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**THE DEVELOPMENT OF A QUESTIONNAIRE TO IDENTIFY ADOLESCENTS  
AT RISK FROM SUBSTANCE ABUSE**

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A thesis submitted in partial fulfillment of the requirements of Nottingham Trent University for the  
degree of Doctor of Philosophy

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## **DEDICATION**

This thesis and the philosophy which has driven it, is dedicated to my 5-year old daughter Emily Alice Nicola Sutherland. The work was begun a month before she was born and has been going on for all of her life. Emily, I did it for you, but now it is over.

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- Finally, thanks to my mother, Helen Sutherland. It can't have been easy having me as a son, but maybe, after all these years, I have at last gone some way towards fulfilling my potential?

The following have been taken from work developed for this thesis:

#### Journal Articles

1. Griffiths, M.D. & Sutherland, I. (1998). Adolescent gambling and drug use, Journal of Community and Applied Social Psychology, 8, 423-427.
2. Griffiths, M.D., Wood, R. & Sutherland, I. (1998) Adolescent gambling: Still a cause for concern, Society for the Study of Gambling Bulletin, 32, 30-37.
3. Sutherland, I & Willner, P. (1998a) Patterns of substance use among English adolescents, Addiction, 93, 8, 1199 - 1208.
4. Sutherland, I. & Shepherd, J. P. (2000) Adolescent substance use: A possible resurgence by 11-year olds, British Medical Journal, 321: 1161.
5. Sutherland, I. & Shepherd, J. P. (2001) Social dimensions of adolescent substance use, Addiction, 96, 3, 445-458
6. Sutherland, I. & Shepherd, J. P. (2001) The prevalence of alcohol, cigarette and illicit drug use by English adolescent, Addiction, in press.
7. Sutherland, I. & Shepherd, J. P. (In submission British Journal of Health Psychology) The development of a psychometric questionnaire designed to differentiate between adolescent users and non-users of tobacco, alcohol and illicit drugs.
8. Sutherland, I. & Shepherd, J. P. (In submission, Journal of Adolescence) Adolescents' beliefs about future substance use: A comparison of current users and non-users of cigarettes, alcohol and illicit drugs.
9. Sutherland, I. & Willner, P. (1998b) The influence of household substance use on children's later cigarette, alcohol and drug use: A three factor model, Early Child Development and Care, 141, 111-126.
10. Sutherland, I. (1999) The assessment of an individuals risk from substance abuse, Assessment Matters, [www.assessmentmatters.org.uk/focus/focus.htm](http://www.assessmentmatters.org.uk/focus/focus.htm).
11. Sutherland, I., (1996) Adolescent substances abusers: Is it possible for psychologists to relate to them? Substance Misuse Bulletin, 10, 1, 5-6.
12. Willner, P., Sutherland, I. & Hart, K. (2000) Young people's reports of their illicit alcohol purchases. Drugs: Education, Policy and Prevention, (In Press).
13. Willner, P.; Hart, K.; Binmore, J.; Cavendish., M; Dunphy, E. & Sutherland, I. (2000) Alcohol sales to underage adolescents: An unobtrusive observational field study and evaluation of a police intervention, Addiction 95, 9, 1373 - 1388

## Books

1. Sutherland, I. (2001, In submission) A Parents guide to substance use.

## Conference Papers

1. Griffiths, M. D., Sutherland, I., Wood, R., & Barons, C. (1997) Adolescent scratchcard gambling in the United Kingdom, 10th International Conference on Gambling & Risk Taking, Montreal.
2. Griffiths, M.D. & Sutherland, I. (1998, July). Illegal adolescent gambling and its relationship to tobacco, alcohol and other drugs, The Third European Association for the Study of Gambling Conference, Munich, Germany.
3. Griffiths, M.D. & Sutherland, I. (1998, June). Illegal adolescent gambling and its relationship to tobacco, alcohol and other drugs, The Twelfth National Conference on Problem Gambling, Las Vegas, United States.
4. Griffiths, M.D. , Wood, R. & Sutherland, I. (1998, May). Adolescent gambling : Still a cause for concern. Invited paper, The Society for the Study of Gambling, London.
5. Griffiths, M.D. , Wood, R., Sutherland, I. & Barons, C. (1998, September). Adolescent scratchcard gambling in the UK. Invited paper presented to the Swedish Gaming Academy, Svenska Spel, Stockholm, Sweden.
6. Griffiths, M.D., Wood, R. & Sutherland, I. (1999). Youth gambling in the UK. Proceedings of the National Australian Gambling Society Annual Conference, Adelaide : NAGS, in press.
7. Griffiths, M.D., Wood, R., Sutherland, I. & Barons, C. (1997, June). Adolescent scratchcard gambling in the United Kingdom, The Tenth International Conference on Gambling and Risk Taking, Montreal, Canada.
8. Griffiths, M.D., Wood, R.T.A. & Sutherland, I. (1999, July). Underage players' behaviour and problems - The impact of game on society, Invited paper presented at the European Lottery University Seminar, Heriot-Watt University, Edinburgh.
9. Sutherland, I (1995) Can assessment tools designed for use with recovering addicts be used to identify pre-addicts?, South-West Undergraduate Conference, Bristol University, Bristol.
10. Sutherland, I (1996) Is it possible to predict those at risk of addiction?, Psychology Postgraduate Annual General Meeting, Glasgow-Caledonian University, Glasgow.
11. Sutherland, I. & Willner, P (1997) The link between neuroticism, social influences and the onset of substance use in adolescents, British Psychological Society Annual General Meeting, Edinburgh, Scotland.
12. Sutherland, I. & Willner, P (1997) The role of alcohol in adolescent substance abuse: No alcohol, no drug misuse?, American Psychological Society Annual General Meeting, Chicago, USA.
13. Sutherland, I. (1997) Is it possible to predict which adolescents are at risk from addiction? Staffordshire Education Authority Symposium on Adolescent Substance Abuse, Stafford, England.
14. Sutherland, I. (1997) The identification of adolescents at risk from addiction, Addiction Research Group Conference, University of Wales, Swansea
15. Sutherland, I. (1998) The development of an instrument to assess the vulnerability of individuals to substance misuse, The National Role of Crucial Assessment Conference, Leeds, England.
16. Sutherland, I., (1995) The development and application of a questionnaire to assess the changing personalities of substance addicts during the first year of recovery, British Psychological Society (Scottish Branch) Annual General Meeting, Crieff, Scotland.

17. Sutherland, I., (1997) The identification of adolescents at risk from addiction, Trust for the Study of Adolescence Summer Symposium, London, England.
18. Sutherland, I., Willner, P. & Gough, R. (1997) The role of alcohol in adolescent substance abuse: No alcohol, no drug misuse?, British Psychological Society Annual General Meeting, Edinburgh, Scotland.

## **Reports**

Gluck, J. & Sutherland, I. (2000) Psychotropic substance use within a selection of schools in the United Kingdom, Adolescent Assessment Services

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## ABSTRACT

The aim of this research was to develop a psychometric instrument (the Substance Abuse Susceptibility Index, SASI) capable of identifying young people at risk from substance abuse. The intention was to be able to do this before their substance using careers began. The SASI was designed in two sections: Section 1 which concentrated on psychological variables such as levels of self-esteem and Section 2 on sociological variables such as family structure and peer substance use. The work was undertaken from a biopsychosocial perspective and employed a risk factor or risk assessment paradigm.

The thesis will present findings from five main studies. Prevalence data will be presented in detail as will information on the relationship of psychological and sociological variables to substance abuse. In addition, detailed information will be given on the development of the SASI and models of adolescent substance abuse will be presented. The key findings from the studies were:

**Studies 1 and 2:** These studies were prevalence studies. 36.9% of the subjects who returned useable questionnaires said that they did not use any kind of psychotropic substance. Overall, the prevalence of substance use rose from 30.4% of the sample at age 11 to 83.9% at age 16 (Figure 3.1). Alcohol was the most heavily used substance with 30.4% of the sample drinking at age 11, rising to 83.9% at age 16. Cigarettes were the second most heavily used substance with 5.4% of 11-year olds smoking, rising to 29.5% at age 15 and decreasing slightly to 26.6% at age 16. Regular use of illegal drugs rose from 1.3% of the sample at age 11 to 31.8% of the sample at age 16.

**Study 3:** Study 3, the Open Closed Study, was a small study which attempted to assess the reliability of the SASI when children were asked to identify themselves (the Open group) compared with when they were asked to report anonymously (the Closed group). No overall differences were found in levels of reported use between the groups for either cigarettes, alcohol or illicit drugs. Similarly, no differences were found in the psychological variables being measured between the two groups.

**Study 4:** The study was designed as a replication of Study 2 and aimed to assess the reliability of the SASI when applied across groups. Although there were some prevalence and statistical differences between Study 2 and Study 4, the overall conclusions from the two studies remained, essentially, the same. Data from this study was also used to develop models of substance use.

**Study 5:** This final study was designed to validate the SASI through confirmation of the prevalence data presented earlier and through confirmation of the models developed from

Study 4. It was found that the prevalence data were consistent with the earlier data and that the models were stable across the studies.

The conclusion of this research is that, within the limits of cross sectional data, the SASI is a valid and reliable instrument capable of identifying adolescents at risk from substance abuse although further, longitudinal work is needed to confirm this conclusion.

## **CHAPTER 1 – INTRODUCTION**

The purpose of this introductory chapter is to summarise current thinking on substance use, particularly adolescent substance use. Specifically, the issue of definitions of addiction will be covered as will theories of the causes of substance misuse and treatment strategies.

### **What is Addiction?**

Addiction and its associated word '...holic' are two of the most difficult words in the English language to define. They are also two of the most misused. They are words that defy simple explanation and mean many different things to many different people and the word 'addiction' has clearly lost its meaning and has been so popularised as to have become largely irrelevant, but from a scientific standpoint how can the term be understood?

Firstly, does a substance or drug have to be involved if a person is to be classified as an addict? Probably not. There have been various pioneers who have shown that there is a serious case for saying that non-substance activities like gambling show all the characteristics of an addiction (Griffiths, 1994), but what are these characteristics? For the sake of clarity addiction has been classified, by DSM-IV (DSM-IV, 1994) amongst others as a condition, substance involving or not, where the following phenomenon are found:

**Tolerance:** A person needs more and more of a substance/activity to achieve the desired effect.

**Withdrawal:** A person suffers psychological or physical torment if the substance/activity is abruptly withdrawn.

**Salience:** The substance/activity is at the centre of a person's life. In other words, a significant proportion of a person's time is spent indulging in the activity or in planning ways of indulging.

**Craving:** A person has an intense desire to use the substance or carry out the activity in spite of adverse consequences.

Therefore society recognises addiction by a person's heightened and habituated need for a substance; by the intense suffering that results from discontinuation of its use; and by a person's willingness to sacrifice everything for drug taking. The inadequacy of this conventional concept lies not in the identification of these signs of addiction, but in the processes that are imagined to account for them. Tolerance, withdrawal, and craving are thought to be properties of particular drugs, and sufficient use of these substances is believed to give the organism no choice but to behave in these stereotypical ways. This process is thought to be inexorable, universal, and irreversible and to be independent of individual, group, cultural, or situational variation; it is even thought to be essentially the same for animals and for human beings, whether infant or adult. However, this pure model of addiction does not exist in reality, and the behaviour of people said to be addicted is far more variable than conventional definitions allow.

While in some cases addiction achieves a devastating pathological extremity, it may actually represent a continuum of feeling and behaviour more than it does a distinct disease state. Neither traumatic drug withdrawal nor a person's craving for a drug appears to be exclusively determined by physiology. Rather, the experience both of a felt need for and of withdrawal from an object or involvement engages a person's expectations, values, and self-concept, as well as the person's sense of alternative opportunities for gratification. These complications are introduced not out of disillusionment with the notion of addiction but out of respect for its potential power and utility. Suitably broadened and strengthened, the concept of addiction provides a powerful description of human behaviour, one that opens up important opportunities for understanding not only drug abuse, but compulsive and self-destructive behaviours of all kinds.

However, even if these criteria are adopted as a useful definition of the addictive state, is it appropriate to talk about addiction, given the controversy surrounding its meaning? Probably not. The first recorded reference to drug use is that in 5000BC the Sumerians were known to use opium. Given that substance use, in one form or another, has continued to this day, a strong case can be made for suggesting that the use of psychoactive substances is a normal

part of the human condition. Therefore it is probably of more help, both popularly and academically, to refer to substance use and substance abuse.

Given the prolonged substance using history of the human race, using psychoactive drugs in a reasonable and controlled way may not be a particularly harmful activity, however when 'use' changes into 'abuse' then harm is caused. However, when does (normal) use become (abnormal) abuse? Broadly the difference is not only a question of semantics, but of action.

**Substance Use:** Any substance use that does not dramatically alter a person's lifestyle or place them at particular risk.

**Substance Abuse:** Substance use where a person's lifestyle is detrimentally altered by that use. This phrase 'detrimentally altered' can be defined in a very broad sense and could equally well refer to adverse financial consequences as to medical and social problems.

### **Theories of Substance Abuse**

A review of current theories of 'addiction' and abuse places the remainder of this work, and the conclusions flowing from it into context. However, this is far from an exhaustive review as there are a large number of theories which try to explain the etiology of abuse, certainly far too many, and to date none has been shown to be definitive. It should be noted that these theories can be applied equally to traditional substance based activities and to non-substance activities such as gambling or Internet abuse.

Many of these theories are single entity theories, focusing on one aspect of a persons life and suggesting that this is the reason for abuse or addiction. Others are more complex and attempt to merge different areas into an interactive model. However, within the last few years a number of holistic models known collectively as biopsychosocial models have emerged. As the name implies, these models seek to amalgamate the three major areas, biology (genetics), psychology and sociology into a single type of holistic theory. It is the biopsychosocial model which has driven much of the work being discussed here and it is the biopsychosocial

approach which will be used when developing the model of adolescent substance abuse which will be the culmination of this work.

### **The Disease Model**

"The Disease Model provides a major part of the justification for excessive, ineffective drug control policies and supports values that are repellent outside the drug field" (Alexander, 1987 pp 47).

The modern concept of addiction and excessive substance use as a disease is based on theories advanced by Jellinek (1960) when discussing alcoholism and is the causal model adopted by self-help groups such as Alcoholics Anonymous (AA).

The Disease Model is not exemplified by one straightforward theory, there are literally dozens of variations ranging from Milam and Ketcham's (1983) definition which sees substance abuse as an incurable all-or-nothing unitary disorder caused solely by hereditary physical abnormalities to Miller's (1993) suggestions of the Disease Model as part of a more biopsychosocial construct. When discussing the Disease Model here, an attempt will be made to refer to a broad synthesis of all the popular variations of the model.

However, before it is possible to discuss the merits, or otherwise, of the Disease Model as it relates to substance use, it is necessary to look at exactly what a 'disease' is. Acker (1993) maintains that it is impossible to say whether substance abuse can be explained as a disease process alone because the definition of the term 'disease' is itself, extremely fluid. Certainly the perception of disease as a concept has altered over the years, often in tune with advancements in medical techniques.

In a slightly simplistic sense, it may be possible to describe disease as any condition that is diagnosable and treatable in medical terms where the cause of the condition is not under the control of the victim (Miller, 1993). However, it might be appropriate to delve a little further into the concept of disease as Miller's suggestion, particularly the reference to 'control' may not only be simplistic, but it is also rather too rigorous to be of practical value. After all, most

conditions have an element of choice within their etiology, be they coronary heart disease, cancer or, to an extent, diabetes.

Generally, it is possible to say that philosophical approaches to disease can be described as Ontological or Functionalist (Engelhardt, 1981). The Ontological view maintains that diseases are real tangible entities that do not exist in abstraction. In this way diseases that are caused by bacteria may be classified as Ontological and this view has proved useful in overcoming and eradicating certain diseases where it has been possible to describe a causal organism, chart its life course and develop agents that will act against it. However, by taking an Ontological approach it is possible to dehumanise an individual and to treat only the condition they are suffering from. In addition, by taking an Ontological approach and granting a disease 'independent status' there is a danger in expecting standardised treatments to work in all cases, which obviously does not happen. On the other hand, the Functionalist approach to disease places the individual at the centre of the condition which is then treated as a homeostatic imbalance and takes an altogether more holistic approach than the Ontological conception of disease. The Functionalist approach was common prior to the nineteenth century, but went out of favour after the industrial revolution as scientists began to have the ability to discover specific disease causing organisms.

Gradually Ontology took over until the only conditions that practitioners sought to explain from a Functionalist standpoint were the psychiatric ones (Reiser, 1978). Nowadays however, medical science appears to be combining the two approaches acknowledging, for instance, that a bad dose of Asian Flu may have Ontological origins but the speed of a patient's recovery may have Functionalist aspects too (Acker, 1993).

Generally, the question of a specific pathological condition being a disease or otherwise, does not seem as important as it once did. After all coronary heart disease (CHD) is clearly classified as a disease, but, like substance abuse, the biological etiology is largely unknown (Lewis, 1991).

On a slightly more practical level, however, it might be more appropriate to follow Talbott's (1986) suggestions that in order for a condition to be a formal disease it needs to fulfill five

categories or assumptions: 1) A disease should be a primary condition, not a secondary symptom; 2) A disease should involve a recognisable set of signs and symptoms that permit accurate diagnosis; 3) A disease should have clearly established etiological agents and causes; 4) A disease should bring about specific anatomical and physiological changes in an affected individual; 5) A disease should have a predictable and progressive course.

Talbott's suggestions do have intuitive merit and, at a glance, various common conditions can be seen to fulfill the paradigm's tenants. Can it be used as a model by which to classify substance abuse as a disease?

If the first point is examined, a disease should be a primary condition, not a secondary symptom one immediately runs into problems, especially if one considers direction of causality. Talbott supported his thesis by citing a study of 500 doctors undergoing treatment for a chemical dependency in which 94% failed to present with a primary psychiatric diagnosis of sufficient severity to explain their addiction (Udel, 1984). Udel did note that nearly three-quarters of the sample complained of emotional symptoms which he described as being secondary to their dependence. Champions of the Disease Model might well cite this work as evidence for their cause, but there are serious flaws within the study. As alluded to earlier, the direction of causality of the reported emotional symptoms must be called into question and the fact that 94% of the sample did not present with an identifiable psychotic illness is hardly conclusive evidence that substance dependence is the primary condition. Additionally, 500 physicians cannot be deemed a representative sample of typical substance abusers and no control subjects appear to have been used. Having said that, it is still a possibility that addiction is a primary disease, so Talbott's first premise could apply and substance abuse *may* be a primary condition, not a secondary symptom.

The second of Talbott's points that a disease involves a recognisable set of signs and symptoms that permit accurate diagnosis, would seem to apply to substance abuse disorders. Although individual responses to different drugs can vary, essentially it appears axiomatic that a person presenting as an addict or substance abuser will suffer from craving, withdrawal, tolerance and so on. However, Talbott lists seven signs that he says are typical of a person in

an addictive state: compulsivity; destruction of physical health; deteriorating emotional health; social, cultural and spiritual depravity; abnormal tolerance; withdrawal and blackouts or amnesia. Whilst some of these states may agree with many mainstream theories others such as 'spiritual depravity' do test the boundaries of credibility somewhat. Nevertheless, it does appear fair to say that this second proposition is reasonable and can be generally supported. This position is accepted by Lewis (1991) who said that the heterogeneity of addiction symptoms by no means need exclude it from classification as a disease. This position can be supported if one compares an addictive state with other, recognised, diseases. For example, schizophrenia, a condition clearly given disease status, often does not display pathognomic signs until the condition is severe and yet psychiatrists seem to have no trouble in diagnosing it, even in young people who are only displaying mild symptoms.

Proposition three that a disease has clearly established etiological agents and causes, is much harder to apply to substance abuse. Even though this research is primarily concerned with identifying causes of substance abuse, no clear etiological agents have yet been indisputably identified.

The penultimate of Talbott's suggestions that disease brings about specific anatomical and physiological changes in an affected individual appears one of the simplest to apply to substance abuse states. It is clear that all drugs of abuse can bring about both physical and psychological changes specific to the class of substance used. For instance, chronic overuse of alcohol can cause Korsakoff's Syndrome and cirrhosis of the liver while the amphetamines can place undue strain on the cardiovascular system and give rise to a paranoid state.

Finally, Talbott's fifth proposition is that a disease has a predictable and progressive course. If one is seeking to support the Disease Model of substance abuse, it may be possible to do so in this context by applying Jellinek's (1960) four phases of alcoholism. Jellinek described the four phases as the pre-alcoholic symptomatic phase where alcohol (and presumably other drugs) are used to reduce levels of stress, the prodrominal phase which is characterised by fugue states, secretiveness and denial, the crucial phase which is typified by a loss of control and the final chronic phase which is typified, in alcoholism, by reverse tolerance, loss of

memory, and social, moral and ethical deterioration. Even allowing for individual differences, if Talbott's propositions can be supported, it might be expected that Jellinek's four phases could be followed, however, there has been a considerable amount of published work that indicates this is not the case. For instance, Marlatt (1983) supports the position of controlled drinking, a stance that runs counter to Jellinek's ideas and the Disease Model as a whole. He maintains that total abstinence is not necessary to a full recovery and work by Roizen et al (1978), which recorded a spontaneous remission rate of up to 40% in alcoholics, also lend weight to critics of Jellinek's theory and, by implication, Talbott's fifth proposition. However, Lewis (1991) contends that given the heterogeneity of symptoms, is it any wonder that substance abuse does not always follow a reliable course? Vaillant (1983), following a longitudinal study, found that many people who might be termed alcoholics or drug addicts by any available definition were actually chronically heavy users who never progressed along an accepted disease course and although they fulfilled most expected criteria, did not end up succumbing to the stereotypical picture of the final stage.

This lack of predictability of a substance abuse disease course is not by any means unique and need not bar substance abuse from classification as a disease. For example, syphilis is certainly classified as a disease and yet progression to the recognised final stages only occurs in a minority of cases. Syphilis has an incubation period of about three weeks followed by a primary lesion with lymphadenopathy, then a secondary phase associated with general lesions. This phase is then followed by a latent period which can last many years, with only a third of cases going onto the final phase involving the central nervous system and, eventually, death. There is no way to predict which third of patients will develop this third, terminal, phase and yet that does not stop syphilis being a disease.

Even if all Talbott's five propositions were fulfilled by substance abusers, and there is much question over them being relevant to the field of addictive behaviours, this would still not be total proof that addiction and substance abuse is a disease in the same mould as cancer or Alzheimer's Disease.

Lewis (1991) advocates that a rigid definition of disease is inappropriate in any context and advocates a biopsychosocial approach being adopted, particularly in the field of the addictive behaviours. He further suggests that if a biopsychosocial approach is used, it then becomes possible to directly compare the addictive behaviours with many other 'traditional' diseases. Lewis believes that four questions must be asked when discussing the classification of a condition as a potential disease: 1) Does the condition have a clear biological basis?; 2) Does the condition have unique, identifiable signs and symptoms?; 3) Does the condition have a predictable course and outcome? and 4) Does the condition have an intentional causation? Clearly this criteria is similar to Talbott's, but has the distinction of addressing the question of "intentional causation" or, put another way, responsibility or self-control. It is this onus that sets Lewis' ideas apart from other Disease Model concepts and may, at first glance, place it diametrically opposed to classic models in the same vein such as those mentioned earlier that are supported by the self-help groups following the Minnesota Model.

Despite the fluidity of the precise definition of disease, the Disease Model has long been applied, in various guises, to both alcohol and drug abuse. Acker (1993) suggests that although this model may be useful as an overall concept, it may not be possible to apply it to everyone. She says that for a white middle class substance abuser with a family and a reasonable job who undergoes treatment, substance abuse is certainly a disease, but she questions whether this may be so of the African-American whose only employment is in trafficking drugs or selling sex, spends considerable time in prison and is never exposed to a treatment programme. In spite of Acker's somewhat stereotypical view of race types, her comments do suggest that 'disease,' particularly in this context, is a relative term and can mean many different things to many diverse groups of people. Indeed, Shaffer and Robbins (1991) have gone so far as to say that the dichotomous question 'is addiction a disease?' can never be definitively answered because the Disease Model is purely a cultural construction.

Certainly, The Disease Model helps substance abusers to accept their dependency and reduce any possible shame and guilt; it may also help the community to accept the problems associated with substance abuse and to take responsibility by instigating preventive programs.

Smith, et al (1985) also say that by adopting a Disease Model, substance abusers in treatment can completely shed any guilt feeling and therefore concentrate on their recovery without moral burdens. Taking a less liberal attitude, the Disease Model may also be seen as allowing substance abusers to abrogate all responsibility for their status and allow them an excuse if relapse occurs. Zweben (1993), answers this criticism by saying that the Disease Model is useful because it allows the therapist to take the stance that the patient is not responsible for the disease but is fully responsible for recovery.

However, the reverse to this particular coin of addicts being 'powerless over their addiction' (AA, 1997) could be that there are morally weak individuals who are unable to cope with the strains of existing within a society or, as Lawrence Kolb suggested, "...little men with powerful social ambitions, but without the requisite abilities to fulfill them" (Kolb, 1925)

Other researchers, more recently than Kolb, are in agreement and do not view the Disease Model favourably. Walters (1992) suggests that the model erodes the human capacity for taking responsibility for one's actions and notes that among the model's drawbacks is the inattention to such issues as personal responsibility, self-efficacy, and autonomy, and its unamenability to empirical evaluation. Others agree with this point of view (Peele, 1987) and argue that 'the disease myth of addiction' cannot be accurate with the natural remission in self-curers, mentioned earlier, being used to discredit the Disease Model. However, those who argue this point may have neglected to note that persons suffering from physical, or Ontological illnesses, such as the previously mentioned Asian Flu do, on occasion, become spontaneously well. Additionally, to refute this criticism of the Disease Model, it might be appropriate to add at this point that Asian Flu, left untreated, will eventually 'burn itself out' as the body becomes resistive to it. Might not the same possibility exist for the addictive conditions?

Bruce Alexander (1987) has indicated that the Disease Model may, at least in part, be politically motivated and provides a major part of the justification for drug control policies and supports values that are controversial outside the drug research field. Certainly it does not appear unreasonable to assume that this may be, at least superficially, true. In support of

Alexander's stance one could simply look at the negative implications on direct employment that a relaxation in control policies would have. In addition, the Disease Model has been used to justify America's ongoing 'War on Drugs' and, with Holland as the notable exception, this attitude has been taken up by all European countries with punitive punishments being handed down to even petty offenders.

In conclusion, the Disease Model has a number of strengths and several severe weaknesses. On the plus side is the fact that it is a simple theory to understand and opens up the substance abuse field to lay persons. Additionally, by removing any shame or guilt that might be present in an addict, it encourages attendance at treatment centres, particular those following the Minnesota Model, where substance abusers know they will not be censured. On the negative side, the model provides individuals with an excuse for their excesses and tends to cause the addict to become reliant on treatment philosophies. There is also a tendency to group sufferers together and not take into account individual differences with substance abusers who question the system being said to be in denial. Possibly the most serious criticism of the model is that, very much like Freudian theory, it has many intuitively good points, but is almost impossible to evaluate from within a scientific framework.

The Disease Model, like many other models in this area, has gone in and out of favour with researchers over the years. Currently, it appears reasonable to say that the Disease Model is not capable, on its own, of explaining causes of addiction and abuse, but may well be useful in combination with other theories of offering at least a partial explanation.

### **The Adaptive Model**

The Adaptive Model of substance abuse is a contemporary of the Disease Model, but can be considered a more humane and, so it is argued, a more effective model (Alexander, 1987).

At the heart of the Adaptive Model is a combination and interaction of faulty upbringing, environmental inadequacy and genetic unfitness. It is considered that these factors are primarily responsible for setting the individual on the path towards addiction which,

Alexander suggests, is symptomatic of a general failure to develop into a mature adult. It is this failure to mature that leads to "...social ostracism, despair, mental disintegration and ultimately suicide" (Alexander, 1987, p: 49) and causes the individual to urgently seek out alternative ways of achieving integration with a peer group. It is this way of reacting to what is seen as an inadequate personality and maturity status that causes the susceptible individual to invoke adaptation to drugs as a form of defence mechanism.

Unlike the Disease Model, the Adaptive Model does not assume that a pathology is at the base of an addiction process, instead the model suggests that people are responding and adapting, within the restrictive limits of their own abilities, to their negative situation. Also in contrast to the Disease Model, which sees substance abuse as causing numerous, often insurmountable problems, the Adaptive Model sees substance abuse as a result of these problems. In other words the focus of the direction of causality is different in the two model types.

One of the crucial differences between the Disease Model and the Adaptive Model is that whilst the former states that addicts are powerless over their addiction, the latter sees addicts as masters of their destiny with responsibility for decisions and actions. In addition, the Adaptive Model does not assume that the addict is out of control as many supporters of the Disease Model do ( Gold and Miller, 1987).

At the causal core of the Adaptive Model is an individuals failure to mature and integrate with their peers, a stance that Alexander (1987, 1990) seems to have gleaned and then extended from Erikson's (1968) work on identity achievement. Alexander suggests that evidence supporting the notion that integration failure leads directly to substance abuse, and subsequently addiction, can be found in correlational studies that have shown that the majority of substance addicts have a background that includes sexual abuse, violence, emotional cruelty and an over-dependence on parents (Browne and Finkelhor, 1986; Yeary, 1982), however, what Alexander does not address is the question of why many of the individuals who have suffered this type of abuse do not turn to drugs as an adaptation.

Alexander also claims support for the Adaptive Model because of the diversity of problems that correlate with the later onset of an addictive state. He cites evidence that has been found which indicates left-handedness correlates with the severity of alcoholism (London, 1986), low platelet monoamine oxidase levels and EEG abnormalities have also been implicated (Tarter and Edwards, 1986) and a host of personality variables are also said to precede onset of addiction (Newcomb et al, 1986). Alexander suggests that this variability, if accurate, undermines any variation of a Disease Model because such a diversity of antecedent traits could not fit into a specific disease process. It is this very diversity of traits that Alexander says lends weight to the Adaptive Model because any deficit can contribute towards integration failure, which, as far as this particular model is concerned, is causal to substance abuse and addiction.

Alexander further tries to support the model by suggesting that the concept of integration failure is compatible with biological and social science theory. He implies that when a species is nearing the capacity that can be easily supported by the environment around it, many of the developing individuals within each generation fail to mature and are not integrated into the adult population. He draws on the work of Krebs (1978) and uses examples of seabirds which, unable to gain individual territories, die, but it is hard to see how this can equate adequately to a human population. It may indeed be possible that seabirds without their own territory are ostracised from the group and die of starvation, but that is a long way from humans failing to become integrated into an adult peer group and becoming a substance addict to compensate for this failure. Indeed, Alexander implies that if this analogy with seabirds is to be taken literally, then 'birds' living within a deprived and overcrowded inner-city area are almost certainly going to turn to substance abuse as an adaptive response. Although many people from these areas do use drugs and alcohol to excess, many do not and, conversely, many people from affluent areas and backgrounds who are not threatened with 'territorial loss' or 'starvation' also use substances of abuse. If Alexander's argument is correct, then this would not occur. Indeed, Alexander's arguments bring up the whole subject of external validity and while it might be appropriate to discuss seabirds within the context of biological mechanisms,

it is questionable whether it is possible to generalise these arguments to people. After all, if Krebs' ideas on seabird behaviour are correct are they not the product of instinct and innate drives? Surely humans are sentient creatures, capable of self-determination and rational decision making processes, is it reasonable therefore to compare addictive responses to overpopulation in gannets?

Finally, Alexander suggests that "...if addiction serves as a way of adapting to integration failure, it should cease if integration is subsequently achieved" (Alexander, 1990, p.47), but is it reasonable to expect an individual to achieve successful integration if they are severe substance abusers?

The Adaptive Model is interesting and not without some merit, but it suffers from one of the major faults of the Disease Model in that it is very hard to imagine how to empirically test it. Until a way is found to quantify this model then it will remain little more than an attractive, some might say intuitively attractive, theoretical model.

### **Biological Theories**

It may be possible to link Disease Models with Biological Models, particularly amongst lay persons as the concept of 'disease' often, as discussed, implies an abnormal, or pathological, underlying physical process. However, for the sake of this work the models discussed here will be confined to those with a neurochemical or genetic basis. Within these areas there have been suggestions over the past few years of a causal link with substance abuse, but Bukstein (1995) suggests that this evidence is not overwhelming and that it is unlikely that there is a single biological cause of substance abuse or addiction. He does go on to say that, like the Disease Model discussed earlier, Biological Theories offer hope of a causal explanation particularly when combined with other theories.

## Neurochemical Theories

The ability of a substance to initiate a withdrawal syndrome upon its cessation is a key component of many commonly used definitions of addiction. Although some drugs of abuse have unique withdrawal signs, there is also a considerable commonality between them, so much so that even substances seemingly opposite in nature such as stimulants and depressants, share similar features both during intoxication and withdrawal (Feldman and Quenzer, 1984) and, alternatively, where commonalities are not present, a rebound effect of opposite polarity upon withdrawal often is. Over recent years a reasonable body of work has built up that has examined the neurochemical mechanisms pertaining to withdrawal and it appears that many commonly abused substances share withdrawal effects associated with the locus ceruleus (Wise, 1989). Given that many pharmacologically diverse groups of substances have close ties, at least in withdrawal, these data lead one to suppose that neurochemical links exist. However, although hyperactivity of the locus ceruleus may initiate withdrawal effects from a wide range of diverse drugs, people do not use drugs only to avoid the unpleasant effects of withdrawal. All drugs of abuse are taken, at least in the first instance, to provide pleasure or positive reinforcement for the user.

Bearing this in mind, are there 'positive' commonalities between the various different groups of commonly abused drugs? If one looks at the dopamine system in the brain, it would certainly appear so. Wise (1989) has found that levels of dopamine are closely linked with the positive reinforcement or reward system in the mammalian brain and has suggested that it is this which may be at the centre of various substances reinforcing abilities. Certainly, numerous studies have supported the notion that increased synaptic levels of dopamine have high positive reinforcement effects (Dackis and Gold, 1985; Gold and Vereby, 1984; Davis and Walsch, 1970) and that this may have a bearing on the addictive properties of certain substances.

If one looks at the properties of various drugs, this hypothesis does not seem unreasonable. Cocaine increases the levels of dopamine (DA) in the synaptic cleft by blocking its reuptake

into the presynaptic neuron and, although not to the same extent, Nicotine also increases DA levels. The active ingredient in cannabis,  $\Delta^9$ -tetrahydrocannabinol, also increases DA levels and the opioids stimulate the dopaminergic cells in the ventral tegmental area (Wise, 1989). These further commonalities seem to indicate a neurochemical link between the different classes of commonly abused drugs, but does beg the question that if DA increase is the end result of ingesting these substances and that it is this increase in dopamine that provides the pleasure inherent in drug abuse, why does the abuser not just simply take L-dopa? A possible area of future research within this field might look at commonalities between Parkinson's patients, schizophrenics taking phenothiazine drugs and opioid addicts. Miller and Gold (1995, p121) sum up these recent findings by saying "What is possible from a synthesis of existing animal and human data is a cogent hypothesis for a common neurochemistry of addiction, comparable in substantiation and credibility to that which has been already formulated for schizophrenia and manic-depressive illness."

### **Genetic Theories**

Genetic theories of substance abuse are also linked to the Disease Model and many of the same arguments apply equally to the two models. The key premise of the genetic group of theories is that there is a direct and traceable hereditary route down which addiction tendencies can be traced.

It may be more valuable however, not to attempt to look to genetics as a causal model, but, especially in light of the biopsychosocial model, to look upon addicts as having a genetic *predisposition* or genetic *sensitivity*, which, in combination with other factors to be discussed later, might contribute to the existence of an addictive state. Certainly, for the past fifteen years or so, authors appear to be considering any genetic link to substance abuse to be, at the very least, polygenic and interacting with environmental factors ( McClearn, 1983; ).

There are numerous classic pieces of work in this area, but two in particular stand out and these will be used to illustrate some of the positive and negative aspects of the genetic theories of addiction.

The first was by Vaillant (1983). In a series of experiments he looked at the prevalence of alcoholism among men who had no alcoholic relatives with men who had several alcoholic relatives. His basic findings were that in the group where the subjects had no familial contact with alcoholism, between 10% and 14% became dependent on alcohol at some time in their lives compared to between 29% and 34% of men who did have family contact with alcoholics.

Superficially, this evidence seems to be strongly supporting a genetic link in the onset of alcoholism, however there are several flaws, the most serious being the social, not genetic effect, that having familial contact with alcoholics relatives would have. It can be assumed that persons who grew up in contact with alcoholic relatives did so in families where the attitudes towards alcohol were vastly different to those subjects whose lives were untouched by alcoholism. Bearing this in mind, the initial strong appearance of the genetic data must be completely confounded by the environmental factors.

Goodwin (1979, 1985) looked at the problem from the perspective of adoption studies and his strongest finding was that 15% of male children of alcoholics who had been adopted by non-alcoholic parents were diagnosed as alcoholic at the time of the study, whereas only 4% of adopted males whose natural parents were not alcoholics received the alcoholic diagnosis. Again superficially, this seems like a very significant effect, males whose natural parents who are alcoholics are at four times greater risk than subjects without that biological predisposition. However, if one looks at that figure from an alternative standpoint it begins to look less impressive. Essentially, what the data means is that 85% of men with alcoholic parents do not become alcoholic.

In addition to the actual figures themselves being less than impressive, the methodology employed by Goodwin can also be called into question. He obtained his data in the first instance from Denmark, where interviews were recorded in Danish, translated into English,

transcribed and sent to America where a psychiatrist made a diagnosis based solely on those transcripts. Goodwin then compared these data with the prevalence of alcohol reported in the general population by the Danish health authorities. This method of data collection is fatally flawed and renders any conclusions Goodwin drew as seriously confounded.

Another problem when looking at genetics to provide an answer to an individuals vulnerability to substance abuse is that, by and large, social variables have been ignored. For example, exposure to illegal drugs is rarely considered. The 1990 Epidemiologic Catchment Area Study estimated that in the United States lifetime opiod use and dependence was approximately 0.7% of the population, far below what one might expect from genetic indicators unless one factors in exposure to drugs. If genetic theories of vulnerability to addiction are accepted it might be expected that persons with strong genetic links to addiction would actively seek out the substances they needed, but clearly this does not happen. Who is to say whether these people would heavily abuse drugs or alcohol if they were exposed to them in a social setting?

Another methodological problem when looking at genetic data is that it is rarely 'clean'. For example, drug users do not tend to restrict their addiction to one particular substance, but instead take a multitude of different preparations, all with differing pharmacological actions. In this way, it is impossible to study the possible genetic transmission of one particular drug.

### **Psychological Theories**

#### **Personality**

Psychological theories of addiction broadly encompass the area of personality and individual personality characteristics, however the examination of personality characteristics within the area of substance abuse is fraught with problems. There are two main areas of controversy, the first being the overall validity of the concept of personality and the second being the possible presence of an addictive personality. However, before these questions can be considered, it needs to be clarified exactly what 'personality' is.

Broadly, personality is based on the individual's distinct and consistent outlooks and actions or overall style of behaviour and can be defined as the way a person reacts to their environment. Inherited or biological traits are not personality traits except inasmuch as they influence behaviour.

There has been considerable discussion in the literature over the validity of personality constructs when applied to a general population, however, personality psychology remains an area of continuing interest and has been ever since psychology's formative years at the turn of the century and numerous theories of personality have been suggested since that time (Freud, 1901; Jung, 1927; Allport, 1937; Rotter, 1954; Maslow, 1968; Cattell, 1970). Although many of these theories are radically different from each other, some being trait theories (Allport, 1937; Cattell, 1970) others taking a humanistic approach (Maslow, 1968) and still others approaching the problem from a social learning perspective, (Bandura, 1977) all of them share in common the desire to gain an insight into and, an explanation for, human behaviour (Schultz, 1990).

In spite of this interest personality psychology went into a decline following Mischel's (1968) examination of the area. In this critique it was claimed that personality constructs were neither reliable nor valid because when behaviours were sampled across different situations there was little cross-contextual consistency, in other words, an individual's behaviour in one situation was not predictive of their behaviour in another (Deary & Matthews, 1993). However, Eysenck (1991) refuted many of Mischel's findings by suggesting that the basic methodology of the work was flawed and that the statistical techniques employed were open to a degree of misinterpretation. Additionally, it would appear that most personality psychologists have resolved the conflicts brought about by Mischel's work by adopting an interactionist approach that amalgamates personality theories with social constructs, so that personality research has taken a more holistic approach in recent years (Carson, 1989; Kenrick & Funder, 1988; Rowe, 1987).

Consequently, in the last two decades the field of personality research has undergone a resurgence and from the plethora of studies and theories that have been published, Costa and

McCrae's (1985) Five Factor theory of personality has emerged as one that appears likely to unify researchers (Deary & Matthews, 1993).

The second area where there has been controversy is over the existence, or otherwise, of the addictive personality (Platt, 1975; Sutker & Allain, 1988; Hoffman & Slade, 1993). Clearly the idea of an addictive personality is attractive in the same way that the presence of an errant gene might be attractive, but, as has already been discussed, the presence of a single, causal factor in substance abuse has been largely discounted.

Some researchers, (Begun, 1977; Sadava, 1978; Slesinger, 1985), appear to consider the presence of an addictive personality a forgone conclusion, whilst others, (Sutker & Allain, 1988; Nathan, 1988), regard the concept with scepticism, claiming that any psychopathology or aberrant personality findings result directly from the substance using state rather than contributing to it. In a review article of the Minnesota Multiphasic Personality Index (MMPI) and its usefulness in identifying the characteristics of alcoholics, Graham & Strenger (1988) concluded that no single personality type is characteristic of all alcoholics and, as such, the continued acceptance of an addictive personality was not appropriate. This evidence suggests that substance abusers are not necessarily united by a common, addictive, personality, however, they may differ in other aspects of personality to non-users or non-abusers.

In order to support the presence of an addictive personality, any theory has to be able to positively answer the following questions:

1. Do substance abusers as a group of people fit into one or more distinct personality patterns?
2. Do people with personalities associated with substance abuse inevitably, frequently, or infrequently become abusers, or do they often express this personal disposition in some other way?
3. Can it be established that many different groups of substance abusers have similar personality traits, and that groups of non-users or substance users do not display these traits?

4. Can predisposing personality traits be established which characterise substance abusers prior to their heavy use, so as to establish personality traits as a cause of addiction?

It is clear that no theory of personality is able to affirm these questions with strong empirical evidence, but in spite of the fact that the concept of a single entity addictive personality can be largely discounted, there have been differences suggested between substance users and non-users, and it is the description of these differences which has prompted further research into this area (, Gossop & Eysenck, 1980; Tarter, 1988; Sutker & Allain, 1988; Lodhi & Thakur, 1992).

So, in spite of the doubts raised about the overall validity of personality as a concept and about the addictive personality in particular, it does appear that the personality variables of substance users and abusers differ in comparison with non-users. As mentioned previously, Costa and McCrae's (1985) Five Factor theory of personality has received strong support and its structure lends itself well to examining the personalities of potential substance abusers. Costa and McCrae (1985) described the five factors of personality as being Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness and although some researchers have taken issue with these terms, primarily because the separation of trait components may be seen as rather artificial due to their dynamic interaction, (Eysenck, 1991) they have also received considerable support (Angleitner, 1991; Wiggins & Broughton, 1991; Digman, 1990). In their overall formulation of Neuroticism Costa and McCrae identified the sub-traits of Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness and Vulnerability as making up the trait. However, this formulation was not designed to exclusively examine the personality characteristics of substance users, and while it is a useful construct, is not sufficiently specific for consideration with substance abuse. The concept of Neuroticism and its component sub-traits, do however lend themselves as useful beginning points in the examination of personality characteristics of substance users and abusers.

If Costa and McCrae's sub-traits are to be utilised in work of this type, it is important to ensure that the overall trait of Neuroticism they purport to make up is, in itself, a valid construct. Although not specifically utilising Costa and McCrae's formulation of

Neuroticism, several studies have found that this general trait is elevated in substance users (Tartar, 1988; Sieber & Bentler, 1982), lending credence to the idea that Neuroticism might be a valid construct to look at in this particular area. However, one of the problems with these types of studies is that they have tended to focus on established alcoholics and other types of substance addict and not on the more ordinary substance user. If the view is taken that addiction is at the extreme end of a behavioural continuum with abstinence at the other then it might be possible to interpolate these types of findings, however, of better value would be a specific examination of those who have not progressed so far along the line.

The sub-traits that make up Neuroticism have also been looked at by researchers both singly and collectively, but, as Oetting & Beauvais (1987) have suggested, findings of elevated sub-trait levels in adolescent substance users may not mean that those findings are characteristic of their underlying personality. They found that even though over a third of adolescent substance users said they took drugs when they were either depressed or anxious, there was no overall tendency for them to experience these traits. In other words adolescent substance use may, in these cases, be explained by an inappropriateness of response to a stressful situation rather than as a response to an underlying personality trait.

As with the other theories under review, personality, on its own cannot explain substance abuse, but it is a useful construct as a key component of the biopsychosocial theories which will be examined later.

### **The Tension Reduction Hypothesis**

The Tension Reduction Hypothesis was originally formulated by Conger (1956) and was developed along conditioning lines in which substance abuse is constantly rewarding the user by returning them to a state where there is an emotional homeostatic balance. Conger originally conceived it in particular relation to alcoholism, but it can be applied equally to substances other than alcohol, even when the pharmacological effect of the drug being used is different to that of alcohol.

Recent work by Kushner et al (1994) has indicated that insofar as alcohol is concerned, there does appear to be some support for the tension reduction hypothesis, at least in a male population. Kushner looked at the moderating effects of tension reduction alcohol outcome expectancies in 421 undergraduates, nearly half of whom were male. It was found that male subjects with high outcome expectancies showed a stronger positive correlation between measures of anxiety and drinking behaviour than did male subjects with low tension-reduction outcome expectancies. There was no effect found in females. This work does indicate some support for the hypothesis, but, as with all work using undergraduates, the external validity of the results must remain suspect.

Even though studies using undergraduates have problems, it is this expectation of tension reduction, particularly with alcohol, that lends credence to the tension reduction hypothesis. Frone (1993) looked at the hypothesis and its relation to family conflict and expectation of effect and found a positive correlation between levels of conflict, the tension reduction expectancies related to alcohol and actual alcohol consumption. On the other hand, a similar study by Cooper et al (1990), but this time transferred to the work place, found no support for a simple tension reduction model of work stress-induced drinking.

It is an attractive theory and one that has found broad support amongst the lay public because it seems intuitively accurate, but as with many theories of substance abuse, it does not have consistent empirical support and does not appear to be the only answer.

Cooper summed up the reservations about the model when he said that "...tension reduction theories of alcohol use are overly broad and that individual characteristics must be considered to account for stress-related effects on alcohol use and abuse" (Cooper, 1992, p.139)

### **The Lifestyle Model**

Another theory that may be considered under the umbrella of psychological theories is the Lifestyle Model which considers that an individual's abuse of chemicals is not a primary disorder, but rather a reflection of a "peculiar style of thinking" (Walters, 1992, pp: 139).

Specifically, Walters suggests that drug use may be an expression of an underlying criminality which, whilst not always expressed, is lying dormant in the person's psyche.

Essentially the lifestyle model is a collection of traits that Walters says makes up the 'typical' substance abuser. To that extent, it is not so different from addictive personality concepts mentioned earlier and is equally empirically untestable.

He says that the lifestyle model is typified around several main types of deviant behaviour: Irresponsibility and Pseudoresponsibility, where substance abusers fail to meet responsibilities to employers, family and friends, but can, on occasion retain a veneer of responsibility that is more apparent than real due to a lack of depth and commitment; Stress-Coping Imbalance, where substance abusers are unable to deal appropriately with stress and use drugs to relieve excessive levels that build up because they have not learned effective and appropriate coping strategies; Interpersonal Triviality where the user lacks meaningful personal interactions and seeks out other drug users for purely, drug based, superficial relationships and Social Rule Breaking where, Walters says, the substance abuser is less interested in breaking rules than in circumventing them so that drug using activities can be indulged in.

Walters also suggests that substance abusers suffer from generalised cognitive distortions, specifically Mollification where users blame their current drug related problems on others instead of accepting responsibility for their using behaviour; Entitlement where users give themselves permission to use drugs on such premises as having had a bad day at work and Superoptimism which, Walters says, can almost be classed as grandiose thinking where users often believe they have their use of chemicals under control and do not believe that they are, or could become, addicted.

It is also suggested by the lifestyle theory that substance abuse has a recognisable and predictable course. The Pre-Drug Stage is described as the stage when people between the ages of about 12 and 21 experiment with drugs out of boredom, peer pressure and the search for new sensations. Walters notes that this stage is very common among young people today, but states only a small minority of people experimenting actually go onto the next stage that

he terms Early Drug Stage. This stage tends to occur around the early 20's and early 30's and is a preliminary commitment to a drug orientated lifestyle. The addict, as they have now become, will begin to invest more time, energy and thought into their drug career and drugs will become the salient driving force behind their actions. The Advanced Drug Stage occurs generally after the early 30's and it is during this phase that the user will appear most out of control. It is also during this stage that most contact will be had with the police and hospitals following overdose and suicide attempts. Walters says that it tends to be during this phase that most direct deaths from drugs occur. The final stage described by the lifestyle model is the Drug Burnout and Maturity Stage and tends to occur after about the age of 40. Walters is at pains to point out that entry into this stage is by no means the norm with many users electing to stay in the preceding Advanced Drug Stage. However, if a person does enter this final stage it tends to be characterised by only sporadic drug use. Walters suggests that individuals may enter this stage due to changes in cognitions, values and motives or alternatively because there is a decline in the pleasure perceived by drug use.

Walters admits that there is no empirical evidence to support the model, but maintains that one of its advantages over the more traditional disease model is that it would not be hard to apply empirical principals to it. However, although it is, at least superficially, an attractive and relatively simple theory to understand, it is difficult to understand how it could be quantified with any precision.

### **Behavioural Theories**

#### **Cognitive Social Learning Theory**

As with the other areas already discussed, there are many different models which can be classified Behavioural Theories, but one of the most prominent are the cognitive social learning group of theories which have been developed to explain many different psychological phenomenon, not just the substance abuse. Essentially social learning theory states that a behaviour is likely to be increased due to the presence of three variables:

1. The individual's cognitive expectancy must be that an outcome or reinforcement will follow a particular behaviour.
2. The individual's perception of the value of the outcome or reinforcement must be positive.
3. The nature of the psychological situation in which the behaviour is to occur should be positive.

It is a combination of expectancy and reinforcement that appears to be particularly appropriate when trying to apply cognitive social learning theory to the addictive states. Rotter (1954, p.107) has described expectancy as the subjective probability "...that a particular reinforcement will occur as a function of a specific behaviour..." and it is not hard to see how this might apply to a heavy substance user. Certainly, expectancies are learned and their intensity is directly related to the strength of past behaviour-reinforcement experiences. The reinforcement level is subjective and relative and Rotter (1954, p.107) describes it as "...the degree of preference for any reinforcement to occur if the possibilities of their occurring were all equal..."

In this way it can be seen that many commonly abused drugs are both powerful reinforcers and lend themselves to leading the user to believe strongly in the expectancy value of the substance. In light of this it can be argued that this is why intravenously injecting heroin may be so attractive to the user and why crack cocaine has achieved such a foothold amongst the drug using population in a relatively short space of time.

Bandura (1977a) summed up the cognitive social learning perspective by stating that behaviour (in this case, substance use) is acquired by and maintained through reinforcement, modeling and cognitive self-regulatory mechanisms.

### **The Self-Medication Hypothesis**

Another behavioural model is the self-medication hypothesis first put forward by Khantzian (1985, 1986). Essentially Khantzian suggests that individuals use different substances to

alleviate the symptoms of an underlying psychiatric condition. In other words, he is hypothesising that substance abusers primarily use various different substances in order to reduce emotional suffering whilst the pleasure-seeking motives are by-products secondary to the problem of self-medication.

Khantzian asserted that substance abusers made a distinct drug choice in order to medicate themselves in a way they saw appropriate to their perceived condition and that this choice was the result of the distinct psychopharmacological properties of the drug of choice interacting with the primary feeling state they were experiencing. For instance, he suggests that heroin addicts prefer opiates because of their powerful muting action on the disorganising and threatening affects of rage and aggression which Khantzian suggests heroin users are predisposed towards feeling. On the other hand, cocaine has its appeal because of its ability to temporarily raise lowered levels of self-esteem, and to relieve distress associated with depression, hypomania and hyperactivity.

Khantzian asserts that while addicts tend to experiment with many different drugs, most have a particular drug that they come back to time and time again, their 'drug of choice' and that it is the selection of this 'drug of choice' that is at the heart of the self-medication hypothesis.

Like many of the theories described so far, the self-medication hypothesis seems, at least superficially, to be intuitively correct. It would be neat and symmetrical indeed to be able to say that people with low self-esteem use cocaine whereas persons who are aggressive use opiates, unfortunately this does not appear to be the case as there are many other variables such as economics and availability that are not covered by the model.

Certainly there is a high degree of psychopathology amongst chronic substance abusers, but, once again, the question of direction of causality needs to be considered. If, for one moment, this question is put to the side, affective disorders appear to be extremely common amongst substance abusers (Gawin and Ellinwood, 1988) as do borderline personality disorders and antisocial personality disorders (Kleinman et al, 1990). Additionally, higher than average incidents of depression are found in addicts (Dorus and Senay, 1984) and anxiety is also

higher in addicts than non-addicts (Bukstein et al, 1989) as is attention-deficit hyperactivity disorder (Carroll and Rounsaville, 1993).

It is the finding by Carroll and Rounsaville that 34.6% of 298 treatment seeking cocaine abusers met DSM-III-R criteria for childhood attention deficit hyperactivity disorder (ADHD) that is particularly interesting when discussing this model. If one takes cocaine and ADHD as examples to examine Khantzian's theories, then it does appear that there may be many points in its favour. Certainly, Carroll and Rounsaville's findings are supported by various researchers including Milin et al (1991) who found that 50% of ADHD adolescents who abused drugs had cocaine as their main drug of preference.

