarette use and lifetime alcohol use from the psychosocial variables, after controlling for the demographic factors (i.e. age, gender, ethnicity and SES).

As noted in Table 3, two personal factors (i.e. self-deviance, and committing acts of violence) were significantly associated with an increased likelihood of both tobacco use and alcohol use. A third personal factor, ego integration, was associated with a lower likelihood of both tobacco use and alcohol use.

Table 4 shows that in the analysis in which all parental bonding variables were included, only maternal conflict and paternal conflict were significantly and independently associated with lifetime tobacco use. The significant and independent predictors of lifetime alcohol use were maternal warmth and paternal conflict.

As regards family legal drug use, maternal smoking, sibling smoking, and sibling drinking were significant predictors of lifetime smoking. Furthermore, maternal drinking and paternal drinking were both significantly and independently associated with lifetime drinking.

Table 5 depicts the results of the logistic regression analyses examining the associations between the two outcomes and the factors in the contextual domain (i.e. school and neighbourhood factors). As shown, low satisfaction with school and school suspension were significant predictors of lifetime smoking. On the other hand, all four school variables were significantly associated with lifetime alcohol consumption: school satisfaction, school drop-out and school environment were negatively associated with lifetime drinking, while school suspension was associated with an increased probability of lifetime drinking.

For the neighbourhood variables, only victimization was significantly and independently related to lifetime smoking. However, both neighbourhood cohesion and high availability of alcohol were significant predictors of lifetime drinking (See Table 5).

Discussion

To our knowledge, this is the first study conducted to examine the shared and unshared psychosocial predictors of tobacco use and alcohol use among a community sample of adolescents in South Africa. We found that many of the risk and protective factors related to

tobacco and alcohol use are shared, partially supporting a common cause model (Brook et al., 1997; Cohen & Brook, 1987), while fewer risk factors were unshared.

In support of our hypothesis, personal factors were generally shared predictors of tobacco and alcohol use. Specifically, we found that externalizing behaviours (i.e. self-deviance and perpetration of violence) were positively related to both smoking and drinking. This could be explained by the influence of the peer group (Kokkevi et al., 2007; Morojele & Brook, 2006) and/or a shared common, genetic liability (Hopfer, Crowley, & Hewitt, 2003; Kendler et al., 2003). Regarding the internalizing processes, ego-integration was related to both tobacco and alcohol use. An important component of ego-integration relates to the function of the ego in controlling impulses (e.g., self-control) and dealing with the external environment (Hsu & Marlatt, 2012). Given the importance of the attribute *self-control*, it is not surprising that greater self-control insulates the adolescent from both tobacco and alcohol use (Boisvert et al., 2013). In contrast to the literature, depression was not independently related to tobacco or alcohol use among adolescents in this study (Best et al., 2006; Chang, Sherritt & Knight, 2005; Dierker et al., 2005).

This study extends FIT (Brook et al., 1990), by demonstrating that parent-child conflict is a shared predictor of tobacco and alcohol use. We found that a distant/conflictual parent-child relationship with the father was strongly associated with both cigarette smoking and alcohol use while a distance/conflictual parent-child relationship with the mother was strongly related to tobacco use only. Children who have a non-conflictual, close and supportive relationship with their parents are more likely to (a) internalize their parental values, (b) identify and cooperate with their parents, and (c) exert emotional self-control, all of which, in turn, would be associated with less cigarette smoking and alcohol use. It is notable that the predictive role of maternal factors (maternal rules in particular) did not come out as strongly in this study as in studies in the U.S. Interestingly, this same finding has been observed in studies that have applied FIT in Colombia (South America; e.g. Brook et al., 2001). Colombia and South Africa are both middle income countries and likely to be more similar socio-economically to each other than to the US. In contexts in which there are high levels of socio-economic disadvantage, structural factors such as poverty and violence may hinder the enactment of potentially positive parenting behaviours, with parents being more likely to adopt inconsistent parenting styles and strict discipline (Barbarin & Richter, 2001; Ward, Makusha & Bray, 2015). It is also conceivable that the weak/non-significant association between maternal rules and tobacco and alcohol use among adolescents in South Africa and Colombia may be due to low variability in the participants' scores on this factor in the two countries.

In contrast to the finding that parental bonding factors are **generally** shared predictors of tobacco and alcohol use, it emerged that the parental legal drug use factors were unshared. Consistent with FIT and Social Learning Theory (Hirschi, 2004), we found that adolescents whose family members (mother, siblings) smoke cigarettes are more likely to smoke, suggesting modelling of their family members' behaviour. Similarly, adolescents whose family members drink alcohol seemed to be at increased risk for drinking themselves. Genetic research, such as twin studies, indicates that legal drug use is partly explained by genetic factors (Kendler et al., 2014).

