Using the theory of planned behaviour to predict tobacco and alcohol use in South African students

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ABSTRACT

Health-risk behaviours established in youth increase the likelihood of developing disease later in life. Prevention of disease could be enhanced by the determination of predictors and factors that influence health-risk behaviours. Using the Theory of Planned Behaviour (TPB) as a model of health-risk behaviour, this study aimed to predict the intention to use and the actual use of tobacco and alcohol in students from the University of Cape Town over a 2-month period. The study proposed subjective well-being (SWB) as a factor that moderates the relationship between intention to use tobacco and alcohol and actual tobacco and alcohol use. Data was collected from questionnaires completed by participants on two occasions. In session one ($n = 107$) intention to use tobacco and alcohol and SWB was measured. In session two ($n = 90$) actual tobacco and alcohol use and SWB were measured. Perceived behavioural control (PBC) was a significant predictor of intention to use tobacco over 2-months and subjective norms was a significant predictor of intention to use alcohol over 2-months. Smoking and drinking behaviour for a 2-month period was predicted by intention and PBC. SWB did not significantly moderate the relationship between intention and behaviour. Implications for future research in this area are discussed.

Some of the most common causes of death and disease today have among their antecedents powerful behaviour and lifestyle factors. The prevention of disease and premature death would be greatly enhanced by the determination of predictors and significant factors that influence health behaviours. Two health-related behaviours known to place people at risk of developing disease are tobacco and alcohol use. Tobacco use is the second largest cause of death globally and contributes to the death of one in ten adults worldwide (World Health Organization; WHO, 1998). Findings from the Global Youth Tobacco Survey (GYTS) suggest an estimate of a doubling of deaths from smoking (from 5 million per year to approximately 10 million per year by 2020). Furthermore, youth were identified as a high risk group for increased tobacco use. The GYTS found that almost one in five of non-smoking youths reported they were susceptible to smoking in the next year. Research also shows that there has been an increase in tobacco use among young girls compared with adult females (Warren, Jones, Eriksen & Asma, 2006).

Alcohol consumption has health and social consequences via intoxication (drunkenness), dependence (habitual, compulsive and long-term drinking), and other biochemical effects. In addition to chronic diseases that may result from many years of heavy alcohol use, alcohol may also contribute to traumatic outcomes that kill or disable at a relatively young age, resulting in disability or the loss life. It has been shown that there is a relationship between alcohol consumption and more than 60 types of disease and injury. Alcohol is estimated to cause between 20 - 30% of oesophageal cancer, liver cancer, cirrhosis of the liver, homicide, epilepsy, and motor vehicle accidents worldwide. Alcohol use is related to 1.8 million deaths per year and unintentional injuries due to drunkenness account for about one third of these deaths. Globally, alcohol consumption has increased in recent decades, with all or most of the increase being seen in developing countries (WHO, 2008).

The harmful effects of tobacco and alcohol use are clear and it is apparent that young adults who use these substances stand an increased risk of developing disease or experiencing premature death. For these reasons it is crucial that research is conducted to further our understanding of the factors that drive young people to engage in these behaviours and those that serve as barriers to tobacco and alcohol use. There already has been much research done towards determining the factors that impact upon tobacco and alcohol use in adolescents and young adults (Cooper, 1994; Godin, Valois, Lepage, & Deshamais, 1992; Huchting, Lac, & LaBrie, 2008; McMillan & Conner, 2003). The Theory of Planned Behaviour (TPB; Ajzen, 1991) has formed the basis for many of these studies and has been used to predict both intention to use and the actual use of tobacco and alcohol. This study examines the usefulness of the TPB in understanding the intentions to use and the reported use of tobacco and alcohol in students from the University of Cape Town. Although the TPB has been used as the theoretical basis for over

800 studies of health behaviours (Francis et al., 2004), it has been criticised for not sufficiently explaining the link between intention and behaviour. Therefore while the TPB has been shown to account for a sizable amount of variance in health behaviours there is evidence to support an extension of the TPB (Conner & Armitage, 1998).

The Theory of Planned Behaviour

The TPB is one of the most widely used frameworks for understanding and predicting behaviour. It was developed as an extension to the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980) which proposed that *intention* is the key determinant of behaviour. Here, intention was defined as the motivation required to perform a particular behaviour; thus the more one intends to perform a behaviour the more likely one will be to perform the behaviour. The TRA posited that intention can be used as a proximal measure of behaviour and saw intention (see Figure 1) as being determined by two key factors: attitudes and subjective norms (Ajzen & Madden, 1986). *Attitudes* are general positive or negative evaluations of behaviour. An attitude is assumed to result from two components: 1) behavioural beliefs about consequences of the behaviour, and 2) the outcome expectancies of the behaviour which are corresponding positive or negative value judgments about the behaviour. *Subjective norms* are the global perceptions of social pressure, they indicate a person's own estimate of the perceived social pressure to perform or not perform the target behaviour. Subjective norms are assumed to be incumbent upon one's normative beliefs, which are beliefs about how other people who are in some way important to the person (such as a parent, friend, older sibling or teacher) would like one to behave (Ajzen, 1991).
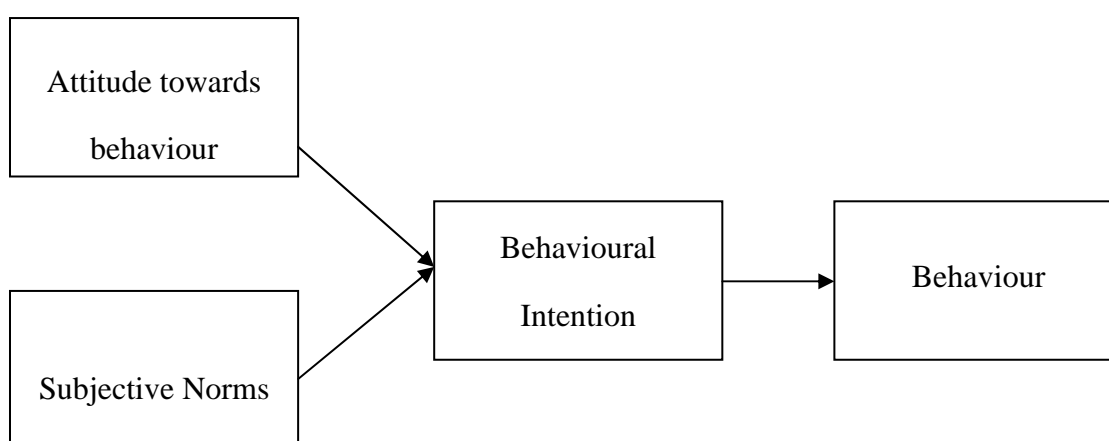

Figure. 1. Model of the Theory of Reasoned Action (Fishbein & Ajzen, 1975).