Cocaine is thought to overcome fatigue and alleviate depression in some individuals, increase feelings of self-esteem, assertiveness and frustration tolerance, overcome feelings of emptiness and boredom and alleviate impulsive and hyperactive states in sufferers of ADHD (Zweben and Smith, 1989). It is this association with ADHD that champions of the self-medication hypothesis point to when seeking to support the theory. Cocaine is a CNS stimulant and is chemically and effectively similar to Ritalin and Dexedrine that are commonly used to treat children with ADHD and it has been suggested that people with undiagnosed ADHD intuitively use cocaine as their first drug of choice because they find it alleviates the symptoms of their condition (Milin, 1991).

However, although the relationship between ADHD and cocaine use is said to provide strong evidence in favour of the model, there is a specific flaw that runs throughout the whole argument and this was touched on earlier, it is the question of direction of causality. Although Carroll and Rounsaville found that nearly 35% of treatment seeking cocaine addicts could be diagnosed as suffering from ADHD, they did not establish if this condition was caused by the long term use of cocaine or if the ADHD caused the cocaine addiction.

There do not appear to have been any studies done which have looked at this question and until that work is done the self-medication hypothesis remains an attractive, but, once again, empirically unsupportable hypothesis.

### **The Biopsychosocial Approach**

The models already discussed are only a small fraction of those put forward to explain substance abuse, but the one thing they all have in common is that none is able to claim to be the definitive answer to the causes of the addictive process.

However, as with many other areas of medicine, it does appear that the various disciplines of psychology are slowly drawing together and acknowledging that each has something to offer when trying to explain substance abuse and consequently, biopsychosocial models are emerging that are more holistic in nature than any of the models discussed so far.

But what is a Biopsychosocial Model? Essentially it may be any one of a number of generic theories that draws together elements from across different disciplines. There is not therefore any one particular biopsychosocial model, but rather numerous models that may draw together paradigms from, for instance, sociology, psychology and neurology. Commonly a biopsychosocial model may assume that an addictive state has been caused by a complex interaction of biological susceptibility, psychosocial and cultural influences, pharmacological effects and learned behaviour.

Early work on biopsychosocial models came from Ewing (1983), Tarter and Edwards (1986) and Wallace (1989) and have subsequently been refined over the years. Wallace (1993) suggests that it would be hard for any worker in the field to reject the biopsychosocial models as they are both logically and intuitively correct. He suggests that the new biopsychosocial models must be accepted because they are based on the fact that "...biological, behavioural, cognitive, psychosocial and socio-cultural events all enter into the nature of alcoholism and addictive diseases of all types." (P.76)

But is a biopsychosocial perspective any different, in practical terms, from the older models? It seems fair to answer that with a qualified 'possibly'. One of the main advantages of biopsychosocial models is that they are not restrictive and allow wide exploration and interpretation across disciplines. In this way adoption of these models allows for a reduction in the ideological clashes which have characterised much of the work in this field up until

now. Additionally, biopsychosocial models fit reality far better than any of the unidimensional models described earlier. We are, after all, complex beings, acted on by our biology, genetic history, social factors and so on. It is unreasonable to expect that any disease entity, let alone a complex state like substance abuse, to be the result of a single factor.

In summary, a biopsychosocial perspective of substance abuse promotes productive integration of diverse research perspectives; explains clinical heterogeneity while preserving common clinical dimensions; necessitates multidimensional assessment; and promotes individually prescribed treatment.

It would therefore seem reasonable to assume that multidimensional, interactive, biopsychosocial models are now necessary for continued progress in understanding and altering substance abuse states and the many personal and societal problems associated with them. Although knowledge of causality remains elusive, several hypotheses related to how we think about and respond to addictions can be generated from the biopsychosocial group of theories including:

1. Substance misuse embraces a variety of syndromes including dependency syndrome and substance misuse related disabilities.
2. Substance misuse lies upon a continuum of severity.
3. The development of substance misuse follows a variable pattern over time and may or may not progress to a fatal stage depending on the type of syndrome and/or degree of severity.
4. Because the elements in the experience of addiction will differ between individuals, there is no one superior treatment for all substance misuse.
5. The population of substance misusers is heterogeneous and defy stereotyping.
6. Successful treatment is contingent upon accurate and comprehensive assessment and matching of affected individuals to the most appropriate treatment.
7. Recovery may or may not require abstinence, depending upon the degree of severity and/or the type of syndrome.

The Biopsychosocial group of theories is a conceptual framework that allows attention to be focused on all problems related to substance misuse. This allows those who develop policy and programs for, or provide services to, people affected by substance misuse (either their own or someone else's) to address the broad range of problems, from problems which are just beginning to those that are long standing. The theories unify prior biological, psychological, and social theories of addiction, the net result being the synthesis of a specific conceptual framework comprised of a unique set of hypotheses. The theory group is not simply a bolted together version of the older theories, rather the biopsychosocial theories are a supreme candidate beckoning a diverse population of addiction professionals to work together towards solutions to a wide variety of serious problems under the umbrella of common terminology and concepts.

### **Conclusions**

The number of potential causal factors and theories of substance abuse is considerable and if their possible interactions are taken into account then the number stretches to near infinity. However, of the theories presented here, it is the biopsychosocial group of theories which offer the most promise towards understanding substance abuse.

### **Treatment of Substance Abuse**

Two of the main treatments for substance abuse will now be presented. Only two treatment modalities have been chosen because, as with the preceding theories, there are a formidable number, many of which only vary slightly. The two which have been selected are the Relapse Prevention (RP) programmes and the 12-step programmes. These have been selected as they represent two popular regimes, one of which is scientifically based and empirically testable (RP) and one of which is not (12-step).

Before these are explored, it is important to note that recently the National Institute on Drug Abuse (NIDA, 1999, p 3-5) published a general comprehensive guide to substance abuse

treatment which reviewed many of the popular treatment programmes. It is interesting that the 12-step programmes were not evaluated separately. In this document NIDA outlined thirteen key points which are summarised below.

1. No single treatment is appropriate for all individuals. Matching treatment setting, interventions, and services to each individual's particular problems and needs is critical to his or her ultimate success in returning to productive functioning in the family, workplace, and society.
2. Treatment needs to be readily available. Because individuals who are addicted to drugs may be uncertain about entering treatment, taking advantage of opportunities when they are ready for treatment is crucial. Potential treatment applicants can be lost if treatment is not immediately available or is not readily accessible.
3. Effective treatment attends to multiple needs of the individual, not just his or her drug use. To be effective, treatment must address the individual's drug use and any associated medical, psychological, social, vocational, and legal problems.
4. An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that the plan meets the person's changing needs. A patient may require varying combinations of services and treatment components during the course of treatment and recovery. In addition to counseling or psychotherapy, a patient at times may require medication, other medical services, family therapy, parenting instruction, vocational rehabilitation, and social and legal services. It is critical that the treatment approach be appropriate to the individual's age, gender, ethnicity, and culture.
5. Remaining in treatment for an adequate period of time is critical for treatment effectiveness. The appropriate duration for an individual depends on his or her problems and needs. Research indicates that for most patients, the threshold of significant improvement is reached at about 3 months in treatment. After this threshold is reached, additional treatment can produce further progress toward recovery. Because people often leave treatment prematurely, programs should include strategies to engage and keep patients in treatment.

6. Counseling (individual and/or group) and other behavioural therapies are critical components of effective treatment for addiction. In therapy, patients address issues of motivation, build skills to resist drug use, replace drug-using activities with constructive and rewarding non drug-using activities, and improve problem-solving abilities. Behavioral therapy also facilitates interpersonal relationships and the individual's ability to function in the family and community.
7. Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioural therapies. Methadone and levo-alpha-acetylmethadol (LAAM) are very effective in helping individuals addicted to heroin or other opiates stabilize their lives and reduce their illicit drug use. Naltrexone is also an effective medication for some opiate addicts and some patients with co-occurring alcohol dependence. For persons addicted to nicotine, a nicotine replacement product (such as patches or gum) or an oral medication (such as bupropion) can be an effective component of treatment. For patients with mental disorders, both behavioural treatments and medications can be critically important.
8. Addicted or drug-abusing individuals with coexisting mental disorders should have both disorders treated in an integrated way. Because addictive disorders and mental disorders often occur in the same individual, patients presenting for either condition should be assessed and treated for the co-occurrence of the other type of disorder.
9. Medical detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug use. Medical detoxification safely manages the acute physical symptoms of withdrawal associated with stopping drug use. While detoxification alone is rarely sufficient to help addicts achieve long-term abstinence, for some individuals it is a strongly indicated precursor to effective drug addiction treatment.
10. Treatment does not need to be voluntary to be effective. Strong motivation can facilitate the treatment process. Sanctions or enticements in the family, employment setting, or

criminal justice system can increase significantly both treatment entry and retention rates and the success of drug treatment interventions.

11. Possible drug use during treatment must be monitored continuously. Lapses to drug use can occur during treatment. The objective monitoring of a patient's drug and alcohol use during treatment, such as through urinalysis or other tests, can help the patient withstand urges to use drugs. Such monitoring also can provide early evidence of drug use so that the individual's treatment plan can be adjusted. Feedback to patients who test positive for illicit drug use is an important element of monitoring.
12. Treatment programs should provide assessment for HIV/AIDS, hepatitis B and C, tuberculosis and other infectious diseases and counseling to help patients modify or change behaviours that place themselves or others at risk of infection. Counseling can help patients avoid high-risk behaviour. Counseling also can help people who are already infected manage their illness.
13. Recovery from drug addiction can be a long-term process and frequently requires multiple episodes of treatment. As with other chronic illnesses, relapses to drug use can occur during or after successful treatment episodes. Addicted individuals may require prolonged treatment and multiple episodes of treatment to achieve long-term abstinence and fully restored functioning. Participation in self-help support programs during and following treatment often is helpful in maintaining abstinence.

These principles of treatment are useful and although developed in America seem equally appropriate to the UK. One of the most important aspects of these principals is that they take an holistic approach to substance abuse treatment, not simply focusing on the immediate addiction. Equally they do not specifically concentrate on a single treatment regime, but appear applicable to most of the current treatment regimes available. With these principals in mind, Relapse Prevention and the 12-step model will now be discussed.

## **Relapse Prevention**

Relapse Prevention (RP), was originally a cognitive-behavioural therapy developed by Marlatt and Gordon (1985) for the treatment of alcoholism. Subsequently it has been adapted for other types of substance abuse problems as well as behavioural problems such as chronic obesity.

Cognitive-behavioural strategies are based on the theory that learning processes play a critical role in the development of behavioural patterns. Individuals learn to identify and correct problematic behaviours and relapse prevention encompasses several cognitive-behavioural strategies that facilitate abstinence as well as providing help for people who experience relapse.

The RP model proposed by Marlatt and Gordon (1985) suggests that both immediate determinants (, high-risk situations, coping skills, outcome expectancies, and the abstinence violation effect) and covert antecedents (, lifestyle factors and urges and cravings) can contribute to relapse. The RP model incorporates numerous specific and global intervention strategies that allow a therapist and client to address each step of the relapse process. Specific interventions include identifying specific high-risk situations for each client and enhancing the client's skills for coping with those situations, increasing the client's self-efficacy, eliminating myths regarding drug effects, reducing positive outcome expectancies, managing lapses, and restructuring the client's perceptions of the relapse process. Global strategies comprise balancing the client's lifestyle and helping him or her develop positive addictions, employing stimulus control techniques and urge-management techniques, and developing relapse road maps (Larimer et al, 1999). One of the most important functions of the therapist working within the RP framework is to teach the client to anticipate the problems they are likely to meet and help them develop effective coping strategies.

Research indicates that the skills individuals learn through relapse prevention therapy remain after the completion of treatment. In one study, most people receiving this cognitive-behavioural approach maintained the gains they made in treatment throughout the year

following treatment (Carroll et al, 1994). However, others are less certain of the efficacy of the model particularly when applied to other areas than alcohol abuse which the model was originally developed for. For instance, Wilson (1996) suggests that RP therapies are not particularly useful in smoking cessation and obesity and believe that the model is overly costly in terms of therapist time. Becona and Vazquez (1997) agreed when they evaluated the effectiveness of adding an RP component to a traditional cognitive behavioural multi-component smoking cessation package and found no difference in relapse rates at the end of 12 months.

However, generally research has found the Relapse Prevention model to be a useful one. Irwin et al (1999) carried out a meta-analytical review of the model and concluded that "... RP was generally effective, particularly for alcohol problems. Additionally, outcome was moderated by several variables. Specifically, RP was most effective when applied to alcohol or polysubstance use disorders, combined with the adjunctive use of medication, and when evaluated immediately following treatment using uncontrolled pre-post tests." (p. 563).

### **12-Step Programmes**

The 12-step programmes, also referred to as the Minnesota Model were originally developed by Alcoholics Anonymous (AA) in the late 1930's and were later adapted by Narcotics Anonymous (NA) and others. They have long been a cornerstone of many treatment programmes and have been used, in one form or another by many millions of people around the world.

Although there are variations, the basic 12-steps are (in the case of alcohol):

1. We admitted we were powerless over alcohol - that our lives had become unmanageable
2. We came to believe that a Power greater than ourselves could restore us to sanity.
3. We made a decision to turn our will and our life over to the care and direction of God, as we understood Him.
4. We made a searching and fearless moral inventory of ourselves.

5. We admitted to God, to ourselves, and to another human being the exact nature of our wrongs.
6. We were entirely ready to have God remove these defects of character.
7. We humbly asked God to remove our shortcomings.
8. We made a list of people we had harmed, and became willing to make amends to them all.
9. We made direct amends to such people wherever possible, except when to do so would injure them or others.
10. We continued to take personal inventory and when we were wrong promptly admitted it
11. We sought through prayer and meditation to improve our conscious contact with our loving God, praying only for knowledge of His will for us and the power to carry that out
12. Having had a spiritual awakening as a result of these steps, we tried to carry this message to persons suffering with addictive behaviour and practice these principles in all of our affairs.

Although these steps have been extensively utilised by substance abusers from many different cultures and backgrounds there is little empirical evidence to show that they are effective. The majority of the organisations which use the 12-step methodology resist scrutiny, particularly the originating organisation Alcoholics Anonymous. Of concern too is the over-politicalisation and over-commercialisation of what is seems to be a thriving industry based upon the 12-step philosophy.

The key question of course, is although widely used, does the 12-step philosophy actually work? A recent study by Fiorentine (1999) has been highlighted by Alcoholics Anonymous (2000) as supporting their treatment system. Fiorentine suggests that, in conjunction with other treatments, participation in the 12-step programmes can be a useful adjunct to other forms of therapy for drug and alcohol abuse, provided the individual attends regular meetings of AA/NA groups on at least a weekly basis. However, Fiorentine also says that little is

known about the effectiveness of the programme and that further, structured, research needs to be undertaken.

In a complex study which looked at proximal outcomes and compared 12-step programmes to cognitive behavioural therapies, Finney et al (1999) suggested that the theories on which 12-step programmes are based are not sufficiently grounded and need to be re-evaluated. But looking at the success of utilising a 12-step programme in the treatment of addicted adolescents, Winters et al (2000) found that inclusion in the programme improved an individuals chances of continued abstinence.

As mentioned earlier, one of the major problems facing researchers is the reluctance of the treatment organisations to allow scientific scrutiny of their methods. As will be noted from the brief review, above, the studies cited are not assessments of the 12-step programmes per se, rather they are comparative research. Additionally, most of the research which has been undertaken into the 12-step methodology has been confounded by experimental noise in the form of conjoint therapeutic activities.

Another area which gives rise to concern is the emphasis in the 12-step philosophy of the role of God in the process of recovery. The treatment organisations are quick to emphasise that they do not mean 'God' in the traditional religious sense, but to any reader of the 12-steps, terms such as 'spiritual awakening' must lead them to believe that this is, at the least, a quasi-religious organisation. This appears to be a limiting factor, particularly as it may well alienate many people in need of help who are not religious. Given the role of religiosity in the process of addiction (to be discussed later) the emphasis of religion in the 12-step philosophy appears to be flawed.

Of further cause for concern is that the 12-step philosophy is very closely linked to the disease model of addiction. As discussed earlier, there are deep flaws in this model, not least of which being that alcoholics and substance addicts are given substantial grounds for abrogating any degree of responsibility for their 'illness'. AA and similar treatment groups indoctrinate their members into believing they are powerless over their condition, and, in many cases, members see AA/NA as their last hope. Clearly this is unhealthy particularly as

the 12-step groups always seem to blame individual deaths on the 'disease' of addiction and blame individuals who relapse because they have not closely followed the programme.

Peele (2000) is generally opposed to the AA/NA philosophy and states that AA itself admits that only about 5% of those who join the organisations still attend meetings a year later and that any recovery rates are flawed by the 95% drop out rate. Peele goes on to say "... their role in alcoholism treatment is repressive and totalitarian, and continues to retard progress in dealing with alcoholism in an effective, sensible way that respects the freedom and conscience of the individual." (p. 1).

Peele suggests that the following key research questions need to be asked of both recovering individuals and of the 12-step based organisations:

1. Did you stop drinking as a result of AA? That is, did you stop drinking first and then attend AA, or how long after attending AA did you quit drinking? What actually made you stop drinking? How many times had you been to AA before it worked for you?
2. What percentage of people in your experience who come to AA are helped by it and end up staying with it? What percent of people who come to AA in your view either continue to drink or drink again at some point after coming to AA? Do people ever resolve a drinking problem without AA? What percentage of problem drinkers succeed without AA?
3. Do you think all individuals who have a drinking problem should be in AA? Do you think people who attend AA are less likely to become controlled drinkers than people with a drinking problem who never attend AA? Which problem drinkers do you think are least well-suited for AA? What alternatives are available for such people or should be available to such people?
4. Do you think private treatment is helpful for problem drinkers and alcoholics? What percentage of private treatment centres practice the 12-step approach, in your experience? If private treatment centres practice the same philosophy as AA, why do people need private treatment in addition to or in place of AA, especially considering that AA is free?

5. Has AA ever harmed a person? What happens to people who drop out of AA? If a person were to control their drinking and come to AA, how would AA members treat him or her? Do you think most AA members accept other approaches to drinking problems? Do you think that alcoholism counselors and heads of treatment programs must themselves be AA members?

Clearly, serious questions have to be posed about the effectiveness of the 12-step programme. There can be no doubt that many people have experienced the programme, but, given anecdotal evidence, many also seem to have experienced only limited benefits, and, in some cases, harm from participation. As Peele (2000) suggests, AA in particular appears to be reaching almost cult status in America with many people being forced into 12-step treatment programmes. The organisation reacts aggressively to anyone who questions their underlying philosophy of total abstinence and it is this unwillingness to entertain alternate concepts such as controlled drinking, which is particularly worrying.

Given the widespread use of the programme, particularly by AA/NA, private inpatient treatment centres, the courts and social services it is almost astounding that the treatment philosophy has not undergone rigorous scientific evaluation.

It is telling that NIDA (1999) in their recently published 'Principles of Drug Addiction Treatment' largely ignored the 12-step programmes.

## **CHAPTER 2 – RISK FACTORS**

### **Introduction**

The aim of this research was to develop a psychometric instrument (the Substance Abuse Susceptibility Index, SASI) capable of identifying young people at risk from later substance abuse before their substance using careers begin. The SASI was be designed in two sections: Section 1 concentrated on psychological variables such as levels of self-esteem and Section 2 on sociological variables such as family structure and peer substance use. The work was be undertaken employing a risk factor or risk assessment paradigm and this chapter will describe the background to the work and the reasons for selecting the areas for inclusion in the SASI.

Throughout this work, unless specifically stated otherwise, the term 'substance use', or any of its derivatives, can be taken to encompass illicit drugs, alcohol and tobacco. Additionally, the terms 'use' and 'abuse' are used and it should be noted that, unless stated otherwise, 'use' refers to what society accepts as relatively normal use of a substance whereas 'abuse' refers to abnormal or harmful use as referred to earlier (p3). This approach has been decided upon based on the premise that the use of alcohol, and to a lesser extent certain illegal drugs, is a normal part of development and not, in its own right, pathological (Lowe et al, 1993).

In order to place the development of the SASI into context, the risk factor approach will be discussed.

### **Risk Factors**

Within this context risk factors are the presence in a person's life of certain circumstances that put them at greater risk of developing a condition than people without those circumstances. On occasion the term 'risk factor' may be confused with 'protective factor' with some authors choosing to differentiate between the two terms, however, within this framework, the terms will be used interchangeably with a risk factor merely meaning either the absence of a protective factor, or the reverse of a protective factor. For instance, the presence of a strong

religious conviction may be termed a protective factor, the lack of such a conviction, a risk factor.

Theoretically, once a risk factor has been identified it is possible to weight that factor, in the case of this research through logistic regression, and to develop an odds risk ratio associated with it. In this way it is possible to say that, for instance, a cigarette smoker has a 3:1 chance of having a heart attack compared to a non-smoker (Hall & Round, 1994).

The adoption of a risk factor approach has been taken as it seems implicit that this stance is one of the few within the field of substance use that lends itself to pragmatic outcomes and any attempt to develop an instrument that assesses a young individual's chance of becoming a substance abuser must, by definition, take a risk factor approach. The risk analysis approach adopted by this research seeks to determine what is different about those who go from use to abuse and, by determining factors which are common to substance abusers, a risk assessment scale can be developed that can be applied to prevention programmes aimed at young people who are not yet abusing.

Not only does this approach make practical sense, but it is also intuitively correct to say that there must be a quantifiable difference between two similar children who both come from comparable backgrounds, one of whom develops a chemical abuse problem and the other who simply uses chemicals within the accepted societal framework. The problem lies in identifying those differences and developing appropriate methods of assessment.

There has been a great deal of work during the last thirty years into risk assessment in substance use and certain specific areas have been identified as being possibly causal, or at least contributory, to adolescent substance abuse. One of the problems with this area of research is that, until recently, researchers have tended to take a single factor as the focus for their research and have tried to apply that construct, in causal terms, to adolescent substance abuse when combinations of risk factors account for more of the variance in substance abuse than any single variable ( Beschner & Treasure, 1979; Jessor & Jessor, 1978). Clearly a single factor approach is doomed to failure as it is now widely acknowledged that there is no single cause of adolescent substance abuse, but rather the condition is caused by a

constellation of interacting factors. This attitude can be summarised by Hawkins et al (1992) who stated that "...a promising line for prevention research lies in testing interventions targeting multiple early risk factors for drug abuse" (p. 65) and by Bry (1983) who said that "...any predictive model that still rests on the assumption that a single variable will eventually be found to predict drug abuse is obsolete..." (p. 228).

In addition to adolescent substance abuse being multi-causal, it is also suggested that the presence of risk factors may have a cumulative affect with risk of substance use increasing with each additional factor added (Bry et al, 1982; Newcomb et al, 1986). For example, if we turn to the field of medicine, it is well known that cigarette smoking is a causal factor in coronary heart disease (Hall & Round, 1994) and it is estimated that a person who smokes is three times more likely to develop the condition than a person who does not (Hall & Round, 1994). Another risk factor in this condition is hypertension where it is known that a hypertensive person is twice as likely to develop coronary heart disease as a non-hypertensive person. These effects are cumulative so if you have a person who is both a smoker and hypertensive they are six times as likely to develop coronary heart disease than a non-hypertensive non-smoker. In light of this, it is a reasonable premise to suggest that risk factors for adolescent substance abuse may be linked in a similar way. However, it should also be noted that not all risk factors are similarly weighted, as was demonstrated with the coronary heart disease example, and this should be taken into account when assessing an individuals vulnerability to substance abuse.

In addition, there is little evidence in the field of substance abuse regarding the effect that factor interactions might have. This is a particular problem as although coronary heart disease may be a devastating condition, certain aspects of its etiology are not complex, the risk factors are well known, but this is not the case with adolescent substance abuse. As noted, adolescent substance abuse is clearly multi-factorial in causality, but the exact identity of the factors are not yet fully determined. By taking a multi-factorial or biopsychosocial stance, it is being acknowledged that the individual is an organism acted upon by biological factors (genetic pre-determinants), psychological factors (aspects of personality) and by social factors

(family, peers and so on) and that these three diverse, yet interrelated areas, are present in each person to differing degrees and that these different proportions will cause each individual to respond uniquely.

The purpose of identifying specific risk factors is so an individual can address these potentially causal areas and so prevent later substance abuse problems. As with any condition, if one is able to identify causal factors, then appropriate steps can be taken to prevent the development of that condition by eradicating, or minimising the effect of the causal factor. Again, an obvious parallel example is coronary heart disease where if an individual can be persuaded to stop (or better still, never start) smoking they are reducing their chances of developing the condition. Although this simple logic has profound implications for substance abuse prevention programmes, the situation, when applied to this area, is not as straightforward as it may at first appear.

As will be discussed later, although some of the risk factors that have been identified are receptive to intervention, for instance peer association, others such as genetic pre-disposition, are outside anyone's power to alter. However, the assessment of risk factors can still be useful even if a person's risk assessment is entirely composed of unalterable factors because if a person is aware they have a propensity for substance abuse then they are likely to be more receptive to early warning signs and prevention initiatives.

A particular problem with adopting a risk factor approach in this area is the question of the direction of causality, although this is not a problem in most areas where the paradigm is used. Obviously the direction of causality of the relationship between cigarette smoking and coronary heart disease is clear, the presence of the illness does not initiate tobacco use, but the picture in substance abuse research is, again, not so obvious. If we use low academic achievement as an example it might be considered impossible to say whether low marks in school cause an adolescent to turn to substance use or whether the use of various substances cause the individual to under achieve. However, the risk factors cited here are generally accepted as preceding substance abuse and have been shown to be stable over time (Hawkins et al, 1992).

The question of the selection of the individual factors being used in this work is crucial and normally with risk factor research their selection would largely be driven by an orientation to one particular theoretical standpoint. However the factors being used here, although their selection has been theory driven, has been the result of a synthesis of current and past theoretical standpoints. A conscious decision has been made to avoid any one particular frame of reference and the temptation to look at a single area has been put to one side. Instead, an attempt has been made to develop a comprehensive battery of risk factors so that the eventual application of the SASI can account for as much of the variance as possible.

Risk factors for later substance abuse can broadly be placed in three main categories:

1. Biological, which includes any possible genetic pre-disposition to substance abuse.
2. Psychological, particularly factors concerned with certain aspects of personality.
3. Sociological, which encompasses the family and peer groups, as well as secondary behaviour such as delinquency and academic standards.

The individual risk factors that are going to be used throughout this research will now be discussed individually and a case made for their inclusion in the SASI.

### **Biological/Genetic Risk Factors**

This area will not be considered in any depth as it is largely outside the scope of this research. Although a biopsychosocial stance is being taken, it was decided early on that, for purely practical reasons, including genetic variables was not possible. Discussions did take place with geneticists about the possibility of collecting saliva samples from adolescents, but funding restrictions made this approach impossible. Genetics will only be looked at to the extent that parental links to adolescent substance use will be considered.

However, it is felt important, for contextual reasons, to look briefly at some of the main areas of interest. Greater consideration will be given to these theories when models of substance abuse are discussed later.

There has been a significant amount of research on the physiological differences between alcoholics and non-alcoholics, but very little on other substances. A good deal of the work has concentrated on the possible heritability of alcoholism ( Goodwin, 1979), however, as discussed earlier, much of the evidence concerned with a genetic link is seriously flawed and is open to debate. Numerous other studies that have also looked at the connection between family substance use and the substance use of offspring have found increased adolescent use within using families and this extends to families where there is an addiction component. For instance Lawson and Lawson (1992) found that of children who had alcoholic parents 30% were themselves alcoholic, 40% moderate drinkers and 30% abstainers. This was compared to the offspring of moderately drinking parents, 5% of whom were alcoholics, 85% of whom were themselves moderate drinkers and 10% of whom were abstainers. Of the children of abstinent parents, 10% were alcoholics, 50% were moderate drinkers and 40% were abstainers. These results are, superficially, impressive, but, as with all the risk factors under discussion, other external aspects need to be considered.

However, in a recent study Han et al (1999) looked at groups of monozygotic and dizygotic twins who completed a psychological assessment and a substance use interview to determine whether they had ever used tobacco, alcohol or other illicit drugs. They found that, after controlling for external factors, genetic links could not be considered causal and concluded that their findings indicated that adolescent initiation of substance use is influenced primarily by environmental rather than genetic factors. However, in a similar study Bierut et al (1998) concluded that it was the genetic link which accounted for the variance and dismissed the environmental factors.

It may be that however sophisticated they are, twin studies are not the right approach to unraveling the complex links between genetics and substance use and abuse. As stated, any twin study will inevitably be contaminated by confounding variables and it is impossible to control for all of these, possibly researchers ought to look in other directions although Schork and Schork (1998) warn that one of the serious problems when looking at the question of the heritability of addiction related conditions are the limitations of the technologies being used to

conduct relevant studies. They suggest that as these technologies have not been assessed exhaustively, this may be one of the reasons why independent studies have produced widely different results.

Although much of the evidence is contradictory and some of it is based upon dubious methodology there may be genetic differences between substance abusers and non-abusers, but the evidence is cloudy at best and considerably more work needs to be undertaken before that link can be firmly established.

### **Psychological Risk Factors**

Psychological risk factors broadly encompass the area of personality and individual personality characteristics. As noted earlier in the Introduction, there are various areas of controversy related to personality psychology, but it is felt that these have been adequately addressed without reiterating them.

The individual personality areas will now be discussed.

#### **Self-Esteem**

Of the sub-traits under consideration, self-esteem has received a considerable degree of attention from researchers, although much of the work is some years old. There have been mixed findings and a consistent relationship between low self-esteem and adolescent substance abuse has been hard to establish (Swaim et al, 1989) although Carvajal et al (1998) has found that optimism, hope, and self-esteem are determinants of avoiding substance use. It is possible that this difficulty in establishing a relationship has been because researchers have tended to concentrate on measuring global self-esteem rather than on specific areas although Carvajal et al (1998) claim that high global self-esteem is an important protective factor in adolescents whilst Young et al (1989) broke global self-esteem down into sub-traits and measured school self-esteem, home self-esteem and peer self-esteem and found a very strong relationship between low home and school self-esteem and higher drug use. Glindemann et al

(1999) measured self-esteem and related these to actual alcohol levels. They consistently found that those adolescents with lower self-esteem had higher blood alcohol levels than those with higher self-esteem markers, but Scheier et al (2000) found that high initial level of self-esteem fostered more increases in alcohol use compared to low initial level of self-esteem and concluded that results indicated that self-esteem is part of a dynamic set of etiological forces that instigate early-stage alcohol use.

Collateral work with established substance addicts has been more consistent in its findings, Gossop (1976) in a comparative study of addicts and non-addicts found a significant difference in self-esteem between the two groups and this finding was supported by Gutierrez and Reich (1988) and by Cavaola and Schiff (1989) who found that the self-esteem of addicts in treatment was significantly lower than that of a non-addict control group. Additionally, Lindblad (1977) and Manganiello (1978) both showed that addicts' feelings of low self-esteem were stronger than those of a non-addict control group with Teasdale and Hinkson (1971) suggesting that feelings of low self-esteem were the reason that some addicts became dependent on amphetamines.

In general research findings of the relationship of self-esteem to adolescent substance use is inconsistent with some older studies actually showing higher levels of self-esteem in drug users (Frumkin et al, 1969; Hogan et al, 1970; Kleckner, 1968), although with these studies, high levels of self-esteem may have been found because subjects were intoxicated at the time of testing.

Although findings from a good deal of this work is unclear and, indeed some of the findings are contradictory, there is enough evidence to support the inclusion of self-esteem in the construction of the SASI.

### **Depression**

A second area worthy of consideration is that of depression which is clearly related to self-esteem. Both pathological and non-pathological depression has been found by Keeler, et al

(1979) to be elevated in substance addicts and they indicated that up to a 98% rate of depression existed amongst substance addicts. However, this does not give any indication as to direction of causality and the two facts may only be collaterally related. The study gave not indication as to why the substance addicts were showing depressive symptoms and did not differentiate between degree of addiction, so although interesting, the statistic by itself is not particularly significant.

However, during a general survey of 510 adults Weissman and Myers (1980) found significant levels of clinical depression amongst the alcoholics in the sample and Rounsaville, et al (1983) supported this finding when they found that 53.9% of opiate addicts had, at some time in their lives, suffered from a major depressive illness. This last figure can be compared with levels of depression in non-addict populations which are estimated to be up to 23% of women and 11% in men (Weissman and Myers, 1978). When related to adolescent substance use, Brook et al (1980) carried out a longitudinal study which assessed adolescent personality aspects at Time 1 and again at Time 2, two years later, and correlated these with substance use. They found there was a significant relationship between adolescents' substance use and depressive mood levels, a finding which lends itself to the hypothesis that adolescent substance users have differing mood levels to non-users.

Abraham and Fava (1999) suggested that drug abuse had been thought to both cause depression and to serve as a form of self-medication for depression and they conducted a retrospective, blind case-controlled assessment of the drug and depressive history of depressed outpatients. They looked at several individual drugs and found that alcohol dependence followed the onset of first life depression by nearly five years and that among polydrug-dependent patients, multiple drug use always followed the onset of depression, except for LSD, which coincided with the onset of depression. Cocaine dependence occurred nearly seven years after a first major depressive episode and opiate and sedative use nearly four years after the first depressive episode. Although Abraham and Fava chose to interpret these findings as supporting a self-medication hypothesis of substance abuse, the results could

also be seen as attributing a direction of causality to the relationship of depression and substance use. It should be remembered though, that the participants in this study were all clinically depressed patients attending hospital for treatment of a major depressive illness, therefore the results cannot easily be attributed to a more general population.

When looking at the relationship of adolescent substance use to depression Hoffman and Su (1998) cautioned that many researchers risked a classification bias as studies generally only relate the two variables and exclude the possibility of other causal or related variables. Aseltine et al (1998) illustrated this point by finding that although depressive symptoms were related to adolescent substance use, substance use was also related strongly to negative peer pressure and with low family support.

Although some of the evidence is open to alternative explanations, the construct of Depression is strong enough to include it in any psychometric measure of the relationship of adolescent's personalities to substance abuse.

### **Anxiety**

Anxiety levels have also been found to be raised in both substance addicts and substance users. Sutherland (1997) found in a study of 867 recovering substance addicts that immediately following cessation of use addicts, understandably, had very high levels of anxiety, but that these levels fell the longer an individual remained abstinent. Sutherland also noted that although levels of anxiety reduced, they never fell to such a level such that they were comparable with the anxiety levels of a non-substance using control group. Christo & Sutton's (1994) work with 200 recovering addicts using Spielberger's (1983) State-Trait Anxiety Inventory confirms these findings by indicating that anxiety is initially raised in addicts during early recovery, but falls back during later recovery with levels remaining significantly higher than those of a non-addict population. Wells and Stacey (1976) in a study of 5,540 subjects found clear distinctions between addicts and non-addicts with the addicts having significantly raised levels of anxiety and Schuckit, et al (1990) reported that 98% of

male alcoholics in a treatment programme indicated they suffered from anxiety while 80% claimed they experienced related problems of shortness of breath and palpitations. There is also considerable further collateral evidence that substance abusers have raised indices of anxiety and it is one of the most definitive of the six sub-traits of Neuroticism. ( Gossop, 1978; Gossop and Eysenck, 1980; Doherty and Matthews, 1986 & Walfish, Massey and Krone, 1990).

The study conducted by Deasesmith et al (1998) looked at the relationship between anxiety and adolescents with existing substance abuse and concluded that anxiety disorders commonly coexist with substance use disorders in adolescents. They further suggest that early identification and treatment of anxiety disorders may in fact prevent substance abuse in this population. A study by the International Consortium in Psychiatric Epidemiology (Merikangas et al, 1998) took a prospective view and looked at the relationship between mood and substance use in adolescents across six European countries. Results indicated that there was a strong association between mood, anxiety disorders and substance disorders at all sites. It was also found that although there was no specific temporal pattern of onset for general mood disorders in relation to substance abuse, the onset of anxiety disorders were more likely to precede that of substance disorders in all six countries.

Most the work just described refers to either recovering or to currently addicted subjects so may have limited value in theoretical application to adolescents at the beginning of their substance using career, but the presence of anxiety is a consistent variable in much of the literature so is an appropriate variable to include in the SASI.

### **Hypochondria**

Hypochondria is broadly related to anxiety and Delatte and Delatte (1984) found a positive correlation between substance addicts and levels of hypochondriasis which is supported by Hoffman and Slade (1993) who found that pre-alcoholics had abnormally high health concerns. Additionally, a survey of 1,884 substance addicts using the MMPI found that

hypochondriasis was elevated in a majority of the participants (Horn, Wanberg & Adams, 1974).

It was decided to include items relating to Hypochondria in the SASI, because, although there was not a great deal of empirical evidence to support its inclusion, it seemed an area which, at the least, could prove interesting and worthy of exploratory analysis. In addition, the areas described earlier have been fairly well established in substance abuse research and it seemed appropriate to include an area which was speculative.

### **Hostility**

Violence and aggression have long been associated with alcohol use and numerous research studies have shown a consistent relationship between alcohol use and violence (Nicholson et al, 1998). Models of aggression are common in the literature (Mawson, 1999; Kingsbury et al, 1997; Barratt & Slaughter, 1998) many of them relate to personality and there has been a continuing search for a 'violence prone personality'. However, as with the concept of the 'addictive personality', this search has largely been abandoned (Walters, 2000) in favour of an examination of specific traits (Espnes, 1996).

Alcohol use is well known to be associated with increased violence (Athanasiadis, 1999) with many researchers claiming a causal, dose related, link between alcohol and violence (Brismar and Bergman, 1998). Cherpitel (1997) found that a positive relationship existed between alcohol and violence related injuries when data from two US emergency rooms were analysed. At both centres those being treated for violence related injuries were more likely than a control sample of patients with non-violence related injuries to have been drinking in the six hours leading up to the injury.

A relationship between illicit drug use and violence has been less easy to establish. Parker and Aurehahan (1998), in a review of published literature, found no evidence to support a link between drug use and violence, but they did establish a strong relationship between alcohol and all kinds of violence. However, Lowry et al, (1999) found that even the availability of

illicit drugs increased the likelihood of school based violence, a finding which supported Smart et al's earlier (1997) work who reported that violent delinquents at a Canadian school were more likely to be illicit drug users than non-violent delinquents. However, direct links have been established as Daderman and Lidberg (1999) found a strong relationship between the use of flunitrazepam (Rohypnol) and excessive violence. Although flunitrazepam is not actually an illicit drug, rather a prescription drug in most countries, it is interesting that a drug from the benzodiazepine group should be strongly associated with violence.

The relationship of hostility, substance use and self-esteem has also been looked at. A traditional view suggests there is a causal link between low self-esteem, aggression and subsequent violence, but recent work has not confirmed this (Bushman & Baumeister, 1998; Baumeister et al, 2000). In fact one study by Papps and O'Carroll (1998) has found that high levels of self-esteem, when coupled with high levels of narcissism, are correlated with tendencies to express anger and hostility.

Fishbein (1998) acknowledges that use of psychoactive substances have been associated with hostility and violent behaviour, but also suggests that only a subgroup of the population manifests excessively violent behaviour when intoxicated. For instance, Fishbein suggests that certain personality traits also need to be present in intoxicated individuals for violence to develop. Taylor and Chermack (1993) reported similar findings and acknowledged that alcohol is a potent antecedent to aggressive behaviour particularly if the individual is psychologically predisposed to aggression.

In 1990 Walfish et al found that a group of 809 addicts in residential treatment had significantly elevated anger and hostility markers compared to those of a non-addict population while Teasdale et al, (1971) suggested that addicts had raised levels of hostility and that heroin and barbiturates were used by them to overcome these feelings. As with Anxiety, this much of the work described has been with established substance addicts, but it does lend some weight to the hypothesis that substance abusers are quantifiably different from non-abusers and that they exhibit higher hostility levels than non-users.

In particular, the link between use of alcohol, particularly excessive use, and aggression is clear so it is appropriate when looking at the development of a new instrument to include items relating to hostility.

### **Fantasy**

Finally, research also suggests that many substance abusers are extreme fantasists and since the early 1960's when the hallucinogens D-Lysergic Acid Diethylamide (LSD) and mescaline were first used by young people, drugs of all types have become synonymous with Fantasy. In addition to the hallucinogens, it would appear that all drugs from alcohol to marijuana can be associated with a Fantasy state, or at least a desire on the part of the user to acquire such a state. Firestone (1993) noted that there was a positive correlation between Fantasy and a tendency to become addicted and Milkman, et al (1984) found that it was possible to predict the chance of relapse amongst addicts by determining their tendency towards Fantasy. Cavaola and Kane, (1989) went further and suggested that a tendency towards Fantasy could be thought of as predisposing an individual towards addiction with persons who have a high Fantasy rating being the most at risk. Therefore it was decided to include items relating to this trait in the SASI.

### **Sociological Risk Factors**

The area of sociological risk factors can be further sub-divided many times, however, for the purposes of this research, only the areas which previous work has shown to be particularly strongly related to adolescent substance use will be addressed. These areas include early initiation into substance use, the influence of the family, peer influence, school achievements and expectations, religiosity and delinquent behaviour of various types.

### **Early Initiation of Substance Use**

The earlier an individual begins substance use, the greater the risk that they will go on to develop an abuse problem later in life (Kandel, 1992), and use before the age of 15 puts a person at greatly increased risk (Robins & Przybeck, 1985), findings confirmed by Fergusson et al (1995) who found that age of initiation of alcohol use was one of the three strongest predictors of late adolescent alcohol use. Early initiation also makes it likely that these individuals will use more frequently than their counterparts who started substance use later in life (Fleming et al, 1982).

Using a questionnaire design DuRant et al (1999) assessed health risk behaviours in 2,227 adolescents and found that the single greatest predictor of later substance abuse was early onset of cigarette smoking. Other significant predictors of later use was early initiation of marijuana and alcohol use. A considerable body of work has supported these conclusions (Zhang et al, 1997 or see Moncher et al, 1991 for a synopsis) and it appears that age of initiation into substance use is one of the few predictors of adolescent substance use problems that is definitive.

### **Religiosity**

It has long been speculated that religiosity is a protective factor against substance use (Cochran, 1992). Numerous studies have suggested that if individuals have strong religious convictions they are less likely to use cigarettes, alcohol and drugs than those who do not have any such beliefs. Francis (1997) looked at the attitudes towards substance use held by over 11,000 young people aged 13-15 and found that even after controlling for individual differences in personality, personal religiosity was positively correlated with rejection of substance use. As part of a large genetic-epidemiological survey, Kendler et al (1997) looked at nearly 2,000 pairs of twins and concluded that religiosity may be one of the most important familial-environmental factors that affect the risk of substance use in general and later dependence.

Coming to similar conclusions Benda (1997) describes a reciprocal relationship between religiosity and drug use and Foshee & Hollinger (1996) extended this to suggest that maternal religiosity was also a protective factor for adolescent alcohol use. Foshee and Hollinger (1996) looked at 1,553 adolescents aged 12-14 years and found that adolescents who had a mother who was religious were less likely to use alcohol than those whose mothers were agnostic. This was after controlling for other factors such as race, age, gender, family structure and the number of friends who smoked cigarettes. Hardesty and Kirby (1995) went further and suggested that higher levels of family (as opposed to maternal) religiosity was related to lower levels of various types of substance including beer, marijuana, cocaine, crack cocaine and amphetamines.

In a study in Holland, Mullen and Francis (1995) looked at the attitudes towards drugs held by 1,534 young adolescents and concluded that although there were variances dependent on the type of drug being looked at, a person's religious beliefs would generally be predictive of a negative attitude towards drugs. In a similar way Francis and Mullen (1993), in a questionnaire study of 4753 English adolescents between 13-15 years old, found that religiosity was a significant predictor of negative attitudes towards drugs. This difference in attitude appears to be translated into actual differences in use with Cronin (1995) finding that amongst a sample of American college students, alcohol and drug use was lower amongst those with religious beliefs.

Engs & Mullen (1999) carried out a questionnaire survey in Scotland with 4,066 young people and found that there were significant differences in substance use levels between those who were not religious and those who were (Females; non-religious vs. religious: Excessive Alcohol, 55.5 vs. 36.2%, Tobacco, 43.3 vs. 29.3%, Marijuana, 32.4 vs. 15.1%, Amphetamines, 8.4 vs. 4.1%, LSD, 7.4 vs. 2.9%, and Ecstasy, 4.8 vs. 2.1%. Males showed a similar picture: Excessive Alcohol, 61.3 vs. 32.4%, Tobacco, 47.8 vs. 35.2%, Marijuana, 50.2 vs. 28.3%, Amphetamines, 15.9 vs. 8.0%, LSD, 17.6 vs. 8.4%, and Ecstasy, 9.2 vs. 5.2%).

It may be speculated as to why religiosity is be a protective factor against substance abuse (for instance individuals involved with a formal religion may find that the belief systems of

that religion are against substance use or that commitment to a religious sect may give a meaning to life that makes substance use appear less attractive), but whatever the reason, as adolescents' religious convictions appear to contribute as a protective factor against substance use of all kinds, this is an area that should be assessed in any instrument such as the one under development here.

The exception to this is, of course religions such as that practiced by the Rastafarians who encourage marijuana use.

### **Peer Influence**

The influence of an adolescents friends and contemporaries is clearly strong in many aspects of a young persons life, but before peer influence is discussed, it is worth noting that the extent of the influence of the peer group on an individual is probably more susceptible to other risk factor influence than any of the other areas being considered here. For instance a person with few friends and very low self-esteem is likely to be more open to peer influence than a person with high levels who has no need to conform to a group norm. Additionally, peer influence clearly extends to many aspects of an adolescents life, we have only to look at the world of fashion and the need for individuals to conform to the their societal norms by buying the appropriate records and clothes to know instinctively that the peer group is of the utmost importance.

Numerous studies have documented the powerful influence of peers on adolescent drug use with various authors suggesting that one of the best predictors of adolescent drug use is the extent to which one associates with other adolescents who use drugs (Blechman, 1982; Elliott et al, 1985; Johnson, et al, 1987; Needle et al, 1986; Orcutt, 1987) and several longitudinal studies have found that young adolescents who associated with drug using peers at Time 1 were far more likely to be using drugs at Time 2 than those who associated with non-drug using groups (Kaplan et al, 1984; Elliott et al, 1985). As specific examples, Byram & Fly (1984) found that a linear relationship existed between self-reported increased use of alcohol

and increased use of alcohol by friends and O'Connell et al (1981), in a large study of 10-12 year olds, found that the single most predictive factor of cigarette smoking was friends use of tobacco.

Indeed, some studies have suggested that the influence of peers is greater than that exerted by the family. Smith et al (1989) found that friends' approval and direct modeling of drinking behaviour was a much stronger predictor than demographic variables and family use. However, the extent of this influence may be flexible with family influences being stronger with the very young and peer influence only gaining the upper hand as the adolescent approaches the middle teenage years (Zucker & Noll, 1982).

However, in a recent study Reed & Rowntree (1997) examined data gathered during an American national survey during 1977-79 and concluded that through path analysis, they could find no evidence that peer influence was a contributory factor in adolescent substance use. Finally, Barnes & Windle (1987) looked at the comparative influence of friends opinions over those of their family and found that adolescents who valued friends opinions were more likely to use both alcohol and illegal drugs than those who valued the opinions of their families.

The majority of researchers have concluded that the influence of peers on adolescent substance use is considerable, and it is clear that any risk factor estimation would be unwise to leave out an assessment of their influence.

### **Delinquency**

Delinquency is a general term that can be used to describe many types of anti-social behaviour including precocious sexual behaviour and drug use. However, within the context of this research the term will be used to describe behaviour that has caused an individual to have come into negative contact with the police, to have been suspended from school or to have committed criminal acts they have not been apprehended for.

It has been suggested that amongst young offenders drug use is approaching approximately 90% with possibly over 50% requiring drug abuse treatment (Winters et al, 1993). This is a finding supported by Milin et al (1991) who found a substance abuse rate of 81% amongst a sample of 111 11-17 year old offenders. Clearly these figures come from the extreme end of the scale, but behaviour that might loosely be termed 'delinquent' does appear related to substance use. It was suggested by Shannon et al (1993) that suspensions and expulsions from school, accidents, arrests by the police, attempted suicides and pregnancies were more prevalent among adolescents who were substance users than amongst non-users. Following a longitudinal study which first looked at 410 children when they were 5-10 years old and again when they were 14-18 years old, Brook et al (1992) found that childhood aggression was a precursor of adolescent delinquency and drug use and that early adolescent drug use was correlated with contemporaneous delinquency. Van Kammen et al (1991) looked at substance abuse in 2573 young adolescents and found that significantly more of the multiple substance users were engaged in delinquent acts and had conduct problems than were either single users or nonusers and Dembo et al (1991) noted that in a study designed to look at the relationship of drug use and crime, it was found that self-reported delinquent behaviour and alcohol use prior to initial interview were key predictors of reported delinquent behaviour during the 10-15-month follow-up period.

However, not all researchers are as convinced of the link. Otero et al (1994) looked at various aspects of delinquency and drug use in 2,022 male teenagers in Spain and concluded that there is no causal relationship between drug abuse and delinquency, rather that other, non-specified, variables are responsible for any statistical relationship found. In addition, Fagan et al (1990) carried out a four city study of substance use and delinquency with a general adolescent population and concluded that although serious substance use was more prevalent and frequent amongst serious delinquents, it was believed that there was no causal relationship, rather that the two phenomenon occurred along parallel, but independent social networks. However, Loeber et al (1999) undertook a prospective study using logistic regression techniques and concluded that there was a causal link between delinquency and

substance use with early delinquency predicting later substance use. This was supported by a second prospective study (Stice et al, 1998) which tested the nature of the relationship between delinquency and problem use over a 1-year interval in adolescents who had been treated for substance abuse. Results showed that delinquency moderated the relation between consumption and problem use, with high-delinquent teens showing consistently elevated levels of use-related problems across all levels of substance use compared with non-delinquent adolescents.

Nevertheless, even though the causal relationship appears to be in some doubt, there is a considerable body of evidence to suggest that such a relationship exists between delinquency and substance use and should therefore be included in any assessment being made of adolescent lifestyles.

### **Academic Standing**

Numerous studies have found that low levels of academic achievement are correlated with substance use of all kinds. However, with this area in particular, it is necessary to call the direction of causality into question. It is questionable whether low academic standing might be a contributory factor in the initiation and continuation of substance use or whether the use of substances causes marks to fall. A clue to answering this question may come from Block et al (1988) who found that intelligence (IQ) declined in boys who used drugs between the ages of 11 and 18. Another clue comes from Fleming et al (1982) who suggested that high reading ability and high IQ scores at a young age were predictive of increased alcohol use in early adolescence. If these two findings are coupled, it may, on one level, be possible to speculate that it is the substance use which causes the lowered academic standing rather than the other way around. However, when considering the relationship between academic standing and substance use. The question of direction of causality should always be born in mind.

Data obtained from 2,229 adolescents by Jenkins (1995) concluded that students' academic performances were strongly related to both experimentation and continued heavy drug use

with the users being the underachievers. Similar conclusions were drawn by Paulson et al (1990) who found that amongst a group of 446 adolescents, aged 9-17, the non-drug users reported higher overall grades, fewer absences and missed lessons less than drug users. In addition, the non-users also had higher academic aspirations and more interest in school work than drug users. Again, these findings have been confirmed by Schulenberg et al (1994) in America who found that higher grade point average contributed negatively to substance use as did plans to continue onto higher education. Shannon et al (1993) looked at 348 young confirmed drug users and concluded that they were generally in lower ability groups, were referred more often for special education and psychological services and failed more courses than their non-using colleagues. These findings were extended from drugs to alcohol by Pendorf (1992) who found that heavy users of alcohol enjoyed school and school subjects less, had greater potential for conflicts with teachers, and received lower grades than non-drinking or light drinking colleagues.

Finally, Allison (1992) examined the academic records of 2,543 high school students in Canada and found that those who were in basic and general academic streams had significantly higher levels of cigarette, alcohol, and cannabis use compared with those of advanced level students.

It does appear therefore that substance use of all kinds is negatively related to academic achievement and expectations and further evaluation of this area may enable adolescents at risk from substance use to be more readily identified. Specifically, the question of direction of causality needs to be answered, because although it is clear that academic standing is closely related to substance use until we know whether it is antecedent or dependent on substance use any prevention programmes will be hampered.

### **The Family**

The role of the family in the etiology of adolescent substance use is one of the most complex factors that need to be considered and family substance use has been found to directly effect

adolescent use (Sutherland & Willner, 1998). Given that most children and adolescents will spend the majority of their early lives within the environs of their family, its importance cannot be overemphasised. An issue that is of particular importance is in how one determines what actually composes a 'family'. Families can vary from a single parent living with a single child to large multi-generational extended families living under the same roof. For the purposes of this work the term 'family' is being used to include anyone who permanently lives in the adolescents' home, in other words, family is being used synonymously with 'household'.

The influence of the family on adolescent substance use can show itself in a diverse number of ways, but principally these are the composition of the family unit, the substance using behaviour of the family, the atmosphere within the family unit and the parenting styles used by the senior members of the family.

The various possible permutations of the family structure are numerous and many different types could be considered, but as adolescent substance use in non-intact families where parents have divorced or where one has died has been found to be higher than in traditional nuclear families, it is these types of families that will be focused upon (Cannon, 1976; Craig & Brown, 1975; Lowe et al, 1993). In a study of nearly 700 adolescents aged 11-17 years who had been through a parental divorce, Doherty & Needle (1991) found that the participants psychological adjustment was negatively affected by the experience and that substance using behaviour increased. Similarly, Glynn (1981) found that the presence of only one natural parent in the home contributed to the risk of drug use, with the risk increasing if the event took place after the child was 12 years old. However, Glynn commented that it was the quality of the available parenting that was of greatest importance, not necessarily the family structure.