Regarding the contextual factors, the results indicated that the school risk factors for tobacco and alcohol use were both shared and unshared. The two shared risk factors were school suspension and school satisfaction. Many previous studies have indicated the importance of these school factors in adolescent tobacco and alcohol use (Bergen et al., 2005; Best et al., 2006; Morojele et al., 2001). School environment and school drop-out variables were only related to lifetime alcohol use. School drop-out is often positively associated with both tobacco use and alcohol use (Flisher et al., 2010; Townsend et al., 2007). However, in this case the association was in a negative direction, and may be because school drop-out in South African usually occurs due to socio-economic reasons, including limited funds to attend school, a need to work or take care of family members, poor academic performance and early pregnancy among girls (Statistics South Africa, 2015). Future research could help to further examine the association between school drop-out and adolescents' use of tobacco and alcohol in South Africa.

The neighbourhood characteristics were mainly unshared and more strongly related to alcohol use than to tobacco use. Victimization was the only neighbourhood factor that was related to tobacco use. Exposure to violence is often accompanied by internal distress which places young people at greater risk of using tobacco and alcohol in order to cope (Luk et al., 2010). High alcohol availability and low neighbourhood cohesion were only related to lifetime drinking. In neighbourhoods in which alcohol is easily available, young people are likely to access alcohol or model the behaviour of their peers, siblings and adults, and become more inclined to drink alcohol (Parry et al., 2004). In terms of neighbourhood cohesion, young people in highly cohesive neighbourhoods may be deterred from drinking alcohol by adult members of their community (Maimon & Browning, 2012) or due to an inclination to conform to the values of the members of their community (Bendtsen et al., 2013; Beyers et al., 2004).

Only two demographic variables (age and ethnicity) were associated with both tobacco use and alcohol use. As expected, being older was consistently associated with the use of both substances. Consistent with other research in South Africa (e.g. Brook et al., 2005; King et al., 2003; Reddy et al., 2013b), the black African adolescents were less likely to report cigarette smoking than all other groups. Only the Indian adolescent participants were less likely to report alcohol consumption than the black adolescents; their low rate of alcohol consumption could be due to our finding that 60% of them self-reported as Muslim.

Gender and SES were only associated with tobacco use. The association between gender and smoking concurs with findings of other studies (Israelowitz & Rawson, 2006; Flisher et al., 2003; Reddy et al., 2007; 2013a; b). Generally, there is a negative association between adolescent smoking and SES (Hiscock et al., 2012) but in this study the association was positive, which may be because adolescents of higher socio-economic status have more access to disposable income, and hence easier access to tobacco products (Chen et al., 2013).

The lack of gender differences in alcohol use could reflect the convergence of drinking behaviour among adolescents (e.g. Malbergier et al., 2012), and suggests that alcohol intervention efforts for adolescents should be equally targeted at both genders. The non-

significant association between SES and alcohol use is not surprising given that previous findings on this association among adolescents have been inconsistent, and depend on the measures of SES (i.e. whether they assess the income and/or education and/or occupational status dimension of SES) and alcohol use (i.e. whether they assess frequency, quantity or alcohol-related problems) that are employed (Kendler et al., 2014; Melotti et al., 2011). Different potential mechanisms may explain the link between SES and alcohol consumption, as SES may reflect financial/material resources, or attitudes and values regarding alcohol consumption, among other factors (Kendler et al., 2014; Melotti et al., 2011). The lack of a significant association between SES and alcohol use in this study may be due to the fact that the analyses were conducted for the combined sample. A follow-up analysis revealed that the association between SES and alcohol consumption varied as a function of ethnicity. SES was not related to alcohol use for any of the sub-samples except for the Indian sub-sample for whom the association was significant and negative.

This study has a few limitations. First, since the design was not longitudinal, it is impossible to determine the temporal or causal direction of the observed relationships. Second, we used self-reporting as opposed to objective assessments of tobacco and alcohol use. **Third**, this study's findings may not necessarily generalize to populations in other countries or settings. Fourth, the results concerning the scales with relatively low internal consistency (namely ego integration, self-deviance, maternal rules and adolescent victimization) must be interpreted with caution. Although attempts were made to adapt these scales to the South African context, it is conceivable that further revisions may have been required prior to use of the scales among the study participants. Nevertheless, some of these variables did predict tobacco and/or alcohol use. Finally, since the data for this study were collected in 2004 the generalizability of the study's findings is not clear. However, there is evidence from a number of studies that suggests that risk factors for substance use among adolescents tend to be stable over time (Hallgren & Kallmén, 2014; Patrick & Schulenberg, 2010).