The limitation of the TRA was that it was designed to address only those behaviours that were volitional, with the implication that performance of behaviour was solely dependent on personal agency. The TPB was developed by Azjen to address the limitations of the TRA. Like

its predecessor, the TPB was designed to identify the factors that underlie behaviour and thus adequately predict future behaviour. The TPB extends the TRA and addresses its criticisms by including *perceived behavioural control* (PBC) as another determinant of intention and behaviour.

PBC is the extent to which a person feels able to control their enactment of a behaviour. Ajzen (1991) suggests that PBC will affect behavioural outcome if an individual has accurately assessed that he or she has a high degree of control over the behaviour. PBC has two aspects: 1) how much actual control a person has over a behaviour, and 2) how confident he or she feels about being able to perform or not perform a behaviour. PBC is determined by control beliefs about the power of both situational and internal factors to inhibit or facilitate the performance of the behaviour. Thus the TPB sets out to predict the occurrence of specific, volitional health behaviours, such as tobacco or alcohol use, based on measurements of the three key determinants of intention and behaviour; attitude, subjective norms and PBC (see Figure 2).
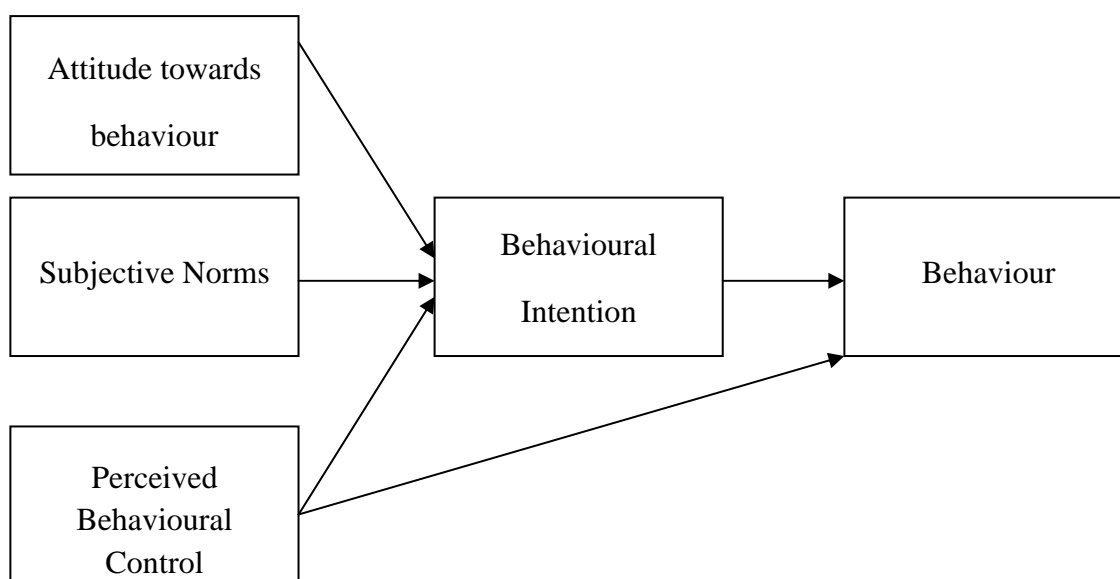
Figure. 2. Model depicting the Theory of Planned Behaviour (Ajzen & Madden, 1986).

Behavioural intention is usually well predicted by the three components: attitude, subjective norms and PBC, while behaviour is well predicted by PBC and intention. The TPB has been successfully applied to the prediction of a number of health behaviours, including alcohol (Conner & Norman, 1996; Huchting et al., 2008; Marcoux & Shope, 1997) and tobacco use (Godin et al., 1992; Wall, Hinson, & McKee, 1998; Ziervogel et al., 1999). Across these studies the three predictors of intention and behaviour accounted for an average of 48% of the variance in intentions to smoke and 41% of the variance in intention to drink alcohol. However,

intentions and PBC accounted for less than 10% of the variance in tobacco use and only 28% of the variance in alcohol consumption (McMillan & Conner, 2003). Thus it seems clear that there is a gap between the TPB's ability to predict intention to use tobacco and alcohol and its ability to predict the activities of tobacco and alcohol use.

Ajzen (1991) suggested that the TPB is open to expansion if further predictors can be identified. This has lead to the consideration of a number of additional cognitive predictors of intention and behaviour (McMillan & Conner, 2003). However, as yet little research has been done considering the possible impact of affective predictors on behavioural intention and behaviour. This seems odd considering how the findings of many studies have focused on the impact of negative affect on the engagement in health-risk behaviours. Studies have shown that negative affect has been linked to increased use of alcohol (Krause & Coker, 1999).

Furthermore, negative mood has been shown to consistently increase smoking behaviour in both laboratory research (Conklin & Perkins, 2005; Kassel, Stroud, & Paronis, 2003) and clinical studies (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Shiffman & Waters, 2004). Considering the impact that negative affect has on the performance of health-risk behaviours such as smoking and drinking, it is pertinent to consider whether positive affect might act as a buffer to engaging in alcohol and tobacco use. This study explores SWB as a moderating variable that may affect the relationship between intention and behaviour.