Turner et al (1991) looked at mother-only families and traditional, intact, families and concluded that family structure was predictive of experimentation with different substances even when sociodemographic and family process measures were controlled for with adolescents from single-parent homes being more at risk than their counterparts from intact

families and Stern et al (1984) concluded that "...the absence of the father from the home affects significantly the behaviour of adolescents and results in greater use of alcohol and marijuana" (p. 309). Findings related to family structure are however, somewhat mixed, possibly due to the influence of other factors. For instance Barnes and Windle (1987), following a self-report questionnaire survey of 673 young adolescents, found that living in a single parent family was predictive of illicit drug use, but not of alcohol use and that living with a natural parent and a step-parent increased this risk further. Miller (1997) looked at a cohort of 7,722 teenagers and found that those from one-parent families were considerably more likely to use cigarettes, alcohol and illicit drugs than children from intact families. Miller found that it made no difference if the single parent family comprised of a mother or father.

In light of these various findings, the structure of the family does appear to have a bearing on adolescent substance use, but to what extent this influence is affected by other variables is unclear.

The family substance using behaviour is clearly of significance in the etiology of adolescent substance use and it is generally accepted that a positive relationship between parental and offspring substance use exists (Anderson & Henry, 1994). This is something that has been known for a considerable length of time. For instance, Tec (1974) looked at the relationship between family and adolescent use and found a positive association between parent's and children's consumption of illegal drugs with more parental drug use among adolescents who regularly used marijuana than amongst non-users and Ahmed et al (1984) considered that drug salience in the household was the best predictor of children's expectations to use and actual use of a variety of substances including alcohol and tobacco. It would be a mistake to suggest that only parental substance use is involved here, the role of siblings has also been found to be of importance with older siblings opinions and habits being a considerable influence on younger adolescent substance use (Needle et al, 1986; Duncan et al, 1996).

More recently, Lowe et al (1993) in a meta-analytic study into the relationship between family and offspring drinking, found that in over forty published studies from 1967-1991, the

vast majority concluded that there was a positive relationship between adult and child drinking with more frequent and heavier parental drinking being related to increased offspring consumption and in a literature review Denton & Kampfe (1994) found that a consistently strong relationship had been shown between family and adolescent use with family use being predictive of adolescent use. Stephenson et al (1996) were more specific and, following administration of a self-report questionnaire, concluded that one of the best predictors of adolescent substance use was maternal substance use and although reporting similar findings Hops et al (1996) concluded that the greater parental effect was on their younger children with influence lessening as the children grew older. Finally, following a longitudinal study, Chassin et al (1996) concluded that there was a strong relationship between parental alcoholism and their offspring's substance use. Not only does research link these two areas, but so does popular perception as it appears obvious to say that adolescents are more likely to use a range of substances if they see other household members using the same substances. What popular perception cannot answer however, is the extent, or strength, of this link.

As well as family structure and family substance use, of equal importance is family atmosphere, parental style and attitude towards substance use. In homes where there is conflict, substance use is more likely amongst children than in homes that are generally harmonious ( Baumrind, 1983; Wilson & Hernstein, 1985; Malkus, 1994). Parental style is also important with inconsistent attitudes towards discipline being predictive of adolescent substance use (Kandel & Andrews, 1987). In households where there is either overly strict discipline or overly lax discipline children are more likely to use substances than in moderate homes (Lowe et al, 1993), and Barnes & Windle (1987) found that adolescents living in households where there were few rules were more at risk from excessive use of alcohol and drugs than those living in controlled homes. Low levels of parental support also seem to be predictive of adolescent substance use with Barnes & Windle (1987) finding that adolescents were more at risk in homes where paternal nurturance was low, as they suggest "...a high degree of parental nurturance (*support*) along with low coercive punishment and clear

expectations for adolescent behaviour appear to be salient factors for the prevention of alcohol and drug abuse....in adolescence." (p. 17).

Clearly, a stable, caring family is a protective factor and the presence of a family in turmoil, a risk factor.

The emotional style of the family has also been found to be important. Brook et al (1988) found that adolescent marijuana use was correlated with lack of parental affection and with parents who were not child-centred. It has also been found that parental involvement in adolescent activities and strong bonding between parents and children discourages the initiation of adolescent substance use and decreases its levels when use is already present (Barnes, 1984; Jessor & Jessor, 1977; Brook et al, 1990; Johnson & Pandina, 1991).

Parental attitude towards substance use also plays a part in adolescent use with Barnes & Windle (1987) finding that alcohol and illegal drug use was higher in homes where parents approved of use than where strong disapproval was voiced. Lowe et al (1993) concluded that parental attitude towards drinking was predictive of adolescent alcohol use with extremes of opinion being more salient than a moderate attitude. They concluded that moderation in attitude, parental discipline and alcohol use was strongly related to moderate adolescent alcohol use.

In light of this evidence, the role of the family in adolescent substance use is clearly of crucial importance and the inappropriate, dysfunctional family, must be considered a considerable risk factor in the etiology of adolescent substance abuse.

### **Conclusions**

The number of potential causal factors in adolescent substance use is considerable and if their possible interactions are taken into account then the number stretches to near infinity. However, if a psychometric measurement is to be made of risk factors then clearly this number needs to be reduced.

An attempt has been made here to synthesize current thinking on risk factors in adolescent substance use and to justify why each of these areas should be included in the SASI. The areas under discussion have been the most prominent ones, but it is not suggested that they are definitive or, indeed, the only possible risk factors. However, they are the ones that have been consistently shown over the past 20 years to be influential in adolescent substance use. The development of any psychometric instrument in this particular field is going to be a compromise, but by selecting these areas it is anticipated that the majority of the variance will be accounted for.

## **CHAPTER 3 – STUDIES 1 AND 2: PATTERNS OF ADOLESCENT SUBSTANCE**

### **ABUSE**

#### **Introduction**

Alcohol use by young people is on the increase in the UK, and abstainers are now rare (Sutherland & Willner, 1998a, Sutherland & Shepherd, 2000). To place this in historical context, a 1943 report claimed that 75% of seven to fourteen year olds in England had used alcohol, but by 1988 this figure had risen to 96% (Bagnall, 1988). Similarly, a 1985 study found that only 2% of Scottish fifteen and sixteen year olds reported never having drunk alcohol: most subjects in this study said that drinking was initiated between ten and eleven years of age and escalated throughout the teenage years (Plant et al, 1985). In addition it was recently noted that alcohol consumption patterns appear to be changing, with young children using large quantities of alcohol at each drinking session, and the suggestion made that these young (14/15 year olds) are now specifically drinking in order to get drunk: the 'big-bang approach to sessional drinking' (Measham, 1996). These findings are particularly worrying in the light of recent studies suggesting that the younger the age of alcohol initiation the greater the level of alcohol misuse at age 17-18 (Gruber et al, 1996; Hawkins et al, 1997).

The scale of cigarette smoking in adolescents is also a matter of great concern, and there is evidence that, after a period of decline, smoking is again increasing in young people. Bagnall (1988) found that 34% of her sample of UK thirteen-year-olds admitted to having smoked cigarettes, and 6% said that they did so at the time of the study. While unacceptably high, these figures are lower than in some other countries. In Italy, for example, up to 47% of young adolescents were regular smokers (Donato et al, 1995). There appears to be no gender difference with respect to those who have ever smoked cigarettes, but regular smoking is significantly more frequent in girls than in boys (Bagnall, 1988).

The prevalence in adolescents, and age of initiation, of illegal drug use has also been examined ( Sutherland & Willner, 1998a). Dupre et al (1995) found that of 64 respondents to

a 'cocaine hotline' the mean age of onset for alcohol use was 13.6 years, 13.3 years for marijuana and 14.6 years for cocaine. Although this sample size is small and represents a group of established drug users, other work of a similar nature has arrived at comparable estimates. For instance, Segal (1991) found that first use of illegal substances occurs over a period from 13 to 16 years and Balding (1994), in his continuing survey of health behaviour in English adolescents, found that 24.3% of 14-15 year olds, as opposed to 3.8% of 11-12 year olds, had used illegal drugs. Balding also noted gender differences in the onset of adolescent illegal drug: 3.8% of 11-year old boys, but only 1.8% of 11-year old girls had used illegal drugs, figures which rise to 34.7% of 15-year-old boys and 28.0% of 15-year-old girls (Balding, 1994).

In addition to studies reporting on the usage of individual substances, there have also been a number of studies of the interlocking patterns of usage of cigarettes, alcohol and illegal drugs (Sutherland & Willner, 1998a). It is clear that the use of one or more of these substances, particularly alcohol, has an affect on subsequent use patterns of the others, but the nature of this effect is open to debate (for a review see De-Piano & Van-Hasselt, 1994). Miller (1995) examining data from four American national surveys dating from 1974 to 1988, suggested that adolescents are more likely to use alcohol before marijuana, and marijuana before hard drugs, because these substances are more widely used and are used at early ages. This account of sequential progression is known as the "gateway" theory (Yamaguchi & Kandel, 1984; Kandel et al., 1992). However, the results of longitudinal studies tend to be more complex than this. In a study of over 4,000 young teenagers, Bailey (1992) found that levels of use of both alcohol and cigarettes had a direct bearing on whether or not subjects initiated later drug use, with heavier drinking and smoking indicating greater risk. This position was supported by Yu and Williford (1992), who found that alcohol use increased the chance of using cigarettes and marijuana, amongst a sample of 3,000 young people, but also found that alcohol and cigarette use in combination significantly increased the likelihood of using marijuana, with the strongest impact when alcohol and cigarette use was initiated in a posited critical age period between the ages of 13 and 16. Kandel et al (1992) found that whereas

progression to illicit drugs among men was dependent on their prior use of alcohol, among women either cigarettes or alcohol was a sufficient condition for progression to marijuana. Following an examination of the developmental pathways taken by a group of serious drug abusers, Golub and Johnson (1994) suggested that alcohol may not, in fact, be a necessary precursor to other substance use. Indeed, Ellickson et al (1992) suggested that alcohol use actually followed marijuana use, while preceding use of all other illicit drugs.

Although there is a degree of conflicting evidence, the consensus appears to be that there is a relationship between cigarette, alcohol and drug use in adolescents, and that alcohol may well have a causal link with later cigarette and drug use. However, few of these studies have included a pre-teenage sample and no studies of the inter-relationships between the usages of different substances by adolescents appear to have been carried out in the UK. The major objective of this part of the work was to examine patterns of substance use among a large sample of young English adolescents and to establish baseline levels of use.

Given this seemingly causal link between alcohol and other types of substance use, particular attention was paid to the preferences expressed for different types of drinks. These preferences were also looked at because of the relatively recent introduction of 'alco-pop' drinks and a reported rise in adolescent drinking (Balding, 1997). In addition, there is a considerable body of popular, largely anecdotal, evidence which suggests that alco-pops have had a strong impact on adolescent substance using patterns over the past two years. Again for contextual reasons, the alco-pop phenomena will now be presented in some depth.

Alco-pops first arrived in the UK from Australia in May 1995 and in that short time have developed a large following amongst adolescent drinkers. However, one of the problems with any discussion of alco-pops is in defining exactly what they are. The alcohol industry and specifically their regulatory body the Portman Group, seem to be at odds with the popular perception of what is or is not an alco-pop. For the purposes of this work alco-pops will be defined as any sweetened alcoholic drink predominately sold in single drink units with a strong citrus (or other) base designed to act as a masking agent for the alcohol content.

Currently there are about 50 different types of alcoholic drink available that fall into this category although the alcohol industry prefers to define the stronger ones as 'designer drinks'. The first drink of this type to be introduced into the UK was 'Two Dogs,' an alcoholic lemonade and this was quickly followed by various brands of alcoholic cola and then by alcoholic juices and other popular alcoholic drinks such as cider and vodka that had their alcohol content masked by some form of fruit juice. Alco-pops range in strength from 15.0% alcohol by volume (abv) (Cisco Orange, a combination of citrus fruit and grape wine said by the alcohol industry to be a designer drink) to the current market leader 'Hooch' which is around 4.7% abv depending on the flavour chosen. These strengths can be placed in context by comparing their alcohol by volume content with that of typical draft beers which are around 3% abv.

A particular area of concern with the rise in alco-pop sales is that it may be underage drinkers who are responsible for their success and there is the beginnings of a groundswell of research which is looking at this question ( McKeganey, 1996; Hughes et al, 1997).

## **Method**

### **Participants**

Participants were a total of 5,492 adolescents from 6 English secondary schools. The total population of the 6 schools was 6,974. Although it was planned to utilise the entire student population this was not possible owing to exam commitments, absenteeism and school outings. Of the 5,492 participants, 5,402 returned useable questionnaires. 867 of these subjects, aged 11-15 and attending one of the schools, were surveyed in a pilot study (Study 1) carried out in the spring of 1996. The remaining 4,535 subjects, aged 11-17 and attending the other 5 schools, were surveyed in the spring of 1997. Data from 17-year-olds were excluded from the analysis as there were only 19 respondents in total in this subgroup (Study 2).

The data reported were supplied by the remaining 5,383 respondents: their age and gender breakdown is detailed in Table 3.1 Except for the fact that School 1, used in Study 1 (the pilot study), does not have a sixth form (hence, no data from 16-year-olds), the age and gender distribution was similar across schools. Data collected from the other five schools have been designated Study 2.

The 6 schools surveyed in this study were chosen to reflect different geographical areas and demographic characteristics. However, the sample is not assumed to be representative of English schoolchildren as a whole, and the extent to which the findings can be extrapolated from these particular locations is unknown. Two of the schools were in one of the most deprived inner London boroughs, two were in a city in the south of England, parts of which are very deprived, and two were semi-rural: one of these (Study 1) was in the south-west of England, and the other was in a relatively affluent part of the north midlands.

**Table 3.1 - Number and gender of participants**

	Males						Females						Total
	11	12	13	14	15	16	11	12	13	14	15	16	
<b>S1<sup>1</sup></b>	26	109	99	137	68	-	20	101	114	109	84	-	<b>867</b>
<b>S2</b>	43	103	110	111	99	52	56	88	99	121	101	45	<b>1028</b>
<b>S3</b>	36	75	46	28	97	56	75	64	84	121	69	55	<b>806</b>
<b>S4</b>	24	90	71	186	85	36	27	62	69	79	87	65	<b>881</b>
<b>S5</b>	41	88	127	112	57	57	30	73	62	74	89	54	<b>864</b>
<b>S6</b>	45	101	64	108	92	49	59	72	56	120	99	72	<b>937</b>
<b>Total</b>	<b>215</b>	<b>566</b>	<b>517</b>	<b>682</b>	<b>498</b>	<b>250</b>	<b>267</b>	<b>460</b>	<b>484</b>	<b>624</b>	<b>529</b>	<b>291</b>	<b>5383</b>

<sup>1</sup> Study 1 Data

### **Materials**

The data presented in this study were abstracted from various responses to the Substance Abuse Susceptibility Index. Specifically, the data reported in this chapter were derived from answers to the following questions:

1. Do you smoke cigarettes?
2. If you do smoke cigarettes, how many would you usually smoke in a week?

3. Do you drink alcohol?
4. If you do drink alcohol, what is your favourite drink?
5. If you do drink alcohol, how many times a week would you usually drink?
6. If you have been drunk, how many times has this happened?
7. Have you ever used any drugs that were not given to you by a doctor?
8. If you've used drugs not given to you by a doctor, please say what they were.
9. About how many times have you used these drugs?
10. If you use them regularly, how many times a week do you use them?

The completed data were coded using, for the most part, 0 or 1. In certain cases ( 'If you do drink alcohol, what is your favourite drink?') a range of scores was used ( 1 for beer, 2 for wine etc). It was emphasised in the instructions to respondents that 'Drug use' refers to illicit drugs only. To ensure that simple experimentation of substances was not included in the analysis, the data presented refer to 'regular use', which was defined as use of alcohol, tobacco or illegal drugs that takes place at least once a week for a period of three months or more.

### **Procedure**

The procedure which follows was adopted for this and all subsequent studies. In order to avoid unnecessary repetition of information, the procedure will be given only once. The exception to this was Study 3 (Chapter 5). Any minor differences will be given where appropriate.

Participants were told at general school assemblies that over a period of a week, as timetabling allowed, a questionnaire survey would be carried out to find out about various aspects of their lives. They were told that this would be done in tutor groups and that details would be explained to them by their individual tutors. Tutors were briefed by the head teacher and were asked to administer the questionnaire at their weekly tutor class during the designated week, which was the same week for all the schools involved in the study.

However, it was left to the tutors how they explained the research to their pupils. This was done because of the differences in ages of the participants and because it was felt that specific tutors would know their individual classes better than any third party. However, it was stressed that the information summarised below should be included in any briefing carried out by tutors although the precise format in which it was presented was left to individual tutor's discretion.

Tutors were asked to ensure that pupils understood that completion of the questionnaire was not an examination and that there were no right or wrong answers, that pupils did not have to participate if they did not want to, and that they could withdraw from the survey at any time. In addition, teachers were asked to stress that the survey was completely confidential and that neither the teachers nor the researchers wanted to know individuals' names and there was no space on the questionnaire for names to be written. Tutors were asked to emphasise confidentiality by ensuring that each questionnaire was handed out with a plain envelope and returned, sealed, in that envelope. This was done in order to reassure students that the teachers would not be able to see the completed questionnaires and recognise individuals by their handwriting. Finally, it was made clear by the teachers that answers should refer to regular use only (as discussed above) and should not include experimentation or occasional use on special occasions.

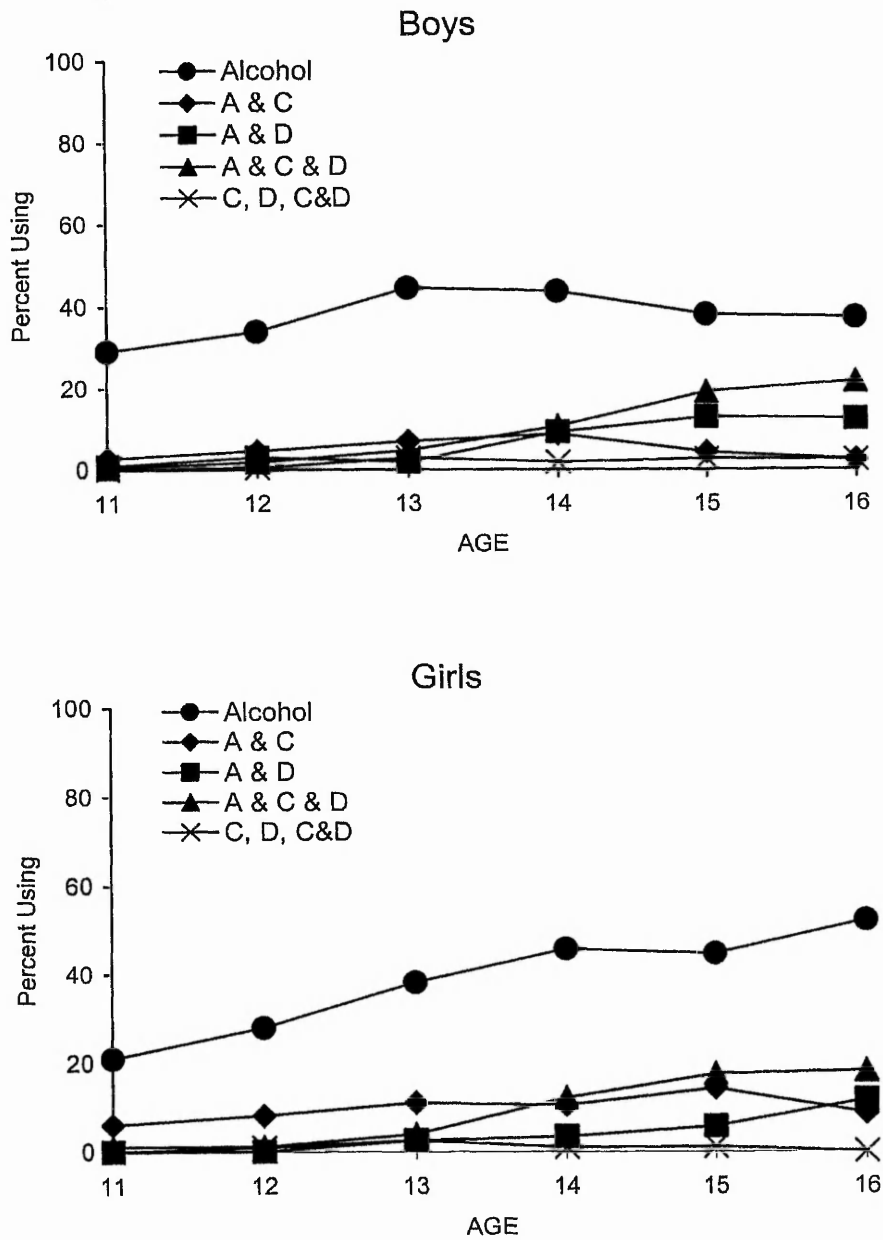
## **Results**

Data from Study 1 and Study 2 were very similar. The two sets of data have therefore been amalgamated for the purposes of presentation. The exception to this is the section on Alcohol Preferences, where the data from Study 1 ( $n = 867$ ) has been excluded, as alco-pops were only just beginning to appear on the market when this work was undertaken. As noted, all of the results refer to 'regular' use, defined as at least once weekly use for a period of not less than three months. In order to correct for differences in distributions, the results were analysed using Mantel-Haenszel chi-squared tests.

### **Age and gender differences in substance use**

Only 1982 (36.9%) of the subjects who returned useable questionnaires said that they did not use any kind of psychoactive substance. Overall, the prevalence of substance use rose from 30.4% of the sample at age 11 to 83.9% at age 16 (Figure 3.1). Alcohol was the most heavily used substance with 30.4% of the sample drinking at age 11, rising to 83.9% at age 16. Cigarettes were the second most heavily used substance with 5.4% of 11-year olds smoking, rising to 29.5% at age 15 and decreasing slightly to 26.6% at age 16. Regular use of illegal drugs rose from 1.3% of the sample at age 11 to 31.8% of the sample at age 16.

**Figure 3.1** Proportion of different ages using alcohol (A) alone, or in combination with cigarettes (C) or drugs (D). The line labeled C, D, C & D shows the total of all alcohol-exclusive combinations.



There were no gender differences in overall substance use or in alcohol use ( $\chi^2 = 1.2$  and  $2.7$ , respectively, NS); however, cigarette smoking was significantly more prevalent in girls than in boys ( $\chi^2 = 14.5$ ,  $p < 0.0001$ ), and drug taking was significantly more prevalent in boys than in girls ( $\chi^2 = 14.3$ ,  $p < 0.0001$ ).

### **Patterns of substance use**

Table 3.2 shows the proportions of the overall sample who used alcohol, cigarettes or drugs exclusively as well as those using different combinations of substances. Exclusive consumption of alcohol dominated adolescent substance use, with 39.2% of the overall sample using only alcohol. However, there was virtually no exclusive use of either cigarettes or drugs at any age. Conjoint use of cigarettes and drugs (but not alcohol) was also negligible. Rather, cigarettes and drugs were almost invariably used in combination with alcohol.

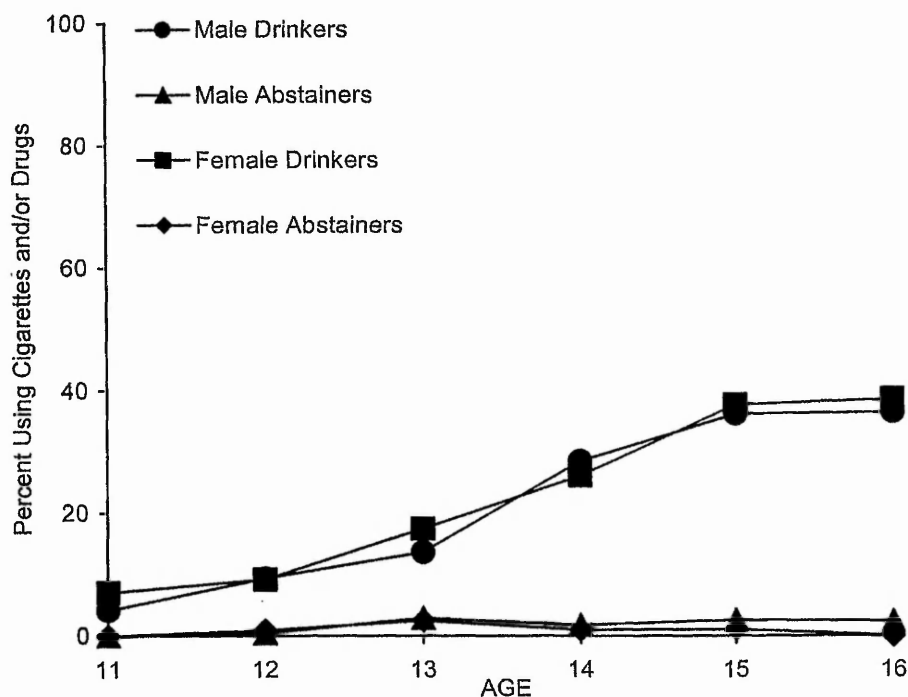
**Table 3.2 - Mean percent using alcohol and non-alcohol combinations**

	<b>Boys (n = 2728)</b>	<b>Girls (n = 2655)</b>
<b>Cigarettes only</b>	1.1	0.9
<b>Drugs only</b>	0.2	0.04
<b>Cigarettes &amp; Drugs only</b>	0.4	0.1
<b>TOTAL 1</b>	1.7	1.0
<b>Alcohol only</b>	39.0	39.3
<b>Alcohol &amp; Cigarettes only</b>	5.7	10.3
<b>Alcohol &amp; Drugs only</b>	6.9	3.7
<b>CAD</b>	9.4	9.4
<b>TOTAL 2</b>	61.0	62.7
<b>TOTAL 3 (T1 + T2)</b>	62.7	63.7

A mean across gender of 5.3% of the sample used a combination of alcohol and drugs, 8% used alcohol and cigarettes and 9.4% used all three types of substances. In all 22.7% used cigarettes and/or drugs in combination with alcohol, and this figure rises to 37.5% by age 16. By contrast only 1.3% of the sample used cigarettes and/or drugs without alcohol, and this figure remains negligible across all age groups (Figure 3.1). The differences between alcohol drinkers and alcohol abstainers are dramatically illustrated in Figure 3.2, which shows all use

of cigarettes ( $\chi^2 = 439.5$ ,  $p < 0.0001$ ) and all use of drugs ( $\chi^2 = 452.8$ ,  $p < 0.0001$ ) in each of these groups. Among regular users of illegal drug 74.6% reported using primarily marijuana, 11.1% said they used primarily amphetamines, 8.6% MDMA, and 5.7% opiates or cocaine. 13.2% of the drug users reported poly-drug use comprising marijuana and ecstasy and/or amphetamines.

**Figure 3.2** - Cigarette and/or drug use, by alcohol drinkers and alcohol abstainers



### Intoxication

Because alcohol plays a significant role in the use of other substances, drunkenness was also examined as a potentially important factor. Table 3.3 shows the frequency of reported intoxication on alcohol or drugs. Many respondents (50.5%) had never been intoxicated. Among subjects who did report intoxication, both alcohol and drug intoxication were bimodally distributed, with the majority of respondents reporting either very low (1-5 occasions) or very high (>20) frequencies. A significant group of subjects reported high frequencies of alcohol intoxication, but low frequencies of drug intoxication. However, the

reverse pattern was very uncommon; high levels of drug intoxication were almost invariably associated with high levels of alcohol intoxication.

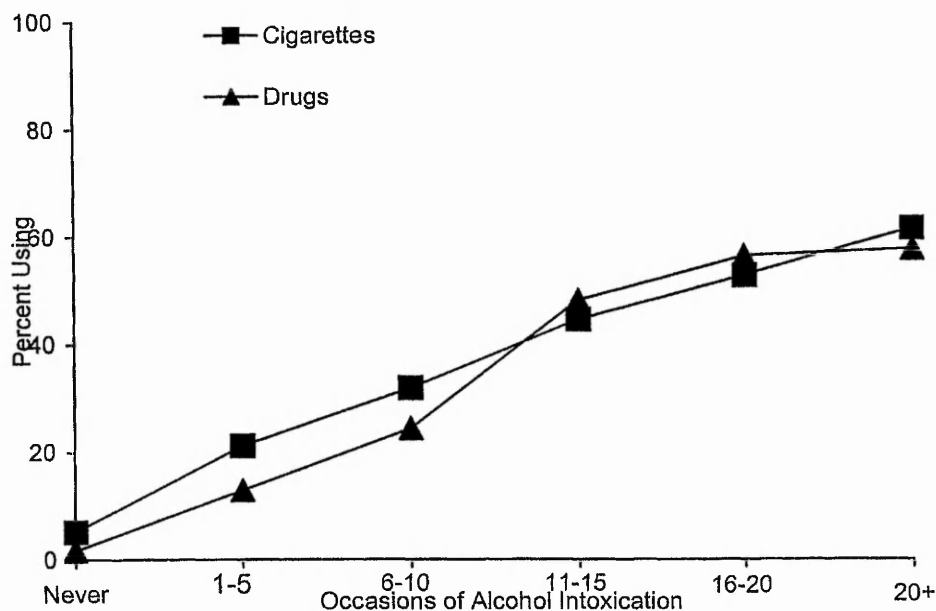
**Table 3.3 - Frequency of drug and alcohol intoxication**

Alcohol intoxication	Drug Intoxication						Total
	Never	1-5 times	6-10 times	11-15 times	16-20 times	20+ times	
Never	51.3%	0.4%	0.1%	0.04%	-	0.1% 7	52.2%
1-5 times	22.6%	1.9%	0.3%	0.2%	0.02%	0.5%	25.5%
6-10 times	3.7%	0.6%	0.1%	0.1%	0.04%	0.2% 8	4.7%
11-15 times	1.7%	0.6%	0.2%	0.1%	0.04%	0.5%	3.0%
16-20 times	0.3%	0.1%	0.02%	0.2%	-	0.1% 7	0.7%
20+ times	5.8%	2.8%	0.6%	0.7%	0.08%	3.2%	13.1%
Total	85.3%	6.4%	1.2%	1.4%	0.2%	4.6%	99.1% <sup>1</sup>

<sup>1</sup> Less than 100% due to 50 subjects not completing the appropriate questions.

In view of this apparent dependence of drug intoxication on the experience of alcohol intoxication, the relationship between alcohol intoxication and level of drug use was also considered (Figure 3.3). Overall, smoking and drug use increased from 3.3% and 1.0%, respectively among non-drinkers to 28.1% and 23.8% among drinkers. Of those with fewer than 5 reported episodes of drunkenness, 21.2% said they smoked cigarettes and 13.2% said that they took drugs, as opposed to 48.1%, and 49.2%, respectively, of subjects who reported more than 5 episodes of drunkenness (cigarettes,  $\chi^2 = 157.6$ ,  $p < 0.0001$ ; drugs,  $\chi^2 = 316.7$ ,  $p < 0.0001$ ; Table 3.4). These relationships were very similar in a restricted analysis of the 15 year-old group so these figures do not arise accidentally from the fact that both cigarette/drug use and problem drinking increase with age.

**Figure 3.3 - Drug and cigarette use in relation to frequency of alcohol intoxication.**



#### **Alcohol Preferences**

The assessment of adolescents' alcohol preferences was made by categorising their stated preferred drink into three areas: Beer/Lager/Cider/Wine (referred to below as simply Beer); Alco-pops; and Spirits.

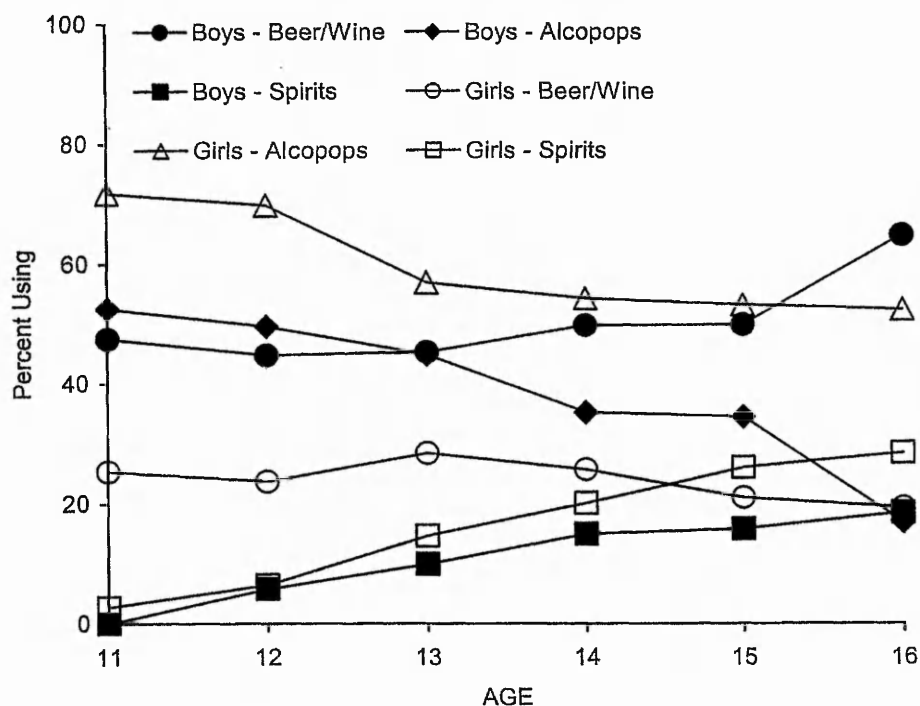
Among the drinkers in the sample, Beer was preferred by 36.8%, Alco-pops by 46.8%, and Spirits by 16.5% (Figure 3.4). Preferences for Beer remained fairly constant across the age range (35.6% at age 11, 38.0% at age 16). Alco-pops on the other hand, decreased in popularity with age, but, conversely, preference for Spirits increased with age from 1.5% at age 11 to 24.3% at age 16. These overall figures conceal large sex differences, with girls showing a marked preference for Alco-pops (56.4%; Beer: 23.5%; Spirits: 16.5%), while boys tended to prefer Beer (50.1%; Alco-pops: 37.1%; Spirits: 12.8%).

**Table 3.4** - Drug and cigarette use in relation to alcohol use and drunkenness

	Boys	Girls	Mean Across Gender
<b>CIGARETTES</b>			
<b>All Subjects</b>	16.6%	20.7%	18.7%
<b>Non-Drinkers</b>	3.9%	2.7%	3.3%
<b>Drinkers</b>	24.8%	31.4%	28.1%
<b>Drunk &lt; 5 times</b>	20.1%	22.2%	21.2%
<b>Drunk 5 &gt; times</b>	39.1%	57.1%	48.1%
<b>DRUG USE</b>			
<b>All Subjects</b>	16.9%	13.2%	15.1%
<b>Non-Drinkers</b>	1.6%	0.4%	1.0%
<b>Drinkers</b>	26.7%	20.9%	23.8%
<b>Drunk &lt; 5 times</b>	17.0%	9.3%	13.2%
<b>Drunk 5 &gt; times</b>	49.1%	49.2%	49.2%

Except at age 16, when alco-pop preference fell sharply in boys (to 16.9%), the sex difference in alco-pop preference remained roughly constant (around 20%) across the 11-15 age range. As boys started at a lower baseline, this represents a much greater proportional change with age in boys than in girls. The age-related increase in the number of adolescents reporting a preference for Spirits was particularly marked in girls (28.4% vs. 18.5% at age 16).

**Figure 3.4** - Types of drink preferred. The percentages are of drinkers only.



The relationship between drink preference and other substance use was also considered with Spirit drinkers being significantly more likely to smoke cigarettes than Alco-pop drinkers ( $\chi^2 = 34.5$ ,  $p < 0.0001$ ) who, in turn, were at a greater risk than Beer drinkers from smoking ( $\chi^2 = 10.8$ ,  $p < 0.01$ ). Spirit drinkers were also more at risk from drug use than either of the other two categories of drink ( $\chi^2 = 54.4$ ,  $p < 0.0001$ ), but in this instance, Alco-pop drinkers were at no greater risk from drug use than Beer drinkers ( $\chi^2 = 0.1$ , NS). Spirit drinkers were more likely than Alco-pop drinkers to have been drunk ( $\chi^2 = 76.2$ ,  $p < 0.0001$ ), but no difference was found between Alco-pop and Beer drinkers ( $\chi^2 = 0.3$ , NS). Spirit drinkers were more likely to have been drunk in excess of twenty times than drinkers from the other two categories ( $\chi^2 = 94.8$ ,  $p < 0.0001$ ), but there was no difference between Alco-pop and Beer drinkers ( $\chi^2 = 0.1$ , NS). Separate examination of boys and girls showed that all of these measures, including drug use ( $\chi^2 = 7.9$ ,  $p < 0.01$ ), were significantly higher among Alco-pop drinkers in younger girls, but none of the Alco-pop or Beer differences were significant in younger boys. In the older group,

Alco-pop users smoked more than Beer drinkers ( $\chi^2 = 6.2$ ,  $p < 0.02$ ), but these two sub-groups did not differ significantly on the other three measures. Again, the higher value for Alco-pop drinkers was true for girls ( $\chi^2 = 12.1$ ,  $p < 0.0001$ ), but not for boys. Among the girls, drunk >5 times was also higher in Alco-pop drinkers than in Beer drinkers ( $\chi^2 = 4.3$ ,  $p < 0.02$ ) (Table 3.5).

**Table 3.5** - The relationship of alcohol preferences to various delinquent behaviours. Figures are percentages of the different types of alcohol drinkers.

<b>Boys</b>				
	<b>Behaviour</b>			
<b>Alcohol Preference</b>	<b>Cigarette Smoking</b>	<b>Drug Use</b>	<b>Ever drunk</b>	<b>Drunk on 20+ Occasions</b>
<b>Beer etc</b>	23.6	25.3	74.1	22.0
<b>Alco-pops</b>	25.6	25.0	70.3	21.7
<b>Spirits</b>	36.2	43.5	91.0	48.6

<b>Girls</b>				
	<b>Behaviour</b>			
<b>Alcohol Preference</b>	<b>Cigarette Smoking</b>	<b>Drug Use</b>	<b>Ever drunk</b>	<b>Drunk on 20+ Occasions</b>
<b>Beer etc</b>	20.2	14.1	64.5	13.5
<b>Alco-pops</b>	30.4	18.8	73.2	18.7
<b>Spirits</b>	48.0	35.8	92.5	39.2

### **Discussion**

These studies report cross-sectional data on associations, among English adolescents, between alcohol use and drunkenness on the one hand, and cigarette and drug use on the other. The data are derived from a whole-school census of six non-randomly chosen secondary schools, and cannot be considered to represent a random sample of the adolescent population. Nevertheless, the size of the sample (>5000) and the fact that the six schools were drawn from geographically and demographically diverse locations, suggests that the data may have some degree of generality.

The reliability and validity of self-report questionnaires is always open to debate, but this is particularly the case when the subjects are adolescents and even more so when the subject of interest is substance use. Two main causes for concern are the perceived fear by individuals that they might be 'caught out' if they admit to substance use, leading to under-reporting, and conversely, a desire to impress their peers by claiming far greater substance use experience than they actually have. Care was taken in the design of this study to minimise these two problems and although it was beyond the scope of the project to exclude them definitively, attention to confidentiality issues may have been sufficient to control for these factors. Specifically, subjects were not asked for their names, so there would have been little fear of their substance use being accurately attributed to individuals, and the questionnaires were returned in unmarked and sealed envelopes, so subjects should not have been concerned at their handwriting being recognised by teachers. The fact that the administration of the questionnaire was confidential also diminishes the likelihood of excessive substance use being claimed out of bravado. These conclusions are supported not only by earlier research in this area ( Winters et al., 1990), but also by the fact that the great majority of the questionnaires appeared to have been completed carefully and conscientiously and, as such, did not appear to have been affected either by bravado or by fear of discovery.

A further issue concerns the use in the questionnaire of the word 'cigarettes', rather than 'tobacco'. As noted, there was very little admitted use of cigarettes and drugs in combination, which, is perhaps surprising, given that the illegal drug used most frequently by the subjects of this study was marijuana. In the United States marijuana is often smoked on its own, either in resin form in a pipe or as pure 'grass' cigarettes. However, in Britain cannabis resin is usually smoked as a cannabis/tobacco mixture. Given that this is the case, it is possible that although marijuana users almost certainly use tobacco when they smoke cannabis, they do not consider themselves to be cigarette smokers.

As noted, care was taken to avoid gathering data from those subjects who were simply experimenting with the various substances under investigation. To this end it was emphasised to subjects that they should report that they were using a certain substance only if they were

doing so on a weekly basis and had been doing so for a minimum period of three months (these arbitrary figures were decided upon following discussions with teachers and educational psychologists during the development stage of this project). At age 11, substance use was reported by just over 30% of the sample. This figure largely reflected alcohol use. However, 5.4% of eleven year olds admitted smoking cigarettes, which is cause for concern, and 1.3% said they used illegal drugs. All these figures rose linearly with age until nearly 84% of all sixteen year olds claimed to be using at least one psychotropic substance on a regular basis. It is worth noting that 16 years is the minimum legal age at which a person can buy cigarettes in the UK and is two years short of the age at which alcohol can legally be bought in a pub. It is possible that the figures for illegal drug and alcohol use might have been even higher if pupils absent at the time of the study had been included. This group includes pupils who were absent from school through exclusion, and there is reason to believe that drug and alcohol use within this group is considerably higher than for children attending school (Kandel, 1975; Johnston et al, 1978).

Despite there being no marked gender differences in overall alcohol use, cigarette smoking was significantly greater in girls than in boys and drug use was greater in boys than in girls. This gender bias in smoking has received a great deal of attention, and has been noted in previous studies of teenage smoking in the UK ( Miller et al, 1995). The reasons for the prevalence of smoking among teenage girls are not well understood, but may reflect an increase in the targeting of cigarette advertising towards this group (Pierce et al., 1994). Alternately, Lowe et al (1993) have suggested that drunkenness is not as acceptable for girls as it is for boys, so girls compensate by increased cigarette smoking. However, this suggestion is not supported by the present findings, as girls and boys did not differ significantly in levels of drunkenness.

The most important finding of this part of the work is that it may be possible to use alcohol consumption as a predictor of both illegal drug use and cigarette smoking by English adolescents. At all ages, within this sample of 11-16 year olds, both illicit drug use and smoking were strongly associated with alcohol drinking, such that consumption of other

substances was minimal in non-drinkers. These findings strongly support the concept that alcohol may be the gatekeeper to smoking and illegal drug use, within this population. This concept was first advanced by Kandel and colleagues on the basis of a cohort of subjects in New York State first studied in the early 1970s at the age of 15, and followed up in their mid-20s and mid-30s (Yamaguchi & Kandel, 1984; Kandel et al., 1992). These studies reported a sequential progression from alcohol to cigarettes to illicit drug use although it should be noted that these data were cross-sectional not longitudinal as in the other studies mentioned. The progression from alcohol to illicit drugs among New York adolescents has been confirmed by others (Welte & Barnes, 1985). However, the progression from alcohol to cigarettes, while confirmed in a sample of Israeli teenagers, was not found in a French sample (Adler & Kandel, 1981), and, as noted, some evidence suggests that the importance of alcohol as a gateway to marijuana use among New Yorkers may have declined with the increased availability of marijuana (Golub & Johnson, 1994). Thus, the role of alcohol in the initiation of adolescent substance use appears to vary between cultures and at different times within a culture. The present findings indicate that alcohol is an almost obligatory prerequisite to smoking and illicit drug use within this sample of English adolescents.

In addition to the crucial role of alcohol in the use of other substances, also identified has been an important relationship with the level of alcohol consumption. For instance, drinkers who had been drunk more than five times were more than twice as likely to smoke cigarettes as drinkers who had been drunk less than five times. In the same way, the prevalence of illegal drug use was over three and a half times as high among high-drunk drinkers as among low-drunk drinkers, and, if girls only are considered, this figure rises to over five times. Similar data have been reported in earlier studies by Jessor and colleagues, who found significant correlations between extent of problem drinking on the one hand and smoking and illicit drug use on the other. In one of their studies, the prevalence of marijuana use among American 17-18 year olds rose from 1% among non-drinkers through 36% among non-problem drinkers to 80% among problem drinkers (Donovan & Jessor, 1978; Jessor, 1987).

The present study confirms these observations and extends them to a UK cohort and to a much younger age group.

These findings, that adolescents who smoke or use illicit drugs almost invariably also drink alcohol, and that their likelihood of other substance use increases as their drinking becomes more problematic, clearly have important implications for the prevention of smoking and drug abuse. Unfortunately, it is less clear precisely what those implications are. One approach, suggested by the concept of "alcohol as gatekeeper", is to target substance prevention at the initiation of alcohol use: if initiation to alcohol invariably precedes the use of other substances, then alcohol prevention should be the most effective substance abuse strategy (Welte & Barnes, 1985). However, a more complex position is implied by the relationship of other substance use to drunkenness. This suggests that adolescent substance use may be part of a more general syndrome of "problem behaviour" (Donovan & Jessor, 1978; Jessor, 1987), in which case removing alcohol use might be relatively ineffective in controlling the use of other substances. Whether alcohol should be viewed as the primary problem ("alcohol as gatekeeper") or as a symptom of a broader problem ("problem behaviour"), in relation to illicit drug use and smoking, remains a crucial issue for future research. However, irrespective of this theoretical issue, the present data identify a crucial practical focus for drug (and smoking) prevention initiatives, at least within an English population, which should be targeted at children who drink: children who have not initiated drinking appear to be at very low risk for other substance use. As alcohol use may be predictive of later smoking and illicit drug use it would seem appropriate to ensure that parents are aware of this connection, as alcohol initiation usually takes place within the home environment at an early age (Plant, et al, 1985).

Another point concerns the rates of alcohol and other substance use reported by the present sample of English adolescents. These figures are somewhat higher than have been reported in earlier surveys: for example, the figure of 61% for the mean across ages (11-16) of the proportion of adolescents who regularly drink alcohol stands in marked contrast to previously published statistics indicating that - prior to the introduction of alco-pops - only about 20% of

English schoolchildren drank regularly (Gilvarry et al, 1995). However, these data are consistent with results of a very recent survey which reported that 50% of 12-13 year old British adolescents are "regular drinkers" (Balding, 1997). While part of the discrepancy between the most recent findings and previous statistics may stem from different definitions of "regular drinking", it is also possible that the actual prevalence of under-aged drinking has very recently risen, and that the introduction and availability of alco-pops has contributed significantly to this upward shift in the overall prevalence of under-age drinking, both directly, and indirectly by encouraging experimentation with other types of drink. If the recent prevalence findings (Balding, 1997) can be replicated, such an upward shift in regular drinking would signify a radical departure from historical trends. A retrospective report published shortly before the introduction of alco-pops concluded that "there is no evidence that underage drinking has either increased or decreased over the past 20 years" (Sharp, 1994). However, evidence from two independent sources indicates that regular drinking among adolescents may have undergone an abrupt and marked increase. Clearly, this possibility requires verification and explanation, but may be due, at least in part, to the introduction of alco-pops.

Within this sample, alcohol preferences varied significantly across both age and gender. Broadly speaking, boys preferred "conventional" drinks (beer, wine, lager and cider) while girls preferred alco-pops and spirits, and preferences for the conventional drinks remained fairly constant across ages (as a proportion of the drinking population, which increased with age), while alco-pop preference decreased and preference for spirits increased with age. Indeed, while most current concern is focused on alco-pops, the fact that spirits are the preferred drink of over 25% of 16 year-old girls is extremely disturbing, not only for the adverse health implications that this implies, but also because spirits drinkers were more likely to use cigarettes and drugs, and had been more frequently drunk, than either beer/wine or alco-pops drinkers. These data support the suggestion that involvement with certain types of beverages may be particularly likely to lead adolescents to experience problems (Smart & Walsh, 1995).

The popularity of alco-pops among our sample, at around 50%, is remarkable considering how recently these drinks were introduced to the UK, but is consistent with other very recent surveys (Health Promotion Wales, 1997; Balding, 1997; Hughes et al, 1997). These drinks are of concern for a number of reasons. First, alco-pop drinkers are more likely than drinkers who prefer beer or wine (though less so than spirits drinkers), to display other forms of substance using behaviour, such as drunkenness, smoking, and to a lesser extent, drug use; this was particularly the case in girls. The greater incidence of drunkenness (see also Balding, 1997), may arise because the aversive flavour of ethanol is so well disguised that it is relatively easy to consume a large amount of alco-pops in a short period of time. Adolescent drinkers, particularly the younger ones, are likely to be relatively inexperienced with the physiological, psychological and behavioural effects of ingestion of alcohol, and as a result, alco-pop drinkers may be especially susceptible to a potentially pathological pattern of "binge-drinking." This danger is aggravated by the fact that most alco-pops are very potent in terms of their alcohol content. Thus, adolescents who rapidly "gulp" these sweet tasting beverages may experience dangerously high concentrations of blood alcohol levels.

The popularity of alco-pops among adolescents may result, in part, from their sweetness. A potentially revealing observation in this connection is the well documented finding that most strains of alcohol-naive animals have a strong aversion to alcohol. However, taste preferences among non-drinking animals can be modified by initiating them into drinking alcohol by adding sucrose to their drink (Samson et al, 1989). These studies have shown that the exposure to high levels of initial sweetness results in the prolonged maintenance of drinking, subsequent to a 'fading-out' procedure during which sweetener is gradually removed from the alcohol (Samson et al, 1989). This experimental procedure closely mirrors the age-dependent decline in alco-pop usage among teenage drinkers. Alongside the evidence that the early initiation of alcohol use leads later to increased use of alcohol and other drugs (Gruber et al, 1996), there is cause for concern that early experience with alco-pops may result in higher levels of later alcohol consumption. This possibility will require careful monitoring as the current generation of alco-pop users matures to adulthood and switches to less sweet drinks.

In conclusion, these results indicate that alcohol consumption by secondary school pupils represents a major risk factor or marker for underage smoking and use of other illicit drugs. Furthermore, relative to under-age beer or wine drinkers, under-age alco-pop drinkers, particularly girls, were more likely to use cigarettes and drugs, and had higher levels of drunkenness; though all of these problems were even greater in spirits drinkers. The high prevalence of alcohol and other drug use, and the possibility that these problems may have been exacerbated by the introduction of alco-pops, raises concern that the conditions may exist for a steep rise in alcohol-related problems, accompanied by a corresponding rise in the use of cigarettes and illegal drugs, as well as the various anti-social behaviours generally associated with these substance-using activities.

## **CHAPTER 4 - DEVELOPMENT OF THE SASI AND KEY RESULTS**

### **Introduction**

This chapter deals with the development process of the Substance Abuse Susceptibility Index (SASI) and presents the methodology used in some detail.

The questionnaire, was designed in two sections: The first to measure aspects of personality and the second to look at the influence of sociological variables such as parental use, religiosity and academic achievement. This chapter concentrates on the development of the first section.

The participants and procedure were as described for the previous studies

### **Questionnaire Development 1**

The Substance Abuse Susceptibility Index was constructed in two sections; Section 1 measuring personality constructs and Section 2 being an examination of various social situations and current substance use.

#### **Section 1**

For Study 1, a pool of 60 items were chosen that broadly measured the overall concept of Neuroticism as suggested by Costa and McCrae (1985), but consisting of six sub-traits selected by the author: self-esteem, Depression, Anxiety, Hypochondria, Hostility and Fantasy. These selections were made based on a review of the literature and earlier work which looked at the changing personalities of recovering drug addicts (Sutherland, 1997). Various consultations then took place with educational psychologists, school teachers and youth workers as to the appropriateness of the items. Following these discussions the number of statements was reduced to 36 with six items relating to each of the sub-traits. Each item was then individually labeled in the format of self-esteem 1, or Anxiety 4.

All statements were Rating Scale Items with the possible responses being, Strongly Disagree, Disagree, Neutral (neither agree nor disagree), Agree and Strongly Agree. These five responses were chosen as it was felt they were non-ambiguous and would give respondents enough scope in which to express themselves adequately.

In order to avoid a positive response bias, half the items were reversed so that an equal number were scored in each direction. In this way the statement 'I have a good appetite' became 'I don't have a good appetite'. Item order was determined using the 'out of the hat' method so that participants would not be able to determine a pattern to the statements.

The problem of social desirability was also considered during the construction of the SASI, but it was felt that due to the nature of the target population and the areas in which it was intended the questionnaire should explore, designing statements that would avoid the potential for a social desirability bias would be difficult. It was decided therefore to address this problem from a purely practical level and attempt to minimise the risk of building in a social desirability bias by ensuring the confidentiality of the exercise. The items appear in Table 4.1.

## Section 2

The items and questions in this section asked for basic demographic data, but were also designed to elicit responses about individuals more general social situation. Specifically questions were asked about subjects current cigarette, alcohol and drug use as well as family substance use and intended future use. Other risk factors such as academic achievement, religiosity and contact with the police were included in this part of the SASI. These areas were selected based on the research in Chapter 2.

**Table 4.1** – Study 1: The original 36 items of Section 1

Abbreviated Items	Sub-Trait
I think my parents are proud of me	Self-esteem 1
I look forward to lots of things	Depression 5
Sometimes I am rather badly behaved	Self-esteem 6
I get on well with my family and friends	Hostility 1
I hate being late for things like school	Anxiety 2

I like the way I am	Self-esteem 5
I nearly always feel cheerful	Depression 6
I enjoy watching cartoons and films on TV	Fantasy 4
I don't tend to worry about things	Anxiety 1
I sometimes worry when I feel unwell	Hypochondria 3
I enjoy competitions and sports	Hostility 5
I think that I am a good person	Self-esteem 3
I am rarely involved in fights or arguments	Hostility 2
Sometimes I don't think I deserve to be happy	Self-esteem 2
I like the world the way it is	Depression 2
I often wake late in the morning	Depression 4
Everything I do takes lot of effort	Depression 3
I enjoy reading novels	Fantasy 5
I don't have a good appetite	Depression 1
I am not a person who dreams much at night	Fantasy 3
I sometimes get sudden feelings of panic	Anxiety 7
Sometimes people really annoy me	Hostility 3
I sometimes dream of living in another country	Fantasy 1
I sometimes worry about getting ill	Hypochondria 5
I'm not keen on exercise	Hypochondria 2
I quite often feel a bit nervous and frightened	Anxiety 5
I sometimes feel so ashamed of things I've done....	Self-esteem 4
I'm not the sort of person who worries about little things	Anxiety 6
I find it easy to relax	Anxiety 4
I'm not one of those people who gazes out of the window.	Fantasy 6
I'm not worried about what the future might bring	Anxiety 3
I tend to keep my feelings to myself	Hostility 6
I'm not very interested in the way my body works	Hypochondria 1
If my friends are ill I get worried about my own health	Hypochondria 4
I often get angry at the way people treat me	Hostility 4
I don't often go to see the doctor	Hypochondria 6

### **Study 1 - The Pilot Study**

#### **Factor Analysis**

The data obtained from the pilot application of the Substance Abuse Susceptibility Index, were assessed using Principal Components Analysis with varimax rotation. Two factors with Eigenvalues of 11.7 and 7.9 were retained using the Scree Plot criterion and confirmed by Kaiser's method. These factors accounted for 65% of the total variance. Variables that loaded less than 0.1 were excluded from interpretation and when this was taken into consideration Factor 1 contained eighteen significant items out of the thirty-six scored of which nine were cross-loaded with Factor 2. Factor 2 contained sixteen significantly loaded items with twelve items cross-loading onto Factor 1. Table 4.2 shows the factor pattern of the data.