However, this research has several strengths. This is one of the first studies in South Africa to examine multiple psychosocial predictors of both smoking and drinking simultaneously, within an ethnically diverse adolescent sample. Second, we included a relatively large sample, and a restricted age range. Third, we employed a multidimensional approach which examined the association of a number of important variables (in several domains) with tobacco and alcohol use. Fourth, we used a community-based sample as opposed to a school-based sample which enabled us to include adolescents who are out of school.

Conclusions and Implications

The findings of this study have important implications for policies and programs to prevent or delay the onset of tobacco use and alcohol use. The results highlight the protective role of components of parental bonding within adolescents' lives and imply that improving parent-adolescent relations, and encouraging fathers in particular to be more actively involved in parenting, may serve as a defense against both cigarette smoking and alcohol use. For South Africa and similar countries in Sub-Saharan Africa in which levels of single parenthood and orphanhood are relatively high (Statistics South Africa, 2015) many children do not benefit from such relationships with parents or guardians, making them more prone to using tobacco

and alcohol. The findings that adolescents seem to model their legal drug use after their family members' use of such drugs (Brook et al., 1990; Hirschi, 2004) suggest that parents should minimize their own use of alcohol and tobacco in order to prevent or delay their children's uptake of substances (Hill et al., 2005).

The findings also suggest that interventions should focus on reducing adolescents' engagement in deviant and violent behaviour, and on enhancing their self-control in order to minimize their use of tobacco and alcohol. In addition, improvements to adolescents' schooling experiences may help to reduce their alcohol use and to a lesser extent, cigarette smoking. At the neighbourhood level, the results support policies and legislation which restrict the availability of alcohol to minors and address the structural factors that foster low neighbourhood connectedness, crime and violence. In conclusion, interventions that focus particularly on multiple (i.e. personal attributes, family, and contextual/school) risk factors may have an impact on the use of both alcohol and tobacco by adolescents in South Africa. Where possible, such programs should be personalized to ensure that they address the specific set of risk factors that has a bearing on each individual's tobacco use, alcohol use and engagement in other risk behaviours.

References

- Barbarin, OA., Richter, LM. *Mandela's Children: Growing Up in Post-Apartheid South Africa*. New York: Routledge; 2001.
- Bendtsen P, Damsgaard MT, Tolstrup JS, Ersbøll AK, Holstein BE. Adolescent alcohol use reflects community-level alcohol consumption irrespective of parental drinking. *Journal of Adolescent Health*. 2013; 53:368–373. [PubMed: 23763965]
- Bergen HA, Martin G, Roeger L, Allison S. Perceived academic performance and alcohol, tobacco and marijuana use: longitudinal relationships in young community adolescents. *Addictive Behaviors*. 2005; 30:1563–1573. [PubMed: 16122617]
- Best D, Manning V, Gossop M, Gross S, Strang J. Excessive drinking and other problem behaviours among 14-16 year old schoolchildren. *Addictive Behaviors*. 2006; 31:1424–1435. [PubMed: 16442742]
- Beyers JM, Toumbourou JW, Catalano RF, Arthur MW, Hawkins JD. A cross-national comparison of risk and protective factors for adolescent substance use: the United States and Australia. *Journal of Adolescent Health*. 2004; 35:3–16. [PubMed: 15193569]
- Boisvert D, Boutwell BB, Barnes JC, Vaske J. Genetic and environmental influences underlying the relationship between low self-control and substance use. *Journal of Criminal Justice*. 2013; 41:262–272.
- Boden JM, Fergusson DM, Horwood LJ. Alcohol misuse and criminal offending: Findings from a 30-year longitudinal study. *Drug and Alcohol Dependence*. 2013; 128:30–36. [PubMed: 22901412]
- Brook JS, Brook DW, De La Rosa M, Whiteman M, Johnson E, Montoya I. Adolescent illegal drug use: the impact of personality, family, and environmental factors. *Journal of Behavioral Medicine*. 2001; 24(2):183–203. [PubMed: 11392919]
- Brook JS, Brook DW, De La Rosa M, Whiteman M, Montoya ID. The role of parents in protecting Colombian adolescents from delinquency and marijuana use. *Archives of Pediatrics and Adolescent Medicine*. 1999; 153:457–464. [PubMed: 10323624]
- Brook DW, Brook JS, Rosen Z, Montoya I. Correlates of marijuana use in Colombian adolescents: a focus on the impact of the ecological/cultural domain. *Journal of Adolescent Health*. 2002; 31:286–298. [PubMed: 12225741]
- Brook JS, Brook DW, Gordon AS, Whiteman M, Cohen P. The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs*. 1990; 116(2):111–267.