Subjective Well-being

The term SWB was first coined by Warner Wilson (1967). Since then research on SWB has flourished (Diener, 2000; Diener, Suh, Lucas, & Smith, 1999; Kahneman, Diener & Schwarz, 1999). SWB has been shown to be closely correlated with quality of life, happiness and satisfaction. As the name suggests, SWB is concerned with the value judgment given by an individual concerning his or her state of well-being. SWB is a broad category that includes people's emotional responses, domain satisfactions and global judgments of life satisfaction.

Current literature on SWB suggests that it is comprised of three separable components: *life satisfaction,* which entails global judgments of one's life and satisfaction with important domains, such as work satisfaction. *Positive affect,* which is the experience of pleasant emotions and moods, and *negative affect,* which is the experience of unpleasant emotions and moods (Diener, 1984). Each of these components needs to be understood in its own right as research has shown them to be empirically independent. However the fact that they also correlate substantially suggests the need for an overarching higher-order factor (Stones & Kozma, 1985). In its most basic operational definition, SWB is most often interpreted to mean experiencing a high level of positive affect, a low level of negative affect, and a high degree of satisfaction with

one's life. Therefore, to the extent that one endorses these three constructs, one is said to have high SWB (Deci & Ryan, 2008).

Thus far, most of the literature on the psychosocial predictors of tobacco and alcohol use has focused on determining social and cognitive predictors of health behaviours (Armeli, Dehart, Tennen, Todd, & Affleck, 2007; Bailey, 2006; Nation & Heflinger, 2006; Wilson et al., 2007). As such, the impact of positive affective states has largely been unexplored and the need remains to assess the relationship between positive affective states such as well-being and health-related behaviours in the hopes of determining affective factors that protect youths from engaging in tobacco and alcohol use. The few studies that have focused on the link between positive emotional states and the performance of health-promoting behaviours indicate that positive states and the perception of well-being and happiness are linked to the performance of health behaviours (Bogart, Collins, Ellickson & Klein, 2006; Caperchione, Jones, Lauder, & Mummery, 2006; Lawton, Conner, & Parker, 2007; Sale, Guppy, & El-Sayed, 2000). Unfortunately studies have yet to examine whether positive emotional states might reduce the performance of health-risk behaviours. This study assesses whether SWB moderates the relationship between intention to use tobacco and alcohol and actual tobacco and alcohol use, using the TPB as the basis for predicting intentions to use and the actual use of tobacco and alcohol in students from the University of Cape Town.

Relevance of the study

As outlined above tobacco and alcohol use has been linked to various diseases and premature death (WHO, 2008). Despite this growing body of evidence there is a high prevalence of engagement in both health-risk behaviours in youth (Warren et al., 2006). This study aims to develop a better understanding of the link between intention to use tobacco and alcohol and the actual use of these substances in students from the University of Cape Town. This study assesses the usefulness of TPB as a model to predict intention to use tobacco and alcohol and actual tobacco and alcohol use. The hope is that the findings of this study will shed further light on the incongruence between intention and behaviour. The hypothesis is that SWB may have a moderating effect on the intention-behaviour relationship, which may have implications for the design of future intervention programs aimed at reducing tobacco and alcohol use in youths.

METHOD

Design

This study was based on a correlational design with the aim of exploring whether the factors outlined by the TPB are related to the intention to use and the use of tobacco and alcohol in students from the University of Cape Town. A further aim of the study is to establish whether SWB moderated the relationship between intention and behaviour in reference to tobacco and alcohol use. Using a longitudinal design, data was collected on two occasions, with a 2-month interval between data collection sessions. In the first data collection session, attitudes, subjective norms, PBC, SWB and intention to use tobacco and alcohol were measured. In the second data collection session which occurred 2 months after the initial session attitudes, subjective norms, PBC, SWB and reported tobacco and alcohol use were measured.

Participants

The study population was undergraduate Psychology students from the University of Cape Town. From this population, 107 participants ranging in age from 18 to 26 were recruited. All 107 participants ($n = 95$ female; $n = 12$ male) took part in session one of the study. However, only 90 (84%) participants ($n = 82$ female; $n = 8$ male) returned to complete session two. Eligibility requirements for the study were that participants were: 1) registered as an undergraduate Psychology student at the University of Cape Town, 2) 18 years of age or older, 3) competent in English language and 4) able and willing to provide informed consent. From the chosen study population students were recruited as part of the Student Research Participation Program (SRPP). A notice was placed on the SRPP board briefly introducing the study and inviting students to participate. The notice also contained information about where and when the data collection would take place..

Measures

The following variables were measured using self-report questionnaires: attitudes, subjective norms, PBC, intention to use tobacco and alcohol over a 2-month period, tobacco and alcohol use over 2 months, and SWB.

Attitudes towards tobacco use and alcohol consumption were measured by self-report questionnaire consisting of 8 items. Total scores ranged from 8 – 40 points, the lower the score the more negative the evaluation of tobacco or alcohol use. The questionnaire was devised specifically for this study (Appendix A), based on a manual for constructing questionnaires based on the TPB (Francis, *et al*. 2004).

Subjective norm: were measured by a self-report questionnaire consisting of 6-items,

which assessed the impact of important others' opinions about tobacco and alcohol use on the participants own use of tobacco and alcohol. Scores ranged from 6 – 30 points, the lower the score the more negative the perception of tobacco and alcohol use by significant others. The questionnaire was constructed specifically for this study (Appendix B), based on the manual for constructing questionnaires based on the TPB (Francis, *et al*. 2004).

PBC over tobacco and alcohol use was measured by an 8-item self-report questionnaire assessing participants' perceived amount of control over their ability to regulate tobacco and alcohol use. Scores ranged from 8 – 40, the higher the score the more control a person perceived themselves to have over smoking and drinking behaviour. The questionnaire (Appendix C) devised for the study was based on Ajzen's original measures of PBC (Ajzen & Madden, 1986).

Intention to smoke cigarettes and drink alcohol over a 2-month period were assessed by a 4-item self report questionnaire (Appendix D) designed for the study, based on the manual for constructing questionnaires based on the TPB (Francis, *et al*. 2004). Participants could score between 4 – 20, with a low score indicating no intention to use tobacco and alcohol over a 2-month period and a high score indicating an intention to use tobacco and alcohol over a 2-month period.