**Table 4.2 – Study 1: Factor pattern**

<b>Factor 1: self-esteem</b>	<b>Factor 1</b>	<b>Factor 2</b>
Self-esteem 5	.66	.02
Self-esteem 3	.62	.30
Anxiety 4	.55	.13
Hostility 1	.55	.29
Self-esteem 1	.54	.38
Depression 6	.50	.30
Hostility 5	.47	.15
Hypochondria 2	.47	.15
Self-esteem 2	.45	.09
Depression 5	.45	.37
Self-esteem 4	.44	.35
Depression 1	.38	.17
Fantasy 5	.29	.01
Self-esteem 6	.28	.15
Depression 2	.28	.24
Hostility 2	.20	.09
Depression 4	.18	.11
Depression 3	.11	.07
Hostility 6	.08	.04
Hostility 3	.06	.01
<b>Factor 2: Anxiety</b>	<b>Factor 1</b>	<b>Factor 2</b>
Anxiety 5	.38	.50
Hypochondria 5	.19	.49
Hypochondria 3	.15	.48
Anxiety 7	.37	.45
Anxiety 6	.36	.41
Anxiety 2	.20	.41
Fantasy 4	.04	.36
Hypochondria 1	.14	.35
Hypochondria 4	.15	.33
Anxiety 1	.25	.33
Hostility 4	.23	.27
Fantasy 2	.09	.24
Hypochondria 6	.16	.21
Anxiety 3	.02	.20
Fantasy 1	.12	.15
Fantasy 3	.03	.10

All the statements relating to Depression were found in Factor 1 as were all the statements relating to self-esteem. In addition, five of the statements concerned with Hostility were also found in Factor 1. Factor 2 contained all the Anxiety statements as well as five of the six Hypochondria items and four of the six Fantasy items. Factor 1 contained one Hypochondria statement, one Fantasy statement and one Anxiety statement while Factor 2 contained just one stray Hostility statement.

Within the distribution pattern of Factor 1, the items with the heaviest loadings were the ones from the Depression and self-esteem sub-scales with the items from the Hostility sub-scale having less significant loadings. Given this, as well as the fact that low self-esteem is often related to depression, a decision was taken to label Factor 1, self-esteem. In a similar way, the distribution pattern within Factor 2 was examined and a decision was taken to label this Anxiety as the Anxiety and Hypochondria items had the highest loadings whereas the Fantasy items only achieved modest loadings. Factor 1 was correlated with Factor 2 at the level of .43 ( $p < .0001$ ).

To test the reproducibility of this factor pattern, the sample was randomly split into two and further factor analyses was carried out on the data sub-sets. Once again, the two factors of self-esteem and Anxiety emerged indicating stability of the original factor pattern. In addition, the data set was split into males and females and another, identical, analysis carried out. Again the two factors of self-esteem and Anxiety emerged. However, there was a slight difference in the emphasis of the loading of the items within the two factors. Although all the key items remained the same, males had a slight tendency towards a higher loading on the self-esteem statements.

Cronbach's Alpha examination of the reliability of the factors indicated that Factor 1 gained a standardised item alpha of .66 and Factor 2 a standardised item alpha of .66. The entire data set realised a standardised item alpha of .73. Details of the items individual alpha coefficients can be found in Table 4.3. Throughout this development process a pragmatic clinimetric approach was adopted.

**Table 4.3 – Study 1: Alpha Coefficients**

Abbreviated Items	Sub-Trait	+/- scored	$\alpha$ if deleted	$\chi^2$	Odds Ratio
I think my parents are proud of me	Self-esteem 1	-	.67	37.1	6.4
I look forward to lots of things	Depression 5	-	.67	39.8	5.4
Sometimes I am rather badly behaved	Self-esteem 6	+	.67	36.0	5.2
I get on well with my family and friends	Hostility 1	-	.66	25.5	3.2
I hate being late for things like school	Anxiety 2	+	.68	29.4	2.8
I like the way I am	Self-esteem 5	-	.65	10.8	2.8
I nearly always feel cheerful	Depression 6	-	.67	19.1	2.7
I enjoy watching.... TV	Fantasy 4	+	.64	28.4	2.6
I don't tend to worry about things	Anxiety 1	-	.66	9.4	2.5
I sometimes worry when I feel unwell	Hypochondria 3	-	.66	4.4	2.2
I enjoy competitions and sports	Hostility 5	-	.69	9.8	2.1
I think that I am a good person	Self-esteem 3	-	.66	5.1	2.0
I am rarely involved in fights....	Hostility 2	-	.67	4.4	1.9
I don't think I deserve to be happy	Self-esteem 2	+	.66	4.4	1.9
I like the world the way it is	Depression 2	-	.66	7.5	1.8
I often wake late in the morning	Depression 4	+	.67	7.2	1.8
Everything I do takes lot of effort	Depression 3	+	.67	3.0	1.8
I enjoy reading novels	Fantasy 5	+	.66	11.1	1.7
I don't have a good appetite	Depression 1	+	.67	8.4	1.6
I am not a person who dreams much....	Fantasy 3	-	.68	6.7	1.6
I sometimes get sudden feelings of panic	Anxiety 7	+	.67	3.8	1.6
Sometimes people really annoy me	Hostility 3	+	.67	3.5	1.6
I ...dream of living in another country	Fantasy 1	+	.67	15.9	1.5
I sometimes worry about getting ill	Hypochondria 5	-	.66	5.9	1.5
I'm not keen on exercise	Hypochondria 2	+	.67	5.4	1.5
I quite often feel a bit nervous....	Anxiety 5	+	.65	9.8	1.4
I ....feel so ashamed of things I've done....	Self-esteem 4	+	.65	6.1	1.4
I'm not the sort of person who worries....	Anxiety 6	-	.66	15.7	1.3
I find it easy to relax	Anxiety 4	-	.65	10.7	1.2
I'm not one of those people who.....	Fantasy 6	-	.67	6.1	1.2
I'm not worried about the future....	Anxiety 3	+	.67	5.5	1.2
I tend to keep my feelings to myself	Hostility 6	+	.71	2.8	1.2
I'm not very interested in how my body works	Hypochondria 1	+	.67	5.4	1.1
If my friends are ill I get worried ....	Hypochondria 4	-	.66	4.9	1.1
I often get angry at the way people treat me	Hostility 4	+	.66	8.4	0.0
I don't often go to see the doctor	Hypochondria 6	+	.67	0.1	0.0

Once these two factors had been isolated an analysis was carried out to see if they were able to discriminate between substance users and non-users. Before this was undertaken the spread

of scores for the data set was examined and banded into Low trait, Medium trait and High trait groups. This was done by placing the top third scores in the High group, the middle third in the Medium group and the bottom third into the Low group and in this way three levels of the overall trait of Neuroticism were created.

Subsequently the data set was further sub-divided so that banded scores were created for the two Factors as well. The number of participants in each Neuroticism and Factor category can be found in Table 4.4.

**Table 4.4** – Study 1: The numbers of participants in each factor level

<b>Combined</b>			
	<b>Low</b>	<b>Medium</b>	<b>High</b>
<b>Neuroticism</b>	200	364	303
<b>Factor 1: Self-esteem</b>	178	547	142
<b>Factor 2: Anxiety</b>	167	633	67
<b>Boys</b>			
	<b>Low</b>	<b>Medium</b>	<b>High</b>
<b>Neuroticism</b>	106	185	147
<b>Factor 1: Self-esteem</b>	90	282	66
<b>Factor 2: Anxiety</b>	77	319	42
<b>Girls</b>			
	<b>Low</b>	<b>Medium</b>	<b>High</b>
<b>Neuroticism</b>	94	364	303
<b>Factor 1: Self-esteem</b>	88	265	76
<b>Factor 2: Anxiety</b>	90	314	25

## **Study 1 - Results 1**

Before these results are presented, it should be noted that confusion may arise over the use of terminology with relation to Factor 1, self-esteem. Those participants in the High self-esteem group are actually those with *low* self-esteem. They were allocated to the High group because they had high levels of pathology and their low self-esteem levels indicate they are at risk from substance abuse. In order to make this clearer when referring to low or high self-esteem, lower case will be used, but when referring to the Low, Medium or High groups, upper case will be used. In all cases membership of a High group indicates high levels of that trait.

Once this banding process had been completed, the three levels of Neuroticism, as well as those of the Factors, were compared to cigarette, alcohol and drug use, with instances of concurrent cigarette, alcohol and drug use (CAD) and to individuals who had been intoxicated with alcohol on more than twenty occasions, a parameter that it was decided would represent 'problem drinking'.

A relationship was found between levels of Factor 1, self-esteem, and substance use with lower levels of self-esteem indicating increased substance use, but no significant relationships were found between levels of Factor 2, Anxiety, and substance use.

It was found that 45.2% of subjects with low levels of self-esteem reported regularly smoking cigarettes as opposed to 8.9% of those with high self-esteem ( $\chi^2 = 32.9$ ,  $p < .0001$ ). A similar, although slightly weaker, effect was found with the relationship between self-esteem and alcohol use with 77.4% of those with low self esteem drinking compared with 51.5% of those with high self-esteem ( $\chi^2 = 24.4$ ,  $p < .0001$ ). When illegal drug use was considered it was found that 35.5% of those with low self-esteem claimed they used drugs compared with 11.1% of those with high self-esteem ( $\chi^2 = 13.8$ ,  $p < .0001$ ). Finally, it was found that a relationship existed between self-esteem and occasions of alcohol intoxication whereby 25.8% of those with low self-esteem said they had been drunk over twenty times compared with 7.8% of those with high self-esteem ( $\chi^2 = 30.0$ ,  $p < .0001$ ).

## **Questionnaire Development 2**

Although the results from Study 1 revealed some discrimination between substance users and non-users, these relationships were weak and it was thought that the items contained within the factors might not be the best ones suited for assessing adolescent substance use.

In order to test this each item was examined separately to assess its ability to discriminate between drug users and non-users. Items had five possible responses which were scored 0-4 with zero being low pathology and four being high. Illegal drug use between the low and high groups was compared. The individual item assessment was made by chi-square analysis and was confirmed by obtaining odds ratio figures for each item. For instance, 15.2% of those who scored zero for Hypochondria 1 said they used illegal drugs compared to 14.5% of those who scored four. This was not found to be significant either by chi-square or by odds ratio ( $\chi^2 = 5.4$ , NS; O/R 1.05). On the other hand, 15.6% of those who scored zero on Hostility 1 said they used illegal drugs compared to 40.0% of those who scored four. This was found to be significant ( $\chi^2 = 25.5$ ,  $p < .0001$ ; O/R 2.6) and it is therefore possible to say that those who scored highly for Hostility 1 were 2.6 times more likely to use illegal drugs than those who scored low. In this way it is possible to say that Hostility 1 is a more useful item than Hypochondria 1. The discriminatory power (odds ratios) of each item can be found in Table 4.3. After examining all the items in Section 1 of the SASI, a decision was taken to reduce the number of items from 36 to 28 for Study 2. This decision was made after balancing factor analytic considerations against Cronbach's Alpha coefficients and the findings of the odds ratio analysis. No hard and fast rules were laid down for excluding items, rather a subjective analysis was made that took into account the wording of individual items and how they fitted in with the remaining, stronger, items. However, certain broad criteria were used as guidelines which were that items should be considered for exclusion if the factor analysis showed a strong tendency to cross load or if the item had a factor loading below .1; if the alpha coefficient was below .65 and if the odds ratio was below 1.3. Details of the excluded items can be found in Table 4.5.

**Table 4.5** – The excluded items of Section 1

Item	Sub-Trait	Factor Loadin g	Cross- Loaded	$\alpha$ if delete d	O/R
I find it easy to relax	Anxiety 4	.55	No	.65	1.2
I am not one of those people who gazes out of the window and daydreams	Fantasy 6	.36	Yes	.67	1.2
I'm not worried about what the future might bring	Anxiety 3	.20	No	.67	1.2
I tend to keep my feelings to myself	Hostility 6	.08	No	.71	1.2
I'm not very interested in the way my body works	Hypochondria 1	.35	No	.67	1.1
If my friends are ill I get a bit worried about my own health	Hypochondria 4	.33	No	.66	1.1
I often get angry at the way people treat me	Hostility 4	.27	Yes	.66	0.0
I don't often go to see the doctor	Hypochondria 6	.21	Yes	.67	0.0

Some marginal items were retained as it was felt that the larger and more diverse sample planned for Study 2 might reveal a stronger discriminatory power in some of these items than had been revealed by Study 1. Only those items with very poor factor loadings, poor alpha coefficients and very poor powers of discrimination were discarded.

The data obtained from Study 2, involving the application of instrument to 4,516 subjects, was again subjected to a factor analytic examination and was analysed using Principal Components Analysis with a normalised varimax rotation. Two factors emerged from the analysis of the 28 items. These had eigenvalues of 3.2 and 2.8 and were retained using the Scree Plot and Kaiser's criterion. These two factors accounted for 69% of the total variance.

Table 4.6 shows the factor pattern of the data. Factor 1 contained five significant items and Factor 2 contained a further five significantly loaded items. The remaining items either had very poor factor loadings or were heavily cross-loaded.

**Table 4.6** – Study 2: Factor loadings for the two-factor solution

	Factor 1	Factor 2
<b>Factor 1: Anxiety</b>		
Anxiety 5	.66	.06
Anxiety 6	.63	.17
Anxiety 4	.63	.11
Anxiety 1	.61	.09
Anxiety 3	.45	.10

<b>Factor 2: Self-esteem</b>		
Self-esteem 3	.04	.73
Self-esteem 1	.08	.64
Self-esteem 6	.13	.54
Self-esteem 2	.17	.50
Self-esteem 5	.40	.50

All the significant items in Factor 1 were from the Anxiety sub-scale and all the significant items in Factor 2 were from the self-esteem sub-scale so a decision was taken to term Factor 1 Anxiety and Factor 2 self-esteem.

Once again, the data was subjected to further factor analysis to examine the reproducibility of this factor pattern. The sample was again randomly split into two and divided up into gender and the two factors of Anxiety and self-esteem were found to be stable.

Cronbach's Alpha examination of the reliability of the factors indicated that Factor 1 gained a standardised item alpha of .78 and Factor 2 a standardised item alpha of .74. The entire data set realised a standardised item alpha of .79 (Table 4.7).

**Table 4.7 – Study 2: Reliability coefficients for the two-factor solution**

	<b><math>\alpha</math> if item deleted</b>
<b>Factor 1: Anxiety</b>	
Anxiety 1	.71
Anxiety 3	.79
Anxiety 4	.71
Anxiety 5	.69
Anxiety 6	.70
<b>Overall <math>\alpha</math> of Factor 1</b>	<b>.78</b>
<b>Factor 2: Self-esteem</b>	
Self-esteem 1	.66
Self-esteem 2	.68
Self-esteem 3	.60
Self-esteem 5	.67
Self-esteem 6	.71
<b>Overall <math>\alpha</math> of Factor 2</b>	<b>.74</b>
<b>Combined <math>\alpha</math></b>	<b>.79</b>

These data were again banded into three groups, High, Medium and Low using the top, middle and bottom scores as criteria. In addition, the two factors were combined to give an overall Neuroticism score which was also banded into Low, Medium and High levels. These

banded scores were then compared with cigarette, and illegal drug use as well as problem drinking (individuals who had been drunk in excess of twenty times in the past year) and concurrent use of cigarettes, alcohol and drugs (CAD).

It should be noted that simple alcohol use is not presented here. This is because alcohol use is so wide spread within our society and its use subject to so many cultural and sociological variables that it was believed that excessive intoxication would be a more reliable marker.

### **Study 2 - Results 1**

When overall Neuroticism was considered, it was found that of those subjects who fell into the High Neuroticism category, 35.8% smoked cigarettes compared with 10.3% of those in the Low Neuroticism group ( $\chi^2 = 93.7$ ,  $p < .0001$ ; O/R 3.5). Another large difference was found in illegal drug use with 30.2% of the High Neuroticism group claiming drug use compared with 14.4% of the Low Neuroticism group ( $\chi^2 = 75.0$ ,  $p < .0001$ ; O/R: 2.1). When excessive intoxication was looked at it was found that 30.4% of the High Neuroticism group compared to 11.7% of the Low group reported having been drunk on more than twenty occasions within the past year. ( $\chi^2 = 14.8$ ,  $p < .0001$ ; O/R 2.6). When the two factors were considered separately, it was found that 20.1% of subjects with High anxiety levels reported regularly smoking cigarettes as opposed to 19.6% of subjects with Low anxiety levels, a difference which was not statistically significant ( $\chi^2 = 2.2$ , NS). Similarly, only a small, non-significant, difference in alcohol use and intoxication between the Low and High anxiety groups was found. Illegal drug use was not statistically significantly different between the Low and High anxiety groups either. Greater differences were noted with the second factor, self-esteem. Of those with low self-esteem 46.6% smoked cigarettes compared with 14.4% of those with high self-esteem ( $\chi^2 = 157.4$ ,  $p < .0001$ ; O/R 3.2). Occasions of alcohol intoxication also appeared to be affected by self-esteem levels with 30.4% of subjects with low self-esteem saying they had been drunk more than twenty times compared with 11.7% of those with high self-esteem ( $\chi^2 = 112.4$ ,  $p < .0001$ ; odds ratio: 2.6). Finally when drug use

was looked at, it was found that 37.2% subjects with low self-esteem claimed illegal drug use compared with 10.5% of those with high self-esteem ( $\chi^2 = 164.1$ ,  $p < .0001$ ; O/R 3.5).

### **Questionnaire Development and Factor Analysis 2**

Although some discriminatory power had been found with the two factor formulation, it was considered likely that this could be improved upon by further examination of the data. Consequently, and again in line with the assessment made in Study 1, a chi-square and odds ratio analysis was made of the individual items. This method was employed for all 28 items and the results can be found in Table 4.8. By employing the same criteria used at the end of Study 1, it was found that 22 of the 28 items discriminated strongly and it was decided to adopt these items for further analyses. The six items which were excluded from further analysis can be found at the end of Table 4.9.

**Table 4.8** – Study 2: The discriminatory power of the 28 items (Items in *italics* were excluded from further analysis)

Abbreviated Item	Sub-Trait	Low Score	High Score	$\chi^2$	O/R
I think my parents are proud of me	Self-esteem 1	8.5	48.1	245.1	5.7
Sometimes I am rather badly behaved	Self-esteem 6	5.5	28.5	209.8	5.2
I don't often go to see the doctor....	Self-esteem 7	7.3	28.9	133.6	4.0
I think that I am a good person	Self-esteem 3	10.4	30.0	38.3	2.9
I enjoy competitions and sports	Hostility 4	11.3	28.0	134.3	2.5
I often get angry...	Hostility 5	12.2	29.0	57.4	2.4
I occasionally worry about getting ill	Hypochondria 5	9.1	21.0	34.2	2.3
I like the world the way it is	Depression 2	8.3	18.5	28.0	2.2
I'm not very interested in how my....	Hypochondria 1	14.7	29.3	42.0	2.0
Everything I do takes lot of effort	Depression 3	10.9	19.5	14.7	1.8
I like the way I am	Self-esteem 5	13.6	23.4	25.9	1.7
I sometimes worry when I feel unwell	Hypochondria 3	12.1	20.9	16.6	1.7
I quite often feel a bit nervous....	Anxiety 4	14.6	23.3	25.3	1.6
I sometimes feel so ashamed....	Self-esteem 4	15.1	22.8	35.8	1.5
I often wake late in the morning	Depression 4	12.4	19.1	35.5	1.5
...I don't think I deserve to be happy	Self-esteem 2	16.4	24.1	30.0	1.5
I don't have a good appetite	Depression 1	18.1	25.2	55.7	1.4
I don't tend to worry about things	Anxiety 1	18.1	24.5	42.8	1.4
I am rarely involved in fights....	Hostility 2	12.7	17.9	35.5	1.4
I .... get sudden feelings of panic	Anxiety 6	15.1	21.6	26.9	1.4
I'm not the sort....who worries....	Anxiety 5	15.9	21.2	15.5	1.4
I hate being late for things like school	Anxiety 2	15.3	20.0	14.6	1.3
<i>I dream of living in another country</i>	<i>Fantasy 1</i>	<i>14.4</i>	<i>16.0</i>	<i>4.8</i>	<i>1.1</i>
<i>If my friends are ill I get ...worried....</i>	<i>Hypochondria 4</i>	<i>13.6</i>	<i>14.1</i>	<i>7.9</i>	<i>1.04</i>
<i>I look forward to lots of things</i>	<i>Depression 5</i>	<i>15.1</i>	<i>15.5</i>	<i>2.5</i>	<i>1.02</i>
<i>I nearly always feel cheerful</i>	<i>Depression 6</i>	<i>16.1</i>	<i>16.3</i>	<i>3.9</i>	<i>1.01</i>
<i>I'm not worried about.... the future...</i>	<i>Anxiety 3</i>	<i>20.0</i>	<i>20.1</i>	<i>33.0</i>	<i>1.0</i>
<i>I get on well with my family....</i>	<i>Hostility 1</i>	<i>15.0</i>	<i>13.5</i>	<i>6.8</i>	<i>0.9</i>

In addition, the discriminatory powers of the individual items was further confirmed by plotting a linear regression line against drug use. The figures showing this regression analysis

along with the regression equations for each item have been placed in Appendix 1 at the end of the thesis.

A further factor analysis was then carried out involving just the 22 items that had been found to strongly discriminate between substance users and non-users. Four factors with Eigenvalues of 2.8, 2.1, 1.6 and 1.2 were retained using the Scree Plot criterion and confirmed by Kaiser's criterion. These factors accounted for 70% of the total variance. Table 4.9 shows the factor pattern of the data. Factor 1 consisted solely of four items relating to self-esteem and so this factor was termed Low self-esteem.

Factor 2 contained several items relating to Hypochondria and Hostility and upon careful consideration it was decided that the items reflected a generalised lack of concern, particularly related to the persons health. For this reason Factor 2 was termed Lack of self-concern.

Due to the content of the factors, Factors 3 and 4 were termed Depression and Anxiety respectively. At this time it was decided to re-name the overall score Neurotic Susceptibility to Substance Abuse (NSSA) as the 22-item scale being adopted was not broad enough to be simply titled Neuroticism.

The stability of these factors was confirmed by splitting the data by gender and age and re-running the analysis where similar, confirmatory, results were found.

Cronbach's alpha showed reliability coefficients of .81 for Factor 1, .74 for Factor 2, .75 for Factor 3 and .61 for Factor 4. An overall alpha coefficient of .84 was found for the complete 22 items (Table 4.10).

**Table 4.9** – Study 2: Factor loadings for the four-factor solution

	Factor 1	Factor 2	Factor 3	Factor 4
<b>Factor 1: Self-esteem</b>				
Self-esteem 6	.66	.15	.10	.03
Self-esteem 1	.56	.10	.24	.14
Self-esteem 7	.54	.38	.02	.05
Self-esteem 3	.48	.01	.35	.21
<b>Factor 2: Lack of Self-Concern</b>				
Hypochondria 3	.62	.64	.06	.16
Hostility 5	.05	.54	.02	.25
Hypochondria 1	.09	.52	.01	.11
Hostility 4	.01	.50	.05	.07
Hostility 2	.11	.44	.06	.32
Hypochondria 5	.06	.42	.07	.22
<b>Factor 3: Depression</b>				
Self-esteem 5	.10	.18	.64	.16
Depression 3	.09	.01	.59	.16
Depression 2	.05	.02	.51	.19
Self-esteem 4	.21	.12	.48	.16
Self-esteem 2	.36	.21	.45	.13
Depression 1	.18	.10	.41	.01
Depression 4	.01	.06	.29	.27
<b>Factor 4: Anxiety</b>				
Anxiety 6	.27	.02	.08	.63
Anxiety 5	.26	.02	.19	.56
Anxiety 4	.36	.11	.17	.54
Anxiety 1	.23	.07	.37	.44
Anxiety 2	.16	.10	.01	.28

**Table 4.10** – Study 2: Reliability coefficients for the four factor solution

	$\alpha$ if item deleted
<b>Factor 1: Self-esteem</b>	
Self-esteem 1	.69
Self-esteem 3	.71
Self-esteem 6	.74
Self-esteem 7	.74
$\alpha$ for Factor 1	.81
<b>Factor 2: Lack of Self-Concern</b>	
Hypochondria 1	.67
Hostility 4	.70
Anxiety 3	.70
Hypochondria 3	.72
Hypochondria 5	.77
Hostility 2	.82
$\alpha$ for Factor 2	.74

<b>Factor 3: Depression</b>	
Self-esteem 5	.62
Self-esteem 2	.67
Self-esteem 4	.69
Depression 2	.70
Depression 1	.75
Depression 4	.76
Depression 3	.86
<b><math>\alpha</math> for Factor 3</b>	<b>.75</b>
<b>Factor 4: Anxiety</b>	
Anxiety 5	.27
Anxiety 6	.39
Anxiety 1	.57
Anxiety 4	.72
Anxiety 2	.72
<b><math>\alpha</math> for Factor 4</b>	<b>.61</b>
<b>Combined Items - Overall <math>\alpha</math></b>	<b>.84</b>

It was felt that by banding the scores into the High, Medium and Low categories used earlier, considerable quantities of data were being lost, which may have accounted for the poor discriminatory powers of some of the factors, therefore for this part of the analysis the data was divided using quartiles. Again, the discriminatory powers of the factors was assessed through chi-square analysis as well as through the odds ratio, approach. In this case, as there were four bands being used, the chi-squares and odds ratios were calculated using binary logistic regression (Table 4.11.)

**Table 4.11** – Study 2: The Four-Factor Solution and adolescent substance use.

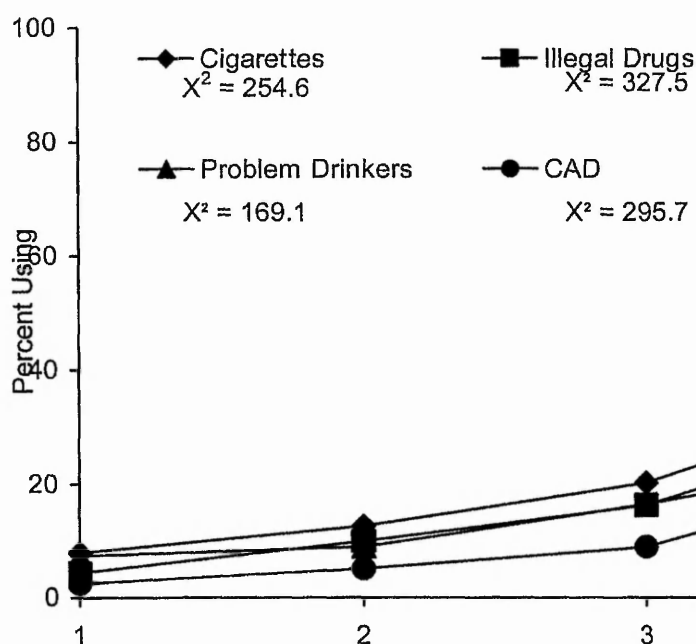
<b>Differences between those in the lowest &amp; highest categories. Percentage using in each category, chi-square and odds ratio.</b>			
	<b>Any Substance Use</b>	<b>Drugs</b>	<b>Cigarettes</b>
<b>Overall Scores:</b>	45.1% 76.8%	4.4% 31.7%	8.0% 36.3%
<b>Neuroticism</b>	254.6, $p < .0001$ ; 1.7	327.5, $p < .0001$ ; 7.1	318.7, $p < .0001$ ; 4.5
<b>Factor 1:</b>	48.1% 74.9%	3.7% 28.7%	5.7% 30.8%
<b>Low Self-esteem</b>	176.0, $p < .0001$ ; 1.6	279.5, $p < .0001$ ; 7.8	251.9, $p < .0001$ ; 5.4
<b>Factor 2: Low Self-concern</b>	47.4% 79.9%	5.8% 25.4%	10.3% 32.7%
	228.5, $p < .0001$ ; 1.7	141.6, $p < .0001$ ; 4.4	169.6, $p < .0001$ ; 3.2
<b>Factor 3:</b>	61.4% 68.2%	9.9% 22.0%	11.5% 29.2%
<b>Depression</b>	20.0, $p < .0001$ ; 1.1	67.5, $p < .0001$ ; 2.2	121.4, $p < .0001$ ; 2.5
<b>Factor 4:</b>	58.5% 67.5%	10.1% 19.3%	16.5% 22.0%
<b>Anxiety</b>	17.7, $p < .0001$ ; 1.2	34.6, $p < .0001$ ; 1.9	10.5, $p < .02$ ; 1.3
<b>Differences between those in the lowest &amp; highest categories. Percentage using in each category, chi-square and odds ratio.</b>			
	<b>Alcohol</b>	<b>Problem Drinking</b>	<b>Cigarettes, Alcohol &amp; Drugs (CAD)</b>
<b>Overall Scores:</b>	44.3% 75.2%	7.4% 25.0%	2.5% 22.7%
<b>Neuroticism</b>	232.8, $p < .0001$ ; 1.7	169.1, $p < .0001$ ; 3.4	295.7, $p < .0001$ ; 9.1
<b>Factor 1:</b>	47.2% 72.6%	5.0% 24.5%	1.7% 19.1%
<b>Low Self-esteem</b>	153.2, $p < .0001$ ; 1.5	165.4, $p < .0001$ ; 4.9	214.0, $p < .0001$ ; 11.2
<b>Factor 2: Low Self-concern</b>	46.2% 78.3%	8.3% 24.9%	2.5% 18.1%
	221.2, $p < .0001$ ; 1.7	121.5, $p < .0001$ ; 3.0	134.7, $p < .0001$ ; 7.2
<b>Factor 3:</b>	61.0% 66.5%	10.6% 20.0%	4.5% 15.4%
<b>Depression</b>	19.5, $p < .0001$ ; 1.1	44.5, $p < .0001$ ; 1.9	134.7, $p < .0001$ ; 3.4
<b>Factor 4:</b>	57.3% 62.0%	11.9% 18.3%	7.0% 12.7%
<b>Anxiety</b>	20.8, $p < .0001$ ; 1.2	19.6, $p < .0001$ ; 1.5	19.9, $p < .0001$ ; 1.8

**Study 2 - Results 2****Neurotic Susceptibility to Substance Abuse**

When the overall scores were looked at, it was found that levels of Neurotic Susceptibility to Substance Abuse as well as each of the four Factors, were able to discriminate well between users and non-users of the various substance groups being looked at and what became clear was that this second formulation, based on the 22 statements that showed greater discriminatory powers in the individual item analysis, was more powerful than the original two factor solution presented earlier.

It was found that overall NSSA levels had a strong effect on all adolescent substance use with those in the highest quartile using significantly more substances than those in lower groups (Figure 4.1).

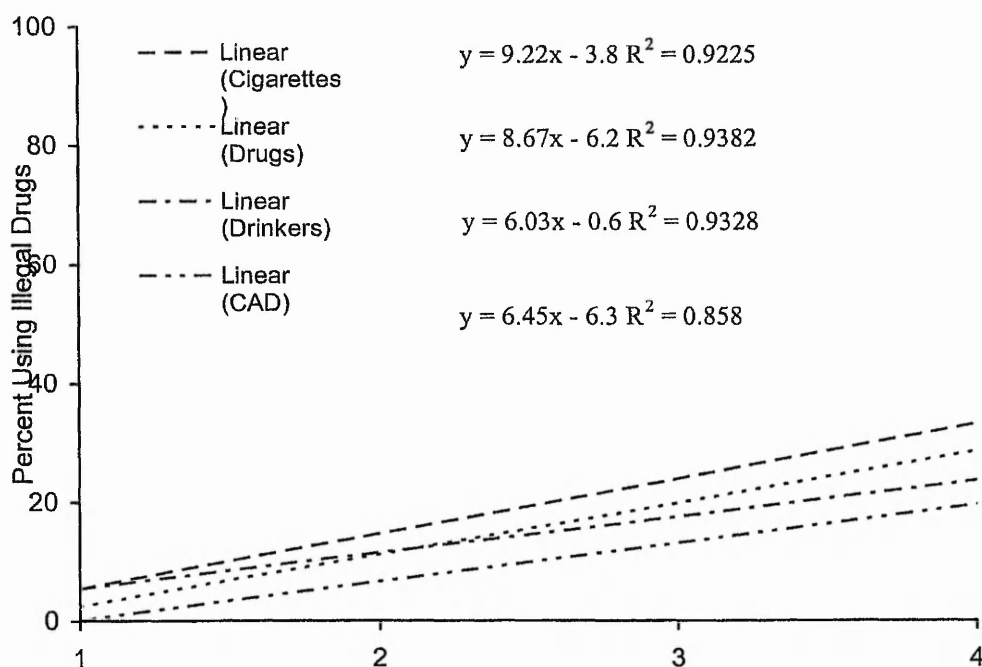
**Figure 4.1 - Study 2: NSSA and Substance Use.**



For example, 22.7% of those in the highest quartile were concurrent users of cigarettes, alcohol and drugs compared with only 2.5% in the lowest quartile ( $\chi^2 = 295.7$ ,  $p < .0001$ ; O/R 9.1) and 31.7% of those in the highest quartile said they used illegal drugs compared with 4.4% in the lowest group ( $\chi^2 = 327.5$ ,  $p < .0001$ ; O/R 7.1). Similar findings were made in respect of excessive intoxication and individual substance use. Full details of these relationships can be found in Table 4.11. By plotting regression lines for each of the substances under consideration it was found that cigarette smoking and illegal drug use were

more sensitive to the effects of increased levels of NSSA than either concurrent cigarette, alcohol and drug use or problem drinking (Figure 4.2).

**Figure 4.2 - Study 2: NSSA, Regression Analysis**



The effect of gender and overall NSSA was also looked at and it was found that there were few differences in the effect of raised trait levels on substance using behaviours. Drug use was an exception to this where it was found that males in the highest quartile were 8 times more likely to use drugs than their counterparts in the lowest quartile. The same figure for females was 6.5.

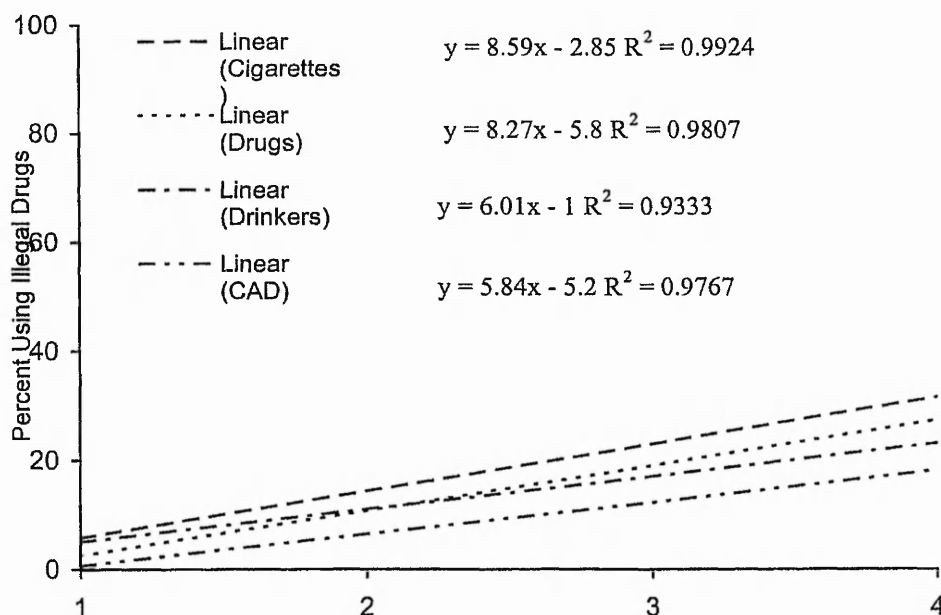
Age was also examined in the context of NSSA and was found to have an effect on substance using behaviour. Risk from cigarette smoking remained fairly constant with those 11-year olds who were in the highest quartile being 3.4 times as likely to use tobacco as those in the lowest quartile. This figure increased slightly to 4.0 at age 16. Risk from alcohol decreased

from 3.6 at age 11 to 1.2 at age 16 and risk from drug use increased from 2.0 at age 12 (no data available for 11-year olds) to 3.1 at age 16 with a peak of 7.9 at age 14. Risk from concurrent use of cigarettes, alcohol and drugs increased from 3.3 at age 12 (no data available for 11-year olds) to 7.5 at age 16 with a peak of 11.2 at age 14.

### Factor 1: Low self-esteem

Factor 1, self-esteem, was found to show good discriminatory powers between substance users and non-users with regression equations indicating that cigarette smoking and illegal drug use were effected by changing levels of self-esteem to a greater extent than either concurrent use of cigarettes, alcohol and drugs or problem drinking. (Table 4.11 and Figure 4.3). Once again, it should be noted that in this context low levels of self-esteem are to be considered pathological with those individuals having high levels being less at risk than those at the other end of the scale.

**Figure 4.3** – Study 2: Self-esteem levels: Regression Analysis



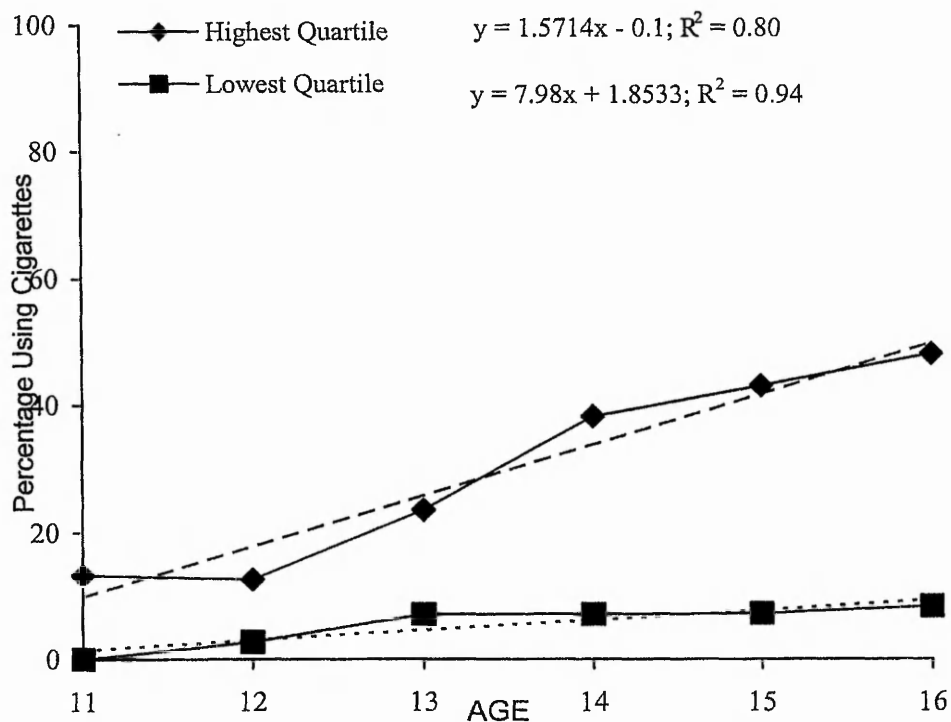
Of those who had low levels of self-esteem 30.8% smoked cigarettes compared with 5.7% of those with high levels ( $\chi^2 = 251.9$ ,  $p < .0001$ ; O/R 5.4); 24.5% of those with low levels had

been drunk over twenty times compared with only 5.0% of those with high levels ( $\chi^2 = 165.4$ ,  $p < .0001$ ; O/R 4.9) and 28.7% of those with low self-esteem used drugs compared with 3.7% of those with high self-esteem ( $\chi^2 = 279.5$ ,  $p < .0001$ ; O/R 7.8). Concurrent cigarette, alcohol and drug use was also effected by self-esteem levels with 19.1% of those with low self-esteem using all three substance types compared with 1.7% of those who had high levels ( $\chi^2 = 214.0$ ,  $p < .0001$ ; O/R 11.2).

When gender was considered it was found that no difference existed between males and females in their response to self-esteem levels and substance use, however, the effect of increasing age was considerable in several instances.

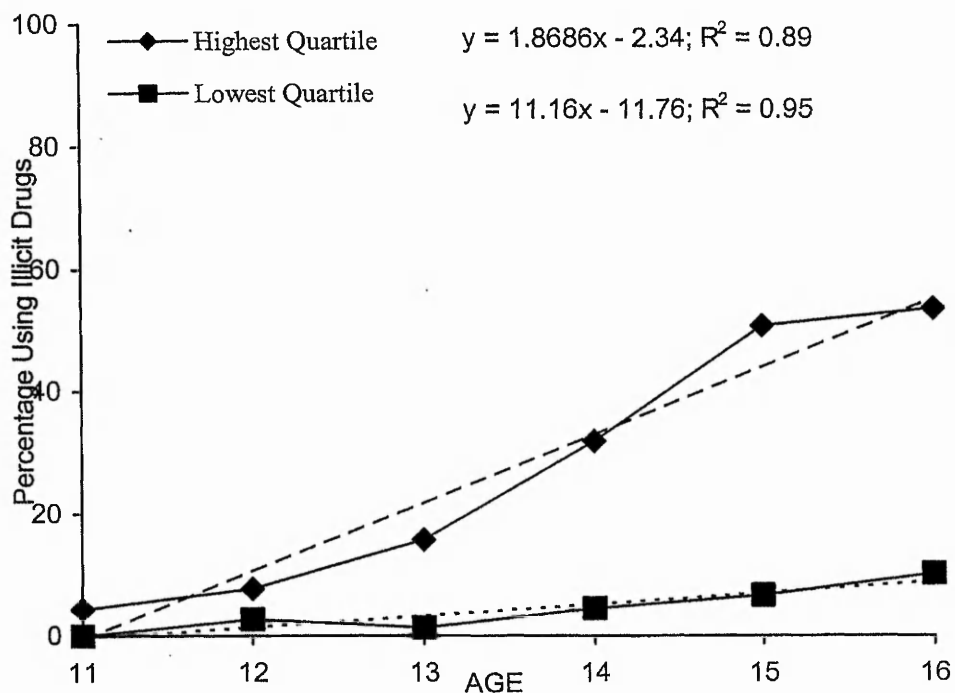
When related to cigarette smoking increasing age seemed to be strongly affected by low self-esteem. At age 11 none of those children who had high levels of self-esteem smoked compared to 13.3% of those with low levels. At age 16 only 8.3% of children with high self-esteem smoked compared with 48% of those with low levels. Regression analysis across the age range revealed a coefficient of 1.57 for those with the highest level of self-esteem compared to 7.98 for those with the lowest (Figure 4.4).

**Figure 4.4** – Study 2: The effect of Age and Self-esteem on Cigarette use



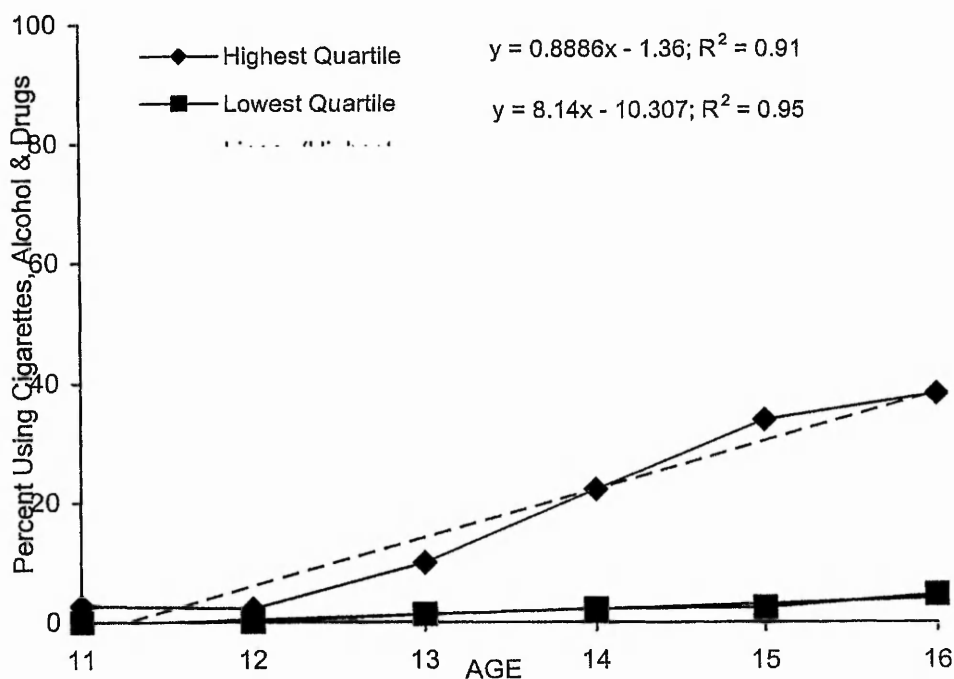
Use of illegal drugs was similarly effected with none of the 11-year olds with the highest levels of self-esteem using drugs compared with 4.4% of those with the lowest self-esteem levels. This difference increased with age until at age 16 it was found that 10.1% of those with high self-esteem used drugs compared with 53.5% of those with low self-esteem. This increased risk was again confirmed by regression analysis which showed a coefficient of 1.86 for those with high self-esteem compared with 11.16 for those with low self-esteem (Figure 4.5).

**Figure 4.5** – Study 2: The effect of Age and levels of Self-esteem on Illicit Drug use



Finally, levels of self-esteem and age were found to effect concurrent use of cigarettes alcohol and illegal drugs (CAD). At both ages 11 and 12, none of the participants with high self-esteem were CAD users, however 2.7% of those with low self-esteem were. These figures increased to 4.6% at age 16 for those with high self-esteem compared with 38.2% for those with low self-esteem. Again, regression analysis confirmed this with high self-esteem showing a coefficient of 0.88 compared to a coefficient of 8.14 for those with low self-esteem (Figure 4.6).

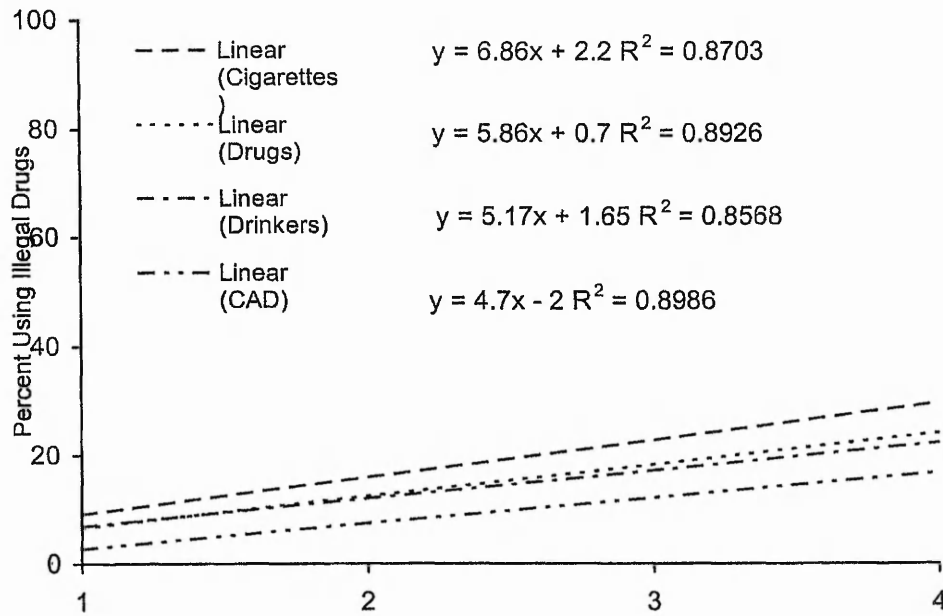
**Figure 4.6** – Study 2: The effect of Age and Self-esteem on Concurrent use of cigarettes, alcohol and drugs.



#### Factor 2: Lack of Self-concern

As expected, Lack of self-concern (LSC) also demonstrated good discriminatory powers (Table 4.11 and Figure 4.7). Of those with High levels of the trait, 32.7% smoked cigarettes compared with 10.3% of those with Low levels ( $\chi^2 = 169.6$ ,  $p < .0001$ ; O/R 3.2); 24.9% with High levels had been drunk more than twenty times compared with 8.3% of those with Low levels ( $\chi^2 = 121.5$ ,  $p < .0001$ ; O/R 3.0) and 25.4% with High levels of LSC used illegal drugs compared 5.8% with Low levels ( $\chi^2 = 141.6$ ,  $p < .0001$ ; O/R 4.4). Concurrent use of cigarettes, alcohol and drugs was also effected by increases in this trait with 18.1% of those with High levels being CAD users compared with 2.5% of those with Low levels ( $\chi^2 = 134.7$ ,  $p < .0001$ ; O/R 7.2).

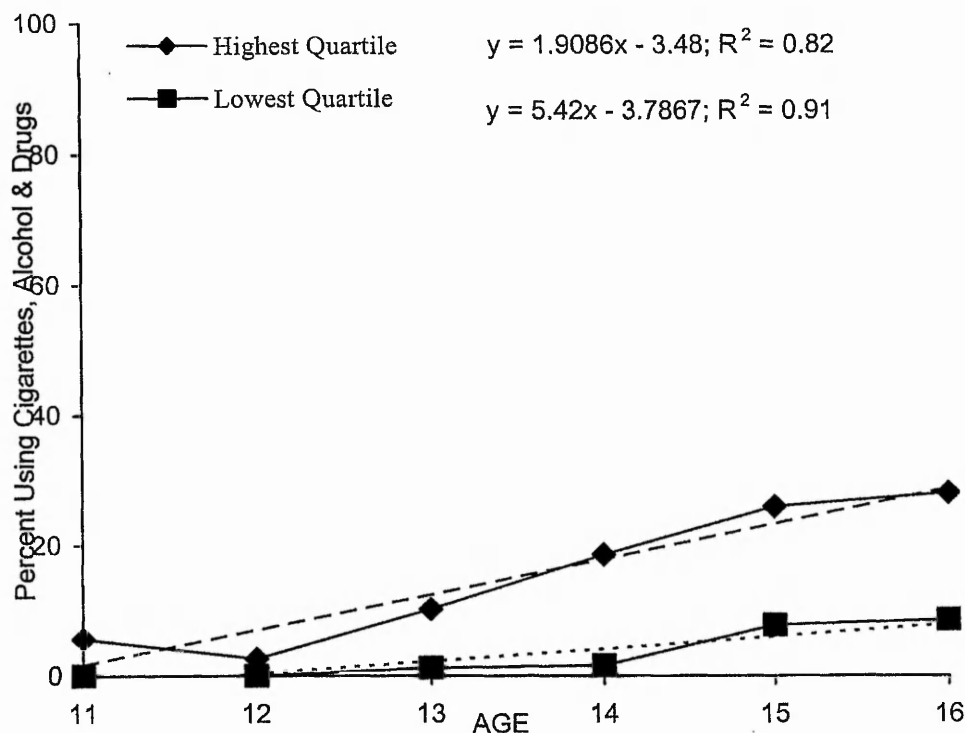
**Figure 4.7** – Study 2: Lack of Self-concern levels: Regression Analysis



When gender differences were considered, there was no effect with both genders being equally susceptible to changes in LSC.

The effect of age was not as pronounced with LSC as it was with self-esteem and the presence of increased levels of the trait only notably effected concurrent use of cigarettes, alcohol and drugs. In this case, none of the 11-year olds in the lowest quartile were CAD users compared with 5.7% of those in the highest quartile. This difference continued across the age range until at age 16, 8.6% of those in the lowest quartile were using cigarettes, alcohol and drugs concurrently as opposed to 28% of those in the highest quartile. Regression analysis showed that those with in the lowest quartile realised a coefficient of 1.90 across age compared with 5.42 for those in the highest group (Figure 4.8).

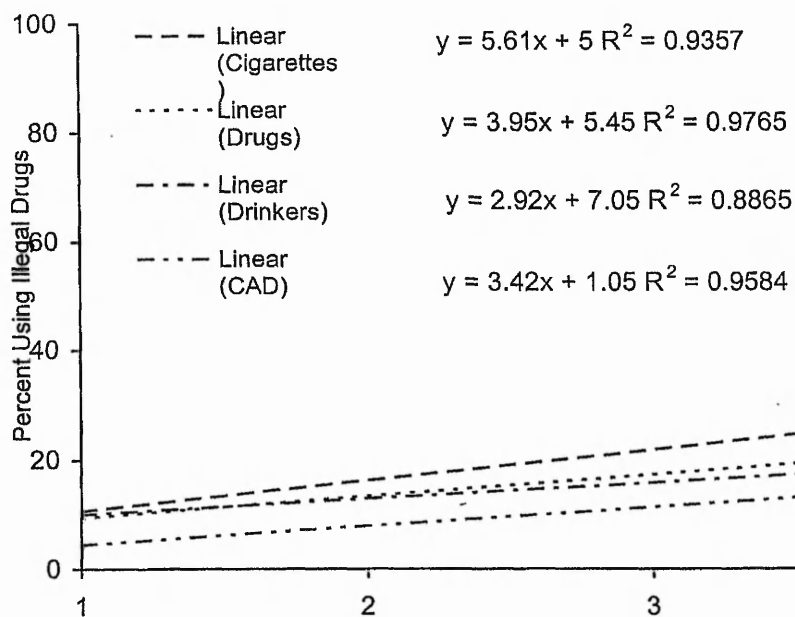
**Figure 4.8** – Study 2: The effect of Age and Low Self-concern on concurrent cigarette, alcohol and drug use



### Factor 3: Depression

The discriminatory power of Factor 3, Depression, was less dramatic than its two predecessors, which was to be expected (Table 4.11 and Figure 4.9). Of those with high levels of depression 29.2% smoked cigarettes compared with 11.5% of those with low depression levels ( $\chi^2 = 121.4$ ,  $p < .0001$ ; O/R 2.5); 20% of high level depressives had been drunk more than twenty times compared with 10.7% of those with low levels ( $\chi^2 = 44.5$ ,  $p < .0001$ ; O/R 1.9) and 22% of those with high levels of depression used drugs compared with 9.9% of those with low levels ( $\chi^2 = 67.5$ ,  $p < .0001$ ; O/R 2.2). Of those with high levels of depression 15.4% were concurrent users of cigarettes, alcohol and drugs compared to 4.4% of those with low levels ( $\chi^2 = 78.3$ ,  $p < .0001$ ; O/R 3.4).