- Brook JS, Morojele NK, Brook DW, Rosen Z. Predictors of cigarette smoking among South African adolescents. *International Journal of Behavioral Medicine*. 2005; 12(4):207–217. [PubMed: 16262539]
- Brook DW, Rubenstone E, Zhang C, Morojele NK, Brook JS. Environmental stressors, low well-being, smoking, and alcohol use among South African adolescents. *Social Science & Medicine*. 2011; 72(9):1447–1453. [PubMed: 21492977]
- Brook JS, Whiteman M, Balka EB, Cohen P. Drug use and delinquency: shared and unshared risk factors in African American and Puerto Rican adolescents. *Journal of Genetic Psychology*. 1997; 158(1):25–39. [PubMed: 9120406]
- Buckner JC. The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology*. 1988; 16(6):771–791.
- Chang G, Sherritt L, Knight JR. Adolescent cigarette smoking and mental health symptoms. *Journal of Adolescent Health*. 2005; 36:517–522. [PubMed: 15901517]
- Chavez EL, Edwards R, Oetting ER. Mexican American and white American school dropouts' drug use, health status, and involvement in violence. *Public Health Reports*. 1989; 104:595–604.
- Chavez EL, Oetting ER, Swaim RC. Dropout and delinquency: Mexican-American and Caucasian non-Hispanic youth. *Journal of Clinical Child Psychology*. 1994; 23(1):47–55.
- Chen CY, Lin IF, Huang SL, Tsai TI, Chen YY. Disposable income with tobacco smoking among young adolescents: a multilevel analysis. *Journal of Adolescent Health*. 2013; 52(6):724–30. [PubMed: 23523310]
- Coetzee J, Dietrich J, Otwombe K, Nkala B, Khunwane M, van der Watt M, Sikkema KJ, Gray GE. Predictors of parent-adolescent communication in post-apartheid South Africa: a protective factor in adolescent sexual and reproductive health. *Journal of Adolescence*. 2014; 37(3):313–324. [PubMed: 24636691]
- Cohen P, Brook JS. Family factors related to the persistence of psychopathology in childhood and adolescence. *Psychiatry*. 1987; 50:332–345. [PubMed: 3423159]
- Derogatis, LR. SCL-90-R, Administration, Scoring, and Procedures Manual 1. Baltimore: Clinical Psychometric Research; 1977.
- Dierker LC, Ramirez RR, Chavez LM, Canino G. Association between psychiatric disorders and smoking stages among Latino adolescents. *Drug and Alcohol Dependence*. 2005; 80:361–368. [PubMed: 15964715]
- Eriksen, M., Mackay, J., Ross, H. The Tobacco Atlas. Fourth. Atlanta, GA: American Cancer Society; New York, NY: World Lung Foundation; 2012.
- Flisher AJ, Ziervogel CF, Chalton DO, Leger PH, Robertson BA. Risk-taking behaviour of Cape Peninsula high-school students. Part X. Multivariate relationships among behaviours. *South African Medical Journal*. 1996; 86(9):1094–8. [PubMed: 8888777]
- Flisher AJ, Parry CDH, Evans J, Muller M, Lombard C. Substance use by adolescents in Cape Town: prevalence and correlates. *Journal of Adolescent Health*. 2003; 32:58–65. [PubMed: 12507802]
- Flisher AJ, Townsend L, Chikobvu P, Lombard CF, King G. Substance use and psychosocial predictors of high school dropout in Cape Town, South Africa. *Journal of Research on Adolescence*. 2010; 20:237–255.
- Hallgren M, Kallmén H. Monitoring the stability of risk factors for adolescent cannabis use. *The International Journal of Alcohol and Drug Research*. 2014; 3(4):235–243.
- Henriksen L, Feighery EC, Schleicher NC, Cowling DW, Kline RS, Fortmann SP. Is adolescent smoking related to the density and proximity of tobacco outlets and retail cigarette advertising near schools? *Preventive Medicine*. 2008; 47:210–214. [PubMed: 18544462]
- Hill KG, Hawkins JD, Catalano RF, Abbott RD, Guo J. Family influences on the risk of daily smoking initiation. *Journal of Adolescent Health*. 2005; 37:202–210. [PubMed: 16109339]
- Hipple B, Lando H, Klein J, Winickoff J. Global teens and tobacco: A review of the globalization of the tobacco epidemic. *Current Problems in Pediatric and Adolescent Health Care*. 2011; 41:216–230. [PubMed: 21821205]
- Hirschi, T. Self-control and crime. In: Baumeister, R., Vohs, KD., editors. *The Handbook of Self-Regulation: Theory, Research, and Applications*. New York: Guilford Press; 2004.