Tobacco use was measured using selected items from the Substance Abuse Questionnaire (Parry, Plüddemann, Louw, & Leggett 2004); only those items pertaining to tobacco use were used. Participants could score either a one or a zero and based on their scores they were placed into one of two categories: non-smoker, or regular smoker. Note these classifications apply only to tobacco use for a 2-month period.

Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT was developed and validated by the WHO in a cross-national study that included six countries, it is a 10-item questionnaire that classifies participants into one of three categories of drinking style: non-drinker, occasional/regular drinker, and heavy drinker. Participants could score between 0 – 37, those who got a score of zero were classed as non-drinkers. Those who score between one and nine were classed as occasional/regular drinkers and those who scored ten and above were considered as heavy drinkers. Note these classifications apply only to alcohol use for a 2-month period.

As *subjective well-being* has two separate components - a cognitive and an affective component - two instruments were necessary to gain a complete measure of SWB. The first instrument, the Satisfaction with Life Scale (SWLS), measures the cognitive elements of SWB: this instrument is the most widely used measure of satisfaction (Diener, 2000). Scores on the SWLS range from 5 – 35, the higher the score the greater the satisfaction with life felt by the

participant. The second instrument, the Positive and Negative Affect Schedule (PANAS), measures the affective element of SWB. The PANAS is comprised of two 10-item mood scales, one measuring positive affect (PA) and the other negative affect (NA). Participants could score between 10 – 50 for both PA and NA. High scores indicate high levels of affect. The scales are shown to be highly internally consistent, largely uncorrelated and stable at appropriate levels over a 2-month period as shown by Watson and Dark (1988). Furthermore, the alpha reliabilities are acceptably high, ranging from .86 to .90 for PA and from .84 to .87 for NA (Watson & Dark, 1988).

Measures of attitudes, subjective norms, PBC and intention to use tobacco and alcohol were devised specifically for the study as no existing measures were available. These questionnaires were devised according the guidelines given in the manual for constructing questionnaires based on the TPB (Francis, *et al*. 2004). However, this meant that the psychometric properties of these measures were not predetermined. In order to establish reliability for these questionnaires, which is a major concern for psychological tests measuring an attribute or behaviour (Rosenthal & Rosnow, 2008), test-retest reliability was assessed.

Procedure

Data was collected on two occasions, within a 2-month period. The same participants were interviewed on each occasion. At both the first and second session all participants were assessed simultaneously in groups ranging in size from 20 to 40 people. The first part of the data collection began at the end of May 2008 and continued for approximately two weeks. The follow-up data collection session occurred two months later and continued throughout August 2008. Owing to the difficulty of getting participants to return to take part in the follow-up session, the second data collection session took more than a month to complete. Data was collected by means of self administered questionnaires. Before beginning the study participants were given an information sheet explaining the study as well as a consent form (Appendix E) to complete. Once they had read the information sheet, participants were given an opportunity to ask any questions about the study or voice any concerns they had about participating in the study. If they were able and willing to consent to participation, they then signed the consent form.

Confidentiality was emphasised at this point and participants were reminded that they were free to leave out items they felt uncomfortable in answering. However, they were instructed to answer all items, if they felt comfortable doing so, as honestly as possible. Participants then received the questionnaires with an attached cover sheet. They were asked to write their name and email address on the cover sheet and then to remove the cover sheet from the rest of the

questionnaires. The coversheets and questionnaires were correspondingly numbered so that participants could be matched to the questionnaires they completed. At the end of the session the questionnaires and cover sheets were placed in separate boxes so that the name or any other identifying factor did not remain on the completed questionnaire. As data collection occurred on two separate occasions, it was necessary to match up the participants' first set of questionnaires and scales with their second set. For this reason a participant log, linking names with study identity numbers was kept. This log was kept private with only the author of the study having access to the log. The log was kept separately from both the consent forms and the completed questionnaires.

All precautions possible were taken to ensure the confidentiality of participants' responses. This was stated in the consent form which all participants read and signed before being enrolled in the study. No student was accepted as a participant unless he or she provided written informed consent and met all eligibility criteria for participation. Completion of the various questionnaires was unlikely to lead to any emotional distress, however all participants were informed that they could leave out any items that they felt uncomfortable answering.

RESULTS & DISCUSSION

Data Analysis

Initially, descriptive statistics were conducted to determine whether the data were normally distributed. Following this, the main statistical analyses were carried out. The first analysis was a binary logistic regression analysis done to determine whether intention to use tobacco and alcohol was predicted by attitudes, subjective norms and PBC. A further analysis was done to see whether intention and PBC could predict reported use of tobacco and alcohol. For this analysis both binary and multinomial logistic regression respectively were used as the outcome variable of alcohol use had more than two categories. The final statistical analysis was concerned with determining whether SWB moderated the relationship between intention to use tobacco and alcohol and reported tobacco and alcohol use in participants. This was done using both binary and multinomial logistic regression analysis. Correlations between all measured variables, except those that were categorical, were carried out (see Table 1). Due to the fact that 17 participants failed to return for the second half of the study, these cases were deleted from any analysis comparing participant's scores from the first session to the second.

Of the 90 participants who completed the self-report measures for tobacco and alcohol use, 58% ($n = 52$) were non-smokers and 42% ($n = 38$) were smokers, 25% ($n = 22$) reported that they did not drink alcohol, while 42% ($n = 38$) were classed as occasional/regular drinkers and 33% ($n = 30$) fell into the category of heavy alcohol use.