**Figure 4.9** – Study 2: Depression levels - Regression Analysis

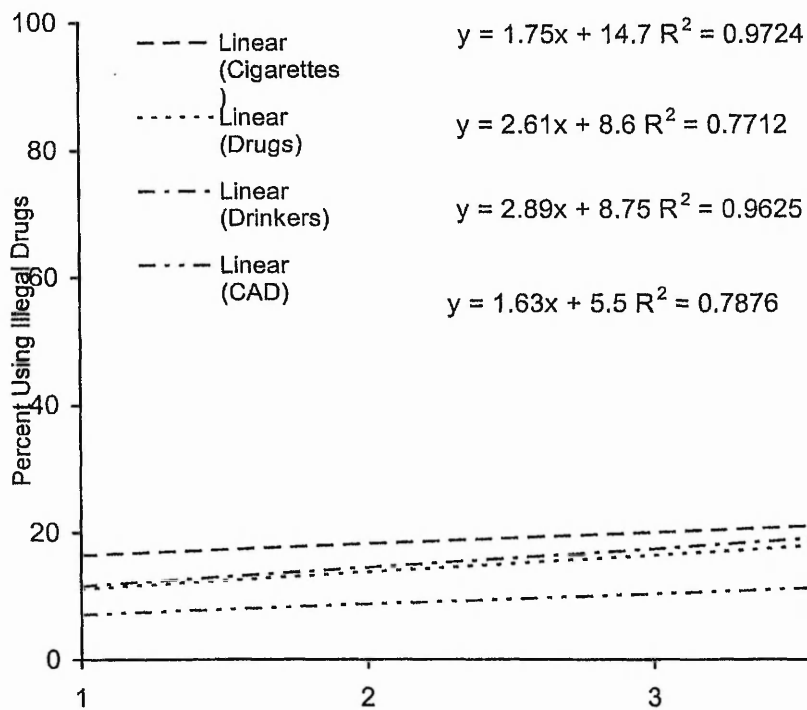


The only gender difference related to levels of depression noted was with concurrent use of cigarettes, alcohol and drugs where males in the highest quartile were 3.3 times as likely to use all three substances compared to males in the lowest quartile. The equivalent figure for females was 5.0. Age did not play a part with this Factor.

#### **Factor 4: Anxiety**

When this final factor was examined it was found that, although able to discriminate between users and non-users, its powers were not as great as for the preceding factors (Table 4.11 and Figure 4.10). Of those with high levels of anxiety, 22% smoked cigarettes compared to 16.5% of those with low levels ( $\chi^2 = 10.6$ ,  $p < .02$  O/R 1.3); 18.3% of those with high levels had been drunk in excess of twenty times compared with 12.0% of those with low levels ( $\chi^2 = 19.5$ ,  $p < .0001$ ; O/R 1.5) and 19.3% of those with high levels of anxiety used drugs compared with 10.1% of those with low levels ( $\chi^2 = 34.6$ ,  $p < .0001$ ; O/R 1.8). Finally, 12.7% of those with high anxiety levels were CAD users compared with 7% of those with low levels of anxiety ( $\chi^2 = 19.9$ ,  $p < .0001$ ; O/R 1.8).

**Figure 4.10** – Study 2: Anxiety: Regression Analysis



The gender difference found in Factor 3 was reversed for Anxiety with high quartile males being 3 times at risk compared to males in the lowest quartile, the equivalent figure for females was 1.2. No significant age effects were found with this final factor.

In light of these more significant findings, it was decided to return to the data obtained by Study 1 to see if similar results, using the same analytical criteria as for Study 2, could be obtained. This course of action was taken as it would serve to further validate the decision to determine factor number and content by a combination of methods rather than solely by factor analysis. Additionally, it was felt that it would allow a more meaningful interpretation to be placed on the Study 1 data.

These results will not be presented in as much detail as those for Study 2 as they are of interest primarily for validation purposes.

## **Study 1 - Results 2**

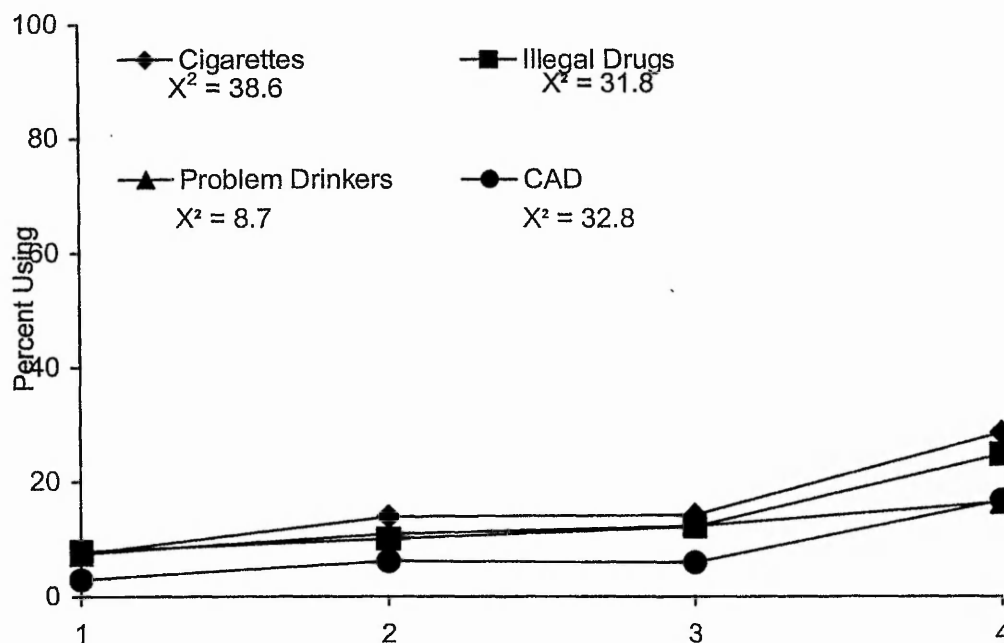
This retrospective analysis of Study 1 was carried out in an identical fashion to the analysis of Study 2.

### **Neurotic Susceptibility to Substance Abuse**

The overall finding from Study 2 was that increased levels of the overall trait of Neurotic Susceptibility to Substance Abuse were related to an increased amount of substance using behaviour, a finding that was replicated by this retrospective analysis of the Study 1 data (Figure 4.11). When specific substances were examined it was also found that the two analyses were generally in agreement. Cigarette use for those in the lowest quartile was 8% for Study 2 and 7.8% for Study 1 and for those in the highest quartile it was 36.3% in Study 2 and 28.5% in Study 1. Drug use for those in the lowest quartile was 4.4% for Study 2 and 7.4% for Study 1 and for those in the highest quartile it was 31.2% in Study 2 and 24.7% in Study 1. A similar pattern was found with problem drinkers where 7.4% of those with low neuroticism in both sets of analysis drank to excess compared to 25% and 16.4% of those in the highest quartile (Study 2/ Study 1). When concurrent use of cigarettes, alcohol and drugs was considered 2.5% and 2.9% of those in the lowest quartile (Study 2/ Study 1) were CAD users compared with 22.7% and 16.7% of those in the highest quartile (Study 2 & Study 1).

As with Study 2, few differences were found between genders in the effect of raised trait levels on substance using behaviours. Drug use was, again, an exception to this where it was found that males in the highest quartile were 4.6 times more likely to use drugs than their counterparts in the lowest quartile. The same figure for females was 2.3. Age differences were consistent with those found by Study 2.

**Figure 4.11** - Study 1: Retrospective: NSSA scores



#### Factor 1: self-esteem

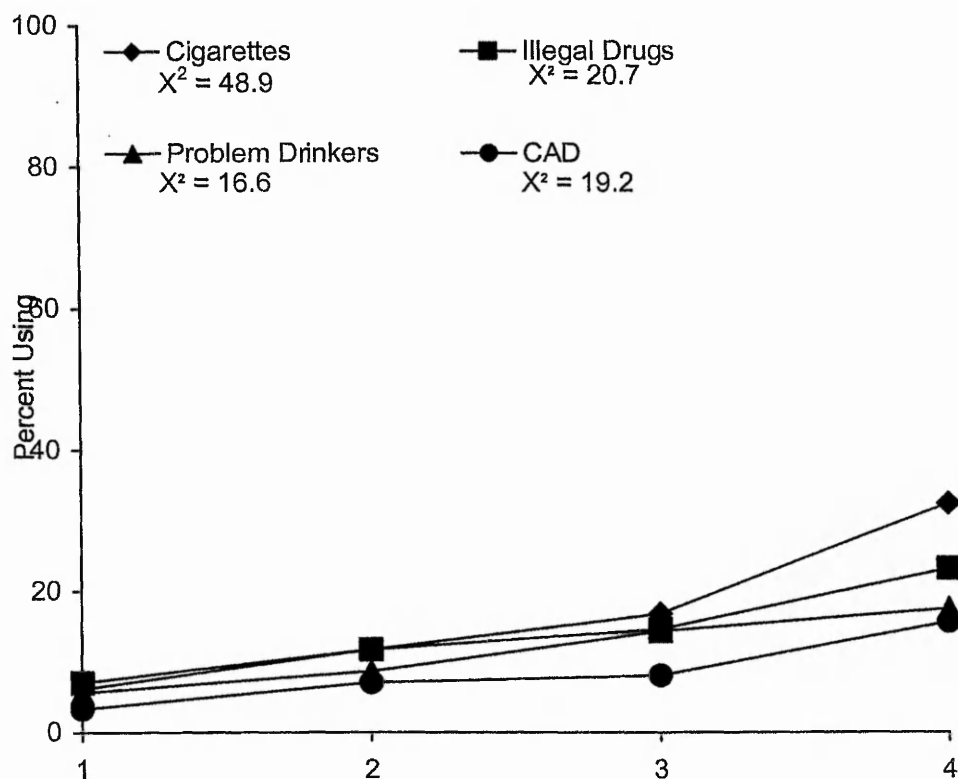
When Factor 1 was considered the findings for cigarette smoking were very similar across the two data sets (Figure 4.12). Of those who had low levels of self-esteem 30.8% and 32.3% smoked cigarettes (Study 2/ Study 1) compared with 5.7% and 6.1% of those with who had high levels (Study 2/ Study 1).

The variation between the two studies was slightly larger when illegal drug use was looked at: Of those who had low levels of self-esteem 28.7% and 23.1%% used illegal drugs (Study 2/ Study 1) compared with 3.7% and 6.7% of those with who had high levels (Study 2/ Study 1).

The findings relating problem drinking to self-esteem levels were also examined and it was found that of those who had low levels of self-esteem 24.9% and 17.5% were problem drinkers (Study 2/ Study 1) compared with 8.3% and 5.6% of those with who had high levels (Study 2/ Study 1).

Finally, when concurrent use of cigarettes, alcohol and drugs was re-examined, it was found that of those who had low levels of self-esteem 19.1% and 15.6% used all three types of substance (Study 2/ Study 1) compared with 1.7% and 3.3% of those with who had high levels (Study 2/ Study 1). Gender and age differences were comparable across the two data sets.

**Figure 4.12** - Study 1: Retrospective: Factor 1, Self-esteem

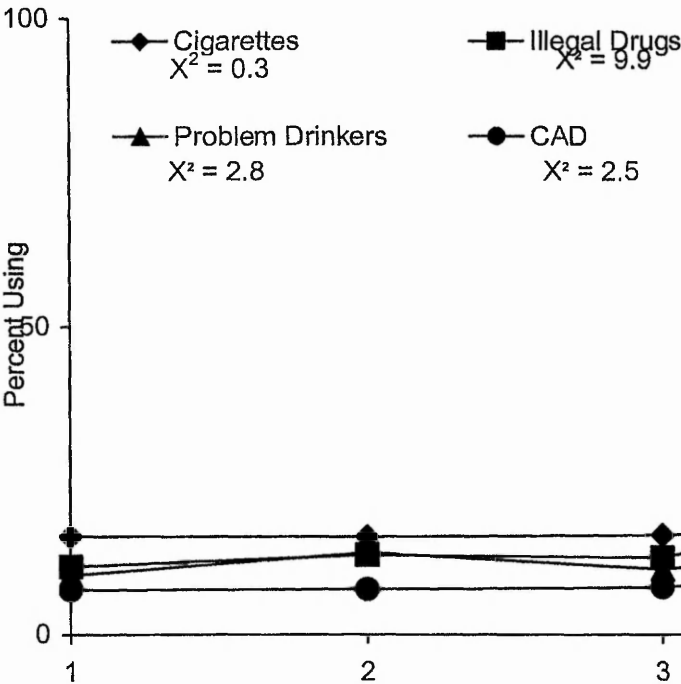


#### Factor 2 : Lack of Self-concern

Surprisingly, when this factor was examined several large differences were found between the two studies (Figure 4.13). With cigarette smoking, Study 2 found that of those in the highest, most pathological, quartile, 32.7% smoked whereas Study 1 found a comparable figure of 17.9%. At the other end of the scale, in Study 2 10.3% of those in the lowest quartile smoked compared with only 15.9% in the same quartile of Study 1. A smaller difference was found in relation to drug use: Of those who were in the highest quartile 25.4% and 22.1% used illegal drugs (Study 2/ Study 1) compared with 5.8% and 11.1% of those with low levels (Study 2/ Study 1). Differences were also found in levels of problem drinking: Of those who were in the highest quartile 24.9% and 14.5% were problem drinkers (Study 2/ Study 1) compared with 8.3% and 9.7% of those in the lowest quartile (Study 2/ Study 1). There was another gap between the two studies in relation to concurrent use of cigarettes, alcohol and drugs: It was

found that of those in the highest quartile 18.3% and 11.4% used all three substances (Study 2/ Study 1) compared with 11.9% and 7.3% in the lowest quartile (Study 2/ Study 1). Again, the effects of gender and age were considered in both studies and although some of the actual percentages using differed, the broad trends of Study 2 were replicated by this retrospective analysis.

**Figure 4.13** – Study 1 Retrospective: Factor 2, Low Self-concern

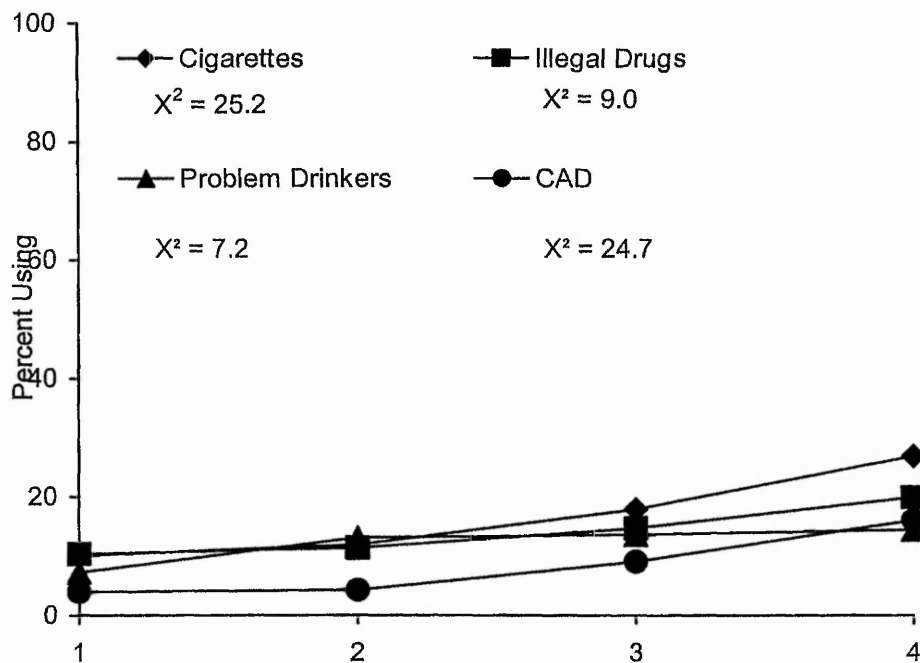


### Factor 3: Depression

The two studies were in much closer agreement when Factor 3, Depression was examined (Figure 4.14). With cigarette smoking, Study 2 found that of those in the highest quartile, 29.2% smoked whereas Study 1 found a comparable figure of 26.9% and Study 2 found that 11.5% of those in the lowest quartile smoked compared with 10.1% in the same quartile of Study 1. Drug use also showed that the two studies were in broad agreement: Of those who were in the highest quartile 22.0% and 19.9% used illegal drugs (Study 2/ Study 1) compared with 9.9% and 10.5% of those with low levels (Study 2/ Study 1). Slight differences were

found with problem drinking: Of those who were in the highest quartile 20% and 14.4% were problem drinkers (Study 2/ Study 1) compared with 10.7% and 7.3% of those with low levels (Study 2/ Study 1). The two studies were also in agreement when concurrent use of cigarettes, alcohol and drugs was looked at: Of those who were in the highest quartile 15.4% and 16.0% used all three substances (Study 2/ Study 1) compared with 4.4% and 4.0% of those with low levels (Study 2/ Study 1).

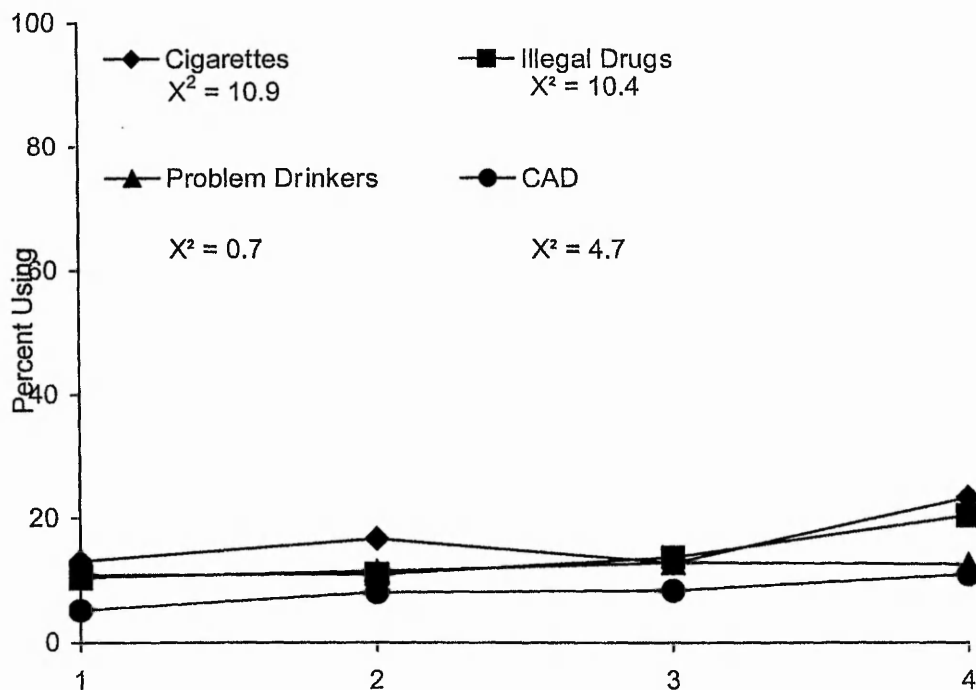
**Figure 4.14** - Study 1: Retrospective: Factor 3, Depression



#### **Factor 4: Anxiety**

Finally, Factor 4, Anxiety was considered and the two studies were found to be generally in agreement (Figure 4.15). Firstly cigarette smoking was looked at: Of those who were in the highest quartile 22.0% and 23.3% smoked (Study 2/ Study 1) compared with 16.5% and 13.1% of those with low levels (Study 2/ Study 1). Drug use was also very similar across the two studies: Of those who were in the highest quartile 19.3% and 20.4% used drugs (Study 2/ Study 1) compared with 10.1% and 10.9% of those with low levels (Study 2/ Study 1). There was a slight difference found with problem drinking: Of those who were in the highest quartile 18.3% and 12.6% used all three substances (Study 2/ Study 1) compared with 11.9% and 10.5% of those with low levels (Study 2/ Study 1). Finally, general agreement was found between the two studies with relation to concurrent use of cigarettes, alcohol and drugs: Of those who were in the highest quartile 12.7% and 11.0% used all three substances (Study 2/ Study 1) compared with 7.0% and 5.2% of those with low levels (Study 2/ Study 1).

**Figure 4.15** – Study 1: Retrospective: Factor 4, Anxiety



### **Discussion**

Due to the development of the Substance Abuse Susceptibility Index this chapter has become fairly complex as considerations such as factor analysis and the actual results found have been presented concurrently. This discussion section will attempt to simplify this and firstly the psychometric aspects of the chapter will be addressed and this will be followed by a discussion of the results.

### **The Psychometrics**

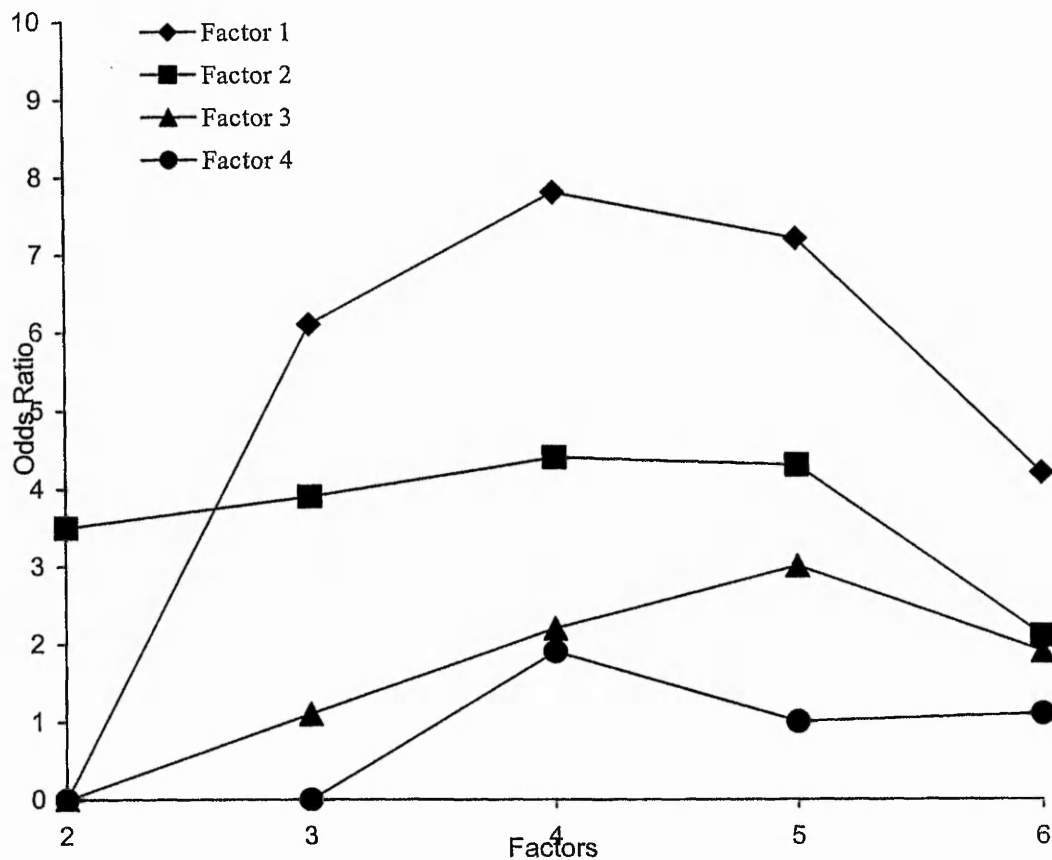
It will have been noted that classic factor analytic theory has not been strictly adhered to during the development of the SASI, but that a number of different approaches have been used. At the heart of this decision was the philosophy behind the work - to develop an instrument, suitable for use not only by psychologists but by teachers and other professionals working in this field, capable of predicting adolescents at particular risk from substance abuse and identifying causal reasons. It was because of this that a risk factor/odds ratio approach

was adopted during the development of this first section of the SASI and why the odds ratios have figured so strongly in the development of the SASI.

Having said that, factor analysis was at the basis of all the decisions made concerning the development of the instrument. When the initial two factor solution was identified during the analysis of both Study 1 and Study 2, it was disappointing that the factors were not sufficiently discriminating to make them worth retaining, however, it was believed that aspects of personality should be discriminating so the items were examined individually. It was this individual analysis that led to a reappraisal of the factor structure and to the development of the final four-factor solution. Again, factor analysis was at the heart of this, but the process was guided by the individual items odds ratios as well as the logical grouping of various of the items. For instance when offered different, equally valid, factor analytic solutions it was logical to group like variables together, in this way items concerned with self-esteem were grouped with several depression items to form Factor 3, Depression. Clearly these items are related and it was sensible to group them together rather than with, say, Hostility items.

As can be seen in Figure 4.16, various factor solutions were assessed and it was found that the four factor solution was the most powerful, but as the initial two factor solution offered by the factor analysis was rejected, the power of this solution was carefully confirmed by odds ratios and chi-square analysis.

**Figure 4.16 -** Study 2: Odds ratios achieved by the Factors when formulated as part of a 2, 3, 4, 5 or 6 factor solution and when measured against drug use



It was a useful exercise to reanalyse the Study 1 data using the four factor solution developed during Study 2, this procedure was a further validation of the decision to deviate from the classic solution offered by factor analysis. The figures in Appendix A show how the final 22 individual items compare when the two sets of data were considered against drug use in the light of this four-factor solution. It can be seen from the regression lines that the majority of the items showed very similar characteristics pattern for both Study 1 and for Study 2, an indication of the validity of the measures.

It is unclear why the classic approach did not offer a sufficiently discriminatory model to warrant further development and why a secondary solution had to be adopted. One explanation might be connected with the nature of the area under examination. It may be that

adolescents are subject to fluctuations of mood state with changing personality traits and that this fact, combined with substance use, was enough to sufficiently skew the results.

It is however believed that factor analysis alone is not an appropriate tool to rely on in this area. With this type of work, a knowledge of the area under investigation is clearly of importance, particularly relating to previous research findings, but of equal importance is a knowledge of practical issues such as the effect of increased commercial advertising and current patterns of substance use amongst young people. An instrument such as the SASI cannot be developed in isolation, rather it has to be developed in light of the global world in which the target recipients of the questionnaire live.

In summary, this first section of the SASI was developed by balancing the results from the factor analysis with the discriminatory powers of the individual items as well as with the alpha coefficients and with a knowledge of the overall area. In this way it is believed that the first section of the SASI is a powerful instrument capable of discriminating between substance users and non-users.

### **The Results**

This part of the discussion will focus on the findings of the four-factor solution and, as the results were very similar, it will address the generalised findings of both Study 1 and Study 2 rather than considering them separately.

The findings show distinct differences in the responses given to the personality assessment questions asked in this first section of the SASI by substance users and non-users. Clearly there were overall differences, but each of the four factors also had the power to discriminate strongly between the two groups which indicates that this first section of the Substance Abuse Susceptibility Index may well be a useful tool, if not necessarily for predicting those at risk, then at least for identifying, through non-substance use related questions, those who are already using psychotropic substances.

Although these findings were very encouraging the question of the direction of causality does, once again, come in at this point. The risk of the direction of causality being a confounding variable in this type of research is always present. Clearly, if we accept the fact that 22% of those who showed High levels of Depression use illegal drugs (as opposed to 15% of the overall sample population), we can either assume that illegal drug users are typically depressed because of drug use or that depressives use drugs, possibly to alleviate their depression. If one is working in the area of research into preventative, rather than curative, psychology then this question is obviously of cardinal importance.

Without labouring the point, it was found that twice as many respondents with High levels of depression were problem drinkers compared with adolescents with Low levels. Alcohol is a central nervous system depressant and is known to have mood lowering psychoactive properties so this direction of causality question is clearly of some importance. It is felt that the only reliable way to overcome this vexing question is through longitudinal research. It is suggested therefore, that of value might be a project that uses an instrument with predictive power, such as the one under development here, and apply it to children aged 9-10 years old with a view to assessing their personalities before substance use begins. The subjects could then be followed up until they were 15-16 years of age with periodic checks being made on their substance using behaviour as well as changes in their personality indices.

### **Neurotic Susceptibility to Substance Abuse**

One of the most significant findings of this part of the work was that the first part of the SASI was capable of discriminating between substance users and non-users. This ability of the combined items (Neurotic Susceptibility to Substance Abuse, NSSA) to discriminate is helpful as it not only provides an immediate snapshot of an individual, but also indicates the overall validity of this part of the instrument.

Part of the philosophical basis for this work is that substance users differ in a fundamental and quantifiable way to non-users and this finding appears to support that stance. It is not

suggested that the significance of the NSSA results signal a re-emergence of the addictive personality concept, but it does indicate that, for whatever reason, young substance users are identifiable through assessment of certain aspects of their personalities. Whether this lends weight to the researchers who support the concept of an addictive personality, ( Begun, 1977; Sadava, 1978; Slesinger, 1985) or is confounded by the arguments of those claim that any psychopathology or aberrant personality findings result directly from the substance using state rather than contributing to it ( Sutker & Allain, 1988; Nathan, 1988) is open to debate. It does appear though that although Graham & Strenger (1988) concluded that no single personality type is characteristic of all alcoholics, the personality types found here do apply to all the different types of substance abuse being examined with similar NSSA patterns being found for cigarette smoking, alcohol use and drug use.

The fact that NSSA markers are elevated in substance users also lends weight to some of the older research ( Sieber & Bentler, 1982), which claimed that the generalised concept of Neuroticism was an area significantly raised in substance users, particularly alcohol abusers.

Oetting & Beauvais (1987) suggested that the personality of adolescents was subject to fluctuations and that findings of elevated trait levels in adolescent substance users might not necessarily mean that those findings are characteristic of their underlying personality. However, even if that is the case, if adolescents perceive themselves as having low self-esteem or raised levels of anxiety then whether or not this state is characteristic of their underlying personality seems irrelevant. Even if subsequent using behaviour can be explained by an inappropriateness of response to a stressful situation rather than as a response to a personality trait then the end result remains the same.

This part of the SASI is clearly biased towards items assessing low mood state and the discriminatory power of the combined items may be interpreted as indicating that a generalised low mood state could pre-dispose a person towards substance abuse. If this is the case, and given the preponderance of items assessing low self-esteem, depression and lack of self-concern, this may well be true, then further work needs to be undertaken which specifically looks at these areas.

### **Factor 1, Self-esteem**

This was the most discriminatory of the factors and it was clear that adolescents with low levels of self-esteem were far more likely to use a variety of substances than those with high, or even moderate, levels. Self-esteem is a trait that has been examined by many previous researchers ( Swaim et al, 1989; Young et al, 1989) and although findings differ on the correlations between personality variables and substance use, the findings in relation to self-esteem are fairly consistent and in agreement with the findings of this work.

The presence of low levels of self-esteem within an individual obviously has global implications that go beyond substance use and it seems likely that this tendency will have a profound effect on their everyday functioning. However, as with all the various areas under discussion, the presence of low self-esteem cannot be taken in isolation. The purpose of this assessment has been to identify causal reasons behind adolescent substance abuse and, as has already been stated, it is extremely unlikely that a single causal factor will be identified. Instead, although causality will vary from individual to individual, a constellation of interrelated characteristics and social indicators will probably emerge and, in the case of low self-esteem, it may well be found that although self-esteem is related to substance use it can also be related to an individual's social situation.

In accepting low levels of self-esteem as being strongly related to substance abuse it is important not to assume that low self-esteem is necessarily causal. It is possible that an individual is responding to self-esteem levels by abusing drugs or alcohol, but when considering ultimate causality the question of what caused the self-esteem in the first place should also be considered. Clearly if a person has been identified as being at risk from substance abuse because of the presence of this characteristic, it is of little value working to raise their levels if there is an unknown causal factor. Bearing this in mind it is important to consider the presence of low levels of self-esteem in the global context of a persons life.

As discussed in Chapter 2, Young et al (1989) measured school self-esteem, home self-esteem and peer self-esteem and found a very strong relationship between drug use, low home and

low school self-esteem. It can be speculated that, given the strong findings reported here, even greater discrimination might have been found if the statements in Section 1 had specifically addressed these 'sub-traits' of self-esteem. In addition to being useful concepts generally, being able to measure specific areas where a person's self-esteem is particularly low would be a helpful pointer towards identifying causal reasons for that state.

Finally, it is interesting to note that adolescents appear to be more susceptible to the effects of low self-esteem as they get older. There were no significant differences found between rates of low self-esteem in the younger age groups compared with the older ones, but the proportional use of all the substances increased with age. It is suggested that as adolescents mature issues related to self-esteem increase in relative importance and the response, in terms of substance use, to low levels comparatively more extreme. Clearly there are other explanations as to why substance use of all kinds increases with age, but what is of interest here is this seemingly exaggerated response by older adolescents to low self-esteem. It is of course possible that as they get older so availability of illegal drugs and alcohol increases and it is this combination of low self-esteem and availability that makes them more vulnerable to substance abuse than their younger counterparts.

### **Factor 2, Lack of self-concern**

This trait was also found to be strongly related to all kinds of substance use in adolescents. Superficially it may seem that a lack of self-concern is similar in nature to low self-esteem, and indeed there may well be a relationship, but in this context it appears that those people who are not concerned about their well-being are at particular risk from substance abuse.

Not only has this finding been empirically supported by the research being reported, but the finding also makes intuitive sense too. If a person tends towards the hypochondriacal they are unlikely to put themselves at risk by abusing drugs, smoking cigarettes or becoming drunk regularly. At the other end of the spectrum, those who are not worried about becoming ill or

give no thought to lifestyle consequences would probably not worry about indulging in activities which have been shown to be risky.

Again, this finding should not be taken in isolation. If a person has extreme tendencies towards a lack of self-concern they are at risk from substance abuse, but the question of why they have these low levels must be asked. Once again, it seems likely that this trait does not exist in isolation.

### **Factor 3, Depression**

Although it did not discriminate as well as the preceding two factors, Depression nevertheless found significant differences between substance users and non-users which confirms the work of many researchers who have long been linking the trait with substance use.

The power of this Factor to discriminate was found not only with illegal drugs, but with alcohol abuse, cigarette use and concurrent use of cigarettes, alcohol and drugs too. Given the power of Factor 1, self-esteem, this is not too surprising as the two areas are clearly linked with low self-esteem often accompanying pathological depression.

Of interest in these findings is the fact that people with high levels of depression are 1.9 more likely to be problem drinkers than those with low levels, but those with high levels were 3.4 times as likely to be concurrent users of cigarettes, alcohol and drugs than those with low levels. Even though this work has found that those people who use drugs tend to be the same ones who regularly get drunk, this is not a pattern found in people with high levels of depression. It might be speculated that this is because of the characteristics of alcohol as a depressant so that adolescents who are prone towards depression naturally stay away from alcohol and gravitate towards other substances. If this were the case, it would lend some weight to Khantzian's (1985) Self-Medication Hypothesis which suggests that a person takes a particular type of substance in order to alleviate an underlying disorder.

#### **Factor 4, Anxiety**

This final factor was clearly the weakest of all the factors, however, it still had the power to discriminate between substance users and non-users.

As discussed earlier, there is a considerable body of evidence which has shown raised anxiety levels in alcoholics and drug addicts and it is suggested that this could possibly be a generalised underlying trait common to substance abusers. If anxiety precedes substance abuse or if substance abuse is a direct response to an anxiety state then clearly the etiology of that state needs to be looked at within each individual. However, it is also possible that raised anxiety indices are the result of collateral activities associated with substance abuse. If this is the case then it would probably be particularly true of the younger age groups who might be concerned about the illegality of their actions or have worries about access to money and the availability of alcohol and drugs.

In light of the relatively weak discriminatory powers of this final factor it would seem prudent to focus on other aspects of the SASI with anxiety only being used to confirm the findings of other areas of the instrument.

#### **Conclusions**

This first section of the Substance Abuse Susceptibility Index shows a marked ability to discriminate between substance users and non-users and this fact, in combination with other positive indicators such as Cronbach's Alpha, show that the instrument is a useful tool in identifying young people who are currently substance users.

However, the question of whether the SASI can predict which pre-using children will go onto to become substance abusers remains unanswered. It is always difficult to extrapolate from cross-sectional analyses and this is particularly so in this case when the crucial question of direction of causality remains unanswered.

As discussed earlier, the only way to assess the SASI's predictive powers and to address direction of causality is through longitudinal work. Although the findings reported here were strong, care needs to be taken if any extrapolation of the results is attempted.

## **CHAPTER 5 - STUDY 3: THE OPEN AND CLOSED STUDY**

This third study, Study 3 or the Open Closed Study, was a small study which attempted to assess the reliability of the SASI when children were asked to identify themselves. As the SASI was designed to be a predictive instrument, although useful in an anonymous setting, it would only have practical use if respondents answered truthfully when they believed they could be identified.

The reliability and validity of self-report questionnaires is always open to debate, but this is particularly the case when the subjects are adolescents and even more so when the subject of interest is substance use. Two main causes for concern are the perceived fear by individuals that they might be 'caught out' if they admit to substance use, leading to under-responding, and conversely, a desire to impress their peers by claiming far greater substance use experience than they actually have. Although the research methodology adopted by this research programme guaranteed anonymity and confidentiality, other research has suggested that this may not always be enough to allay the fears of respondents (Mieczkowski, 1990). However, generally, self-report questionnaires are believed to be a relatively valid way of capturing sensitive data ( Weatherby, 1994).

Response distortion to avoid social stigma is a serious risk in all types of survey but particularly those liable to influence from social desirability issues. Survey respondents may be unwilling to report drug use to avoid adverse reactions from others, but, conversely, respondents with positive views of drug use may exaggerate their drug use to impress, or to live up to a self-image that perceives drug use as positive. These hypotheses are consistent with social desirability theory (Edwards 1957), which suggests that distortion of self-reports, by underreporting or over reporting, occurs as a function of the perceived acceptability of the behavior in question. Evidence from validity studies with highly reliable and valid external criteria (Cahalan 1968; Hyman 1944) indicates that many types of behavior viewed as socially desirable are overreported, while those viewed as less desirable are under reported. Several studies also indicate that the tendency to underreport varies across social groups that

hold differing norms and values regarding the desirability of the behaviors or traits under investigation (Hyman 1944; Hindelang et al. 1981).

Thus, even when validity studies indicate a bias towards underreporting a socially unacceptable behavior, the bias cannot be assumed to be constant across all respondents. Underreporting has been found to vary by drug, with serious levels of underreporting associated with heroin. Cisin and Parry (1980) found that approximately two-thirds of respondents identified as heroin users in clinic records denied heroin use during a survey. In that study, levels of underreporting were also very low for other drugs such as marijuana and cocaine. While this study may indicate that the most undesirable or stigmatized drug behaviors are likely to be under reported, Cisin and Parry noted that the clinic data criterion used in that study was subject to error and that some patients may have inadvertently failed to mention softer drugs such as marijuana during the intake history—thus giving a false degree of net validity to survey reports on the softer drug.

Factors other than social desirability also threaten the accuracy of self-reported drug use data. Respondents may fear legal consequences to reporting drug use if they distrust assurances of confidentiality. They may be unable to report drug use accurately, particularly when questions involve detailed accounts of drug consumption at times in the past. They may not be able to remember the circumstances of use, when they used a drug, or even whether they ever used a particular drug. Heavier drug users are likely to find particular facts more difficult to recall and may experience memory impairment. However, given the adolescent population of this research, this latter point is probably not particularly relevant except in some extreme cases.

In order to test these concerns a methodology was developed which would allow an assessment of substance use to be made when children believed they were anonymous (the Closed Group) and when they believed they could be identified (the Open Group).

## **Participants**

The participants were 879 11-16 year old school children attending a comprehensive school in the south-west of England. The school used was in a large market town and was in the top third of the government league tables for England. Details of participants age and gender can be found in Table 5.1. In Table 5.2 details of age and gender are given dependent upon which of the two study groups (Open or Closed) the participants were in. Of these 879 participants, 189 returned questionnaires which had to be rejected due to a high proportion of inappropriately completed items. Specifically, questionnaires were rejected if the age and gender categories had not been correctly completed. This high rejection rate will be discussed later, but it was found that 131 questionnaires from the Open group and 58 from the Closed group had to be rejected.

**Table 5.1 – Respondents by age and gender**

	11	12	13	14	15	16	Total
<b>Males</b>	38	99	89	49	21	64	360
<b>Females</b>	31	110	74	51	25	39	330
<b>Total</b>	69	209	163	100	46	103	690

**Table 5.2: Open – Closed participants**

### **Open Condition**

	11	12	13	14	15	16	TOTAL
<b>Males</b>	20	49	65	40	0	21	195
<b>Females</b>	14	62	45	45	0	9	175
<b>TOTAL</b>	34	111	110	85	0	30	370

### **Closed Condition**

	11	12	13	14	15	16	TOTAL
<b>Males</b>	18	50	24	9	21	43	165
<b>Females</b>	17	48	29	6	25	30	155
<b>TOTAL</b>	35	98	53	15	46	73	320

## **Methodology**

Prior to the beginning of the study, the headteacher randomly selected which classes would be in the two conditions by writing down the designator for each class on a piece of paper. These were then separated into year groups. The pieces of paper were then put in a bag and taken out one at a time. The first class name out of the 'hat' went into the Open group, the second in the Closed group and so on. This ensured that equal numbers of classes and year groups were assigned to each condition.

The only difference in the methodology followed in this study over those already described was that the members of the Open group were not ensured confidentiality. Whereas members of the Closed group were reassured about confidentiality.

The Open condition therefore supplied data from participants who originally believed they could be identified (but who, in point of fact, remained anonymous) and the Closed condition provided data from participants who had been assured of anonymity.

## **Procedure**

Unlike the previous studies where the questionnaire was completed over a period of a week, this study was completed in a single day as there was a degree of deception involved. Unless this had been done the validity of the study would have been in doubt as the participants in the Open group who had done the questionnaire could have told others who had yet to do the work what had occurred.

Tutors were briefed at the same time by the headteacher. Again, tutors were asked to ensure that pupils understood that completion of the questionnaire was not an examination and that there were no right or wrong answers, that pupils did not have to participate if they did not want to, and that they could withdraw from the survey at any time.

As with the previous studies, to ensure that simple experimentation of substances was not included in the analysis, the data presented refer to 'regular use', which was defined as use of alcohol, tobacco or illegal drugs that takes place at least once a week for a period of more

than three months and teachers administering the questionnaire were asked specifically to emphasise this point.

In addition, the teachers who were administering the questionnaires to the Closed group were asked to stress that the survey was completely confidential and that neither the teachers nor the experimenters had any desire to know individuals' names and there was no space on the questionnaire for names to be written. These tutors were asked to emphasise that each questionnaire would be handed out with a plain envelope and should be returned, sealed, in that envelope, again ensuring confidentiality.

The teachers administering to the Open group did not go through this briefing, instead they simply asked the participants to put their names at the top of the first page. Once the questionnaires had been completed the teachers then asked the participants to remove their names using a heavy pen. The teachers then explained to the participants in the Open group why they had been asked to write their names and reassured them that their participation was actually completely anonymous.

## **Results**

The purpose of this study was not, primarily, to estimate levels of substance use or to look at the psychological variables discussed in Chapter 4, but to assess the reliability of the SASI when participants believed that they could be identified. Therefore, the results will be in three sections: Firstly, there will be a brief presentation of substance use within this population and then there will be a more detailed consideration of the substance use differences between the Open and the Closed groups. Finally, there will be a cursory examination at the effect being in either the Open or the Closed group had on levels of Self-Esteem, Depression, Lack of Self-Concern and Anxiety.

### **Overall Substance Use**

In this study 16.4% of boys said they smoked compared with 14.2% of girls; 42.8% of boys said they drank regularly compared to only 27.3% of girls and 9.4% of boys said they used illicit drugs compared with 4.4% of girls (Table 5.3).

**Table 5.3 – Substance use across the complete sample**

#### **Cigarette Use**

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>Males</b>	13.2	13.1	14.6	18.4	14.3	25.0	<b>16.4%</b>
<b>Females</b>	-	6.4	17.6	19.6	16.0	33.3	<b>14.2%</b>
<b>Mean</b>	<b>7.0</b>	<b>9.3</b>	<b>15.1</b>	<b>17.6</b>	<b>14.6</b>	<b>29.6</b>	<b>15.1%</b>

#### **Alcohol Use**

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>Males</b>	13.2	23.2	46.1	42.9	76.2	75.0	<b>42.8%</b>
<b>Females</b>	3.2	15.6	18.9	35.3	64.0	61.5	<b>27.3%</b>
<b>Mean</b>	<b>8.5</b>	<b>19.9</b>	<b>34.3</b>	<b>40.7</b>	<b>68.8</b>	<b>71.3</b>	<b>36.0%</b>

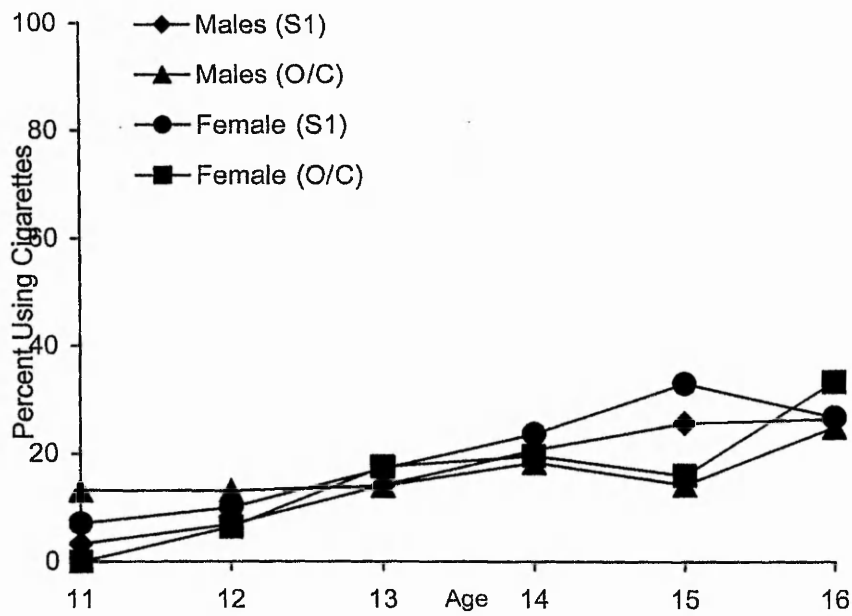
#### **Drug Use**

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>Males</b>	4.2	5.0	11.3	6.1	6.3	17.0	<b>9.4%</b>
<b>Females</b>	-	3.2	4.1	3.0	16.7	3.1	<b>4.4%</b>
<b>Mean</b>	<b>2.9</b>	<b>3.7</b>	<b>7.3</b>	<b>4.4</b>	<b>11.1</b>	<b>10.8</b>	<b>6.6%</b>

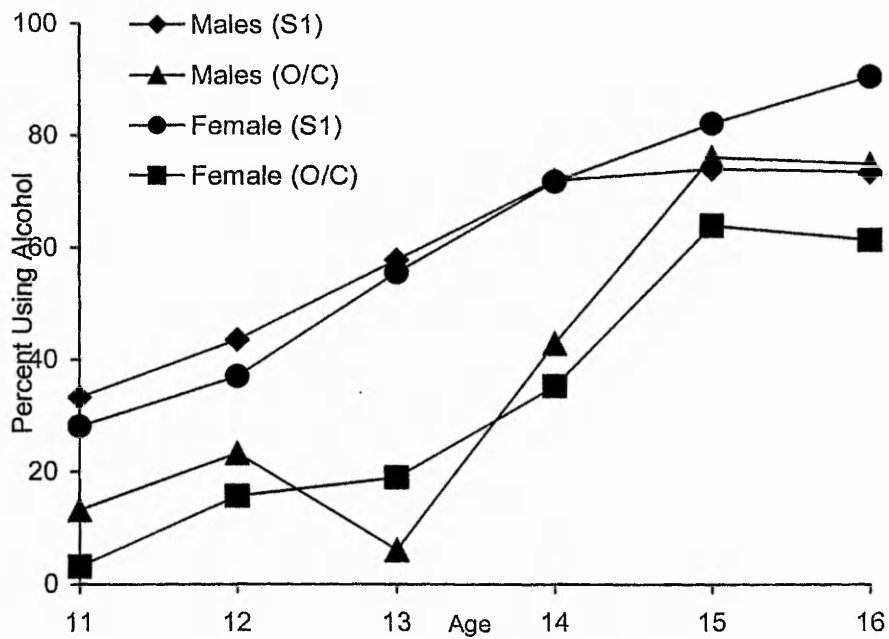
There are both similarities and striking differences between these and the prevalence figures presented in Chapter 3. Male alcohol and cigarette use was broadly the same across both studies, but illicit drug use was far lower in this study (9.4%) than in the previous one (16.9%). Female substance use also showed differences and for all three categories, substance use in this study was considerably lower than in the previous one.

Additionally, within the age range considerable differences were found and these are illustrated in Figure 5.1 (cigarettes), Figure 2 (alcohol) and Figure 3 (illicit drugs).

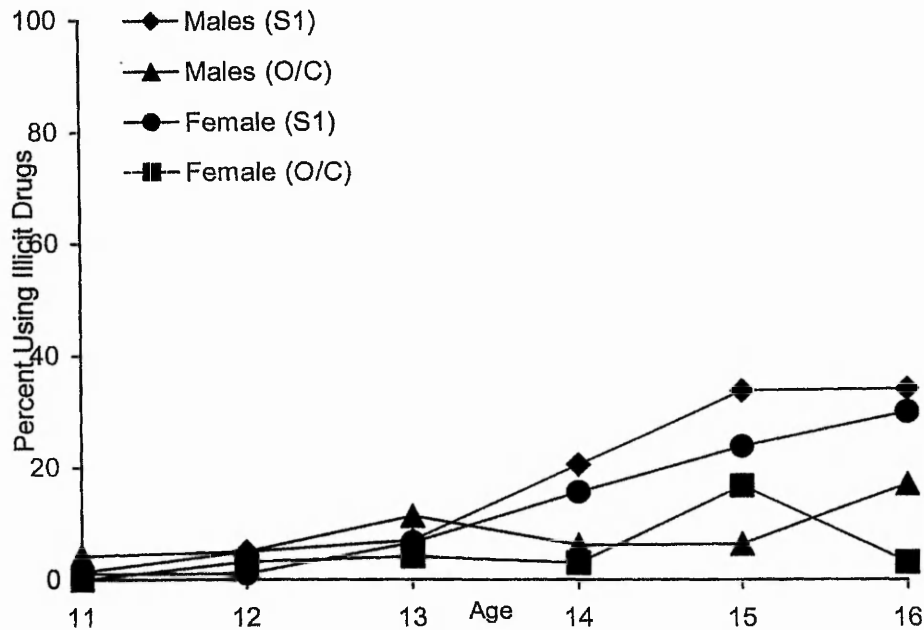
**Figure 5.1** – Cigarette use in Study 2 and Study 3.



**Figure 5.2** - Alcohol use in Study 2 and Study 3..



**Figure 5.3** - Illicit Drug use in Study 2 and Study 3.



#### **Substance Use Differences between the Open and Closed conditions**

Given the results just presented, there are clearly differences between the results obtained in this study and those found in the previous one. However, of primary interest here, are the differences found between the Open and the Closed conditions.

Overall, 13.2% of those in the Open group said they smoked compared with 16.1% of the Closed group ( $\chi^2 = 1.5$ , NS). When these data were unpacked, the only significant finding was that 12.9% of 16-year olds in the Open group said they smoked compared with 36.4% of those in the Closed group ( $\chi^2 = 5.8$ ,  $p < 0.001$ )

33.1% of those in the Open group said they regularly drank alcohol compared with 42.9% of those in the Closed group ( $\chi^2 = 8.7$ ,  $p < 0.003$ ) and 6.1% of those in the Open group reported using illicit drugs compared with 7.0% in the Closed group ( $\chi^2 = 0.7$ , NS).

When gender was looked at, no significant difference was found in girls between the Open and Closed conditions ( $\chi^2 = 0.3$ , NS), but there was a difference in boys. Only 36.4% of boys

in the Open condition said they drank compared to 52.6% in the Closed condition ( $\chi^2 = 10.4$ ,  $p < 0.001$ ).

### **Differences in the Psychological Variables between Open and Closed Groups**

The psychological variables were examined using the same parameters as for the previous study. It was found that there were no significant differences between the responses given by participants in the Open condition to those in the Closed condition.

The data were broken down by both age and gender, but no differences emerged.

### **Discussion**

Compared to previous studies, a high proportion of questionnaires had to be rejected as they were incorrectly completed. Specifically, 21.5% of all questionnaires had either age and/or gender missing. The questionnaires from 15.3% of participants in the Closed condition were rejected compared with 26.2% of those from the Open condition, a difference which was significant ( $\chi^2 = 14.9$ ,  $p < 0.001$ ).

To have over a quarter of all returned questionnaires from the Open group being rejected is cause for concern. The obvious explanation for this is that the participants were concerned about their identities being known, but as they were writing their name at the beginning of the questionnaire, why not complete the additional information as well?