- Hiscock R, Bauld L, Amos A, Fidler JA, Munafò M. Socioeconomic status and smoking: a review. *Annals of the New York Academy of Sciences*. 2012; 1248:107–123. [PubMed: 22092035]
- Hopfer CJ, Crowley TJ, Hewitt JK. Review of twin and adoption studies of adolescent substance use. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2003; 42(6):710–719. [PubMed: 12921479]
- Hsu, SH., Marlatt, GA. Addiction syndrome: Relapse and relapse prevention. In: Shaffer, H.LaPlante, DA., Nelson, SE., editors. *APA addiction syndrome handbook*. Washington, DC: American Psychological Association; 2012. p. 105-132.
- Isralowitz R, Rawson R. Gender differences in prevalence of drug use among high risk adolescents in Israel. *Addictive Behaviors*. 2006; 31:355–358. [PubMed: 15950393]
- Jackson, DN. *Personality research form*. Goshen, NY: Research Psychologist Press; 1974.
- Jessor, R., Graves, TD., Hanson, RC., Jessor, SL. *Society, personality, and deviant behavior: A study of a tri-ethnic community*. New York: Holt, Rinehart, & Winston; 1968.
- Kendler KS, Jacobson KC, Prescott CA, Neale MC. Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants, and opiates in male twins. *American Journal of Psychiatry*. 2003; 160(4):687–695. [PubMed: 12668357]
- Kendler KS, Ohlsson H, Sundquist K, Sundquist J. Clinical features of drug abuse that reflect genetic risk. *Psychological Medicine*. 2014; 44:2547–2546. [PubMed: 24461082]
- King G, Flisher AJ, Mallett MS, Graham J, Lombard C, Rawson T, Morojele NK, Muller M. Smoking in Cape Town: Community influences on adolescent tobacco use. *Preventive Medicine*. 2003; 36:114–123. [PubMed: 12473432]
- Kokkevi A, Richardson C, Florescu S, Kuzman M, Stergar E. Psychosocial correlates of substance use in adolescence: a cross-national study in six European countries. *Drug and Alcohol Dependence*. 2007; 86(1):67–74. [PubMed: 16837140]
- Luk JW, Wang J, Simons-Morton BG. Bullying victimization and substance use among U.S. adolescents: mediation by depression. *Prevention Science*. 2010; 11(4):355–359. [PubMed: 20422288]
- Maimon D, Browning CR. Underage drinking, alcohol sales and collective efficacy: informal control and opportunity in the study of alcohol. *Social Science Research*. 2012; 41:977–990. [PubMed: 23017864]
- Malbergier A, Cardoso LRD, Amaral RA, Santos VCV. Gender parity and drug use: are girls catching up with boys? *Revista Brasileira de Psiquiatria*. 2012; 34:16–23. [PubMed: 22392384]
- Mayosi BM, Lawn JE, van Niekerk A, Bradshaw D, Abdool Karim SS, Coovadia HM, for the Lancet South Africa team. Health in South Africa: changes and challenges since 2009. *Lancet*. 2012; 8(380):2029–2043.
- Medical Research Council. *South African Demographic and Health Survey: women questionnaire*. Cape Town, South Africa: Medical Research Council; 1998.
- Meghdadpour S, Curtis S, Pettifor A, MacPhail C. Factors associated with substance use among orphaned and nonorphaned youth in South Africa. *Journal of Adolescence*. 2012; 35(5):1329–1340. [PubMed: 22704785]
- Melotti R, Heron J, Hickman M, Macleod J, Araya R, Lewis G, ALSPAC Birth Cohort. Adolescent alcohol and tobacco use and early socioeconomic position: the ALSPAC birth cohort. *Pediatrics*. 2011; 127(4):e948–e955. [PubMed: 21402626]
- Morojele NK, Brook JS. Substance use and multiple victimisation among adolescents in South Africa. *Addictive Behaviors*. 2006; 31:1163–1176. [PubMed: 16253426]
- Morojele NK, Flisher AJ, Muller M, Ziervogel CF, Reddy P, Lombard CJ. Measurement of risk and protective factors for drug use and anti-social behaviour among high school students in South Africa. *Journal of Drug Education*. 2002; 32(1):25–39. [PubMed: 12096555]
- Morojele NK, Parry CDH, Ziervogel CF, Robertson BA. Adolescent alcohol misuse: correlates and implications. *African Journal of Drug & Alcohol Studies*. 2001; 1(2):110–124.
- Nebbitt VE, Lombe M, Yu M, Vaughn MG, Stokes C. Ecological correlates of substance use in African American adolescents living in public housing communities: assessing the moderating effects of social cohesion. *Child and Youth Services Review*. 2012; 34:338–347.