Table 1. Correlations among measured variables, p<0.05, N=107 for session 1, N=90 for session 2

	1	2	3	4	5	6	7	8	9	Mean	SD
1. Attitude (Tobacco)	-	0.35	-0.60	0.31	0.17	-0.14	0.03	0.06	-0.03	1.68	0.77
2. Subjective Norms (Tobacco)	0.35	-	-0.21	0.16	0.32	-0.07	0.02	0.10	-0.03	1.61	0.63
3. PBC (Tobacco)	-0.56	-0.21	-	-0.10	-0.25	0.24	-0.02	-0.11	0.11	3.40	0.98
4. Attitude (Alcohol)	0.31	0.16	-0.11	-	0.50	-0.29	-0.01	-0.10	-0.07	2.74	1.06
5. Subjective Norms (Alcohol)	0.17	0.32	-0.25	0.50	-	-0.34	-0.04	0.12	-0.07	2.80	0.88
6. PBC (Alcohol)	-0.14	-0.06	0.24	-0.29	-0.34	-	-0.89	-0.08	-0.03	3.87	0.72
7. SWLS	0.03	0.02	-0.02	-0.01	-0.04	-0.89	-	-0.25	0.50	24.21	5.64
8. PANAS –	0.06	0.10	-0.11	-0.10	0.12	-0.08	-0.25	-	-0.16	25.93	6.25
9. PANAS +	-0.03	-0.03	0.11	-0.07	-0.07	-0.03	0.50	-0.16	-	32.81	6.60

In order to assess the test-retest reliability of the attitudes, subjective norms and PBC questionnaires Pearson's Correlation Coefficient (r) was calculated to measure the correlation between scores taken at time 1 with scores taken at time 2. All correlation coefficients (see Table 2) were significant ($p < 0.05$, $n = 90$). The attitudes towards tobacco and alcohol use questionnaires had the lowest reported r and PBC showed the highest reported r. Ideally, r should be as close to 1 as possible, however the reported correlation coefficients of the attitudes, subjective norms and PBC questionnaires are acceptable, indicating that these questionnaires exhibit adequate test-retest reliability.

Table 2. Test-retest correlation coefficients, p<0.05

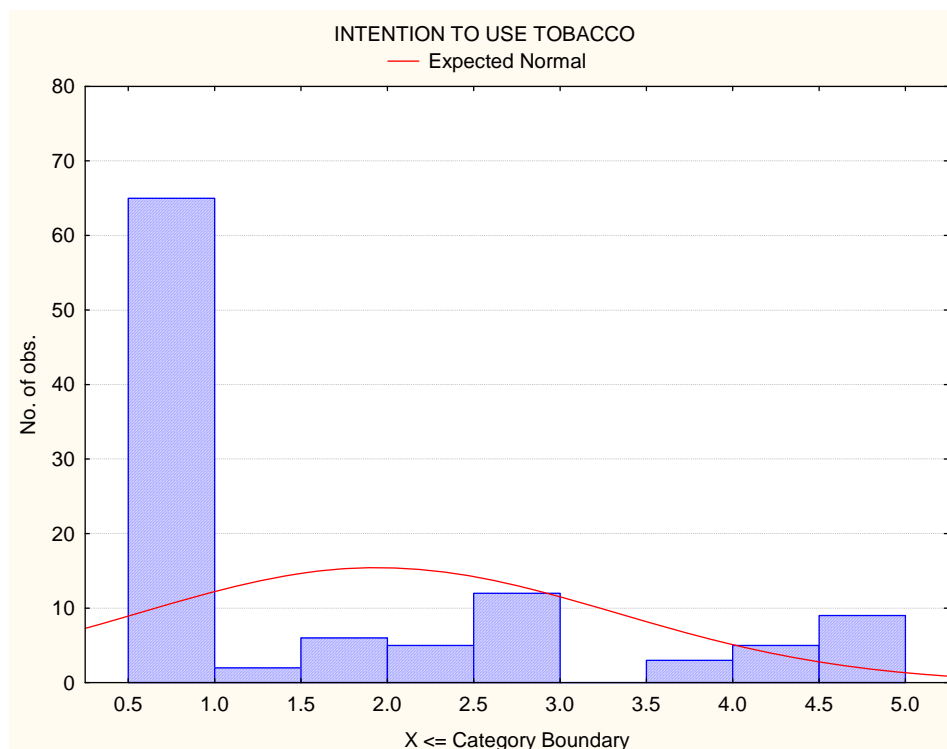| Tobacco use	Pearson's r	Alcohol use	Pearson's r
Attitude	.61	Attitude	.59
Subjective Norms	.72	Subjective Norms	.69
PBC	.77	PBC	.71

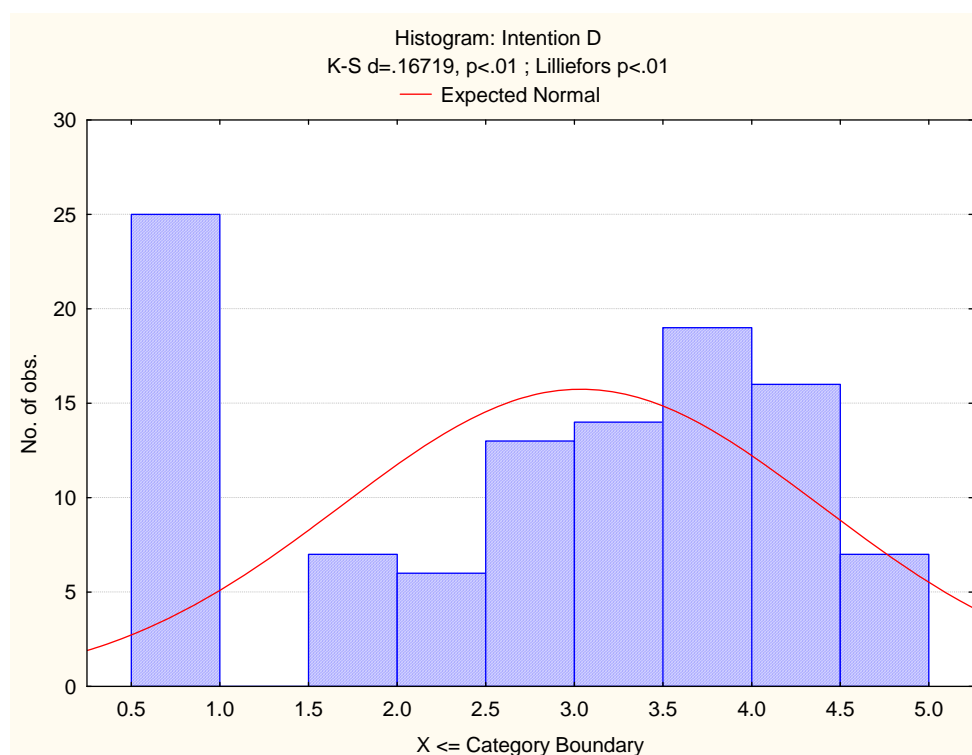Figure 3. Distribution of intention to use tobacco scores