Alternatively, if participants were concerned about confidentiality, why not simply leave out the questions relating to substance use? In point of fact, this did not happen, there were no significant differences in the number of substance related items completed by either of the two conditions ( $\chi^2 = 1.1$ , NS). There does not appear to be an obvious explanation for this difference and it therefore has to be treated, at this stage, as an anomaly. Future work needs to be undertaken to see if this finding can be replicated, preferably at two or more separate sites. The differences in prevalence rates in this study and those found in the earlier work do not give rise for concern over the validity of the instrument. The Open-Closed nature of this work

does present the possibility that the figures have been skewed, but different substance use rates between two studies cannot, by themselves, call into doubt the validity of an instrument. Substance use varies from population to population and wide differences are found at all levels and locations. For instance, high use at one school could be explained simply by the presence of a single person with access to illicit drugs who influences others in the school. Conversely, low use could be explained by the physical isolation of a school. Therefore, although differences were found, these can be seen as a normal part of the distribution pattern of substance use within our society.

Of primary interest in this study were the potential differences to be found between substance use in the Open and Closed conditions. As was shown earlier, these differences were slight, overall there were no significant differences between the two groups in either cigarette or illicit drug use although a difference was found with alcohol use. However, this difference was only relatively minor overall ( $p < .003$ ) and was confined to 12 and 13-year old boys. In point of fact, 12-year old boys reported more alcohol use in the Closed condition, but 13 year old boys reported greater alcohol use in the Open condition.

These findings, combined with those which showed no differences in the psychological variables between the two conditions, indicate that the SASI is a robust instrument when given in anonymous and non-anonymous conditions. However, the question of the high number of incomplete questionnaires returned is still a concern and additional work is needed to ensure that such a high return is truly a simple artifact.

## **CHAPTER 6 - STUDY 4: A FURTHER VALIDATION OF THE SASI.**

This study, designated Study 4, was designed as a replication of Study 2, described in Chapters 3 and 4. The purpose of the study was to gather enough data to show that the findings of Chapter 3 about patterns of adolescent substance use could be replicated and that the four factor structure described in Chapter 4 was valid. The relationship between Neurotic Susceptibility to Substance Abuse and the sub-traits described earlier will also be looked at. Key findings from Studies 2 and 4 will be compared.

### **Participants**

Participants were a total of 3634 adolescents from 6 English secondary schools. The total population of the schools was 6221. Although it was planned to utilise the entire student population this was not possible owing to exam commitments, absenteeism and school outings. Of the 3634 participants, 75 participants were excluded (2.1%) because they did not supply data on their age and/or gender. The data reported were supplied by the remaining 3559 respondents: their age and gender breakdown is detailed in Table 6.1. The 6 schools surveyed in this study were from a large Local Education Authority (LEA) in Northern England. The schools came from varying locations including inner-city and rural. No information was available from the LEA on school characteristics.

**Table 6.1** – Participants

<b>Age</b>	<b>Boys</b>	<b>Girls</b>	<b>TOTAL</b>
<b>11</b>	112	108	220
<b>12</b>	425	393	818
<b>13</b>	442	416	858
<b>14</b>	401	391	792
<b>15</b>	319	304	623
<b>16</b>	123	125	248
<b>TOTAL</b>	<b>1822</b>	<b>1737</b>	<b>3,559</b>

### **Procedure**

As with the previous study, the Substance Abuse Susceptibility Index was used, details of which can be found in Chapter 4. The same procedure was used as for the previous studies.

### **Results**

The results will be in several sections: Firstly substance use data from Study 4 will be presented, this will be followed by a comparison between substance use in Study 2 and Study 4 and this will be followed by a short section on a confirmatory factor analysis which was carried out. Finally, the relationship between the personality variables and substance use will be shown.

### **Substance Use in Study 4**

#### **Age and gender differences in substance use**

Of the 3559 participants, 1897 (53.3%) said they did not use any kind of psychotropic substance. Overall, the prevalence of substance use rose from 18.6% of the sample at age 11 to 71.4% at age 16. Alcohol was the most heavily used substance with 18.7% of the sample drinking at age 11, rising to 66.9% at age 16. Cigarettes were the second most heavily used substance with 4.2% of 11-year olds smoking, rising to 25.9% at age 16. Regular use of illegal drugs rose from 0.9% of the sample at age 11 to 10.9% of the sample at age 16. A peak

of illicit drug use was reached at age 15 when 14.3% of that age group said they were using regularly. Details of this substance use can be found in Tables 6.2, 6.3 and 6.4, below.

**Table 6.2 – Cigarette use by age and gender**

	11	12	13	14	15	16	Mean
<b>Boys</b>	4.6	5.5	10.7	19.1	20.4	21.1	<b>13.4%</b>
<b>Girls</b>	3.8	7.3	10.8	19.0	28.2	30.8	<b>15.9%</b>
<b>Mean</b>	<b>4.2</b>	<b>6.4</b>	<b>10.7</b>	<b>19.1</b>	<b>24.3</b>	<b>25.9</b>	<b>14.6%</b>

**Table 6.3 – Alcohol use by age and gender**

	11	12	13	14	15	16	Mean
<b>Boys</b>	27.0	26.3	40.7	50.6	70.0	70.6	<b>46.0%</b>
<b>Girls</b>	10.7	18.7	35.6	53.3	71.0	66.9	<b>42.9%</b>
<b>Mean</b>	<b>18.7</b>	<b>22.6</b>	<b>38.1</b>	<b>51.9</b>	<b>70.5</b>	<b>68.8</b>	<b>44.5%</b>

**Table 6.4 – Illicit Drug use by age and gender**

	11	12	13	14	15	16	Mean
<b>Boys</b>	0.9	1.4	5.0	10.0	14.7	13.0	<b>7.2%</b>
<b>Girls</b>	0.9	1.3	1.4	7.8	13.8	8.8	<b>5.5%</b>
<b>Mean</b>	<b>0.9</b>	<b>1.3</b>	<b>3.3</b>	<b>8.8</b>	<b>14.3</b>	<b>10.9</b>	<b>6.4%</b>

There was a slight gender difference in overall substance use with boys using more overall than girls ( $\chi^2 = 6.2$ ,  $p < .01$ ). Differences were found within all three categories of substance being looked at: Cigarettes: boys 13.4%, girls, 15.9% ( $\chi^2 = 4.8$ ,  $p < .03$ ); Alcohol: boys 46.0%, girls, 42.9% ( $\chi^2 = 3.5$ ,  $p < .03$ ); Illicit Drugs: boys 7.2%, girls, 5.5% ( $\chi^2 = 4.7$ ,  $p < .03$ ).

### Patterns of substance use

Table 6.5 shows the proportions of the overall sample who used alcohol, cigarettes or drugs exclusively as well as those using different combinations of substances. Exclusive consumption of alcohol dominated adolescent substance use, with 30.7% of the overall sample using only alcohol. There was hardly any exclusive use of illicit drugs (0.3%), or cigarettes (2.6%). Conjoint use of cigarettes and drugs was also negligible (0.7%). A mean across gender of 1.2% of the sample used a combination of alcohol and drugs, 7.0% used alcohol and cigarettes and 4.1% used all three types of substances. In all 12.3% used cigarettes and/or drugs in combination with alcohol. By contrast 3.6% of the sample used cigarettes and/or drugs without alcohol.

**Table 6.5:** Males and females using alcohol and non-alcohol combinations

	Boys (n = 1822)	Girls (n = 1737)
<b>Cigarettes only</b>	3.2	2.0
<b>Drugs only</b>	0.4	0.3
<b>Cigarettes &amp; Drugs only</b>	0.9	0.5
<b>TOTAL 1</b>	<b>4.5</b>	<b>2.8</b>
<b>Alcohol only</b>	33.4	27.9
<b>Alcohol &amp; Cigarettes only</b>	4.9	9.2
<b>Alcohol &amp; Drugs only</b>	1.8	0.7
<b>Alcohol, Cigarettes &amp; Drugs</b>	4.2	4.0
<b>TOTAL 2</b>	<b>44.3</b>	<b>41.8</b>
<b>TOTAL 3 (T1 + T2)</b>	<b>48.8%</b>	<b>44.6%</b>

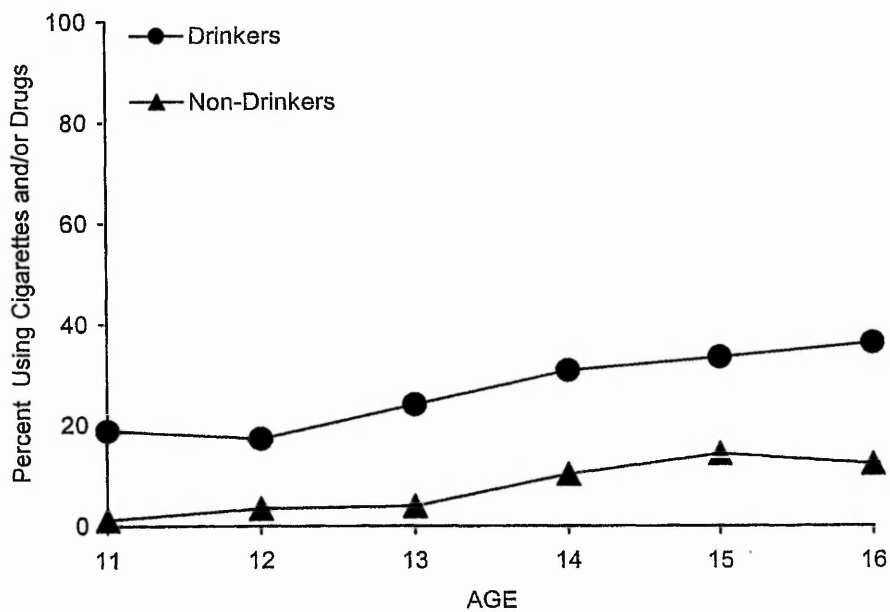
Smoking increased from 5.7% in non-drinkers to 25.8% in drinkers ( $\chi^2 = 286.4$ ,  $p < .0001$ ).

Drug use increased from 1.8% in non-drinkers to 12.5% in drinkers ( $\chi^2 = 166.5$ ,  $p < .0001$ ).

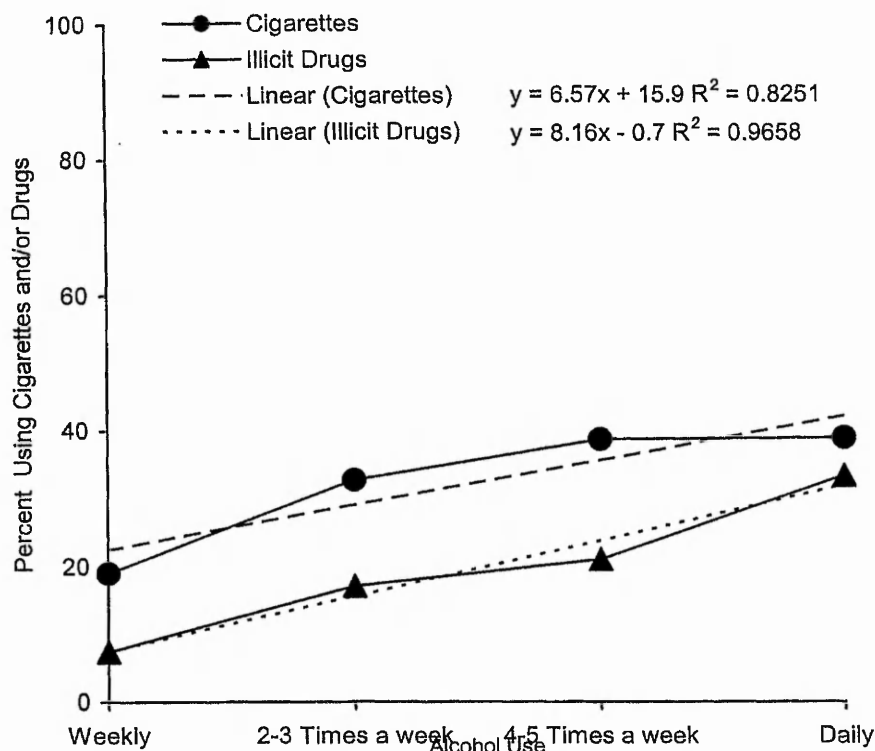
These findings applied to both boys and girls: In females; 32% of all girls who drank alcohol said they smoked compared to only 4.2% who did not drink. ( $\chi^2 = 241.7$ ;  $p < .0001$ ). This was also reflected with drug use where 1.3% of female non-drinkers said they used drugs compared with 11.3% of drinkers ( $\chi^2 = 81.6$ ,  $p < .0001$ ). 7.3% of male non-drinkers smoked compared with 20.6% of drinkers ( $\chi^2 = 69.3$ ,  $p < .0001$ ) and 2.3% of male non-drinkers used

drugs compared with 13.5% of drinkers ( $\chi^2 = 84.5$ ,  $p < .0001$ ). The differences between drinkers and non-drinkers across age, are illustrated in Figures 6.1 and 6.2, which shows all use of cigarettes and all use of drugs in each of these groups.

**Figure 6.1** - Cigarette and/or drug use, at different ages, by drinkers and non-drinkers.



**Figure 6.2** - Cigarette and/or drug use, at different ages, by occasions of alcohol use



#### Illicit Drug Use - Combinations

Combinations of illicit drug use were looked at and a breakdown can be found in Table 6.6. Among regular users of illegal drugs 71.9% reported using only cannabis, whilst 18.4% said they used cannabis in combination with various other drugs such as cannabis and Ecstasy or cannabis and LSD. Very few of the illicit drug users in this survey said they used other drugs to the exclusion of cannabis; 1.3% said they used only cocaine, 4.0% used Ecstasy 2.2% said they used only amphetamines, and 0.9% said they only used LSD. 1.3% of the drug users reported poly-drug users saying they used all the drugs listed.

**Table 6.6 – Illicit Drug Use Combinations**

	11	12	13	14	15	16	Mean
<b>Cannabis</b>	33.3	41.7	61.5	79.4	75.5	70.0	<b>71.9%</b>
<b>Cannabis +*</b>	-	8.3	15.4	14.3	22.3	23.3	<b>18.4%</b>
<b>Ecstasy</b>	33.3	16.7	11.5	1.6	-	6.7	<b>4.0%</b>
<b>Amphetamine</b>	-	8.3	3.9	3.2	1.1	-	<b>2.2%</b>
<b>Cocaine</b>	-	8.3	7.7	-	-	-	<b>1.3%</b>
<b>All Drugs**</b>	33.3	16.7	-	-	-	-	<b>1.3%</b>
<b>LSD</b>	-	-	-	1.6	1.1	-	<b>0.9%</b>

\* Cannabis plus assorted other drugs ( Cannabis + Heroin; Cannabis + LSD etc)

\*\* All drugs asked about (Cannabis, Ecstasy, LSD, Cocaine, Heroin Amphetamines)

### **Drunkenness and other Substance Use**

Occurrences of drunkenness refers to occasions in the past year. Because alcohol appears to play a significant role in the use of other substances, drunkenness was also examined as a potentially important factor. Table 6.7 shows the frequency of reported alcohol intoxication on illicit drug use. Among subjects who reported intoxication on more than 20 occasions in the past year 85.0% said they used drugs on a daily basis. A significant group of subjects (20.7%) reported high frequencies of alcohol intoxication (20+ occasions), but low frequencies of drug intoxication (monthly).

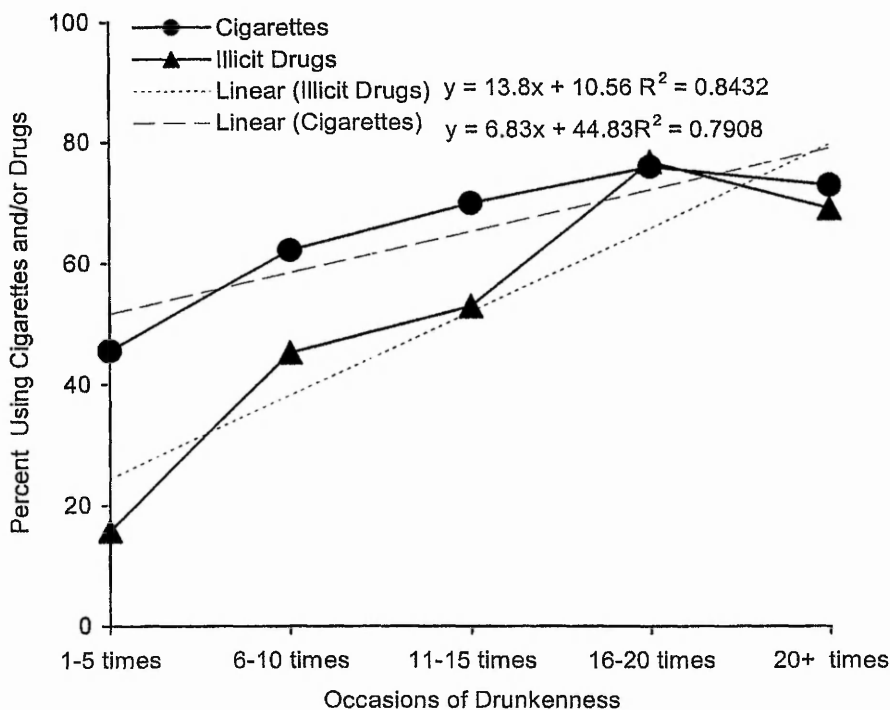
**Table 6.7:** Frequency of alcohol intoxication in the past year and drug use

<b>Occurrences of drug use</b>					
<b>Incidents of alcohol intoxication</b>	<b>Monthly</b>	<b>Weekly</b>	<b>2.3 times a week</b>	<b>Daily</b>	<b>Mean</b>
<b>1-5 times</b>	20.7	6.5	9.1	5.0	<b>13.7%</b>
<b>6-10 times</b>	26.4	19.6	4.6	5.0	<b>19.4%</b>
<b>11-15 times</b>	20.7	17.8	-	5.0	<b>15.4%</b>
<b>16-20 times</b>	11.5	21.7	13.6	-	<b>13.1%</b>
<b>20+ times</b>	20.7	34.8	72.7	85.0	<b>38.3%</b>

Overall a strong relationship was found between levels of alcohol intoxication and frequency of illicit drug use ( $\chi^2 = 50.4$ ,  $p < .0001$ ). Because of this, an analysis was carried out to see if

there was a simple relationship between occasions of alcohol intoxication and any cigarette or illicit drug use. As can be seen in Figure 6.3, a clear relationship exists between occasions drunk and cigarette use ( $\chi^2 = 24.8$ ,  $p < .0001$ ) and with drug use ( $\chi^2 = 88.8$ ,  $p < .0001$ ). Of those with fewer than 5 reported episodes of drunkenness, 45.6% said they smoked cigarettes and of those who reported in excess of 20 episodes of drunkenness 72.9% smoked. Similarly, of those with fewer than 5 reported episodes of drunkenness, 15.8% said they used illicit drugs and of those who reported in excess of 20 episodes of drunkenness 69.1% said they were drug users.

**Figure 6.3:** Cigarette and/or drug use, at different ages, by occasions of drunkenness



#### Substance use in Study 2 and Study 4.

Although comparing the results from two diverse subject populations at two different time points would not enhance the validity of the SASI, it was felt that a comparison of overall substance use levels would provide useful data about trends in adolescent use. The key

comparison points from these data were therefore examined and the percentage of users in each study were compared to see if there were significant differences between those percentages. This was done using the following formulae:  $t = \frac{\sqrt{N_1 \cdot N_2}}{\sqrt{N_1 + N_2}} \cdot \frac{p_1 - p_2}{\sqrt{p \cdot q}}$  where  $p = \frac{p_1 \cdot N_1 + p_2 \cdot N_2}{N_1 + N_2}$   $q = 1 - p$ . The degrees of freedom were computed as  $N_1 + N_2 - 2$ . Any psychotropic substance use was reported in Study 2 to be 63%, however, the equivalent figure in Study 4 was 46.7% of the sample ( $p < .0001$ ). This decrease was true across the age range. In Study 2 overall use of cigarettes by the sample was 19.1% compared with 14.6% in Study 4 ( $p < .02$ ). No significant differences were found within age groups or genders (see Table 6.8). At the upper end of the age range, smoking in 16 year old girls increased from 26.8% in Study 2 to 30.8% in Study 4, but this was not found to be significant ( $p < .328$ ).

**Table 6.8** – Cigarette use by age and gender: A comparison of Study 2 and Study 4

	11	12	13	14	15	16	Mean
<b>S2. Boys</b>	2.6	6.7	15.8	21.3	26.5	26.4	<b>17.3%</b>
<b>S2. Girls</b>	7.7	12.3	17.6	22.3	32.4	26.8	<b>20.9%</b>
<b>S2. Mean</b>	<b>5.5</b>	<b>9.1</b>	<b>16.7</b>	<b>22.0</b>	<b>29.5</b>	<b>26.6</b>	<b>19.1%</b>
<b>S4. Boys</b>	4.6	5.5	10.7	19.1	20.4	21.1	<b>13.4%</b>
<b>S4. Girls</b>	3.8	7.3	10.8	19.0	28.2	30.8	<b>15.9%</b>
<b>S4. Mean</b>	<b>4.2</b>	<b>6.4</b>	<b>10.7</b>	<b>19.1</b>	<b>24.3</b>	<b>25.9</b>	<b>14.6%</b>
<b>Study 2 V Study 4</b>	<b>p = .441</b>	<b>p = .293</b>	<b>p = .105</b>	<b>p = .248</b>	<b>p = .097</b>	<b>p = .458</b>	<b>p = .02</b>

In contrast, the numbers of children who reported regularly drinking alcohol decreased from 61.6% in Study 2 to 44.5% in Study 4. ( $p < .0001$ ). This was true across the age range and across gender (Table 6.9).

**Table 6.9 – Alcohol use by age and gender: A comparison of Study 2 and Study 4.**

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>S2. Boys</b>	32.3	45.0	57.2	70.3	72.1	73.6	<b>60.4%</b>
<b>S2. Girls</b>	29.2	38.7	55.3	69.5	80.9	90.7	<b>62.8%</b>
<b>S2. Mean</b>	<b>30.5</b>	<b>42.2</b>	<b>56.3</b>	<b>69.9</b>	<b>76.6</b>	<b>82.8</b>	<b>61.6%</b>
<b>S4. Boys</b>	27.0	26.3	40.7	50.6	70.0	70.6	<b>46.0%</b>
<b>S4. Girls</b>	10.7	18.7	35.6	53.3	71.0	66.9	<b>42.9%</b>
<b>S4. Mean</b>	<b>18.7</b>	<b>22.6</b>	<b>38.1</b>	<b>51.9</b>	<b>70.5</b>	<b>68.8</b>	<b>44.5%</b>
<b>Study 2 V Study 4</b>	<b>p = .074</b>	<b>p= .0001</b>	<b>p= .0001</b>	<b>p= .0001</b>	<b>p = .013</b>	<b>p= .0001</b>	<b>p = .0001</b>

The number of participants reporting illicit drug use was less in Study 2 where, overall 15.3% said they used drugs compared with 6.4% in Study 4 ( $p < .0003$ ). This change was due to differences in use levels at the upper end of the age range; use amongst younger children remained constant and no significant differences were found between the two studies, but numbers in these latter groups were very small.

**Table 6.10 – Illicit Drug use by age and gender: A comparison of Study 2 & Study 4.**

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>S2. Boys</b>	1.1	4.6	6.7	20.4	34.2	34.0	<b>17.2%</b>
<b>S2. Girls</b>	1.2	1.4	6.5	13.8	23.8	29.9	<b>13.3%</b>
<b>S2. Mean</b>	<b>1.2</b>	<b>3.2</b>	<b>6.6</b>	<b>17.2</b>	<b>28.9</b>	<b>31.8</b>	<b>15.3%</b>
<b>S4. Boys</b>	0.9	1.4	5.0	10.0	14.7	13.0	<b>7.2%</b>
<b>S4. Girls</b>	0.9	1.3	1.4	7.8	13.8	8.8	<b>5.5%</b>
<b>S4. Mean</b>	<b>0.9</b>	<b>1.3</b>	<b>3.3</b>	<b>8.8</b>	<b>14.3</b>	<b>10.9</b>	<b>6.4%</b>
<b>Study 2 V Study 4</b>	<b>p = .487</b>	<b>p = .381</b>	<b>p = .268</b>	<b>p = .047</b>	<b>p = .003</b>	<b>p = .014</b>	<b>p = .0003</b>

### **Factor Analysis**

An abbreviated, confirmatory factor analysis was carried out on these data and it was found that the four factor structure described earlier remained constant.

These four factors (Self-esteem, Self-concern, Depression and Anxiety) accounted for 68.8% of the total variance. Once again, the factors were confirmed by splitting the data by gender and age and re-running the analysis where similar, confirmatory, results were found. Eigenvalues of 2.6, 2.0, 1.4 and 1.2 were returned.

Cronbach's alpha showed reliability coefficients of .79 for Self-esteem, .70 for Lack of Self-concern, .71 for Depression and .59 for Anxiety. An overall alpha coefficient of .78 was found for the complete 22 items.

### **Personality Variables and Substance Use**

After the factor structure had been confirmed, the analyses carried out in Chapter 4 were replicated. Each of the four sub-traits, plus the overall trait of Neurotic Susceptibility to Substance Abuse (NSSA), were banded into quartiles and substance use by different quartile groups analysed. These analyses primarily used binary logistic regression to provide odds ratios and chi-squares.

A similar relationship between personality variables and substance use was found to that in Study 2. NSSA, as well as each of the four Factors, was able to discriminate well between users and non-users of the various substance groups being looked at.

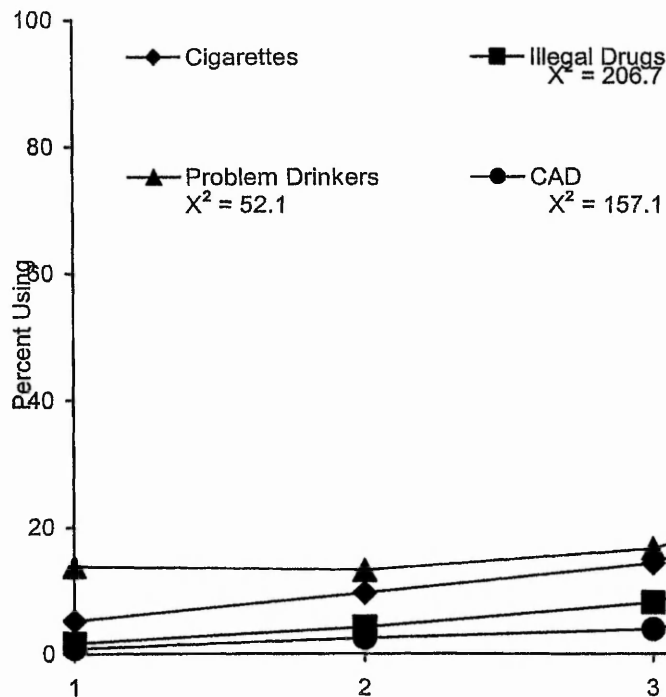
No gender differences were found, both males and females were equally affected by the different levels of the personality variables. Similarly, there was no interaction between age, levels of the personality variables and substance use.

### **Neurotic Susceptibility to Substance Abuse**

Overall Neurotic Susceptibility to Substance Abuse (NSSA) had an influence on all adolescent substance use with those in the highest quartile using significantly more substances than those in lower groups (see Figure 6.4). Cigarette smoking was most sensitive to levels of NSSA ( $y = 8.39x - 5.8$   $R^2 = 0.8774$ ) with 5.2% of those in the lowest quartile smoking compared with 31.6% in the highest ( $\chi^2 = 264.0$ ;  $p < .0001$ ; O/R 8.4). Illicit drug use

was also affected by levels of NSSA, although, as can be seen by the regression equation, to a slightly lesser extent than for cigarettes ( $y = 5.73x - 5.95$   $R^2 = 0.8834$ ). Of those in the lowest quartile, 1.7% used illicit drugs compared with 19.5% in the highest quartile ( $\chi^2 = 206.7$ ;  $p < .0001$ ; O/R 13.8).

**Figure 6.4:** Neurotic Susceptibility to Substance Abuse and Substance Use



Although concurrent use of cigarettes alcohol and drugs was the least significantly affected by NSSA levels, there were still noticeable differences between the groups ( $y = 3.74x - 4.35$   $R^2 = 0.8138$ ). Of those in the lowest quartile, 0.8% used all three classes of substance, but in the highest quartile this figure rose to 12.8% ( $\chi^2 = 157.1$ ,  $p < .0001$ ; O/R 8.4)

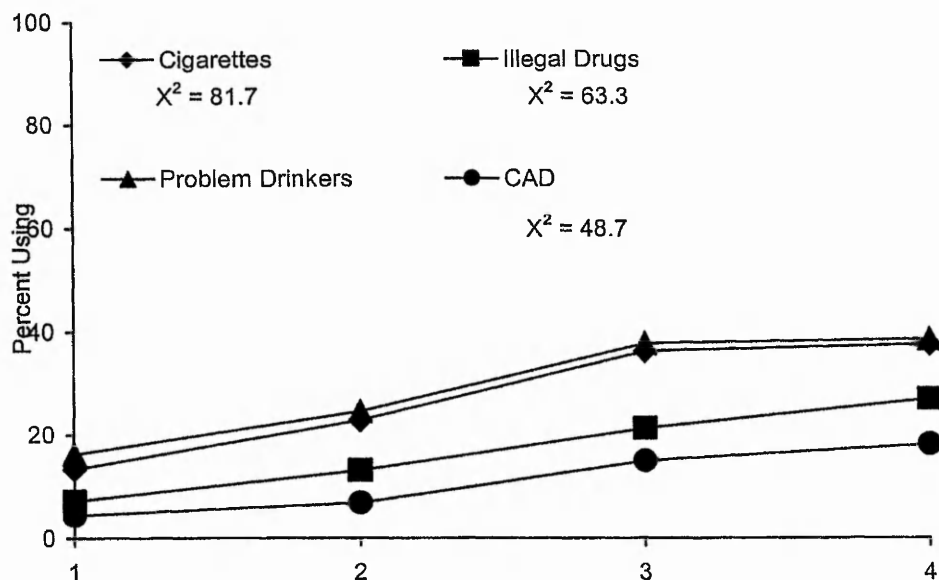
### Factor 1: Self-esteem

Once again, it must be noted that, in this context, low levels of self-esteem are to be considered pathological with those individuals having high levels being less at risk than those

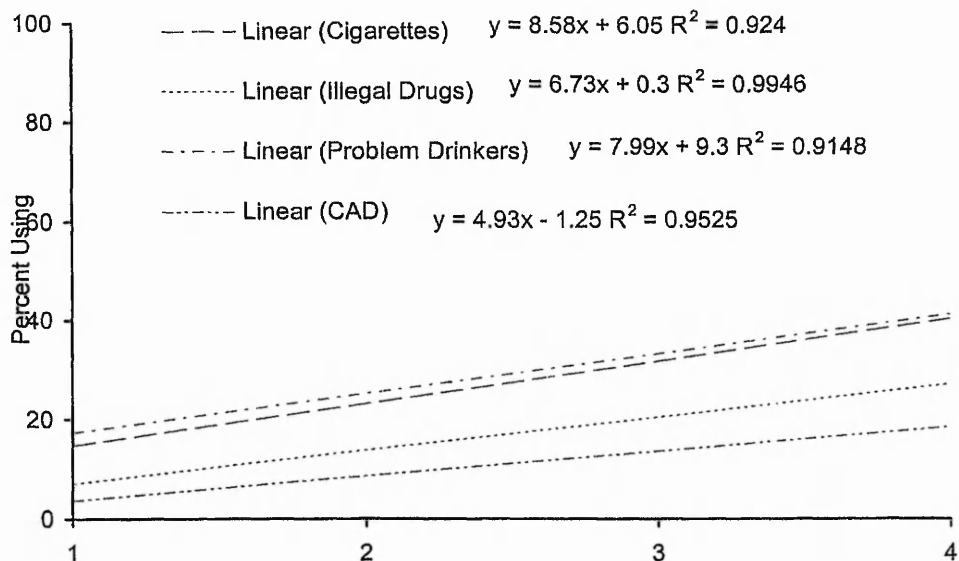
at the other end of the scale. When the findings presented here refer to those in the 'highest quartile', those participants with low levels of Self-esteem are being referred to.

Self-esteem, was found to show good discriminatory powers between substance users and non-user (Figure 6.5 and 6.6). In particular, cigarette smoking was sensitive to levels of Self-esteem ( $y = 8.58x + 6.05$   $R^2 = 0.924$ ) with 13.4% of those in the lowest quartile smoking compared with 37.5% in the highest ( $\chi^2 = 81.7$ ;  $p < .0001$ ; O/R 3.9). Problem drinking was also related to Self-esteem scores ( $y = 7.99x + 9.3$   $R^2 = 0.9148$ ) with 16.3% of those in the lowest quartile being classified as problem drinkers compared with 38.4% in the highest ( $\chi^2 = 35.4$   $p < .0001$ ; O/R 3.2). Illicit drug use was affected by levels of self-esteem too, although, as can be seen by the regression equation, to a slightly lesser extent than for cigarettes and problem drinking ( $y = 6.73x + 0.3$   $R^2 = 0.9946$ ). Of those in the lowest quartile, 7.2% used illicit drugs compared with 26.9% in the highest quartile ( $\chi^2 = 63.3$ ;  $p < .0001$ ; O/R 4.8). Finally, although concurrent use of cigarettes alcohol and drugs was the least significantly effected by self-esteem levels, there were still noticeable differences ( $y = 4.93x - 1.25$   $R^2 = 0.9525$ ). Of those in the lowest quartile, 4.4% used all three classes of substance, but in the highest quartile this figure rose to 18.1% ( $\chi^2 = 48.7$   $p < .0001$ ; O/R 4.8).

**Figure 6.5 - Self-Esteem and Substance Use**



**Figure 6.6 - Self-Esteem and Substance Use: Regression**



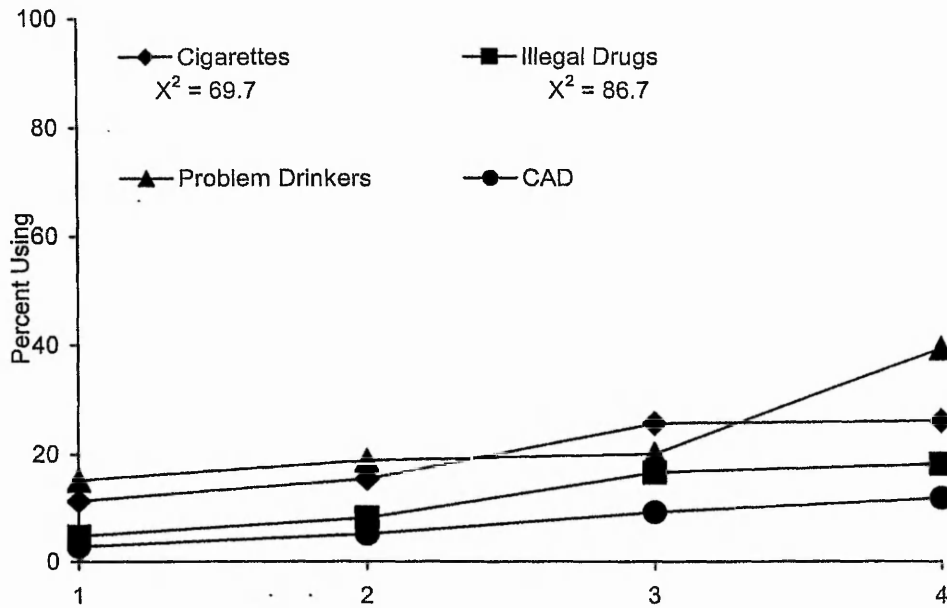
### Factor 2: Lack of Self-concern

As expected, Lack of Self-concern (LSC) also demonstrated good discriminatory powers (Figures 6.7 and 6.8). In this case, the best discriminatory power lay within problem drinkers

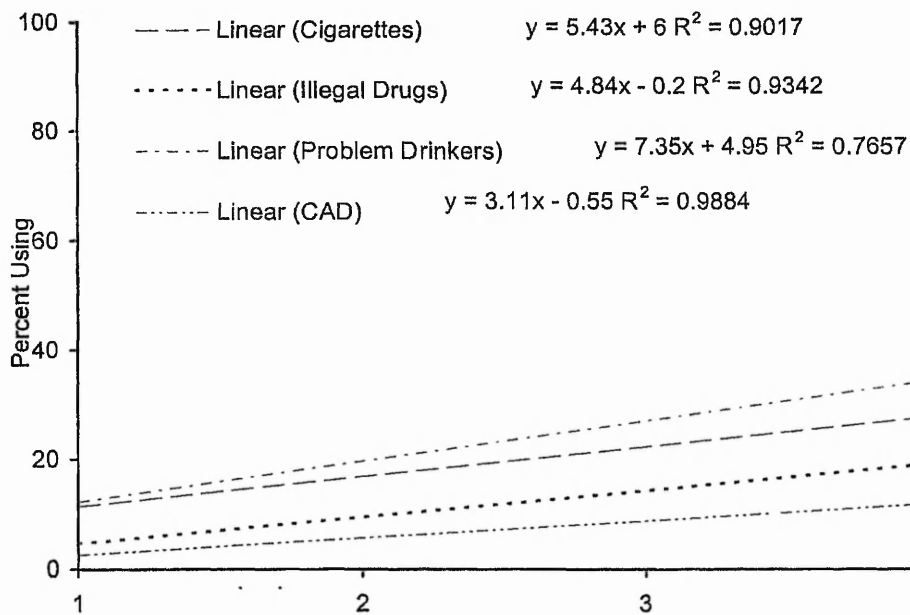
( $y = 7.35x + 4.95$   $R^2 = 0.7657$ ): Of those in the lowest quartile 15.2% were problems drinkers compared with 39.3% in the highest quartile ( $\chi^2 = 42.5$ ,  $p < .0001$ ; O/R 3.6).

Cigarette smoking was also affected by levels of this trait ( $y = 5.43x + 6$   $R^2 = 0.9017$ ) and of those with low levels, 11.3% smoked cigarettes compared with 26.0% of those with high levels ( $\chi^2 = 69.7$ ,  $p < .0001$ ; O/R 2.8). Illicit drug use was also effected by trait levels ( $y = 4.84x - 0.2$   $R^2 = 0.9342$ ) and of those participants with low levels, 4.8% used drugs compared 18.1% with high levels ( $\chi^2 = 86.7$ ,  $p < .0001$ ; O/R 4.4). Concurrent use of cigarettes, alcohol and drugs also differed between trait levels ( $y = 3.11x - 0.55$   $R^2 = 0.9884$ ) with 2.8% of those with low levels using all three types of substance compared with 11.8% of those with high levels of the trait ( $\chi^2 = 52.4$ ,  $p < .0001$ ; O/R 4.7).

**Figure 6.7 - Lack of Self-Concern and Substance Use**



**Figure 6.8 - Lack of Self-Concern and Substance Use: Regression**



### Factor 3: Depression

The discriminatory power of Depression, was less dramatic than its two predecessors, which was to be expected (see Figures 6.9 and 6.10).

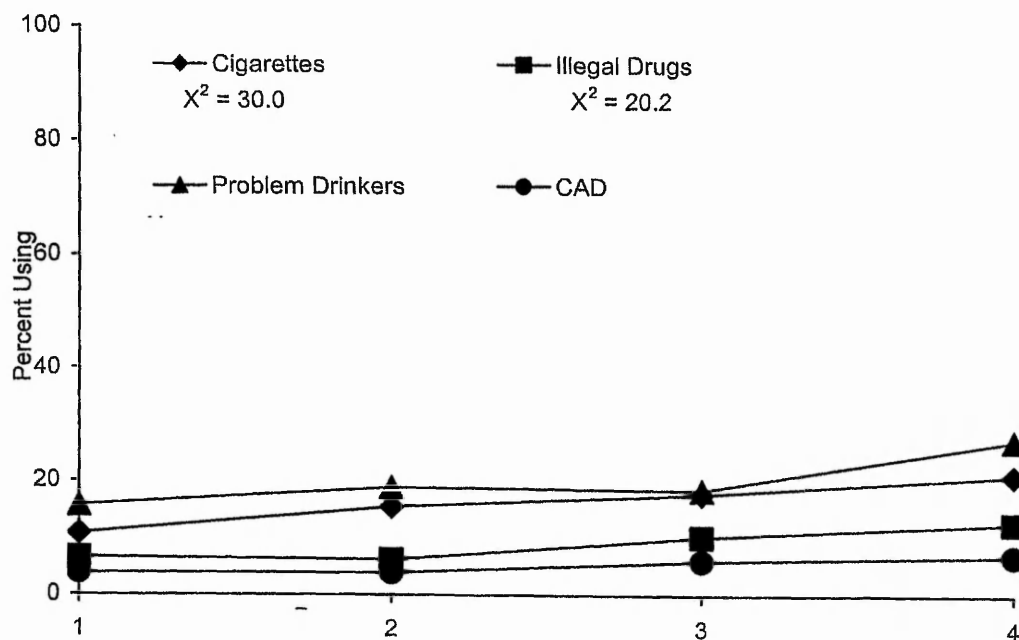
For this factor, problem drinking was most affected by levels of the trait ( $y = 3.41x + 11.5$   $R^2 = 0.7822$ ). Of those with low levels of Depression, 15.7% were classified as problem drinkers compared with 27.2% of those with high levels of Depression ( $\chi^2 = 13.5$ ,  $p < .004$ ; O/R 2.0).

Next most strongly affected by changes in trait levels was cigarette smoking ( $y = 3.29x + 8$   $R^2 = 0.9824$ ). 10.8% of those with low levels of Depression smoked compared to 21.0% of those who had high levels of Depression ( $\chi^2 = 30.0$ ,  $p < .0001$ ; O/R 2.2).

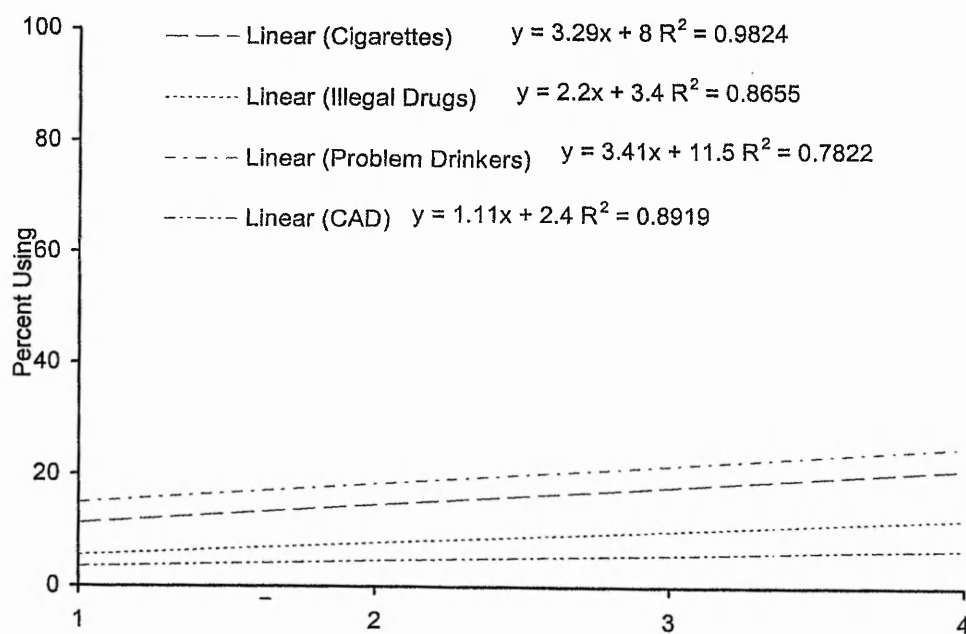
To a lesser extent, illicit drug use was also affected by changes in Depression levels ( $y = 2.2x + 3.4$   $R^2 = 0.8655$ ). Of those with low levels of Depression, 6.6% used illicit drugs compared with 12.6% in the group with high levels of Depression ( $\chi^2 = 20.2$ ,  $p < .0001$ ; O/R 2.0).

Finally, concurrent use of cigarettes, alcohol and drugs was the least affected by changes in levels of Depression ( $y = 1.11x + 2.4$   $R^2 = 0.8919$ ). Only 3.9% of those in the lowest quartile used all three types of substance compared with 6.9% in the highest quartile ( $\chi^2 = 8.8$ ,  $p < .03$ ; O/R 1.8).

**Figure 6.9** - Depression and Substance Use



**Figure 6.10** - Depression and Substance Use: Regression



#### Factor 4: Anxiety

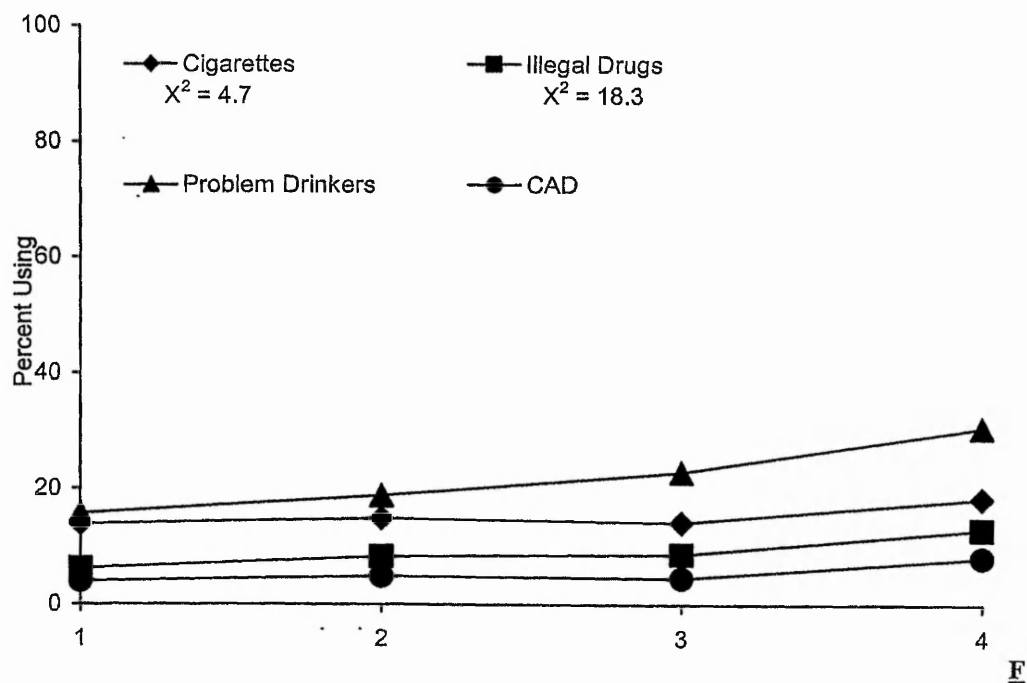
This final factor was the weakest of all in its ability to discriminate (see Figures 6.11 and 6.12). Problem drinking was most affected by levels of this trait ( $y = 4.88x + 9.8$   $R^2 = 0.9549$ ). Of those with low levels of Anxiety, 15.7% were classified as problem drinkers compared with 22.9% of those with high levels of Anxiety ( $\chi^2 = 20.1$ ,  $p < .0001$ ; O/R 2.4).

Illicit drug use was also effected by changes in Anxiety levels ( $y = 2.08x + 3.85$   $R^2 = 0.8862$ ). Of those with low levels of Anxiety, 6.2% used illicit drugs compared with 13% in the group with high levels of Anxiety ( $\chi^2 = 18.3$ ,  $p < .0001$ ; O/R 2.3).

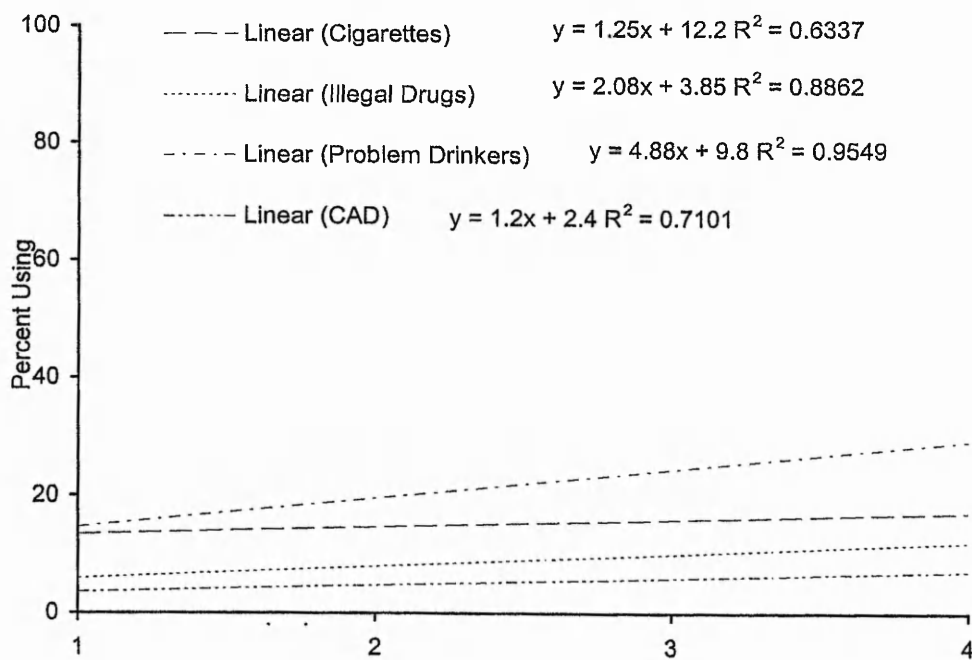
Next most strongly effected by changes in trait levels was cigarette smoking ( $y = 1.25x + 12.2$   $R^2 = 0.6337$ ). 13.98% of those with low levels of Anxiety smoked compared to 18.9% of those who had low levels of Anxiety ( $\chi^2 = 4.7$ ,  $p < .NS$ ; O/R 1.4).

Finally, concurrent use of cigarettes, alcohol and drugs was the least affected by changes in levels of Anxiety ( $y = 1.2x + 2.4$   $R^2 = 0.7101$ ). Only 4.0% of those in the lowest quartile used all three types of substance compared with 8.1% in the highest quartile ( $\chi^2 = 11.3$ ,  $p < .01$ ; O/R 2.1).

**Figure 6.11** - Anxiety and Substance Use



**figure 6.12** - Anxiety and Substance Use: Regression



## **Discussion**

The discussion about the reliability of self-report questionnaires in Chapter 5 applies equally here and the same precautions were taken in this study as in the previous studies. In addition, care was taken to ensure that simple substance experimentation or occasional use was not included, as previously described.

As before, it is possible that the figures for illegal drug and alcohol use might have been higher if pupils absent at the time of the study had been included. This group includes pupils who were absent from school through exclusion, and there is reason to believe that drug and alcohol use within this group is considerably higher than for children attending school (Kandel, 1978; Johnston et al, 1978).

## **Substance Use in Study 4**

This study reports cross-sectional data on associations, among English adolescents, between alcohol use and drunkenness on the one hand, and cigarette and drug use on the other. The data are derived from a whole-school census of six non-randomly chosen secondary schools, and cannot be considered to represent a random sample of the adolescent population.

At age 11, substance use was reported by 18.6% of the sample, but this figure almost exclusively reflected alcohol use. However, 4.2% of eleven year olds admitted smoking cigarettes and just under one percent said they used illegal drugs. All these figures rose linearly with age until just over 71% of all sixteen year olds claimed to be using at least one psychotropic substance on a regular basis.

Overall a slight gender difference was found with boys using more substances overall than girls. However, girls reported smoking more than boys, but also reported less use of illicit drugs and alcohol. This finding of girls smoking more than boys is well known ( Miller et al, 1995), but the reasons behind this discrepancy between genders are still not well understood. Some possible reasons were addressed in Chapter 3 and comments made there apply equally

here. The fact that 30% of 16-year old girls in this study claimed to be regular smokers is worrying and indicates that prevention efforts currently in place, are not effective.

As expected, alcohol use dominated adolescent substance use, not only in terms of proportions, but also in terms of influence. Additionally, as can be seen in Figure 7.2, occasions of use are strongly related to other substance use, the more often a child uses alcohol, the more likely they are to use cigarettes ( $\chi^2 = 47.2$ ;  $p < .0001$ ) and illicit drugs ( $\chi^2 = 53.0$ ;  $p < .0001$ ). These data support the hypothesis that without alcohol there is little additional substance use and that it may therefore be possible to use alcohol as a predictor of future cigarette and illicit drug use in adolescents. At all ages, within this sample of 11-16-year olds, both illicit drug use and smoking were strongly associated with alcohol drinking, such that consumption of other substances was minimal in non-drinkers. These findings support the gateway hypothesis (Yamaguchi & Kandel, 1984; Kandel et al., 1992). and indicate that alcohol is an almost obligatory prerequisite to smoking and illicit drug use within this sample of English adolescents.

As with the previous study, these data also identified an important relationship with the level of alcohol intoxication. An almost linear relationship was identified between occasions of alcohol intoxication and cigarette and drug use (Figure 6.3) and it was found that children who had been drunk up to 15 occasions in the past year were four and a half times as likely to smoke and nearly twice as likely to use drugs as children who had only been drunk five times or less. Children who had been drunk more than 15 times in the past year were over 13 times as likely to smoke and 40 times as likely to use illicit drugs as non-drinkers.

These findings are very strong and, again, support similar data from the United States, mentioned earlier (Donovan & Jessor, 1978; Jessor, 1987). Additionally, they also support Kandel et al's (1992) findings that progression to illicit drugs is dependent on prior use of alcohol. Kandel stressed that this progression was particularly noticeable in men, but this study found no significant gender differences. Kandel also found that age of onset and frequency of use at a lower age of psychoactive substance use were strong predictors of

further progression. This was something not measured by these data, but seems to be likely in light of these cross-sectional findings.

As suggested in Chapter 3 one possible focus for cigarette and drug prevention in adolescents should be alcohol prevention. If adolescents can be delayed from beginning drinking, and particularly if they can be prevented from developing into problem drinkers, then, in light of these data, it seems likely that cigarette and illicit drug use could be reduced too.

Overall 6.4% of this population said they took illicit drugs on a regular basis, but this figure peaked at 14.7% for 15 year old boys and 13.8% for girls of the same age. What is particularly interesting is the role of cannabis (Table 6.6) which may be seen as analogous to alcohol. Golub et al (1992) suggested that marijuana use nearly always preceded use of more harmful substances and commented that as prevalence of marijuana was increasing, the importance of alcohol as a gateway to marijuana was declining, with marijuana's role as a gateway to serious drug use increasing.