- Nguyen LT, Rahman Z, Emerson MR, Nguyen MH, Schwab Zabin L. Cigarette smoking and drinking behavior of migrant adolescents and young adults in Hanoi, Vietnam. *Journal of Adolescent Health*. 2012; 50(3):S61–S67. [PubMed: 22340858]
- Onya H, Tessera A, Myers B, Flisher A. Community influences on adolescents' use of home-brewed alcohol in rural South Africa. *BMC Public Health*. 2012; 12:642. [PubMed: 22883212]
- Parry CDH, Morojele NK, Saban A, Flisher AJ. Brief report: Social and neighbourhood correlates of adolescent drunkenness: a pilot study in Cape Town, South Africa. *Journal of Adolescence*. 2004; 27:369–374. [PubMed: 15159095]
- Patrick ME, Schulenberg JE. Alcohol use and heavy episodic drinking prevalence and predictors among national samples of American eighth- and tenth-grade students. *Journal of Studies on Alcohol and Drugs*. 2010; 71(1):41–45. [PubMed: 20105412]
- Patrick ME, Schulenberg JE. How trajectories of reasons for alcohol use relate to trajectories of binge drinking: National panel data spanning late adolescence to early adulthood. *Developmental Psychology*. 2011; 47(2):311–317. [PubMed: 21219061]
- Ramsoomar L, Morojele NK. Trends in alcohol prevalence, age of initiation and association with alcohol-related harm among South African youth: implications for policy. *South African Medical Journal*. 2012; 102(7):609–12. [PubMed: 22748438]
- Reddy P, Resnicow K, Ouardien R, Kambaran N. Prevalence and correlates of substance use among high school students in South Africa and the United States. *American Journal of Public Health*. 2007; 97(1):1859–1864. [PubMed: 17761580]
- Reddy, SP., James, S., Sewpaul, R., Sifunda, S., Ellahebokus, A., Kambaran, NS., Ouardien, RG. Umthente Uhlaba Usamila – The 3rd South African National Youth Risk Behaviour Survey 2011. Cape Town: South African Medical Research Council; 2013a.
- Reddy P, James S, Sewpaul R, Yach D, Resnicow K, Sifunda S, Mthembu Z, Mbewu A. A decade of tobacco control: The South African case of politics, health policy, health promotion and behaviour change. *South African Medical Journal*. 2013b; 103(11):835–840. [PubMed: 24148167]
- Schaefer ES. Children's report of parental behavior: an inventory. *Child Development*. 1965; 36:413–424. [PubMed: 14300862]
- Schaefer, ES., Finkelstein, NW. Child behavior toward parents: An inventory and factor analysis. Paper presented at the meeting of the American Psychological Association; Chicago, IL: 1975.
- Seggie J. Alcohol and South Africa's youth. *South African Medical Journal*. 2012; 102(7):587. [PubMed: 22748432]
- Smith, GE., Fogg, CP. Psychological antecedents of teen-age drug use. In: Simmons, R., editor. *Research in community and mental health: An annual compilation of research*. Greenwich, CT: JAI; 1979. p. 87-102.
- Statistics South Africa. *General household survey 2014*. Statistics South Africa; Pretoria: 2015.
- Swahn MH, Donovan JE. Predictors of fighting attributed to alcohol use among adolescent drinkers. *Addictive Behaviors*. 2005; 30(7):1317–34. [PubMed: 16022929]
- Townsend L, Flisher AJ, King G. A systematic review of the relationship between high school dropout and substance use. *Clinical Child and Family Psychology Review*. 2007; 10(4):295–317. [PubMed: 17636403]
- Ward, CL., Dawes, A., Matzopoulos, R. Youth violence in South Africa: setting the scene. In: Ward, CL., van der Merwe, A., Dawes, A., editors. *Youth violence: sources and solutions in South Africa*. Cape Town: University of Cape Town Press; 2012. p. 1-20.
- Ward, C., Makusha, T., Bray, R. *South African Child Gauge 2015*. De Lannoy, A., Swartz, S., Lake, L., Smith, C., editors. Cape Town: Children's Institute, University of Cape Town; 2015. p. 69-74.
- Winstanley EL, Steinwachs DM, Ensminger ME, Latkin CA, Stitzer ML, Olsen Y. The association of self-reported neighborhood disorganization and social capital with adolescent alcohol and drug use, dependence, and access to treatment. *Drug and Alcohol Dependence*. 2008; 92(1-3):173–82. [PubMed: 17913396]
- World Health Organization. *Global Status Report on Alcohol and Health*. WHO; Geneva: 2014.