Figure 4. Distribution of intention to use alcohol scores

Predicting intentions to use tobacco and alcohol

The data collected for the outcome variable intention (to use tobacco and alcohol) were not normally distributed (see Figures 3 & 4) and thus had to be changed in order to analyse the data. The data proved to be unsuited to log or square root transformations and thus it was decided to split intention scores into binary groups via the median of each variable. The median score for intention to use tobacco was 1 thus all scores above 1 were separated from scores of 1 or below. All scores of 1 were classed as group 1 and all scores above 1 were classed as group 0. The median score for intention to use alcohol use was 3.5; based on this intention scores were divided into two groups: those who scored 3.5 and below were classed as group 1 and those who scored above 3.5 were classed as group 0. Group 0 represented those with the intention to use alcohol or tobacco over a 2-month period and group 1 represented those who had no intention to use alcohol or tobacco. Using this binary split data that was originally continuous was transformed into categorical data which meant that it was necessary to use binary logistic regression to analyse whether the three predictive factors outlined by the TPB were able to accurately predict intention to use tobacco and alcohol. Alpha was set at 0.05 for all tests of significance, general model validity was assessed by chi-square and the significance of factors within the models was determined by the Wald statistic.

Before a multivariate model of intention to use tobacco and alcohol was created, each predictor of intention was analysed in a univariate model. The univariate model describing the

relationship between attitude and intention to use tobacco was significant (x^2 (1) = 14.82, p = 0.0001). It was found that attitude towards smoking was a significant predictor of intention to use tobacco (Wald (1) = 11.64 p = 0.001). Using the odds ratio it was calculated that for every unit of increase in attitudes concerning smoking, a person was 2.52 times more likely to smoke. This finding fits with the hypothesis proposed by the TPB that attitudes can significantly predict behavioural intention. High attitude scores were indicative of a positive attitude towards smoking and thus it seems plausible that the more favourably one views smoking, the more likely one would be to engage in tobacco use. Subjective norms towards smoking were non-significant (Wald (1) = 2.04, p = 0.153) in their effect on intention to use tobacco.

Finally, the univariate model chosen to represent the relationship between PBC and intention to smoke was also significant (x^2 (1) = 42.73, p = 0.0001). PBC was found to have a significant effect (Wald (1) = 22.58, p = 0.0001) on intention to use tobacco. Calculating the odds ratio it was determined that for every unit of increase in PBC, a person was .18 less likely to intend to use tobacco. The relationship between PBC and intention to use tobacco was inverse meaning that the higher the PBC score, the less likely that there was intention to use tobacco. Those who scored highly in PBC had a high degree of control over their smoking and drinking behaviour and were less likely to be influenced by external circumstances to engage in tobacco and alcohol use. This finding fits with the hypothesis of the TPB which states that high PBC results in the reduction of performance health-risk behaviours.

Based on these three separate univariate models, it was decided only to include attitude and PBC in the final multivariate model as it was only these factors which were able to significantly predict the intention to use tobacco in the univariate analyses. The overall multivariate model showed to be a good fit for the data (x^2 (2) = 42.64, p = 0.0001). Of these two variables, only PBC was shown to be significant (Wald (1) = 17.46, p = 0.0001) in the multivariate model of intention to use tobacco. Calculating the odds ratio it was found that for every unit of increase in PBC, a person was .20 less likely to intend to use tobacco.

The same process was undertaken for predicting intention to drink alcohol using the three variables outlined by the TPB. Initially, separate univariate models were created for attitudes, subjective norms and PBC. Each model was significant in its capacity to represent the relationship between the predictor variables and intention to use alcohol (attitudes: x^2 (1) = 7.70, p = 0.006; subjective norms: x^2 (1) = 37.10, p = 0.0001; PBC: x^2 (1) = 10.83, p = 0.001). Attitudes towards alcohol use were shown to be a significant indicator (Wald (1) = 5.00, p = 0.025) of intention to drink alcohol. By calculating the odds ratio it was found that for every unit of increase in attitude, a person is 1.65 times more likely to intend to drink alcohol.

Subjective norms were also found to be a significant predictor (Wald (1) = 21.85, p = 0.0001) of intention use alcohol. Again using the odds ratio it was determined that for every unit of increase in subjective norms a person is 5.16 times more likely to have the intention to drink alcohol. This shows that subjective norms are a powerful predictor of alcohol use and are more likely to increase intention to drink alcohol than a positive attitude towards alcohol use or a low level of perceived control over alcohol consumption.

Finally PBC was found to be significant (Wald (1) = 9.60, p = 0.002), indicating that PBC was able to predict intention to use alcohol. The relationship between PBC and intention to drink alcohol was inverse, meaning that according to the odds ratio calculation for every unit of increase in PBC a person was .41 less likely to intend to use alcohol. As all three factors were found to be significant predictors of intention to drink alcohol, they were all included in the multivariate model of intention to use alcohol.

The overall model fit for the multivariate analysis was significant (x^2 (3) = 38.89, p = 0.0001). The analysis showed that only subjective norms remained statistically significant (Wald (1) = 15.66, p = 0.0001) in the multivariate model of prediction of intention to use alcohol. High subjective norms scores indicated a person's perception of positive acceptance of tobacco or alcohol use by those who are in some way important to the person. Both attitudes and PBC became non-significant (Wald (1) = .77, p = 0.144 and Wald (1) = 2.13, p = 0.380 respectively) when compared in a multivariate analysis. While the TPB suggests that attitude is a predictor of intention to perform a behaviour, attitude was not a significant predictor of intention to use alcohol or tobacco when assessed in conjunction with other predictors of intention in a multivariate model.