However, to label cannabis as a gateway drug based on these kinds of findings is spurious. For many years anti-drug campaigners on both sides of the Atlantic have been saying that cannabis use leads to 'harder' drug use and, superficially that might appear to be the case. It is probably true to say that a very high proportion of heroin addicts began with cannabis, but what is often not mentioned is that the vast majority of cannabis users never go onto use any other illicit substance.

In this study 71.9% of the drug using population used exclusively marijuana whilst 18.4% used cannabis in combination with another drug and 9.7% used another drug without concurrent cannabis use. These data were unable to show whether any of the participants who used drugs other than cannabis had ever been regular cannabis users, but the fact that over 70% of drug users only used cannabis does make Golub's comments difficult to accept.

### **Substance Use in Studies 2 and 4**

Of greater interest than the simple standalone figures from Study 4, is the comparison of the findings with those from the previous study, Study 2. It should be remembered that these data come from two separate cohorts and that more meaningful comparisons could be drawn if the two sets of data came from a single longitudinal study rather than from two cross-sectional ones.

Although the overall finding regarding cigarette use was that it had declined slightly in Study 4 over Study 2, ( $p = .02$ ), these data hide the fact that the gap between girls and boys, especially in 16-year olds, is increasing (Table 6.8). In the first study, there was no difference in the smoking levels of 16-year old boys and girls, but in the second study, there was a 9.7% difference (girls, 30.8% and boys 21.1%,  $p < .44$ ). Although this difference was not statistically significant, it is still worth drawing attention to.

Additionally, the 4% increase in smoking by 16-year old girls between Study 2 and Study 4 is worrying (26.8% to 30.8%,  $p < .09$ ). Again this was not statistically significant, but as a general trend indicator it shows that, at the very least adolescent, and particularly female adolescent, smoking is not declining.

Clearly government advertising campaigns which have been targeted at this group have not succeeded. Smoking prevention strategies obviously need to be examined, and, in particular, attention needs to be paid to the relationship of alcohol to smoking.

Equally importantly, the reasons why young girls begin smoking also needs further research and the role of advertising needs to be further assessed. Lam et al (1998) in a large study in Hong Kong found a clear relationship between initiation of smoking by young people and advertising. The tobacco companies repeatedly stress that advertising is not aimed at young people, but is targeted towards established smokers in an attempt to get them to switch brands. However, whether or not this is the case appears to be irrelevant as tobacco advertising is attracting young non-smokers towards tobacco use.

In particular the concept children have that smoking is fashionable needs to be addressed as Lam et al (1998) found that the strongest associations between advertising and smoking observed by their study was when young people perceived cigarette advertisements as attractive.

If these teenagers, particularly girls, and the younger cohorts following them, continue to smoke at current, or increased levels, then the potential health and economic implications for future generations are grave.

As noted, illicit drug use declined over the two studies (15.3% to 6.4%,  $p < .0003$ ). In Study 2, a peak of use was reported at age 15 and this peak was found again in Study 4 (Table 6.10), but to a lesser degree. As the same questions were used in both studies and the same procedure was followed, it seems unlikely that the methodology can explain these differences. Another explanation could be that national adolescent drug use is declining, but this does not seem likely in light of recent findings (Sutherland & Shepherd, 2000).

A more likely explanation is that adolescent substance use in different geographical areas, varies. If the same population had been used in Study 4 as in Study 2, the results might have been similar. An appropriate follow up to test this hypothesis is a re-application of the instrument at both sites. Although some of the older children would have left the schools, broadly the populations would be the same and certainly the main socio-economic and demographic variables would not alter.

It was interesting to find that reported regular use of alcohol had decreased from 61.6% in Study 2 to 39.5% in Study 4 ( $p < .0001$ ). This decrease was noticeable in the younger age groups where, for instance 29.2% of girls in Study 2 said they drank regularly compared to only 10.7% in Study 4 ( $p < .002$ ). At the other end of the scale, there was little difference in 16-year old boys drinking between the two studies.

As discussed in Chapter 3, an explanation of this may be that drinking per se has not changed, but rather that the regular drinking figures in Study 2 were inflated. Again it is possible that our earlier prevalence estimates could be inflated by respondents reporting "ever-use" rather than "regular use", though the teachers administering the questionnaire stressed that

respondents should think in terms of regular use ("at least once a week for at least three months") and it seems unlikely that the majority would ignore this clear instruction. It is also possible that the high Study 2 alcohol prevalence data could have been influenced by the introduction of Alcopops and it is possible that their novelty value is now declining leading to an overall decrease in adolescent drinking, but, again, this does not seem likely.

It should also be noted that these data are not derived from a random sample of the adolescent population, so the prevalence estimates presented in this study should be treated with caution. In this study the data are not consistent across the six schools surveyed (range of overall means, 31.3-66.4% for regular alcohol consumption). In future, comparative surveys of this kind should attempt to socio-economically and demographically match schools otherwise comparative figures are bound to be subject to differences which do not relate to true levels of use.

In conclusion, although differences were found between the two studies, many similarities were noted too. The influence of alcohol on cigarette and illicit drug use remains very strong in Study 4. The simple finding from both studies being that the more an adolescent drinks, the more likely they are to use cigarettes and drugs. As has been noted, this applies both to occasions of alcohol consumption and to episodes of drunkenness. This linear relationship is strong and has serious implications for health education campaigns. Both studies found that there is only negligible cigarette or drug use without accompanying alcohol use therefore it seems logical to assume that if initiation into alcohol drinking can be delayed, and eventual consumption levels reduced, then the associated cigarette and drug use will also decrease.

### **Factor Analysis**

The factor structure for Study 4 remained consistent with that found in Study 2. Because of this consistency it can be concluded that the first section of the SASI, the section dealing with personality variables is a powerful instrument capable of discriminating between substance users and non-users.

### **Personality Variables**

As discussed previously (Chapter 4), the personality variables of the SASI were able to discriminate well between substance users and non-users of all ages.

There were overall differences, but each of the four factors also had the power to discriminate strongly between the groups of users and non-users which indicates that this first section of the Substance Abuse Susceptibility Index is a useful tool, if not necessarily for predicting those at risk, then at least for identifying, through non-substance use related questions, those who are already using psychotropic substances. However, as discussed at some length earlier, the question of direction of causality as a confounding variable does, once again, present a problem. Does the substance use lead to, for instance, low self-esteem or does the low self-esteem cause a person to turn to substance use as a way of counteracting the negative trait effects? Again, the only reliable way of addressing this problem is through a longitudinal study using the same cohort of children.

### **Neurotic Susceptibility to Substance Abuse**

The ability of the combined sub-traits (NSSA) to discriminate between substance users and non-users remained stable across both studies. Although there were differences found in actual substance use patterns between the two studies, the ability of NSSA to still be able to discriminate between users and non-users shows that these relationships are strong and stable. The issues surrounding the concept of NSSA and personality associations with substance use in general have been covered earlier so they will not be repeated here. However, despite the fact that some researchers (Sharma, 1995) still support the concept of an addictive personality and maintain that it precedes an addictive state rather than being caused by it, the strong association between raised levels of NSSA and substance use found in this study is not being used to promulgate this hypothesis.

The relationship of high levels of NSSA to substance use is helpful in so far as it potentially allows a person to be assessed for possible substance use without being specifically asked

about use. Raised NSSA levels could be used to indicate that either a person is already a substance user or else they are at risk of becoming one in the future.

### **Low Self-esteem**

As with Study 2, self-esteem was clearly able to differentiate between substance users and non-users and a detailed discussion was given in Chapter 4 about these relationships. The findings of this study are very similar to those of the earlier work and strongly support the inclusion of a measure of self-esteem in any research of this type.

As previously discussed, Young et al (1989) measured school self-esteem, home self-esteem and peer self-esteem and found a very strong relationship between drug use, low home and low school self-esteem. It was suggested earlier that a useful strategy might be to develop a sub-scale that specifically addressed these sub-traits of self-esteem, but that was not feasible for this study. However, of the four items in the current study which measure self-esteem, three measured global self-esteem ('sometimes I don't think I deserve to be happy'; 'I think I am a good person'; 'I can feel so ashamed of some of the things I have done I just want to hide'). One item though specifically addressed the issue of parental approval ('I think my parents are proud of me') and it was this item which was the most discriminatory of all. In fact it was the single most discriminatory item of the whole personality section of the questionnaire.

Any future iterations of this instruments should look more closely at this sub-set of Self-esteem as it might prove to be a valuable addition to any questionnaire seeking to identify current or potential substance users.

This strong association of low self-esteem with substance use, whatever the direction of causality, has important implications for substance use prevention. If indeed low self-esteem is directly related to the onset of substance use, then it is an area which can be targeted by prevention initiatives. Clearly all children would benefit from an increase in global self-esteem, which could be addressed by teachers in the classroom setting, but, importantly, the

discriminatory power of the item relating to parental approval also has important implications for home life too.

An obvious, but maybe simplistic hypothesis, is that if children have high self-esteem then they have no need to become substance users, but given the evidence of Studies 1 and 2, this simple idea has merit.

Having said that, it is not suggested that low self-esteem is, by itself, a definitive causal factor in substance use and abuse, but it does appear to be an important cornerstone.

### **Lack of Self-concern**

Superficially it may seem that a lack of self-concern is similar in nature to low self-esteem, and indeed there may well be a relationship, but in this context it appears that those people who are not concerned about their well-being are at particular risk from substance abuse.

Not only has this finding been empirically supported by the research being reported, but the finding also makes intuitive sense too. If a person tends towards the hypochondriacal they are unlikely to put themselves at risk by abusing drugs, smoking cigarettes or becoming drunk regularly. At the other end of the spectrum, those who are not worried about becoming ill or give no thought to lifestyle consequences would probably not worry about indulging in activities which have been shown to be risky.

Again, this finding should not be taken in isolation. If a person has extreme tendencies towards a lack of self-concern they are at risk from substance abuse, but the question of why they have these low levels must be asked. Once again, it seems likely that this trait does not exist in isolation.

### **Depression**

Although it did not discriminate as well as the preceding two factors, depression nevertheless found significant differences between substance users and non-users which confirms the work of many researchers who have long been linking the trait with substance use.

The power of this factor to discriminate was found not only with illegal drugs, but with alcohol abuse, cigarette use and concurrent use of cigarettes, alcohol and drugs too. Given the power of Factor 1, self-esteem, this is not too surprising as the two areas are clearly linked with low self-esteem often accompanying pathological depression.

Of interest in these findings is the fact that people with high levels of depression were 1.9 more likely to be problem drinkers than those with low levels, but those with high levels were 3.4 times as likely to be concurrent users of cigarettes, alcohol and drugs than those with low levels. Even though this work has found that those people who use drugs tend to be the same ones who regularly get drunk, this is not a pattern found in people with high levels of depression. It might be speculated that this is because of the characteristics of alcohol as a depressant so that adolescents who are prone towards depression naturally stay away from alcohol and gravitate towards other substances. If this were the case, it would lend some weight to Khantzian's (1985) Self-Medication Hypothesis which suggests that a person takes a particular type of substance in order to alleviate an underlying disorder.

### **Anxiety**

This final factor was clearly the weakest of all the factors, however, it still had the power to discriminate between substance users and non-users.

As discussed earlier, there is a considerable body of evidence which has shown raised anxiety levels in alcoholics and drug addicts and it is suggested that this could possibly be a generalised underlying trait common to substance abusers. If anxiety precedes substance abuse or if substance abuse is a direct response to an anxiety state then clearly the etiology of that state needs to be looked at within each individual. However, it is also possible that raised anxiety indices are the result of collateral activities associated with substance abuse. If this is the case then it would probably be particularly true of the younger age groups who might be concerned about the illegality of their actions or have worries about access to money and the availability of alcohol and drugs.

In light of the relatively weak discriminatory powers of this final factor it would seem prudent to focus on other aspects of the SASI with anxiety only being used to confirm the findings of other areas of the instrument.

### **Conclusions**

This first section of the Substance Abuse Susceptibility Index shows a marked ability to discriminate between substance users and non-users and this fact, in combination with other positive indicators such as Cronbach's Alpha, show that the instrument is a useful tool in identifying young people who are currently substance users.

However, the question of whether the SASI can predict which pre-using children will go onto to become substance abusers remains unanswered. It is always difficult to extrapolate from cross-sectional data and this is particularly so in this case when the crucial question of direction of causality remains unanswered.

As discussed earlier, the only way to assess the SASI's predictive powers and to address direction of causality is through longitudinal work. Although the findings reported here were strong, care needs to be taken if any extension of the results is attempted.

Although there were some prevalence and statistical differences between Study 2 and Study 4, the overall conclusions from the two studies remain, essentially, the same.

## **CHAPTER 7 - FAMILY ASPECTS OF ADOLESCENT SUBSTANCE ABUSE**

### **Introduction**

It has been demonstrated already that differences on various levels exist between non-users and substance users of all types. These differences may exist on a genetic level ( Comings et al, 1995), as aspects of personality ( Craig, 1993) or as differences in social circumstances and social responses ( Dielman, 1990). Although the precise nature of the differences in social circumstances are far from clear, what does emerge is that certain aspects of people's lives are consistently difference in users and non-users. As was noted in Chapter 2, these areas include family structure ( Turner et al, 1991); Religiosity ( Cochran, 1992); Peer and influence ( Otero, 1994; Johnston et al, 1984); Academic achievement and expectations ( Paulson et al, 1990); Delinquency ( Johnson, 1986) and the substance using practices of family members (Anderson & Henry, 1994; Needle et al, 1986; Duncan et al, 1996). Although these socially related variables were discussed at some length in earlier an area that needs to be addressed further is family substance use. In particular, one area of importance is the effect of specific substance use, for instance the effect of household cigarette use compared with household drug use. As was noted earlier, for the purposes of this work the term 'family' is being used to include anyone who permanently lives in a home, in other words, family is being used synonymously with 'household'.

## Family Substance Use

### **Cigarette use**

It was concluded by Flay et al (1994) that smoking-related behaviours and attitudes of parents are among the most consistent predictors of adolescent smoking, a position supported by Oygard et al (1995) who, following a longitudinal study in Oslo, found that the single most important long term predictor of daily smoking in young adults was whether or not their mother had smoked cigarettes. Chassin et al (1994) went further than just suggesting a simple causal relationship between parental and adolescent smoking: She suggested that her research indicates that those with a family history of cigarette smoking smoked more cigarettes in a typical day, smoked for more years, perceived themselves as more addicted to cigarettes, had more positive beliefs about the psychological consequences of smoking, and reported stronger pleasurable relaxation motives and stimulation motives for smoking compared with their peers who had no family history of cigarette smoking. Chassin and her colleagues went on to say that these differences might be due to both social-environmental and genetically influenced mechanisms. On the other hand, a study by Wang et al (1995) who looked at 6,900 14-18 year olds in America suggested that peer influence was considerably more important than family influence with family smoking having no discernible effect on adolescent smoking. This view was in accord with Boomsma et al (1994) who looked at contributing genetic and environmental factors in twins and concluded that there was no evidence to suggest that past or present parental smoking encouraged smoking in their offspring. It does seem however, that these findings are in the minority.

Rowe et al (1987) suggested that the transition rate from non-smoker to trier to regular smoker was more rapid in children of smoking parents than in children of non-smoking parents. Even Eiser et al (1989), who suggested that parental *opposition* was the most significant factor in adolescent smoking, acknowledges the fact that parental smoking behaviour does have a role to play in the smoking habits of their children.

Bauman (1990), following a study that looked at the family history of over 2,000 12-14 year olds in America, concluded that lifetime parental smoking was as strongly correlated as peer smoking with adolescent smoking and that peer smoking was often the main determinant of adolescent smoking. Interestingly, if one accepts a link between adult and adolescent cigarette smoking, then this link appears strong. Vlajinac, (1989) in a study of the smoking habits of 1,600 medical students found that even medical education with sufficient information about cigarette smoking's harmful effects did not appear strong enough to influence the subject's smoking behaviour when that behaviour was linked to parental smoking. He found that as medical student's careers progressed those who had been smokers at the beginning of the course remained smokers by the end.

With the exception of one or two dissenting voices, there does appear to be an accepted association between family smoking and subsequent adolescent smoking. Whether this link is sufficiently robust to be determined as causal remains, at least at this stage, open to a degree of speculation.

### **Alcohol use**

If the precise role of the family in adolescent cigarette use is unclear, then it is equally so with adolescent alcohol use. One of the problems in looking at this question is that very little work appears to have been undertaken on 'normal' alcohol drinking so the question is, can data on heavy alcohol use and alcoholism be applied to adolescent drinking? If the view is accepted that alcoholism is simply one end of a behavioural continuum with new drinkers beginning their drinking careers at the far end from alcoholics then it might be possible to apply some of the main theories to this area. However, most of the work that has been done is biased towards pathological drinking.

Some of the work relevant to the specific area of interest here, that of the role of household drinking in adolescent drinking, has been carried out by Ary. In 1993 he carried out a prospective study of 173 families and found that the parent's attitude toward youth alcohol

consumption and parent modeling of alcohol use were strongly related to change in adolescent alcohol use, suggesting that parents can influence the future use of alcohol by their children and Peterson (1993) found that amongst 450 adolescents parental drinking frequency when the subjects were 12-13 years old was a strong predictor of their drinking at ages 14-15. Using survey data from 805 school children Webb (1995) found that parental alcohol use was related directly to adolescent usage, a finding supported by Bahr et al (1998) who, following a study involving 27,000 randomly selected adolescents, agreed that living with family members who drank alcohol, particularly to excess, indirectly increased adolescents chances of having future alcohol problems.

Additionally, Weinberg (1994) examined the relationship between over 2,000 children's reports of their parents' drinking patterns and the child's own alcohol misuse in early adolescence with data being derived from classroom administered questionnaires. Weinberg found that heavy alcohol drinking by either parent was significantly associated with increased odds of alcohol misuse and heavy alcohol use among the children. Again, by talking about 'alcohol misuse', this looks at levels of adolescent alcohol use a significant way along the drinking continuum, however, it does not focus exclusively on alcoholism, either in the parent or in the adolescent.

There appears to be a strong link between parental alcohol use and adolescent use, but it does seem that specific work is needed in the area, particularly in relation to 'normal' alcohol use, before this link can be clearly defined. However, it has already been suggested that alcohol use is a normal social pastime for the majority of people in our society and this fact makes any examination of the effect of household alcohol use on adolescent alcohol use particularly complex as any data are bound to be blighted by external noise.

### **Drug use**

The evidence for a causal influence of family illegal drug use on adolescent drug use is more straightforward than for either cigarettes or alcohol. Denton and Kampfe (1994) in a literature

review, concluded that a relationship exists between adolescent drug use and family drug usage patterns. Specifically, they suggested that there exists a strong relationship between adolescent use, family use, family composition, family interaction patterns, and discrepancies in family perceptions. In a further study, Hops (1996) who found that parent's marijuana use significantly encouraged adolescent marijuana use and by Anderson (1994) who found that frequency of parental substance use was positively related to corresponding adolescent use.

In addition, peripheral work by Neisen, (1993) in a study into HIV prevention tactics, noted that parental substance use was positively correlated with their children's intravenous drug use and Caudill (1994) found in a study with 299 crack cocaine smokers that those with a parental history of substance use were more likely to have reported illicit drug use in the past year and to have received prior treatment for a substance use related problem than subjects without a parental history of substance use.

In addition to this direct evidence, various studies have found that other adolescent behaviour associated with the onset of drug use was found in the offspring of drug abusing parents. For instance, Gabel (1992) found that parental drug use was a reliable predictor of adolescent conduct disorder and overt aggression and Moss et al (1995) found that sons of substance abusing fathers had higher externalising and internalising problem-behaviour scores, lower IQ scores, and lower school achievement scores than the sons of non-substance abusing fathers, all factors that have been suggested as indicators of possible later drug use.

Before this work is described further, it should once again be reiterated that any examination of these areas is inevitably hampered by the question of direction of causality. Is the variable being looked at antecedent, concurrent or consequent to the substance using behaviour? In some areas this question may not be relevant, however in areas such as academic achievement it is a very real problem. Did the individual begin using psychotropic substances because their grades were poor compared to those of their peers, or did their grades go down as a direct result of substance use? When considering findings of any work of this type, this question should be borne in mind.

Data from both Study 2 and Study 4 will be presented.

## **Participants**

Details of participants in Study 2 can be found in Table 3.1 and details of participants in Study 4 can be found in Table 6.1.

## **Materials**

The results being reported here are taken from several questions abstracted from Section 2 of the SASI. As already discussed, this second section was designed to assess various areas including attitudes towards illegal drugs, alcohol and cigarettes, current and planned use of those substances, household use, delinquency and academic standing. The data reported were derived from answers to the following questions:

1. Do you smoke cigarettes?
2. If you do smoke cigarettes, roughly how many would you smoke in a week?
3. Do any members of your family who live at home drink alcohol?
4. Have you ever seen them drunk?
5. If you have seen them drunk, about how many times has this happened?
6. Do any members of your family who live at home smoke cigarettes?
7. If they do, who are they?
8. Do any members of your family who live at home take drugs?
9. If they do, who are they?
10. If members of your family who live at home do take drugs, what drugs do they mainly use?
11. Do you drink alcohol?
12. If you do how often would you usually drink?
13. Have you ever been drunk?
14. If you have been drunk, about how many times has this happened?
15. Have you ever used drugs not given to you by a doctor?
16. If you have used drugs not given to you by a doctor, what were they?

17. About how many times have you used these drugs?
18. If you use them regularly, about how many times a week do you use them?

Once again, to ensure that simple experimentation of substances was not included in the analysis, the data presented refer to 'regular use', which was defined as use of cigarettes, alcohol, or illegal drugs that takes place at least once a week and has done so for a period of three months or more.

## **Results**

The results will be split into two sections: Those from Study 2 and those from Study 4. Comparisons between the findings of the two studies will be drawn in the Discussion section.

### **Study 2**

#### **Any Household Substance Use**

Initially the effect of having a household member who used any type of psychotropic substance was considered.

In households where substance use existed (either cigarettes, alcohol or illegal drugs in any combination) adolescents were far more likely to use those substances than in abstinent households. In using households 70.7% of children themselves used a substance as opposed to 21.4% of children from non-using homes ( $\chi^2 = 622.9$ ,  $p < .0001$ ). This finding extended to all three of the substance groups being looked at (Table 7.1). It was found that 21.3% of adolescents from substance using homes smoked cigarettes compared to only 7.2% of those from non-using homes ( $\chi^2 = 78.0$ ,  $p < .0001$ ); 69.5% of those from using homes drank alcohol as opposed to 18.5% from non-using homes ( $\chi^2 = 658.0$ ,  $p < .0001$ ) and 17.4% of those from using households took illegal drugs compared to 3.7% from non-using homes ( $\chi^2 = 87.7$ ,  $p < .0001$ ). However, these data could be considered contaminated. Although it is useful to

know how many children smoke from cigarette using households compared with non-using homes, this, on its own is not particularly enlightening as members of the cigarette using household could also have been alcohol and drug users. Therefore analyses were undertaken to control for concurrent use of different substance classes.

**Table 7.1** – Study 2: Reported adolescent substance use by family use

Family use	N	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
<b>Cigarettes</b>				
Not used	2002	229 (11%)	1119 (56%)	257 (13%)
Used	2510	631 (25%) O/R 2.6 CI 2.2-3.1	1657 (66%) O/R 1.5 CI 1.4-1.7	433 (17%) O/R 1.4 CI 1.2-1.7
<b>Alcohol</b>				
Not used	1062	123 (11%)	243 (23%)	57 (5%)
Used	3449	737 (21%) O/R 2.1 CI 1.7-2.6	2532 (73%) O/R 9.3 CI 7.9-10.9	633 (18%) O/R 4.0 CI 3.0-5.2
<b>Drugs</b>				
Not used	4251	748 (18%)	2548 (60%)	525 (12%)
Used	253	108 (43%) O/R 3.5 CI 2.7-4.5	220 (87%) O/R 4.5 CI 3.1-6.5	160 (63%) O/R 12.2 CI 9.3-16.0
<b>Overall</b>	<b>4516</b>	<b>862 (19%)</b>	<b>2780 (62%)</b>	<b>690 (15%)</b>

Table 7.2 shows a detailed breakdown of the effects of specific household substance use on child use of cigarettes, alcohol and illicit drugs. The table shows the families displaying each of the eight possible combinations of cigarette, alcohol and drug use, and the percentage of adolescents within each group of families using each substance. For instance, it can be seen from the table that 7.8% of children in non-substance using families smoke cigarettes compared to 53.5% of children from families where cigarettes, alcohol and drugs are used and 24.8% from families where only cigarettes and alcohol are used. This table gives the relative importance of each of the household substance groups.

**Table 7.2** - Study 2: Percentage of adolescents reporting own use of each substance for each combination of reported family use of substances

Family use	Total number of adolescents	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
No Use	630	49 (7.8%)	127 (20.2%)	27 (4.3%)
C Only	398	61 (15.3%)	93 (23.4%)	17 (4.3%)
A Only	1289	160 (12.4%)	923 (71.7%)	185 (14.4%)
D Only	15	6 (40.0%)	10 (66.7%)	6 (40.0%)
C & A Only	1929	478 (24.8%)	1399 (72.5%)	296 (15.4%)
C & D Only	14	5 (35.7%)	8 (57.1%)	7 (50.0%)
A & D Only	67	13 (19.4%)	57 (85.1%)	39 (58.2%)
C & A & D	157	84 (53.5%)	145 (92.5%)	108 (68.8%)

Table 7.3 gives odds ratios and chi-square analyses of the influence of household use of each substance on levels of adolescent use of each substance; these values are shown separately for each type of family. For example, the first entry in the table, 2.2, is the odds ratio for the increased risk of child smoking in families where cigarettes (but not alcohol or drugs) are used, relative to totally abstinent families and the chi-square value ( $\chi^2 = 14.1$ ,  $p < .0001$ ) is the level at which this is significant; the figure nine rows below, 2.3 ( $\chi^2 = 77.9$ ,  $p < .0001$ ), is the odds ratio for the increased risk of child smoking in families where cigarettes and alcohol (but not drugs) are used, relative to families that use alcohol only. In general, reading horizontally across a row, the table shows the effects on adolescent use of adding a single substance to an existing combination of family use, while reading vertically down a column, the table shows the effect of adding a given substance in families displaying different patterns of use. It should be noted that there were relatively few drug-using families, of whom the majority (74%) also used both cigarettes and alcohol. Very small numbers of families used drugs alone ( $n=13$ ) or in combination with cigarettes only ( $n=16$ ) or alcohol only ( $n=38$ ). As a result of these low numbers, comparisons among these three groups (row D) were non-significant.

**Table 7.3 – Study 2: A comparison of the different household use groups.**

Family Comparisons	1V - Family	Child Substance	$\chi^2$	O/R
0 v C	C	C	14.1 p<.0001	2.2
0 v C	C	A	1.5 NS	1.2
0 v C	C	D	0.0, NS	1.0
0 v A	A	C	9.9 p<.002	1.7
0 v A	A	A	473.3 p<.0001	10.0
0 v A	A	D	50.2 p<.0001	3.7
0 v D	D	C	11.4 p<.0001	7.9
0 v D	D	A	14.7 p<.0001	7.9
0 v D	D	D	17.3 p<.0001	14.8
A v AC	C	C	77.9 p<.0001	2.3
A v AC	C	A	0.2, NS	1.0
A v AC	C	D	0.4, NS	1.1
A v AD	D	C	2.5, NS	1.7
A v AD	D	A	6.4 p<.01	2.6
A v AD	D	D	64.1 p<.0001	8.3
C v AC	A	C	17.9 p<.0001	1.8
C v AC	A	A	336.9 p<.0001	8.7
C v AC	A	D	43.6 p<.0001	4.1
C v CD	D	C	3.3, p<.06	3.1
C v CD	D	A	7.0, p<.008	4.4
C v CD	D	D	23.2, p<.0001	22.4
D v AD	A	C	2.6, NS	0.4
D v AD	A	A	2.5, NS	2.9
D v AD	A	D	1.6, NS	2.1
D v CD	C	C	0.0, NS	0.8
D v CD	C	A	0.2, NS	0.7
D v CD	C	D	0.2, NS	1.5
AC v ACD	D	C	53.9 p<.0001	3.5
AC v ACD	D	A	37.0 p<.0001	4.6
AC v ACD	D	D	201.7 p<.0001	12.1
AD v ACD	C	C	23.7, p<.0001	4.8
AD v ACD	C	A	2.6, NS	2.1
AD v ACD	C	D	2.2, NS	1.6
CD v ACD	A	C	1.6, NS	2.1
CD v ACD	A	A	11.1, p<.0001	9.1
CD v ACD	A	D	1.9, NS	2.2

This table shows child use in using and non-using families. Odds ratios indicate the significance of each type of family use on child use. In every case, child substance use was lowest in totally abstinent families and highest in families using all three substances. Between these extremes, the influence of household use of individual substances was somewhat variable. These effects will now be considered.

### Household Cigarette use

It was found that 862 participants (19.1%) smoked cigarettes and that 2,510 (55.6%) had at least one household member who smoked ( $r = 0.17$ ,  $p < 0.01$ ). Of children who lived in a household where there was a smoker, 25.1% smoked themselves as opposed to 11.4% of children who came from households where there was no other smoker (O/R 1.4; C/I 1.2-1.7) (Table 7.1).

Younger children appeared to be particularly susceptible to this effect with, for instance, 14.1% of 12-year olds from smoking households themselves smoking compared to 1.5% of those who came from non-smoking households ( $\chi^2 = 39.3$ ,  $p < .0001$ ). This may be compared with 33.2% of 16-year olds from smoking households using cigarettes, as opposed to 19.7% of those who came from non-smoking homes ( $\chi^2 = 12.6$ ,  $p < .0001$ ). (Table 7.3)

Children who came from households where there was a smoker were also more likely to drink alcohol with 66.0% drinking regularly as opposed to 56.% of children from non-smoking households (O/R 1.5; C/I 1.4-1.7). Again, younger children were particularly effected with 41.8% of 11-year olds from smoking households drinking alcohol compared to 16.2% from non-smoking homes ( $\chi^2 = 33.4$ ,  $p < .0001$ ). At the other end of the age range, of those 15-year olds who lived in a smoking household 81.9% drank alcohol as opposed to 70.0% from a non-smoking home ( $\chi^2 = 17.0$ ,  $p < .0001$ ).

This apparent influence of household cigarette smoking was also illustrated when its effect on adolescent drug use was considered. It was found that 17.0% of children who came from cigarette using families used illegal drugs compared to 13.0% of children who lived in non-cigarette using households (O/R 1.4; C/I 1.2-1.7). A gender difference was also noted with 21.8% of boys from cigarette smoking homes using drugs compared with 12.1% from non-smoking homes ( $\chi^2 = 37.4$ ,  $p < .0001$ ). Girls seemed to be less effected with 14.8% of those from cigarette using households using drugs compared to 11.2% from non-smoking households ( $\chi^2 = 6.1$ ,  $p < .02$ ).

**Table 7.4 – Study 2**

Adolescents who smoke from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-Smoking households	1.6%	1.5%	6.8%	12.1%	22.4%	19.7%
Smoking households	8.6%	14.1%	23.6%	30.1%	35.4%	33.2%
Significance	p < .001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

Adolescents who drink from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-Smoking households	16.2%	32.4%	45.5%	63.7%	70.0%	73.5%
Smoking households	41.8%	49.1%	63.9%	75.2%	81.9%	91.7%
Significance	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

Adolescents who use drugs from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-Smoking households	-	0.7%	2.5%	11.2%	23.7%	25.8%
Smoking households	2.4%	4.5%	8.9%	21.5%	33.2%	37.4%
Significance	-	p < .002	p < .0001	p < .000	p < .0001	p < .0001

#### Household Alcohol use

Adult alcohol use is widespread and 76.5% of the participants said they came from an alcohol using household with 61.6% of the participants themselves regularly drinking ( $r = 0.44$ ,  $p < 0.01$ ). Notably, 73.4% of the children who came from alcohol drinking households regularly drank alcohol themselves, as opposed to only 22.9% of children who lived in non-alcohol using families (O/R 9.3; C/I 7.9-10.9). This effect was particularly marked at the younger end of the age range with 43.4% of 11 year olds who lived in an alcohol using household drinking as opposed to only 0.8% of 11 year olds who came from non-drinking homes ( $\chi^2 = 79.0$ ,  $p < .0001$ ) (Table 7.5).

**Table 7.5** - Study 2

Adolescents who smoke from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	0.8%	3.0%	8.0%	14.5%	16.3%	11.8%
Drinking households	8.4%	11.5%	19.0%	24.1%	32.9%	29.6%
Significance	p < .004	p < .0001	p < .0001	p < .001	p < .0001	p < .001

Adolescents who drink alcohol from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	0.8%	12.8%	19.2%	32.9%	33.7%	38.8%
Drinking households	39.2%	54.3%	68.2%	82.6%	87.7%	91.3%
Significance	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

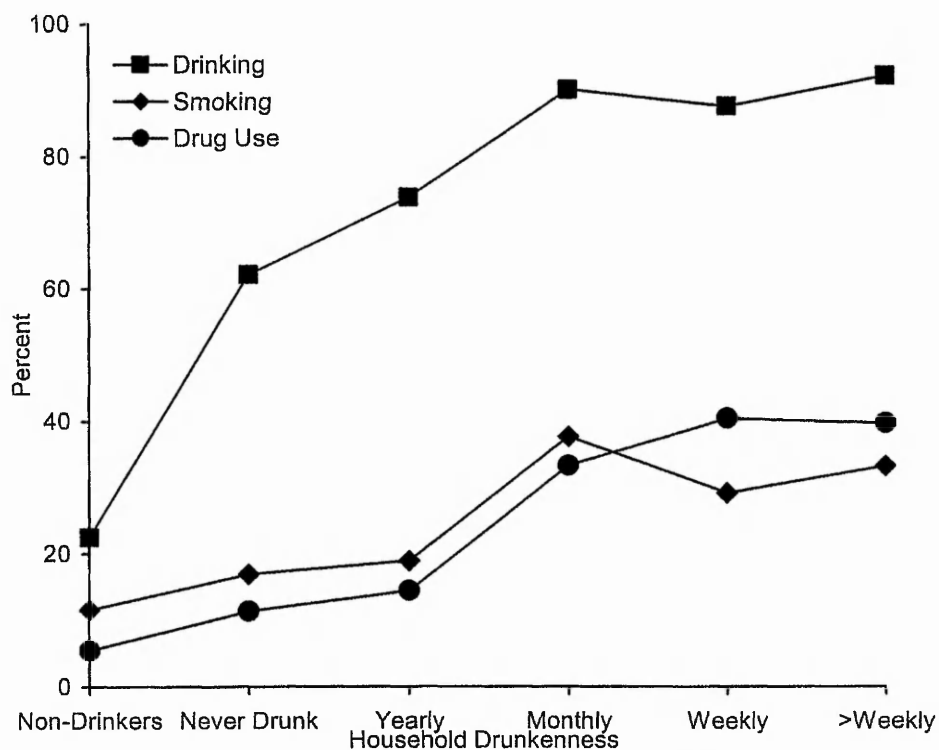
Adolescents who use illicit drugs from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	-	-	1.1%	7.5%	14.6%	11.8%
Drinking households	2.0%	4.3%	7.9%	20.0%	32.6%	35.8%
Significance	-	p < .003	p < .001	p < .0001	p < .0001	p < .0001

The household use of alcohol also affected adolescent cigarette and illegal drug use with 22.1% of participants who came from alcohol using households smoking compared to only 11% of those who came from non-alcohol using households (O/R 2.1; C/I 1.7-2.6). Similarly, 18.4% of children who came from alcohol using households used illegal drugs as opposed to 5.4% of those from non-alcohol using households (O/R 4.0; C/I 3.0-5.2).

Not only was the base factor of household alcohol use important, the extent to which alcohol was used also had a bearing, with levels of adult drunkenness being particularly important (Figure 7.1). Of those children who came from households where family members had been drunk in excess of 20 times (high level households), 92.2% drank themselves as opposed to 76.2% of those who came from households with reported levels of drunkenness of between 1 and 5 occasions (low level households) ( $\chi^2 = 65.5$ ,  $p < .0001$ ).

Of those children who came from households with high levels of drunkenness 83.6% had themselves been drunk, a figure which compares to 64.5% of adolescents who came from low drunkenness households ( $\chi^2 = 70.2$ ,  $p < .0001$ ). The extent of adolescent drunkenness was also effected with 61.5% of those who came from high drunkenness households themselves reporting having been drunk in excess of 20 times. This compared to 24.5% of those who came from low level households ( $\chi^2 = 184.4$ ,  $p < .0001$ ). Comparisons of non-drinking families with 'never drunk' drinking families confirmed that family drinking in itself, independent of drunkenness, was associated with a large increase in the proportion of children using alcohol ( $\chi^2 = 380.2$ ,  $p < .0001$ ; O/R = 6.0).

**Figure 7.1** – Study 2: Household drunkenness and adolescent substance use.

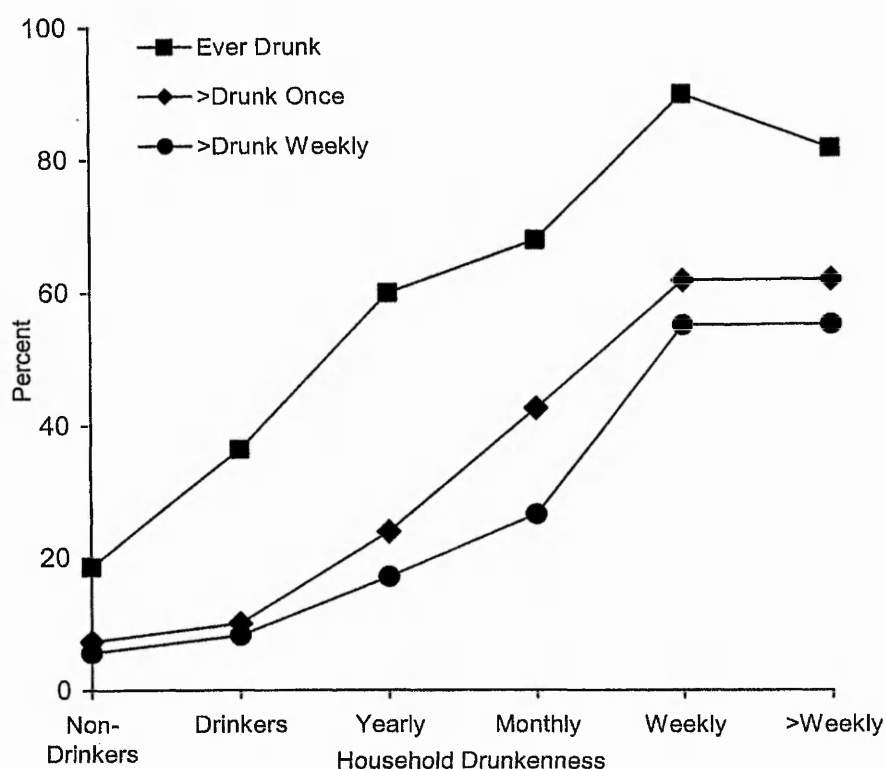


Of those adolescents who came from high drunkenness households 40.7% smoked cigarettes with only 23.8% of adolescents who came from low drunkenness households smoking ( $\chi^2 = 57.6$ ,  $p < .0001$ ). This picture was similar when adolescent illegal drug use was considered

with 40.2% of those children from high drunkenness households using drugs as opposed to 17.7% of those who came from low drunkenness households ( $\chi^2 = 114.8$ ,  $p < .0001$ ). When compared with yearly household drunkenness, significantly greater levels of childrens' use of all three substances were seen in families where frequent, monthly, drunkenness was reported (alcohol:  $\chi^2 = 24.8$ ,  $p < .0001$ ; O/R = 3.3; cigarettes:  $\chi^2 = 27.1$ ,  $p < .0001$ ; O/R = 2.6; drugs:  $\chi^2 = 23.0$ ,  $p < .0001$ ; O/R = 3.0).

There was also a significant correlation ( $r = 0.39$ ,  $p < 0.001$ ) between levels of household drunkenness and adolescent intoxication. Figure 7.2 shows the proportions of children 'ever drunk', 'drunk more than once' and 'drunk weekly', as a function of levels of family drunkenness. Relative to non-drinking families, in families where alcohol is consumed but family members are never seen drunk, the proportion of children 'ever drunk' was doubled but there was no increase in the incidence of multiple drunkenness. However, seeing family members drunk even very infrequently (> once a year) substantially increased reports of child drunkenness, and more than half (55%) of children who reported seeing family members drunk on a weekly basis reported that they themselves were also drunk weekly.

**Figure 7.2** – Study 2: Household and adolescent drunkenness



#### Household Drug use

Illegal drugs were used by 690 (15.3%) of the adolescents as well as by 253 (5.6%) households ( $r = 0.33$ ,  $p < 0.01$ ). Children who lived in households where illegal drugs were used were far more likely to use cigarettes, alcohol and illegal drugs themselves than children who lived in drug free homes. Of the children who lived in drug using families, 63.2% themselves took drugs whereas only 12.4% of children from non-drug using homes took drugs ( $\chi^2 = 479.0$ ,  $p < .0001$ ). This difference was particularly pronounced in 11-year olds where it was found that 33.3% of those who lived in drug using households took drugs, whereas no 11-year olds from non-drug using homes used drugs. (Table 7.6). This trend was not confined to illegal drug use, 54.6% of adolescents from drug using households used cigarettes and 87.0% used alcohol as opposed to 16.9% and 59.9% from drug free households ( $\chi^2 = 219.0$   $p < .0001$ ;  $\chi^2 = 73.6$ ,  $p < .0001$ ).

**Table 7.6 - Study 2**

Adolescents who smoke from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	5.3	7.7	14.4	19.3	27.0	24.6
Drug using households	20.0	33.3	54.1	60.0	63.2	55.9
Significance	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

Adolescents who drink alcohol from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	25.8	40.0	55.2	68.3	75.4	81.5
Drug using households	46.7	75.8	75.7	93.3	93.0	100.0
Significance	p < .07	p < .0001	p < .01	p < .0001	p < .002	p < .006

Adolescents who use illicit drugs from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	0.0	2.5	3.9	13.5	24.2	29.2
Drug using households	33.3	12.1	54.1	70.0	87.7	70.6
Significance	-	p < .20	p < .0001	p < .0001	p < .0001	p < .0001

**Study 4**

The data from Study 4 were analysed in the same way as the data from Study 2.

**Any Household Substance Use**

In households where substance use existed (either cigarettes, alcohol or illegal drugs in any combination) adolescents were more likely to use those substances than in abstinent households. In using households 50.2% of children themselves used a substance as opposed to 17.6% of children from non-using homes ( $\chi^2 = 137.7$ ,  $p < .0001$ ). This finding extended to all three of the substance groups being looked at (Table 7.7). It was found that 15.6% of adolescents from substance using homes smoked cigarettes compared to only 5.6% of those from non-using homes ( $\chi^2 = 25.7$ ,  $p < .0001$ ); 47.9% of those from using homes drank alcohol as opposed to 13.9% from non-using homes ( $\chi^2 = 144.9$ ,  $p < .0001$ ) and 8.4% of those from

using households took illegal drugs compared to 3.7% from non-using homes ( $\chi^2 = 9.8$ ,  $p < .002$ ).

**Table 7.7** - Study 4: Adolescent use of cigarettes, alcohol and drugs by family use

Family use	N	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
<b>Cigarettes</b>				
Not used	1706	133 (7.9%)	676 (40.7%)	86 (5.1%)
Used	1835	379 (20.9%)	858 (47.9%)	192 (10.6%)
		$\chi^2=118.5$ $p<.0001$	$\chi^2=18.1$ $p<.0001$	$\chi^2=34.1$ $p<.0001$
<b>Alcohol</b>				
Not used	706	56 (8.1%)	105 (15.6%)	30 (4.4%)
Used	2853	456 (16.2%)	1429 (51.5%)	248 (8.8%)
		$\chi^2=28.9$ , $p<.0001$	$\chi^2=283.0$ $p<.0001$	$\chi^2=31.8$ $p<.0001$
<b>Drugs</b>				
Not used	3382	419 (12.6%)	1400 (42.7%)	195 (5.9%)
Used	177	93 (53.5%)	134 (77.0%)	83 (49.4%)
		$\chi^2=221.0$ $p<.0001$	$\chi^2=78.6$ $p<.0001$	$\chi^2=414.9$ $p<.0001$
<b>Overall</b>	<b>3559</b>	<b>512 (14.6%)</b>	<b>1534 (44.5%)</b>	<b>278 (7.9%)</b>

However, as in Study 2, these data could be considered contaminated by cross-use therefore analyses were undertaken to control for concurrent use of different substance classes. Table 7.8 shows a detailed breakdown of the effects of specific household substance use on child use of cigarettes, alcohol and illicit drugs. As for the previous study, the table shows the families displaying each of the eight possible combinations of cigarette, alcohol and drug use, and the percentage of adolescents within each group of families using each substance. It can be seen from the table that 5.6% of children in non-substance using families smoke cigarettes compared to 57.1% of children from families where cigarettes, alcohol and drugs are used and 19.6% from families where only cigarettes and alcohol are used. This table gives the relative importance of each of the household substance groups.

**Table 7.8** – Study 4: Adolescents own use of each substance by family use.

Family use	Total number of adolescents	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
No Use	361	20 (5.6%)	48 (13.9%)	13 (3.7%)
*C Only	330	33 (10.3%)	52 (16.5%)	10 (3.1%)
**A Only	1321	102 (7.8%)	612 (47.2%)	61 (4.7%)
***D Only	4	1 (25.0%)	1 (25.0%)	3 (75.0%)
C & A Only	1370	264 (19.6%)	688 (51.9%)	111 (8.2%)
C & D Only	11	2 (18.2%)	4 (36.4%)	4 (36.4%)
A & D Only	20	10 (52.6%)	15 (79.0%)	9 (50.0%)
C & A & D	142	80 (57.1%)	114 (81.4%)	67 (49.6%)

\* Cigarettes

\*\*Alcohol

\*\*\*Drugs

Table 7.9, below, gives odds ratios and chi-square analyses of the influence of household use of each substance on levels of adolescent use of each substance; these values are shown separately for each type of family. For example, the first entry in the table, 2.0, is the odds ratio for the increased risk of child smoking in families where cigarettes (but not alcohol or drugs) are used, relative to totally abstinent families and the chi-square value ( $\chi^2 = 5.3$ ,  $p < .02$ ) is the level at which this is significant; the figure nine rows below, 2.9 ( $\chi^2 = 80.6$ ,  $p < .0001$ ), is the odds ratio for the increased risk of child smoking in families where cigarettes and alcohol (but not drugs) are used, relative to families that use alcohol only. As before, reading horizontally across a row, the table shows the effects on adolescent use of adding a single substance to an existing combination of family use, while reading vertically down a column, the table shows the effect of adding a given substance in families displaying different patterns of use. It should be noted that there were very few families who used drugs alone ( $n = 4$ ), or in combination with cigarettes only ( $n = 11$ ) or alcohol only ( $n = 20$ ). As a result of these low numbers, when logistic regression was undertaken on several occasions the algorithm diverged and it was not possible to obtain odds ratios. In every case, child substance use was lowest in totally abstinent families and highest in families using all three substances.

**Table 7.9 – Study 4: A comparison of the different household use groups.**

Family Comparisons	1V - Family	Child Substance	$\chi^2$	O/R
0 v C	C	C	5.3 p<.02	2.0
0 v C	C	A	0.9 NS	1.2
0 v C	C	D	0.6, NS	0.8
0 v A	A	C	2.1, NS	1.4
0 v A	A	A	141.5 p<.0001	5.6
0 v A	A	D	0.5, NS	1.3
0 v D	D	C	1.6, NS	5.6*
0 v D	D	A	1.3, NS	2.1
0 v D	D	D	-.**	-
A v AC	C	C	80.6 p<.0001	2.9
A v AC	C	A	5.4 p<.02	1.2
A v AC	C	D	14.2, p<.001	1.8
A v AD	D	C	-	-
A v AD	D	A	7.9 p<.005	4.1
A v AD	D	D	-	-
C v AC	A	C	16.6 p<.0001	2.1
C v AC	A	A	139.9 p<.0001	5.4
C v AC	A	D	12.1 p<.0001	2.8
C v CD	D	C	0.6, NS	1.9
C v CD	D	A	2.4, NS	2.9
C v CD	D	D	-	-
D v AD	A	C	1.0, NS	0.3
D v AD	A	A	0.8, NS	2.7
D v AD	A	D	0.1, NS	-
D v CD	C	C	0.3, NS	-
D v CD	C	A	0.5, NS	-
D v CD	C	D	0.9, NS	-
AC v ACD	D	C	84.4 p<.0001	5.5
AC v ACD	D	A	48.5 p<.0001	4.1
AC v ACD	D	D	134.5 p<.0001	11.0
AD v ACD	C	C	0.1, NS	1.2
AD v ACD	C	A	0.1, NS	1.2
AD v ACD	C	D	0.0, NS	1.0
CD v ACD	A	C	6.6 p<.01	6.0
CD v ACD	A	A	9.8 p<.002	7.7
CD v ACD	A	D	0.7 NS	1.7

\*Regression to be treated with caution - low cell numbers, algorithm diverging.

\*\*Calculation not possible due to low cell numbers.

### Household Cigarette use

It was found that 512 participants (14.6%) smoked cigarettes and that 1853 (52.1%) had at least one household member who smoked ( $r = 0.184$ ,  $p < 0.01$ ). Of children who lived in a household where there was a smoker, 20.9% smoked themselves as opposed to 7.9% of

children who came from households where there was no other smoker ( $\chi^2 = 118.5$ ,  $p < .0001$ ) (Table 7.10).

**Table 7.10** – Study 4

Adolescents who smoke from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-Smoking households	0.9%	2.3%	6.8%	9.5%	14.4%	15.3%
Smoking households	7.8%	10.3%	14.3%	27.1%	27.1%	36.0%
Significance	$p < .01$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$

Adolescents who drink alcohol from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-smoking households	11.4%	19.1%	35.4%	45.3%	68.9%	69.2%
Smoking households	26.5%	26.1%	40.6%	57.4%	72.1%	68.3%
Significance	$p < .006$	$p < .02$	$p < .12$	$p < .001$	$p < .381$	$p < .875$

Adolescents who use illicit drugs from smoking and non-smoking households.						
AGE	11	12	13	14	15	16
Non-Smoking households	0.8%	1.5%	2.3%	5.9%	12.4%	9.5%
Smoking households	2.9%	2.7%	5.4%	15.1%	22.7%	17.2%
Significance	$p < .270$	$p < .262$	$p < .02$	$p < .0001$	$p < .001$	$p < .08$

In this study, age was not a factor, all children were equally susceptible to the effects of smoking within the home. For instance, 2.3% of children from non-smoking houses smoked compared with 10.3% from smoking homes ( $\chi^2 = 21.6$ ,  $p < .0001$ ). At the upper end of the age range, 15.3% of 16-year olds from non-smoking homes smoked compared with 36.0% from smoking homes ( $\chi^2 = 13.6$ ,  $p < .0001$ ).

Household smoking had less impact on child use of alcohol in this study than in Study 2, but as already noted, alcohol use in general was less in this study. A significant difference was found in the youngest children; of all 11-year olds who lived in homes where cigarettes were used 26.5% smoked compared with 11.4% from non-smoking households ( $\chi^2 = 7.6$ ,  $p < .006$ ).

At age 14 there was also a significant difference with 57.4% of children from cigarette using

homes drinking compared with 45.3% of those from non-smoking homes ( $\chi^2 = 11.3$ ,  $p < .0001$ ).

The influence of household cigarette smoking was illustrated when its effect on adolescent drug use was considered. It was found that 10.6% of children who came from cigarette using families used illegal drugs compared to 5.1% of children who lived in non-cigarette using households ( $\chi^2 = 35.7$ ,  $p < .0001$ ). The most striking age effect was found, again, at age 14 where 15.1% of those from smoking families used drugs compared with 5.9% of those from non-smoking homes ( $\chi^2 = 17.0$ ,  $p < .0001$ ).

### **Household Alcohol use**

Adult alcohol use is widespread and 80.2% of the participants said they came from an alcohol using household with 44.5% of the participants themselves regularly drinking ( $r = 0.286$ ,  $p < 0.01$ ). 51.5% of the children who came from alcohol drinking households regularly drank alcohol themselves, compared with 15.6% of children who lived in non-alcohol using families ( $\chi^2 = 283.0$ ,  $p < .0001$ ). This effect was particularly marked at the younger end of the age range with 26.7% of 12-year olds who lived in an alcohol using household drinking as opposed to only 7.7% of 12-year olds who came from non-drinking homes ( $\chi^2 = 27.1$ ,  $p < .0001$ ) (Table 7.11).