Table 1
Measures: Sources and Reliabilities of Scales

Measures (No. of items)	Sample Item	Source	Cronbach's Alpha
Demographic Factors			
Age (1)	How old are you?	Original	-
Gender (1)	Male or female?	Original	-
Ethnicity (1)	Which of the following best describes you?	Original	-
Amenities (12)	Does your house have electricity?	Medical Research Council (1998)	0.79
Personal Factors			
Internalizing: Intolerance of deviance (5)	How wrong do you think it is to fake an excuse note from home?	Jackson (1974)	0.76
Internalizing: Depression (5)	Over the past few years, on average, how much were you bothered by feeling no interest in things?	Derogatis et al. (1977)	0.68
Internalizing: Interpersonal difficulty (6)	Over the past few years, on average, how much were you bothered by feeling others are to be blamed for your troubles?	Smith & Fogg (1979)	0.69
Internalizing: Ego integration (6)	How much do you feel like losing your temper at people?	Brook et al. (1990)	0.59
Externalizing: Self deviance (5)	How often have you skipped school?	Jessor et al. (1968)	0.59
Externalizing: Committing of acts of violence (5)	How often have you held a weapon, like a club, knife or gun up to someone?	Chavez, Oetting & Swaim (1994)	0.62
Family Factors: Parental Bonding			
Maternal rules (7)	Does your mother (or female guardian) have definite rules or expectations about homework?	Brook et al. (1990)	0.56
Maternal warmth (8)	Please indicate how much it is like your mother: She frequently shows her love for you	Adapted from Schaefer (1965)	0.87
Maternal conflict (3)	You try to see what you can get away with	Schaefer & Finkelstein (1975)	0.66
Paternal rules (7)	Does your father (or male guardian) have definite rules or expectations about telling him your whereabouts when you are away from home?	Brook et al. (1990)	0.78
Paternal warmth (8)	He gives you a lot of care and attention	Adapted from Schaefer (1965)	0.91
Paternal conflict (3)	Sometimes you go against your father's wishes	Schaefer & Finkelstein (1975)	0.73
Family Factors: Family Legal Drug Use			
Maternal/paternal smoking (1)	What was the greatest number of cigarettes your mother/father ever smoked?	Brook et al. (1990)	-
Maternal/paternal drinking (1)	How often does your mother/father usually drink alcohol (beer, wine, spirits or homebrew)?	Brook et al. (1990)	-
Sibling smoking (1)	How many of your biological brothers and sisters, including half-brothers and sisters smoke cigarettes regularly?	Brook et al. (1990)	-
Sibling drinking (1)	How many of your biological brothers and sisters, including half-brothers and sisters drink alcohol (beer, wine, spirits or homebrew) at least once a week?	Brook et al. (1990)	-
School Factors			
Satisfaction with school (6)	Do you find your studies stimulating?	Brook et al. (1990)	0.78

Measures (No. of items)	Sample Item	Source	Cronbach's Alpha
School suspension (1)	Have you ever been suspended or expelled from school?	Brook et al. (1990)	-
School drop-out (1)	Have you ever dropped out of school?	Brook et al. (1990)	-
School environment (5)	Students are proud of school	Brook et al. (1990)	0.83
Neighborhood Factors			
Adolescent victimization (4)	How often have you experienced someone holding a weapon, like a club, knife or gun to you?	Chavez et al. (1989)	0.54
Neighborhood cohesion (6)	You like living in your neighborhood very much.	Buckner (1988)	0.76
Alcohol availability (1)	How difficult is it to get alcohol if you wanted some?	Jessor et al. (1968)	-
Tobacco availability (1)	How difficult is it to get cigarettes if you wanted some?	Jessor et al. (1968)	-

There are no alphas for single item scales. Slight wording adjustments were made to original items that were not culturally and/or linguistically appropriate for the sample.