Predicting reported tobacco and alcohol use

The TPB states that PBC can also predict behaviour as well as intention, given that an individual correctly perceives the amount of control they have over a given behaviour. A binary logistic regression analysis was carried to out see whether PBC could predict reported tobacco use. The overall model summary was significant (x^2 (1) = 30.26, p = 0.0001) and it was found that PBC significantly predicted reported tobacco use (Wald (1) = 17. 10, p = 0.0001). Calculation of the odds ratio showed that for every unit of increase in PBC, a person was .19 times less likely to use tobacco. As the alcohol use outcome variable had three categories it was necessary to use multinomial logistic regression to assess whether PBC predicted reported alcohol use. The overall model summary showed that the model was a good fit to the data (x^2 (1) =30.26, p = 0.0001) and that PBC significantly predicted reported alcohol use (Wald (1) = 13. 06, p = 0.008).

Calculation of the odds ratio showed that for every unit of increase in PBC, a person was .38 times less likely to use alcohol.

The next analysis was conducted to see whether intention to use tobacco and alcohol could accurately predict reported smoking and drinking behaviour respectively. The data for both the outcome variables was categorical. Data collected for tobacco use was divided into two categories: non-smoker and smoker, and data for alcohol use was divided into three categories: non-drinker, occasional/regular drinker and heavy drinker.

Table 3. Cross tabulation of intention to use tobacco and self-reported smoking behaviour

Reported smoking behaviour for 2-month period	Intention to smoke over two months		
	0 – Intend to smoke	1 – Intend not to smoke	Total
Non-smokers	9	43	52
Smokers	23	15	38
Total	32	58	90

Table 4. Cross tabulation of intention to drink alcohol and self-reported drinking behaviour

Reported drinking behaviour for 2-month period	Intention to Drink to drink over 2 months		
	0 – Intend to drink	1 – Intend not to drink	Total
Non-drinkers	0	22	22
Occasional/regular drinkers	13	25	38
Heavy drinkers	22	8	30
Total	35	55	90

In order to assess the relationship between the categories of intention to use tobacco and reported tobacco use over 2-months (see Table 3) a statistical model based on binary logistic regression analysis was designed. The model was significant (x^2 (1) = 10. 25, p = 0.0001). The model showed that intention to use tobacco was a significant predictor (Wald (1) = 16.22, p = 0.0001) of reported tobacco use. The odds ration calculation showed that for every unit of increase in intention to use tobacco a person was 7.33 times more likely to smoke.

Due to the fact that one category in the cross tabulation between intention and behaviour

for alcohol use (see Table 4) had zero entries, the statistical model designed to assess whether intention could predict reported alcohol use was unstable. Thus, while the model itself was significant (x^2 (1) = 36.67, p = 0.0001) and the model showed that intention to use alcohol was a significant predictor of reported alcohol use (Wald (1) = 9.65, p = 0.008) one cannot be sure of the model fit validity. This means that although intention to use alcohol was shown to significantly predict reported alcohol use, these findings should be replicated to ensure they are correct. Future studies should consider merging categories or finding an alternate means of ensuring that no category has zero entries so that the validity of the model fit is not uncertain.

Subjective well-being and a moderator

The final analysis done on the data was to see whether SWB, as measured by the SWLS and PANAS scales, moderated the relationship between intention to use tobacco and alcohol and reported tobacco and alcohol use. The SWLS and PANAS scales were administered at session one and two, and for the analysis a mean score of SWLS and PANAS was used. A multivariate analysis based on binary logistic regression was formulated to establish a model for assessing whether SWB (as measured by SWLS and PANAS mean scores) moderated the relationship between intention to use tobacco and reported smoking behaviour. The model did not represent a good fit of the data and was non-significant (x^2 (3) = 5.18, p = 0.159). The same process was undertaken to see whether SWB moderated the relationship between intention to use alcohol and reported alcohol use and it was found that the model used to describe the relationship was also non-significant (x^2 (6) =10.39, p = 0.109).

CONCLUSION

Health-risk behaviours such as tobacco and alcohol use established in youth increase the likelihood of developing disease later in life. Prevention of disease could be enhanced by the determination of predictors and factors that influence tobacco and alcohol use in youth. This study used the TPB as a model of health-risk behaviour to predict the intention to use and the actual use of tobacco and alcohol in students over a 2-month period. The study proposed SWB as a factor that moderates the relationship between intention to use tobacco and alcohol and actual tobacco and alcohol use. The findings of this study show that the TPB has some usefulness in determining intention to use tobacco and alcohol and reported tobacco and alcohol use in students from the University of Cape Town. Intention to use tobacco was well predicted by attitudes and PBC when analysed separately; however, when analysed together only PBC was able to significantly predict the intention to use tobacco. Intention to use alcohol was

significantly predicted by attitudes, subjective norms and PBC in separate univariate models; however, when assessed in a multivariate model only subjective norms remained a significant predictor of intention to use alcohol. The TPB served as a useful model determining tobacco and alcohol use over a 2-month period. Findings suggested that intention and PBC were good predictors of reported tobacco and alcohol use.

This study proposed an extension of the TPB, including SWB as a factor that moderates the relationship between intention to use tobacco and alcohol and actual tobacco and alcohol use. Analysis of the data demonstrated that SWB did not have a moderating effect on the relationship between intention to use tobacco and alcohol and reported tobacco and alcohol use. However, due to the limitations of the study it should not be discounted that positive affective states such as SWB may have some impact on whether or not individuals engage in health-risk behaviours such as tobacco and alcohol use. Despite the results showing that SWB did not appear to moderate the relationship between intention and behaviour in terms of tobacco and alcohol use, it is important to conduct further research into discovering affective variables that act as buffers to engagement in health-risk behaviours such as smoking and drinking. There remain unanswered questions concerning how positive states of being influence other health-related behaviours.