Table 2
Prediction of Lifetime Alcohol Use and Lifetime Tobacco Use from Demographic Factors:
Results of Univariate Logistic Regression Analyses: Odds Ratios and 95% Confidence
Intervals (CIs)

	Lifetime tobacco use		Lifetime alcohol use	
	OR	95% CIs	OR	95% CIs
Age	1.63 ***	1.48-1.80	1.51 *	1.35-1.69
Gender	1.35 *	1.01-1.80	1.09	0.78-1.53
Ethnicity ^a				
Coloured	2.51 ***	1.73-3.66	1.45	0.98-2.15
White	1.95 *	1.07-3.54	1.65	0.89-3.06
Indian	2.19 ***	1.48-3.23	0.38 ***	0.23-0.63
Amenities	1.38 *	1.03-1.85	0.91	0.65-1.27

^aBlack is the reference:

* p .05;

** p .01;

*** p .001.

Table 3
Prediction of Lifetime Alcohol Use and Lifetime Tobacco Use from Personal Factors:
Results of Multivariate Logistic Regression Analysis: Adjusted Odds Ratios (AORs) and
95% Confidence Intervals (CIs)

	Lifetime tobacco use		Lifetime alcohol use	
	AOR	95% CIs	AOR	95% CIs
Tolerance of deviance	0.76	0.53-1.08	0.70	0.47-1.05
Depression	1.39	0.96-2.01	1.18	0.78-1.78
Interpersonal difficulty	0.88	0.60-1.28	1.07	0.71-1.62
Ego integration	0.59 ^{**}	0.40-0.86	0.61 [*]	0.40-0.94
Self-deviance	1.59 [*]	1.09-2.32	2.09 ^{***}	1.35-3.24
Perpetration of violence	1.13 ^{**}	1.03-1.25	1.11 [*]	1.02-1.21

*
p .05;

**
p .01;

p .001.

AOR: Adjusted Odds Ratio with all independent variables within the domain and with control on age and ethnicity. 95% CI: 95% Confidence Interval.

Table 4
Prediction of Lifetime Alcohol Use and Lifetime Tobacco Use from Family Dimensions:
Parental Bonding and Legal Drug Use: Results of Logistic Multivariate Analyses:
Adjusted Odds Ratios (AORs) and 95% Confidence Intervals (Cis)

	Lifetime tobacco use		Lifetime alcohol use	
	AOR	95% CI	AOR	95% CI
Parental Bonding				
Maternal rules	1.08	0.95-1.24	1.09	0.93-1.26
Maternal warmth	0.97	0.93-1.00	0.93 ^{***}	0.90-0.97
Maternal conflict	1.13 ^{**}	1.04-1.22	1.02	0.93-1.11
Paternal rules	0.90	0.80-1.01	0.89	0.78-1.01
Paternal warmth	0.99	0.96-1.03	0.98	0.95-1.01
Paternal conflict	1.10 ^{**}	1.03-1.20	1.12 ^{**}	1.03-1.21
Family Legal Drug Use				
Maternal smoking	1.22 ^{***}	1.08-1.37	1.09	0.96-1.23
Maternal drinking	0.83	0.63-1.10	1.37 [*]	1.04-1.81
Paternal smoking	1.04	0.94-1.15	0.98	0.87-1.09
Paternal drinking	1.14	0.94-1.37	1.44 ^{***}	1.18-1.75
Siblings smoking	1.31 [*]	1.03-1.66	1.12	0.91-1.37
Siblings drinking	1.29 [*]	1.02-1.62	1.23	0.99-1.52

* p.05;

** p .01;

*** p .001.

AOR: Adjusted Odds Ratio with all independent variables within the domain and with control on age and ethnicity (black and Indian). 95% CI: 95% Confidence Interval.

Table 5
Prediction of Lifetime Alcohol Use and Lifetime Tobacco Use from Contextual Dimensions: School and Neighborhood Factors: Results of Logistic Multivariate Analyses: Adjusted Odds Ratios (AORs) and 95% Confidence Intervals (CIs)

	Lifetime tobacco use		Lifetime alcohol use	
	AOR	95% CIs	AOR	95% CIs
School Factors				
Satisfaction with school	0.92 **	0.88-0.97	0.95 *	0.90-1.00
School suspension	2.41 ***	1.40-4.25	2.67 ***	1.54-4.65
School drop-out	0.64	0.28-1.46	0.35 *	0.14-0.88
School environment	0.98	0.93-1.03	0.92 **	0.87-0.97
Neighborhood Factors				
Adolescent victimization	1.10 *	1.03-1.20	1.08	0.99-1.18
Neighborhood cohesion	0.98	0.94-1.02	0.93 ***	0.89-0.97
Alcohol Availability	1.16	0.97-1.38	1.45 **	1.15-1.81
Tobacco Availability	1.06	0.85-1.32	0.77	0.59-1.00

*
p .05;

**
p .01;

p .001.

AOR: Adjusted Odds Ratio with all independent variables within the domain and with control on age and ethnicity (black and Indian). 95% CI: 95% Confidence Interval.