Thus, there is a need for further research to explore the links between positive states of being, such as SWB, and the impact they have on our health. While some research has been conducted investigating the relationship between positive affect, well-being and health (Cohen & Pressman, 2006; Kelsey et al., 2006; Lai et al., 2005) there remains a gap in concerning how positive affective states, such as SWB impact upon an individuals intention to engage in and their actual engagement in health-risk behaviours such as tobacco and alcohol use.

Considerations for Future Studies

There were methodological issues that affected the study. The major limitation of this study was the reliance on measures whose psychometric properties had not yet been established. Future studies should undertake to validate all measures or rely on already established measures. Furthermore, researchers wishing to replicate the findings of this study might consider using objective measures of behaviour as well as self-report measures to increase the validity of the self-report measures. The difficulty that arises in accurately measuring emotion has perhaps been in part to blame for the reluctance to research the impact of affect on behaviour. While the measures of SWB used in this study were adequate, it would be ideal to use measures of well-being that do not rely on memory, such as experience sampling which records participant's feelings throughout the day. This would also allow for emotions to be measured on a regular basis rather than on just one or two occasions. This would provide a more accurate picture of

what a person is feeling on a daily basis. Another consideration for future studies was the skewed proportion of female to male participants. In this study approximately 90% of the participants were female. This jeopardises the generalisability of the study and future studies should consider having equal number of male and female participants or alternatively only using participants of one sex. Finally future studies should consider using a larger sample to increase the generalisability of the findings and to ensure that problems such as having zero entries for certain categories does not occur. As this affects statistical analyses and reduces the validity of statistical models used to assess the data.

"There is direct evidence that positive emotion predicts health and longevity, and that happy people have better health habits than less happy people" (Seligman, 2002. p. 14).

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Appendices

Appendix A:

Attitude Scale

Answer all questions as honestly as possible, circle the number that most accurately represents your answer.

Smoking

Smoking tobacco is….

Harmful	1 2 3 4 5	Not Harmful
Good	1 2 3 4 5	Bad
Pleasant (for me)	1 2 3 4 5	Unpleasant (for me)
Unnecessary	1 2 3 4 5	Necessary

Drinking

Drinking alcohol is….

Harmful	1 2 3 4 5	Not Harmful
Good	1 2 3 4 5	Bad
Pleasant (for me)	1 2 3 4 5	Unpleasant (for me)
Unnecessary	1 2 3 4 5	Necessary

Appendix B:

Subjective Norms Questionnaire

Answer all questions as honestly as possible, circle the number that most accurately represents your answer.

Smoking

1. Most people who are important to me think that smoking cigarettes is....

   Good   1   2   3   4   5   Bad

2. I feel pressure from (parents/friends/siblings) to....

   Smoke   1   2   3   4   5   Not smoke

3. People who are important to me want me NOT to smoke tobacco

   Completely agree   1   2   3   4   5   Completely disagree

Drinking

1. Most people who are important to me think that drinking alcohol is....

   Good   1   2   3   4   5   Bad

2. I feel pressure from (parents/friends/siblings) to…

   Drink alcohol   1   2   3   4   5   Not to drink alcohol

3. People who are important to me want me NOT to drink alcohol

   Completely agree   1   2   3   4   5   Completely disagree

Appendix C:

Perceived Behavioural Control Questionnaire

Answer all questions as honestly as possible, circle the number that most accurately represents your answer.

Smoking

1. Smoking cigarettes is a behavior that I am in control of.

   Completely agree   1   2   3   4   5   Completely disagree

2. For me not to smoke cigarettes is….

   Very easy   1   2   3   4   5   Very difficult

3. If I wanted to I could never smoke a cigarette again.

   Extremely likely   1   2   3   4   5   Extremely unlikely

4. External factors influence my decisions to smoke or not smoke cigarettes.

   Extremely likely   1   2   3   4   5   Extremely unlikely

Drinking

1. Drinking alcohol is a behavior that I am in control of.

   Completely agree   1   2   3   4   5   Completely disagree

2. For me not to drink alcohol is….

   Very easy   1   2   3   4   5   Very difficult

3. If I wanted to I could never drink alcohol again.

   Extremely likely   1   2   3   4   5   Extremely unlikely

4. External factors influence my decisions to drink alcohol or not to drink alcohol.

   Extremely likely   1   2   3   4   5   Extremely unlikely

Appendix D:

Intention Questionnaire

Answer all questions as honestly as possible, circle the number that most accurately represents your answer.

Smoking

1. I intend to smoke cigarettes at all in the next 2 months?

    Completely agree   1 2 3 4 5   Completely disagree

2. How often do you intend to smoke cigarettes in the next 2 months?

    Extremely frequently   1 2 3 4 5   Extremely infrequently

Drinking alcohol

1. I intend to drink alcohol at all in the next 2 months?

    Completely agree   1 2 3 4 5   Completely disagree

2. How often do you intend to drink alcohol in the next 2 months?

    Extremely frequently   1 2 3 4 5   Extremely infrequently

Appendix E:

Information Sheet and Consent Form

<u>**Participant Information Sheet and Consent Form**</u>

Why do this study? – This is a descriptive study based on furthering our understanding of health related behaviours in young adults. This study is hoping to identify the possible psychological predictors of health behaviours, both of health promoting and health risk behaviours. Thus the aim of the study is to determine the relationships between health behaviours (both health promoting and health risk behaviours) and particular cognitive and affective factors. By participating in this study you will be helping to establish knowledge on what drives young adults to behave in the ways they do concerning their health. This may result in some benefit to future young adults.

What will participation involve? – Participation in this study involves completing three questionnaires/scales collecting information on health behaviours and emotional and cognitive states. Participants are asked to answer all questions and be honest in their answers.

How long will participation take? – Maximum of 1 hour

As an informed participant of this experiment, I understand that:

1. My participation is voluntary and I may cease to take part in this experiment at any time, without penalty.
2. I am aware of what my participation involves.
3. There are no risks involved in the participation of this study.
4. All my questions about the study have been satisfactorily answered.

I have read and understood the above, and give consent to participate:

Participant's Signature: _____ Date: _____

I have explained the above and answered all questions asked by the participant:

Researcher's Signature: _____ Date: _____