**Table 7.11** - Study 4

Adolescents who smoke from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	2.5%	3.5%	4.5%	13.1%	15.4%	12.0%
Drinking households	4.6%	7.1%	12.4%	20.4%	26.1%	29.5%
Significance	p < .555	p < .085	p < .002	p < .04	p < .02	p < .01

Adolescents who drink alcohol from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	5.6%	7.7%	11.1%	19.6%	34.3%	14.0%
Drinking households	21.6%	26.7%	45.2%	59.2%	78.0%	83.2%
Significance	p < .02	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

Adolescents who use illicit drugs from drinking and non-drinking households.						
AGE	11	12	13	14	15	16
Non-Drinking households	-	0.6%	2.3%	7.6%	9.7%	7.8%
Drinking households	2.3%	2.5%	4.3%	11.6%	19.1%	15.0%
Significance	-	p < .116	p < .200	p < .161	p < .02	p < .186

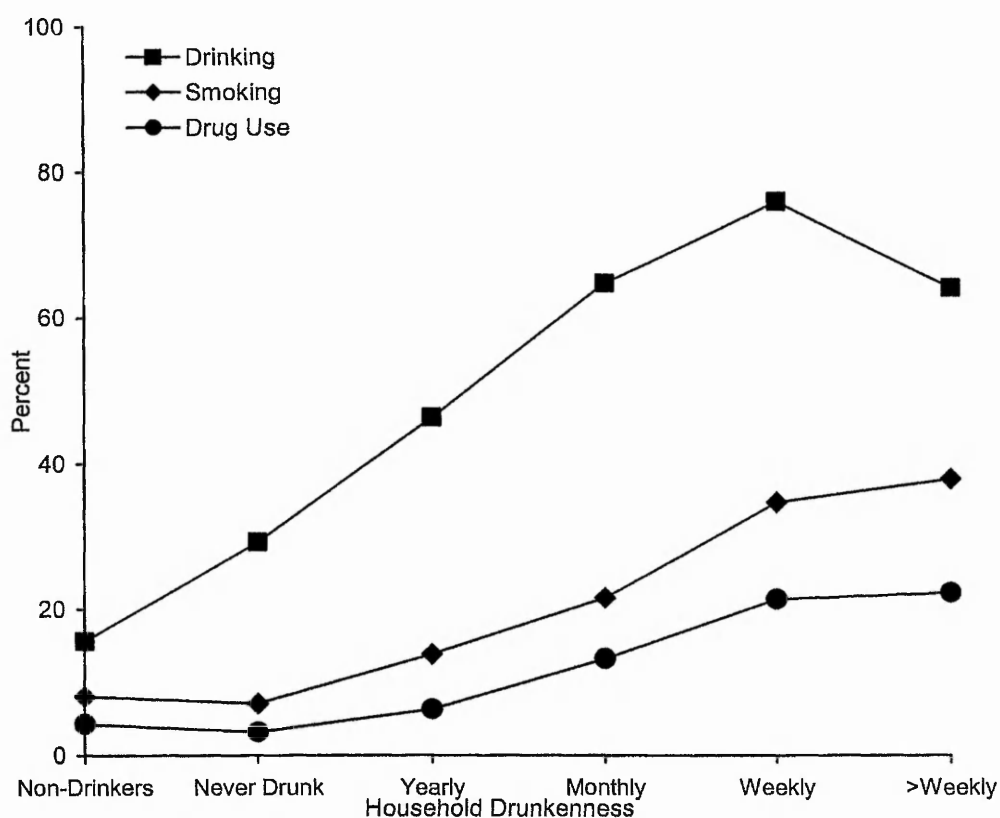
The household use of alcohol also effected adolescent cigarette and illegal drug use with 16.2% of participants who came from alcohol using households smoking compared to only 8.1% of those who came from non-alcohol using households ( $\chi^2 = 28.9$ ,  $p < .0001$ ). Similarly, 8.8% of children who came from alcohol using households used illegal drugs as opposed to 4.4% of those from non-alcohol using households ( $\chi^2 = 15.2$ ,  $p < .0001$ ).

As with Study 2, levels of adult drunkenness were particularly important (Figure 7.3). Of those children who came from households where family members had been drunk in excess of 20 times (high level households), 72.9% drank themselves as opposed to 55.6% of those who came from households with reported levels of drunkenness of between 1 and 5 occasions (low level households) ( $\chi^2 = 37.7$ ,  $p < .0001$ ).

Of those children who came from households with high levels of drunkenness 74.6% had themselves been drunk, a figure which compares to 58.2% of adolescents who came from low

drunkenness households ( $\chi^2 = 34.6$ ,  $p < .0001$ ). The extent of adolescent drunkenness was also effected with 16.1% of those who came from high drunkenness households themselves reporting having been drunk in excess of 20 times. This compared to 5.9% of those who came from low level households ( $\chi^2 = 86.8$ ,  $p < .0001$ ). Comparisons of non-drinking families with 'never drunk' drinking families confirmed that family drinking in itself, independent of drunkenness, was associated with a large increase in the proportion of children using alcohol ( $\chi^2 = 547.1$ ,  $p < .0001$ ; O/R = 5.1).

**Figure 7.3** – Study 4: Household drunkenness and adolescent substance use.

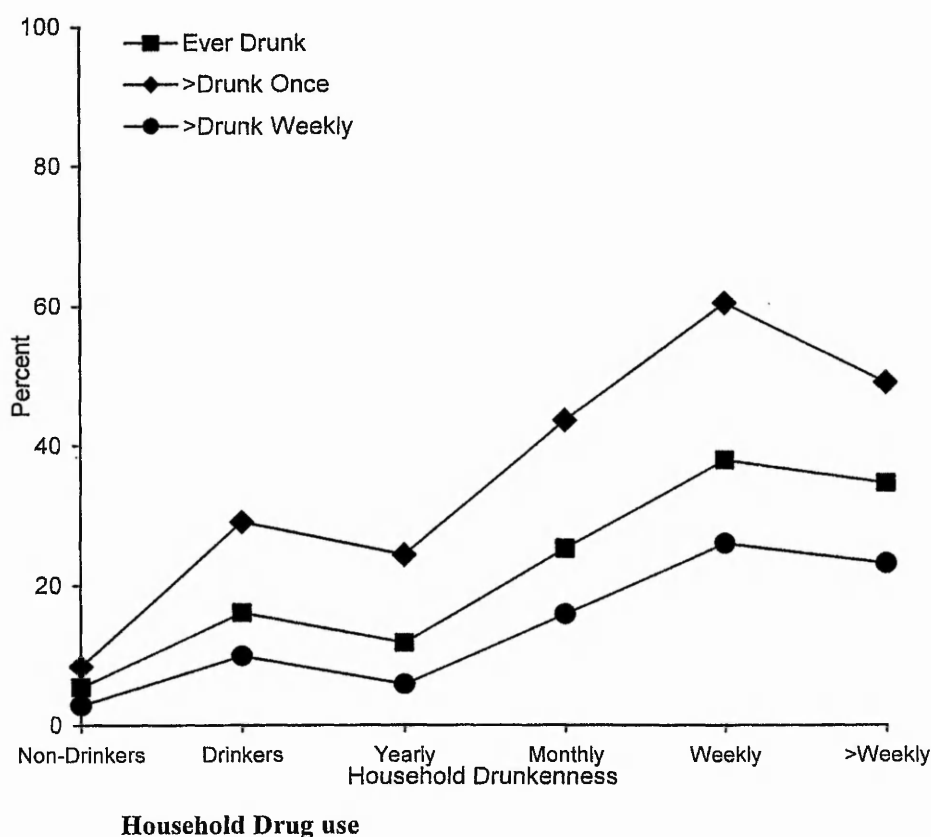


Of those adolescents who came from high drunkenness households 35.5% smoked cigarettes with only 17.7% of adolescents who came from low drunkenness households smoking ( $\chi^2 = 56.7$ ,  $p < .0001$ ). This picture was similar when adolescent illegal drug use was considered with 21.6% of those children from high drunkenness households using drugs as opposed to 9.7% of those who came from low drunkenness households ( $\chi^2 = 114.8$ ,  $p < .0001$ ). When

compared with yearly household drunkenness, significantly greater levels of childrens' use of all three substances were seen in families where frequent, monthly, drunkenness was reported (cigarettes:  $\chi^2 = 13.9$ ,  $p < .0001$ ; O/R 1.7; alcohol:  $\chi^2 = 44.0$ ,  $p < .0001$ ; O/R 2.1; drugs:  $\chi^2 = 17.8$ ,  $p < .0001$ ; O/R 2.3).

As with the previous study, there was also a significant correlation ( $r = 0.42$ ,  $p < 0.001$ ) between levels of household drunkenness and adolescent intoxication. Figure 7.4 shows the proportions of children 'ever drunk', 'drunk more than once' and 'drunk weekly', as a function of levels of family drunkenness.

**Figure 7.4** – Study 4: The relationship between household and adolescent drunkenness



Illegal drugs were used by 278 (7.9%) of the adolescents as well as by 177 (5.0%) households ( $r = 0.34$ ,  $p < 0.01$ ). Children who lived in households where illegal drugs were used were far more likely to use cigarettes, alcohol and illegal drugs themselves than children who lived in drug free homes. Of the children who lived in drug using families, 49.4% themselves took

drugs whereas only 5.9% of children from non-drug using homes took drugs ( $\chi^2 = 414.9$ ,  $p < .0001$ ). All age groups were equally effected. (Table 7.12). This trend was not confined to illegal drug use, 53.5% of adolescents from drug using households used cigarettes and 77.0% used alcohol as opposed to 12.6% and 42.7% from drug free households ( $\chi^2 = 221.4$   $p < .0001$ ;  $\chi^2 = 78.6$ ,  $p < .0001$ ).

**Table 7.12 - Study 4**

Adolescents who smoke from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	3.4%	5.9%	9.6%	16.4%	20.9%	22.3%
Drug using households	33.3%	27.8%	40.7%	63.6%	60.8%	60.9%
Significance	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$
Adolescents who drink alcohol from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	18.2%	22.3%	36.3%	50.4%	69.0%	66.8%
Drug using households	33.3%	38.9%	84.4%	77.3%	86.3%	87.0%
Significance	$p < .352$	$p < .095$	$p < .0001$	$p < .001$	$p < .010$	$p < .04$
Adolescents who use illicit drugs from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug households	1.9%	1.7%	2.8%	7.7%	10.6%	10.6%
Drug using households	-	23.5%	33.3%	62.2%	62.8%	45.0%
Significance	-	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$

## **Discussion**

### **Family Influence**

Given the weight of the literature in this area it was hypothesised that family substance use would play a part in adolescent use and this was found to be the case. However, it should be pointed out that, as with the personality factors discussed earlier, it would be simplistic to suggest that household use is the only variable which might account for adolescent use, but it does appear to be one of a number of areas that influence adolescents substance using habits.

Before it is possible to discuss the evidence of the influence of family substance using behaviour it is necessary to consider a number of points, the first of these being, how does one quantify 'family'? When looking at family influence does one extend this to include grandparents, or simply keep it as parents? Should it include siblings and cousins? Clearly who the researcher includes depends upon the perspective one is approaching the problem from, a geneticist might take one view, a social psychologist another. For the purposes of this work the term 'family' and what constitutes it has been largely disregarded, instead the term 'household member' is being coined. It is felt that when considering influential figures and role models it is important to include all those an adolescent has daily contact with, specifically the people they actually live with. Provided one is not looking purely at genetics, it would not appear particularly important if someone lived with, say, a smoking father or a smoking step-father. The use of the term 'household' avoids any possible ambiguity and removes the likelihood of a person saying that yes, they have a father who smokes forty cigarettes a day, neglecting to mention that they only see him for a few hours each month.

The second general point that needs to be made is concerning the distinctions that should be drawn between different substances. As has already been noted, many studies have looked at the influence of specific family members using specific substances, but can those findings be extrapolated? Is it possible, for instance, to take the evidence of influence shown by a group of cigarette smoking mothers and apply it to alcohol drinking fathers? Indeed, is it even possible to look at the influence maternal use of one substance has and apply it to maternal use of another? Although it would be methodologically very neat to term cigarette, alcohol and drug use 'substance use', in light of the findings of this study and others, it is felt that at this stage the three groups of substances need to remain discreet.

Although the chi-square analysis used here is generally accepted to merely indicate that an association exists between a number of variables, in this case the level of significance achieved by many of the results presented does seem to point towards a very strong relationship between adult and adolescent substance use. In light of this, as well as in the

context of the many other related findings that have already been mentioned, it is difficult not to suggest that a causal relationship exists between adult and adolescent substance use.

Finally, although it had been intended to consider the implications of the findings from the two studies separately, the similarities were so strong that this has proved unnecessary. It is true that substance use, particularly alcohol use, was greater in Study 2, but the relationship between family and adolescent use remained constant across the two studies so the findings will be discussed together.

### **Any Substance Use**

The broad finding of this work is that any adult substance use within a household influences adolescent involvement with substance use of all kinds. This was clearly demonstrated by the overall finding that in households where any of the three groups of substances were used children were six times more likely to use either cigarettes, alcohol or drugs than those who came from abstinent homes.

This finding clearly demonstrates, at the very least, a significant relationship between adult and adolescent substance use, and it is appropriate to suggest reasons why this may be so.

There appear to be three main factors that could be at work within the household unit and that draw on Bandura's (1977) social learning theory; modeling by household members, the attitudes of household members and substance availability in the home. Within any family substance using situation, it is felt that the presence of these three strands, intertwining, interactive and working as a dynamic process, are at the heart of any substance using decision making that goes on within the individual adolescent.

The effect of modeling on all aspects of adolescent behaviour is well known ( Andrews, 1993), but, in addition, it is suggested that parental attitudes in substance using families may be significantly different from those found in non-using families and may be contributory factors in adolescent substance use. In their simplest form, these data suggest that the modeling effect of, for instance, parental cigarette smoking combined with what may be a

more relaxed attitude towards adolescent smoking, along with an assumed availability, seems sufficient to swing the balance away from abstention to use.

It is further suggested that in families where combinations of cigarettes, alcohol and/or illegal drugs are used a permissive attitude has developed so that a climate of substance use exists which may influence the adolescent towards use. It is not suggested that this culture exists to the extent that substance use is expected, or even on the surface tolerated, particularly where illegal drugs are concerned and it is possible that if this were suggested it would be greeted with protestations of denial, but it seems likely that in these families, overt substance use is the norm rather the exception. In these families, it might be expected that a packet of cigarettes would routinely be left in view or a half full ashtray kept in the living room. In the same way, it might be normal practice to have one or two glasses of wine with a meal and to treat a minor headache with painkillers rather than simply waiting for it to go.

It is not implied that any of these practices (with the possible exception of cigarette smoking) are wrong on their own, but it is suggested that they add to the culture of substance use. In these families, it is suggested that the use of psychotropic substances is a normal rather than an abnormal occurrence and as such, if an adolescent were offered cigarettes, alcohol or illegal drugs it would not be a completely alien experience for them to accept.

### **Cigarette use**

Clearly family members have a leading role to play in all aspects of adolescent development and it does not seem surprising that adolescent rates of cigarette smoking are likely to be higher in households where the parents smoke and this has certainly been the case here. It was found that just over 23% of children who lived in a household with a cigarette smoker smoked themselves, a figure more than double that for non-smoking homes. This finding confirms Doherty and Allen's (1994) suggestion that adolescents with a parental smoker were twice as likely to smoke as adolescents without a parental smoker. Particularly startling was

the fact that younger (11-year old) children were nearly eight times as likely to smoke cigarettes if they came from a smoking household than from a non-smoking one.

The increasing use of cigarettes amongst adolescents in the U.K. has already been mentioned, but, given the amount of resources targeted at health promotion in schools and in particular at cigarette use, it is difficult to explain this increase. If the adolescent living in a smoking household is considered, it is easier to see at least superficial reasons. Children who watch their parents or siblings smoking are clearly more likely to do so themselves, but it also seems likely that parents would be less inclined to try and dissuade their children from smoking if they themselves smoked. It is easy to imagine how hard it must be for a conscientious parent, well aware of the dangers of smoking, but addicted to nicotine for decades, to try to explain the health risks to a newly smoking teenager. In addition, if an adolescent is living in a smoking home it is likely that cigarettes would be readily available. These points seem particularly relevant when considering the younger adolescent, clearly family modeling and parental attitude have a stronger influence on the very young than on the slightly older child.

Although these findings confirm previous work, what has not been as well illustrated before is the consequence that household cigarette smoking has on other substance use, a phenomenon it has been termed the 'cross-over effect'. Some work has previously mentioned this effect, particularly in relation to drugs, but not in such a definitive way. Andrews et al (1993) when commenting on substance use data from 645 11-15 year olds concluded that not only did parents' use of a specific substance influence adolescent use of that same substance, but that parents' non-specific influence predicted the onset and maintenance of other substance use too. These findings confirm that work.

This cross-over effect is a dramatic and significant finding. Broadly, it appears that adolescents brought up in households with at least one smoker living there are more likely to use both alcohol and drugs than their counterparts who live in smoking free environments. This is true even when controlling for the use of alcohol and drugs by family members. This finding was particularly true when related to illegal drug use with over 14% of children who came from smoking families using drugs. However, is it possible to suggest that household

smoking could be a causal factor in adolescent drug use? From the evidence presented here it would certainly not be possible to definitively support that argument, but, by the same token, it would be difficult to deny that a significant link does not exist. However, rather than this link being a direct one it might be better to say that the link is peripheral with adult cigarette smoking being symptomatic of an overall attitude towards substance use, an attitude that might, in itself, be a causal factor. In addition, it might be further speculated that the large amount of negative publicity surrounding cigarette smoking may have had an unwanted rebound effect when it comes to adolescents perceptions of the model provided by their cigarette using parents. Given the role their parents provide by using cigarettes, is it not possible to suggest that adolescents are generalising their parents behaviour and transferring it into their own risk taking activities? If this is the case then the high levels of negative publicity surrounding cigarette smoking may be having the opposite effect of that desired with adolescents believing that if their parents are continuing to smoke in spite of the adverse publicity then it is acceptable for them to indulge in all manner of risk taking behaviours. In other words, parents are indulging in an activity that is considered unhealthy so adolescents will indulge in drug use.

### **Alcohol use**

In this sample, the use and influence of alcohol was found to be all pervading: only 20% of the children in this study were non-drinkers from non-drinking families and it was therefore not surprising to find that considerably more adolescents brought up in alcohol using families, themselves drank alcohol.

Of particular interest was the fact that children who came from alcohol using families were over three times as likely to drink than children from non-using homes. The study did not question where adolescent drinking took place, and this is something that could possibly be addressed in future work, but one interpretation of these two figures could suggest that a large

proportion of the drinking took place within the household, indicating that availability of alcohol is an important component in adolescent use.

Care was taken when analysing the data only to include regular drinkers so one must conclude that if the regular drinking took place at home, it was not isolated incidents and must have been done with at least some degree of household approval.

Once again a distinct cross-over effect was found with adolescents from alcohol drinking homes being nearly twice as likely to smoke cigarettes and nearly three and a half times more likely to use illegal drugs than those from non-drinking homes. This is strong evidence for the cross-over effect and, superficially at least, does indicate the possibility of a causal relationship existing between family alcohol use and adolescent drug taking.

These findings are supported by other work done in this area (Sutherland and Willner, 1998) which found that alcohol was a necessary precursor to illegal drug use. In that study it was found that drug use on its own was virtually non-existent, it was almost always accompanied, and indeed preceded by, alcohol use. Again, this lends weight to the argument that all family substance use is crucial to the evolution of an adolescent's substance using career.

Not only was the fact of alcohol use important, the extent of use by household members also had a bearing on adolescent substance use. In particular it was the levels of household drunkenness which appeared particularly crucial. As has been shown, both basic alcohol use by children and incidents of drunkenness were at far greater levels in households where other members had been drunk in excess of 20 times in the past year with adolescents from these types of households being nearly seven times as likely themselves to have been drunk on more than 20 occasions.

A similar pattern was found for both cigarette and drug use with adolescents from these households being over twice as likely to smoke cigarettes and two and a half times as likely to take drugs as children from households with less incidents of drunkenness. Compared to households where alcohol was not used, these children were nearly four times as likely to smoke and over five times as likely to take drugs.

These findings indicate that children from these types of household are at particular risk, but it would be foolish to suggest that it was only drunkenness by family members that was the problem. Clearly in families where alcohol abuse is high there are also other, contributory factors, that may well have led to the high levels of intoxication. Nevertheless, the fact remains that high levels of drunkenness in household members is closely connected to adolescent substance use. It is suggested that when considering substance use education programmes, this fact is taken into consideration.

### **Drug use**

Nowhere is the evidence for family influence being a causal factor in adolescent substance use stronger than where household illegal drug use is involved. This work has shown that, at a basic level, children who lived in households where drugs were used were five times as likely to use drugs themselves than children from non-drug using homes. Given the findings already discussed, a difference would be expected, but what is surprising is the extreme level of the effect. As far as cigarettes and alcohol were concerned, children from drug using families were over three times as likely to smoke and one and a half times as likely to drink than children from non-drug using households. Considering how uniform alcohol drinking is in society this is surprising.

It is once again suggested that the factors of modeling, attitude and availability, could account for this difference, certainly the stereotypical image of a marijuana smoking parent or sibling would be a modeling force and it is likely that they would have a more permissive attitude towards drug use than a non-drug using family. It may also be speculated that the component of availability would be fulfilled within this type of family.

### **Conclusions**

Many of the findings presented here indicate a significant relationship between various aspects of family and adolescent substance using behaviour, particularly in light of the

stability of the findings across two studies. It was anticipated that an effect between family substance and adolescent use would be found, but the extent to which this has been noted is surprising. In light of these findings further studies in this area are warranted however, it is felt that any future work should be specific and not a spin off of other, broader, work. This is a difficult area in which to probe, the questions which must be asked are sensitive and liable to cause offence and be subject to various types of psychometric bias and yet the findings here were so strong that these problems seem worth overcoming.

Finally, the modeling, attitude and availability are important factors in adolescent substance and are also worthy of further study. Singly they are not new concepts, but in combination they may well turn out to be good predictors of adolescent substance use.

## **CHAPTER 8 - SOCIAL ASPECTS OF ADOLESCENT SUBSTANCE ABUSE**

### **Introduction**

Having discussed the effect that various personality and family variables have on adolescent substance use it has been seen that these variables alone cannot account for all of the variance found. This chapter will examine the role of other variables, those covered by Section 2 of the Substance Abuse Susceptibility Index, and results will be presented from Study 2 to show the effect that factors such as peer drug use, religiosity and academic prowess have on adolescent substance use.

It is clear that differences exist on various levels between non-users and substance users of all types. These differences may exist at a genetic level (Comings et al 1995), as aspects of personality (Craig, 1993) and as differences in social circumstances and social responses (Dielman, 1990). Although the precise nature of the differences in social circumstances is far from clear, what has emerged is that certain aspects of people's lives are consistently different in users and non-users. Specifically these areas are family structure (Turner et al, 1991); religious belief (Cochran, 1992); peer and family influence (Johnson, 1984); academic achievement and expectations (Paulson et al, 1990) and delinquency (Otero et al, 1994).

It was hypothesised that differences would be found between substance users and non-users in the social dimensions listed above. Specifically, it was predicted that substance users would be more likely than their non-using peers to come from non-intact families, have a lack of religious faith, value peer opinion over those of the family, have lower perceived academic achievements and expectations and have higher levels of delinquent behaviour.

## **Participants**

Details of participants in Study 2 can be found in Table 3.1.

## **Materials**

The results being reported here are taken from several questions abstracted from Section 2 of the SASI. As already discussed, this second section was designed to assess various areas including attitudes towards illegal drugs, alcohol and cigarettes, current and planned use of those substances, household use, delinquency and academic standing. The data reported were derived from answers to the following questions:

1. Do you believe in God?
2. If you do believe in God, do you go to a place of worship regularly?
3. Whose opinions are more important to you, your parents or your friends?
4. Do both your natural parents live at home with you?
5. Have you ever been in trouble with the police?
6. Have you done well at school so far?
7. Have you ever been suspended from school?
8. Do you think you'll go on to University after you leave school?
9. Do you smoke cigarettes?
10. If you do smoke cigarettes, roughly how many would you smoke in a week?
11. Do you drink alcohol?
12. If you do how often would you usually drink?
13. Have you ever been drunk?
14. If you have been drunk, about how many times has this happened?
15. Have you ever used drugs not given to you by a doctor?

16. If you have used drugs not given to you by a doctor, what were they?
17. About how many times have you used these drugs?
18. If you use them regularly, about how many times a week do you use them?

Questions were responded to on either a simple yes/no basis or else, where quantities were looked at (Q11) a choice would be given ranging from yearly to monthly, weekly, 2-3 times a week or daily.

Once again to ensure that simple experimentation of substances was not included in the analysis, the data presented refer to 'regular use', which was defined as use of cigarettes, alcohol, or illegal drugs that takes place at least once a week and has done so for a period of three months or more.

### **Statistical Analysis**

Data were analysed using a pyramid system. Initially all the data were subjected to basic cross-tabular analyses and these data were then broken down by gender and then by age and finally by age and gender. Data were further analysed by binary logistic regression from which social models of use were developed. The results of these analyses are presented as Mantel-Haenszel chi-square values. In this study, trajectories of use and non-use were studied because the convergence and divergence of trend lines are evidence of more than a simple correlational relationship between substance misuse and social variables.

### **Results**

1492 (33.0%) of the participants came from homes without both natural parents living there; 2176 (48.4%) did not believe in God and 3675 (81.6%) did not attend a place of worship. 1180 (26.2%) valued their friends opinions over those of their parents; 711 (15.8%) said they had done badly at school and 1868 (41.4%) said they did not intend going to University once they had finished school. 501 (11.1%) said they had been suspended from school and 1036

(23.0%) said they had been in trouble with the police.

Table 8.1 shows the proportions of respondents in each group who reported use of the substances under consideration.

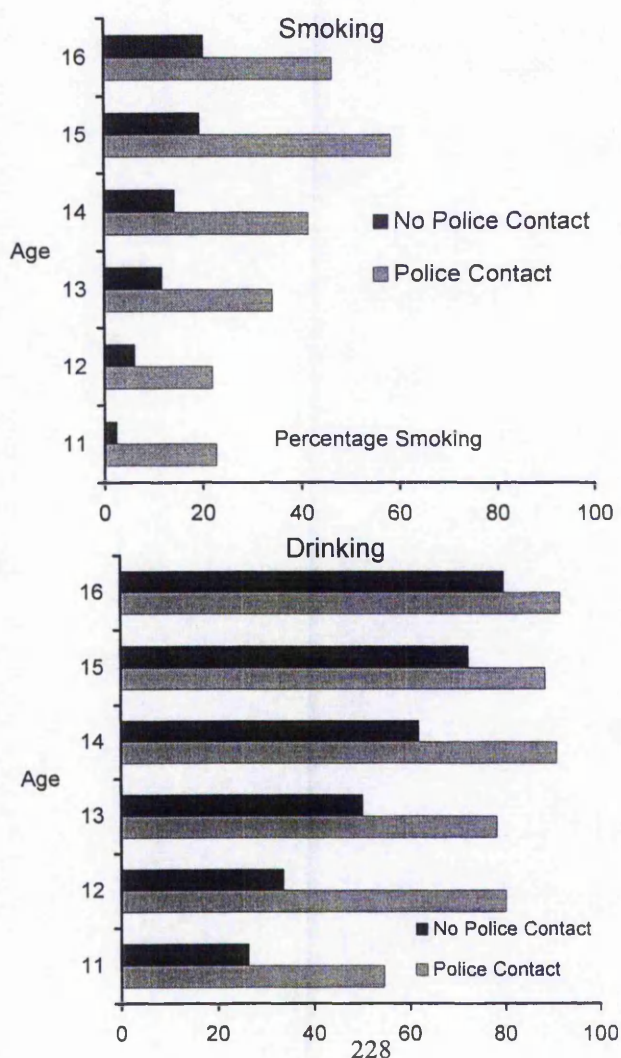
**Table 8.1 - Social factors and substance use**

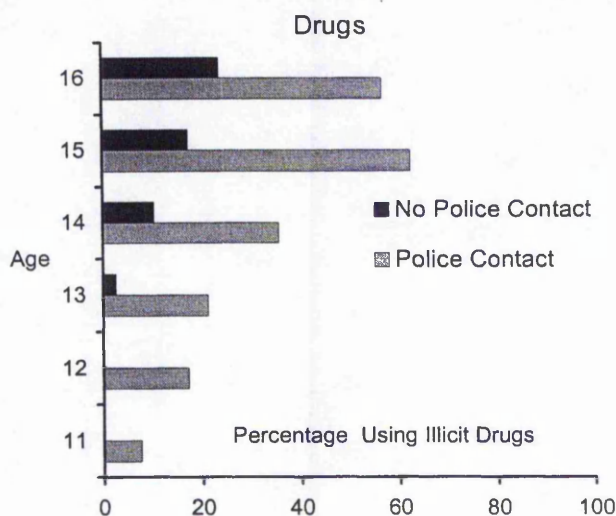
	<b>Cigarette Use</b>	<b>Alcohol Use</b>	<b>Illicit Drug Use</b>
<b>Lives with natural parents?</b>	Yes = 15.3% No = 26.7% ( $\chi^2 = 83.1^{***}$ )	Yes = 59.4% No = 65.9% ( $\chi^2 = 17.6^{***}$ )	Yes = 13.4% No = 19.1% ( $\chi^2 = 24.9^{***}$ )
<b>Believes in God?</b>	Yes = 13.7% No = 24.8% ( $\chi^2 = 90.1^{***}$ )	Yes = 50.2% No = 73.7% ( $\chi^2 = 262.8^{***}$ )	Yes = 9.6% No = 21.1% ( $\chi^2 = 116.4^{***}$ )
<b>Goes to Church?</b>	Yes = 10.7% No = 21.0% ( $\chi^2 = 46.3^{***}$ )	Yes = 31.4% No = 68.3% ( $\chi^2 = 390.2^{***}$ )	Yes = 7.1% No = 17.0% ( $\chi^2 = 51.1^{***}$ )
<b>Values opinions of Parents/Friends</b>	Parents = 15.3% Friends = 26.7% ( $\chi^2 = 83.1^{***}$ )	Parents = 59.4% Friends = 65.9% ( $\chi^2 = 17.6^{***}$ )	Parents = 13.4% Friends = 19.1% ( $\chi^2 = 24.9^{***}$ )
<b>Has done well in school?</b>	Yes = 16.3% No = 33.8% ( $\chi^2 = 118.6^{***}$ )	Yes = 58.6% No = 76.9% ( $\chi^2 = 85.1^{***}$ )	Yes = 12.2% No = 31.5% ( $\chi^2 = 172.2^{***}$ )
<b>Plans to go to University?</b>	Yes = 15.5% No = 24.1% ( $\chi^2 = 53.4^{***}$ )	Yes = 54.0% No = 72.3% ( $\chi^2 = 154.3^{***}$ )	Yes = 11.7% No = 20.3% ( $\chi^2 = 63.5^{***}$ )
<b>Has been suspended from school?</b>	Yes = 38.9% No = 16.6% ( $\chi^2 = 143.5^{***}$ )	Yes = 76.7% No = 59.7% ( $\chi^2 = 54.2^{***}$ )	Yes = 38.7% No = 12.4% ( $\chi^2 = 238.6^{***}$ )
<b>Been in trouble with the police?</b>	Yes = 40.5% No = 12.7% ( $\chi^2 = 400.2^{***}$ )	Yes = 84.6% No = 54.7% ( $\chi^2 = 299.9^{***}$ )	Yes = 37.4% No = 8.7% ( $\chi^2 = 504.5^{***}$ )

### Trouble with the Police

Adolescents who had been in trouble with the police were found to be at greater risk from substance abuse than adolescents who had not had such contact. Of those who reported never having been in trouble with the police 55.4% had used one of the substance categories under consideration compared to 88.4% of those who had been in trouble with the police ( $\chi^2 = 372.3$ ,  $p < .0001$ ): cigarettes, 12.7% and 40.5% ( $\chi^2 = 400.2$ ,  $p < .0001$ ); alcohol, 54.7% and 84.6% ( $\chi^2 = 299.9$ ,  $p < .0001$ ) and illicit drugs 8.7% and 37.4% ( $\chi^2 = 504.5$ ,  $p < .0001$ ). Figure 8.1 shows the different trajectories when age was considered and it was noticeable that the difference between smoking prevalence and illicit drug use in the two groups increased with age whereas it decreased for alcohol use.

Figure 8.1

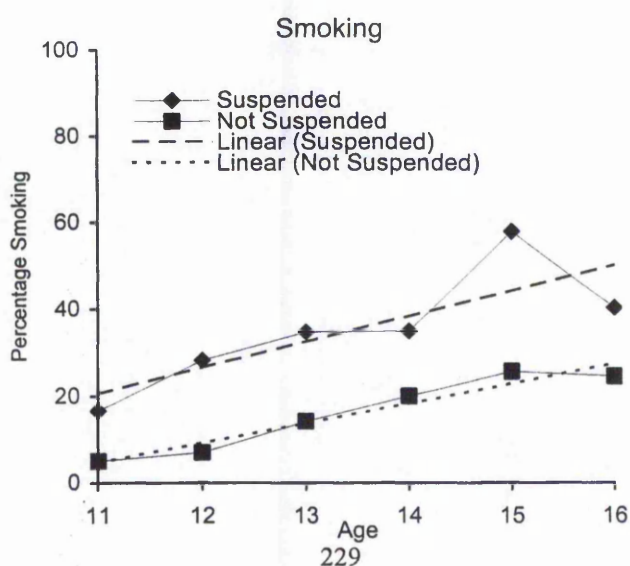




### Suspension from School

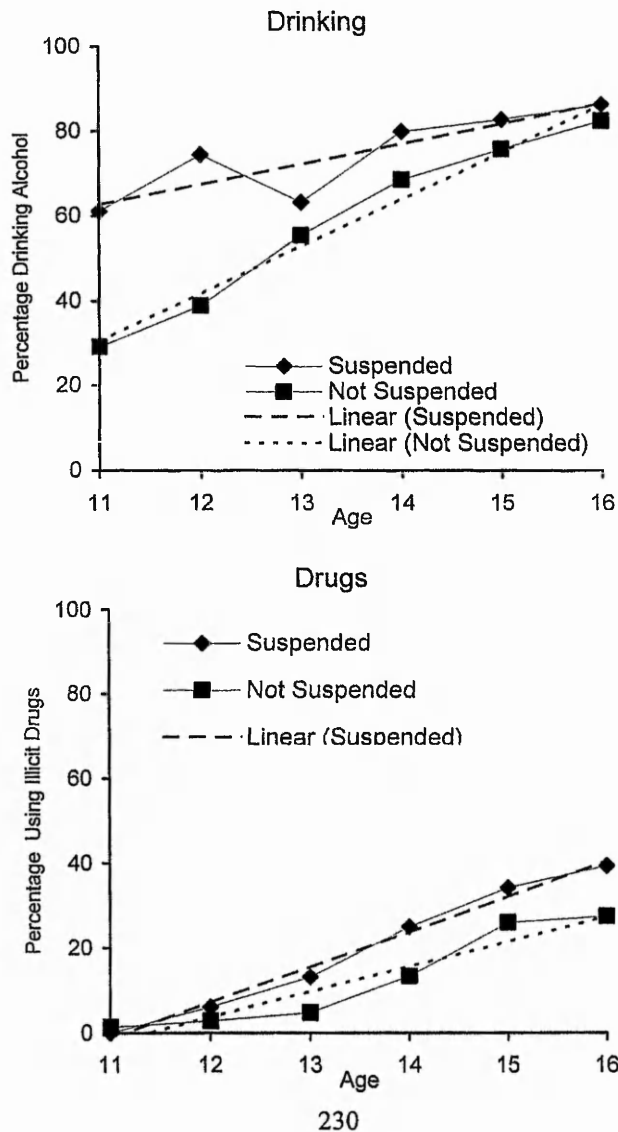
Differences were looked for between children who had and had not been suspended from school. Of those who had not been suspended 60.7% said they used psychotropic substances compared with 81.2% of those who had been suspended ( $\chi^2 = 80.5$ ,  $p < .0001$ ). Substantial differences in terms of different substance use were found: cigarettes, 16.6% and 38.9% ( $\chi^2 = 143.5$ ,  $p < .0001$ ); alcohol, 59.7% and 76.7% ( $\chi^2 = 54.2$ ,  $p < .0001$ ) and illicit drugs 12.4% and 38.7% ( $\chi^2 = 238.6$ ,  $p < .0001$ ). Figure 8.2 shows there was no age effect as far as cigarette use was concerned, but suspension from school was an important factor for alcohol use at a young age since trajectories converged after age 15. The opposite effect was found for illicit drug use with the trajectories diverging as the children became older.

Figure 8.2

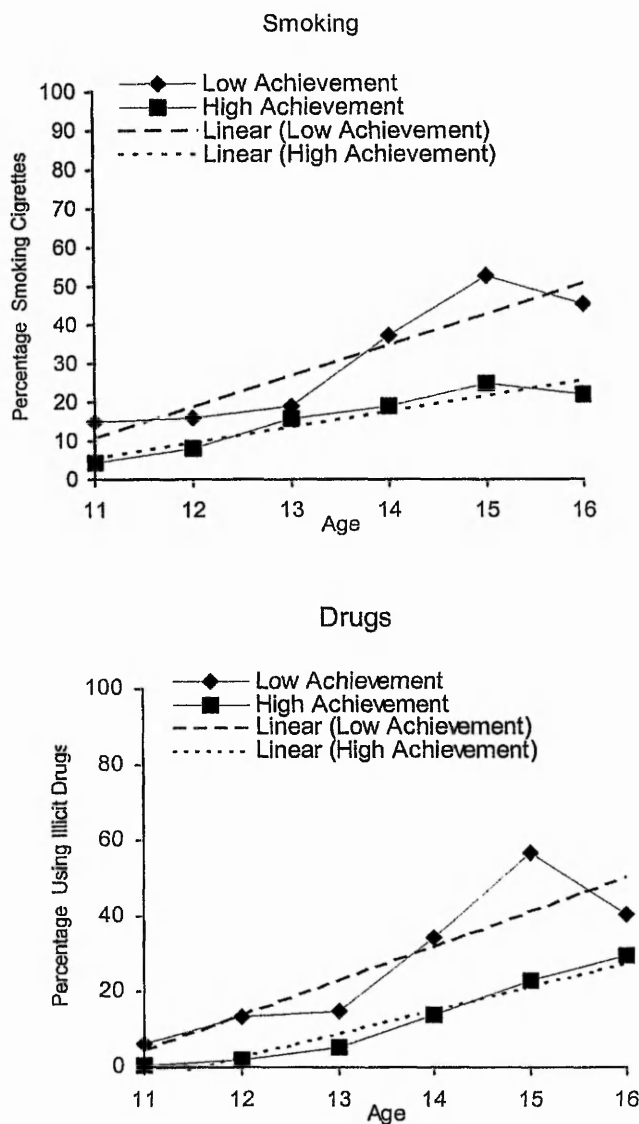


### Academic achievement and expectations

Substantial differences were found between users and non-users in terms of both academic achievement and academic expectations. Of those who believed they had done well at school only 59.8% used substances compared with 79.6% of those who believed they had done badly ( $\chi^2 = 100.8$ ,  $p < .0001$ ). Differences in use of individual substances were also found: cigarettes, 16.3% and 33.8% ( $\chi^2 = 118.6$ ,  $p < .0001$ ); alcohol, 58.6% and 76.9% ( $\chi^2 = 85.1$ ,  $p < .0001$ ) and illicit drugs 12.2% and 31.5% ( $\chi^2 = 172.2$ ,  $p < .0001$ ). Figure 8.3 shows that the differences in smoking preference between high and low achievers increased with age, a pattern which was similar for illicit drugs. Regular alcohol use was not so affected.



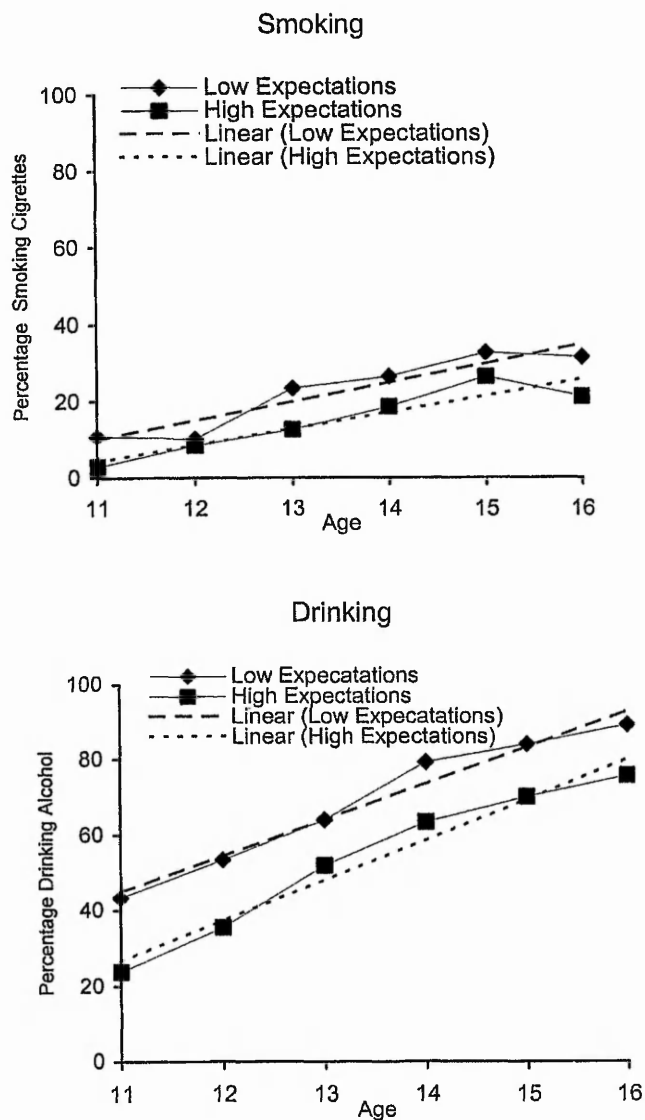
**Figure 8.3**

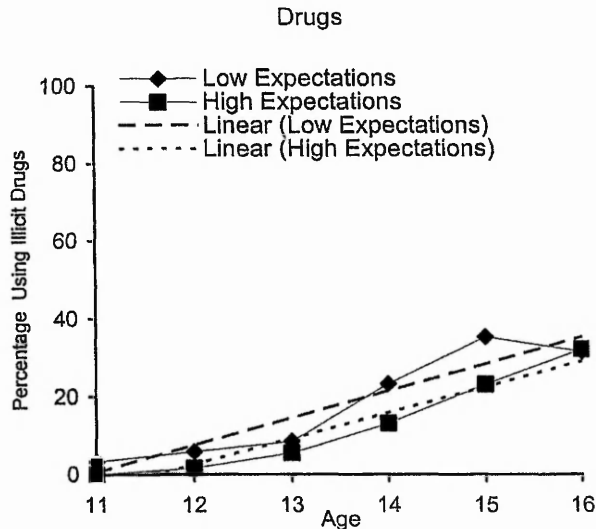


When expectation of progression to tertiary education was considered, a similar pattern emerged. Of those who planned to go on to University only 55.6% reported using any of the substances considered compared with 73.5% of those who did not plan to carry on with further study after school ( $\chi^2 = 149.3$ ,  $p < .0001$ ). Once again, large differences in terms of substance use were found: cigarettes, 15.5% and 24.1% ( $\chi^2 = 53.4$ ,  $p < .0001$ ); alcohol, 54.0% and 72.3% ( $\chi^2 = 154.3$ ,  $p < .0001$ ) and illicit drugs 11.7% and 20.3% ( $\chi^2 = 63.5$ ,  $p < .0001$ ).

This factor was not shown to be age sensitive in relation to either cigarettes, alcohol or illicit drug use (Figure 8.4).

Figure 8.4





### Religious Beliefs

Differences in substance use were also found in relation to religious belief. Only 52.2% of those who believed in God used any of the substances being considered compared to 74.4% of those who did not believe in God ( $\chi^2 = 235.7$ ,  $p < .0001$ ). Highly significant differences were found for the individual substance groups: cigarettes, 13.7% and 24.8% ( $\chi^2 = 90.1$ ,  $p < .0001$ ); alcohol, 50.2% and 73.7% ( $\chi^2 = 262.8$ ,  $p < .0001$ ) and illicit drugs 9.6% and 21.1% ( $\chi^2 = 116.4$ ,  $p < .0001$ ). As can be seen in Figure 8.5, an association between lack of religious belief and increased illicit drug use becomes stronger with increasing age. This was not observed in relation to cigarette smoking and alcohol drinking. For those who expressed a belief in God and attended a place of worship on a regular basis the differences were more noticeable. Only 34.3% of regular attenders regularly used any substance compared to 69.4% of those who did not attend a place of worship ( $\chi^2 = 357.6$ ,  $p < .0001$ ). Again, there were significant differences for the individual substance groups: cigarettes, 10.7% and 21.0% ( $\chi^2 = 46.3$ ,  $p < .0001$ ); alcohol, 31.4% and 68.3% ( $\chi^2 = 390.2$ ,  $p < .0001$ ) and illicit drugs 7.1% and 17.0% ( $\chi^2 = 51.1$ ,  $p < .0001$ ).

Figure 8.5

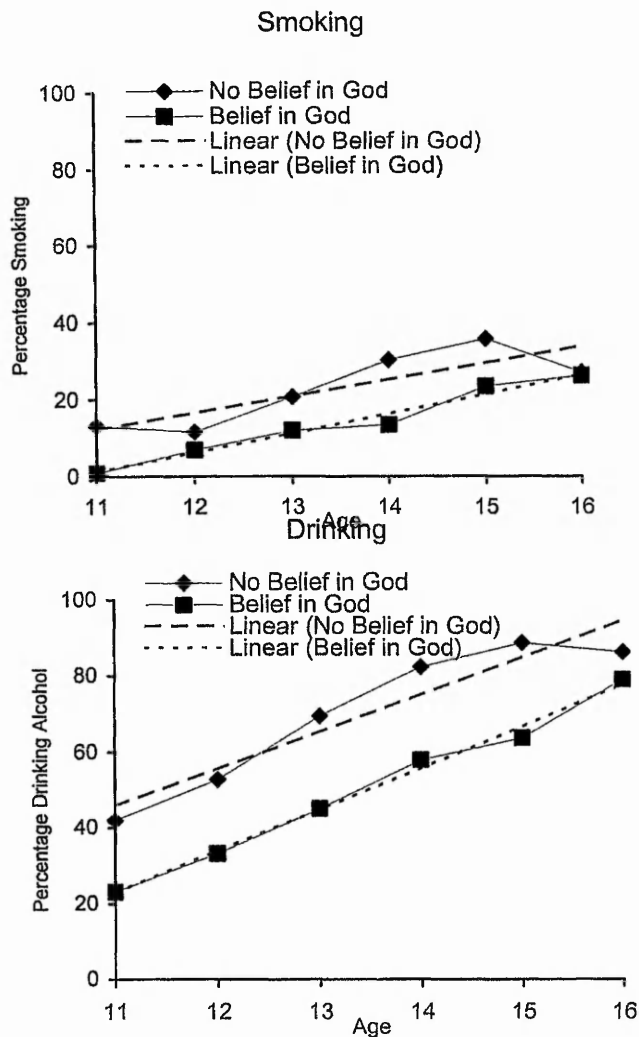
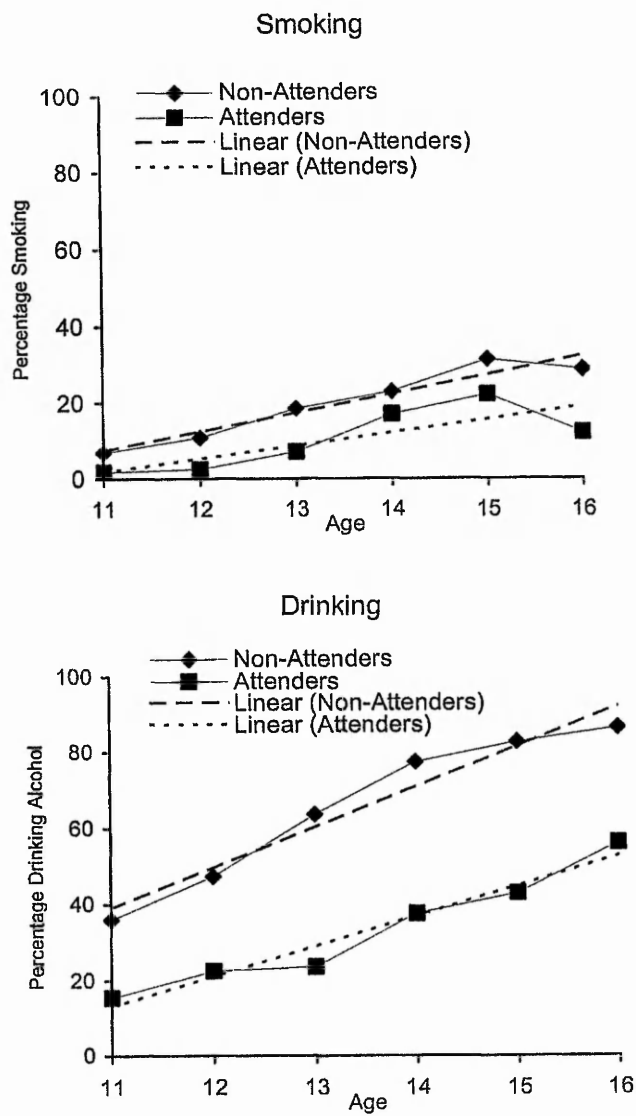
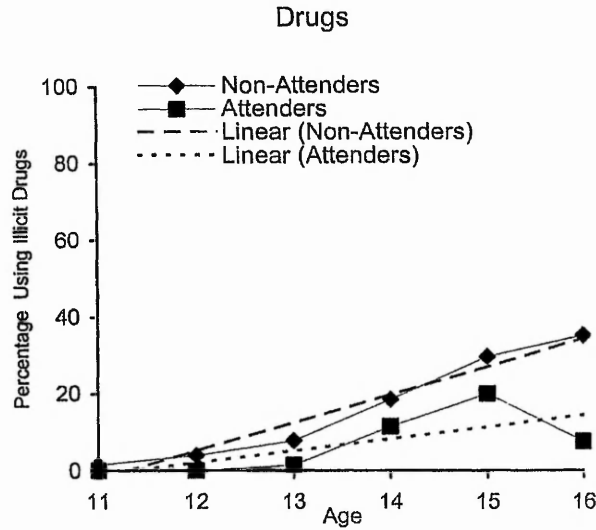


Figure 8.6 shows the effect of attendance at a place of worship when mediated by age. Alcohol use was not effected by age, but both cigarette smoking and illicit drug use were. Trajectories for cigarette smoking were similar for both attenders and non-attenders up until the age of 15 when both decreased, but the decrease was considerably more marked in attenders than non-attenders. When illicit drug use was considered it was found that use continued to increase with age for of non-attenders, but decreased dramatically in attenders after age 15.

Figure 8.6



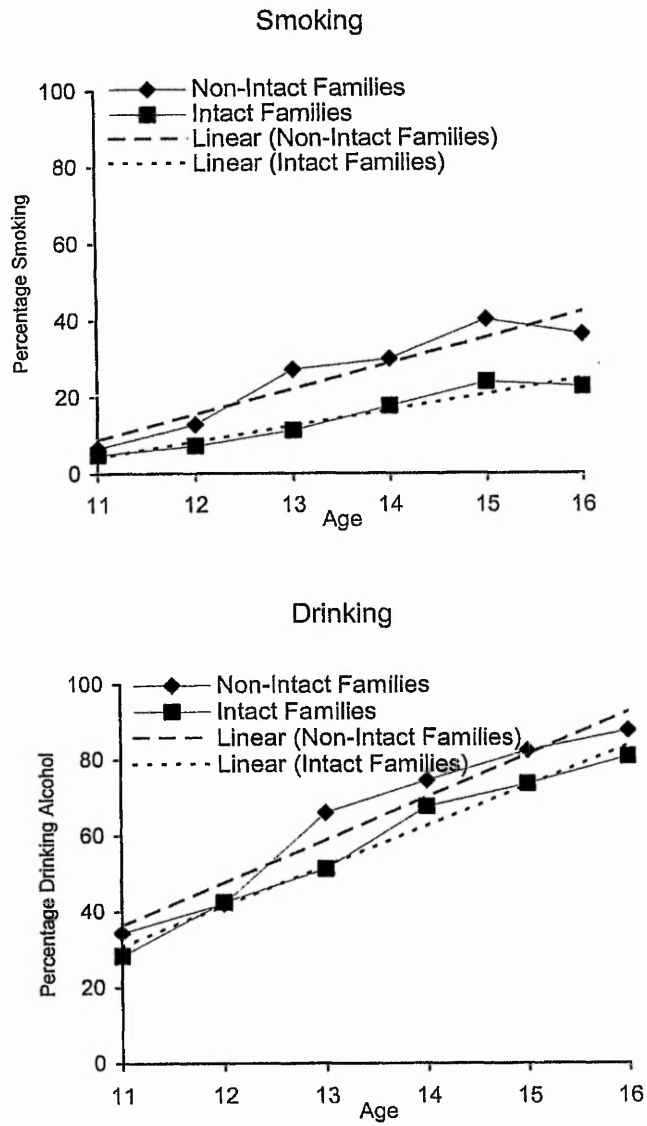


### Family structure

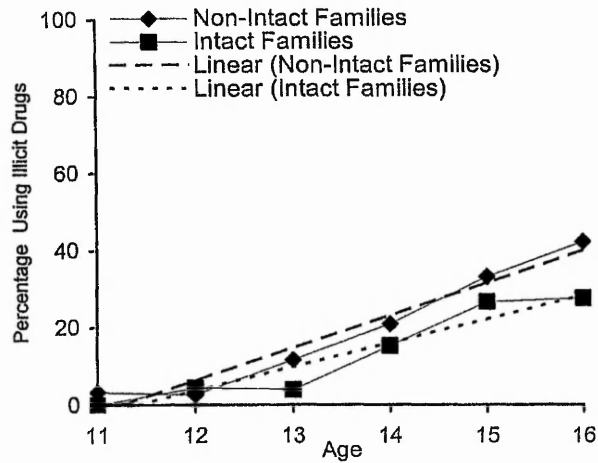
Adolescents who did not live with both their natural parents were found to be at greater risk of substance use than those who came from an intact family. Overall, 60.6% of those from intact families used either cigarettes, alcohol or illicit drugs in some combination, compared to 67.9% of those from non-intact families ( $\chi^2 = 23.0$ ,  $p < .0001$ ). This difference was even more marked for cigarette smoking: 15.3% of adolescents from traditional, intact families smoked compared to 26.7% of those from non-traditional families ( $\chi^2 = 83.1$ ,  $p < .0001$ ). The picture was similar for regular alcohol and illicit drug use with 59.4% and 13.4% of those from intact families using these groups of substances respectively, compared to 65.9% and 19.1% from non-intact families ( $\chi^2 = 17.6$ ,  $p < .0001$ ;  $\chi^2 = 24.9$ ,  $p < .0001$ ).

Figure 8.7 shows the different trajectories when age was considered and it was noticeable that there is a gradual divergence in smoking prevalence between the two groups as age increased. The association between family structure, alcohol drinking and age remained constant. However, there were different trajectories in relation to illicit drug use. Prevalence rose steeply in children from non-intact families, particularly at age 15, whereas prevalence for children from intact families actually decreased after that age.

**Figure 8.7**



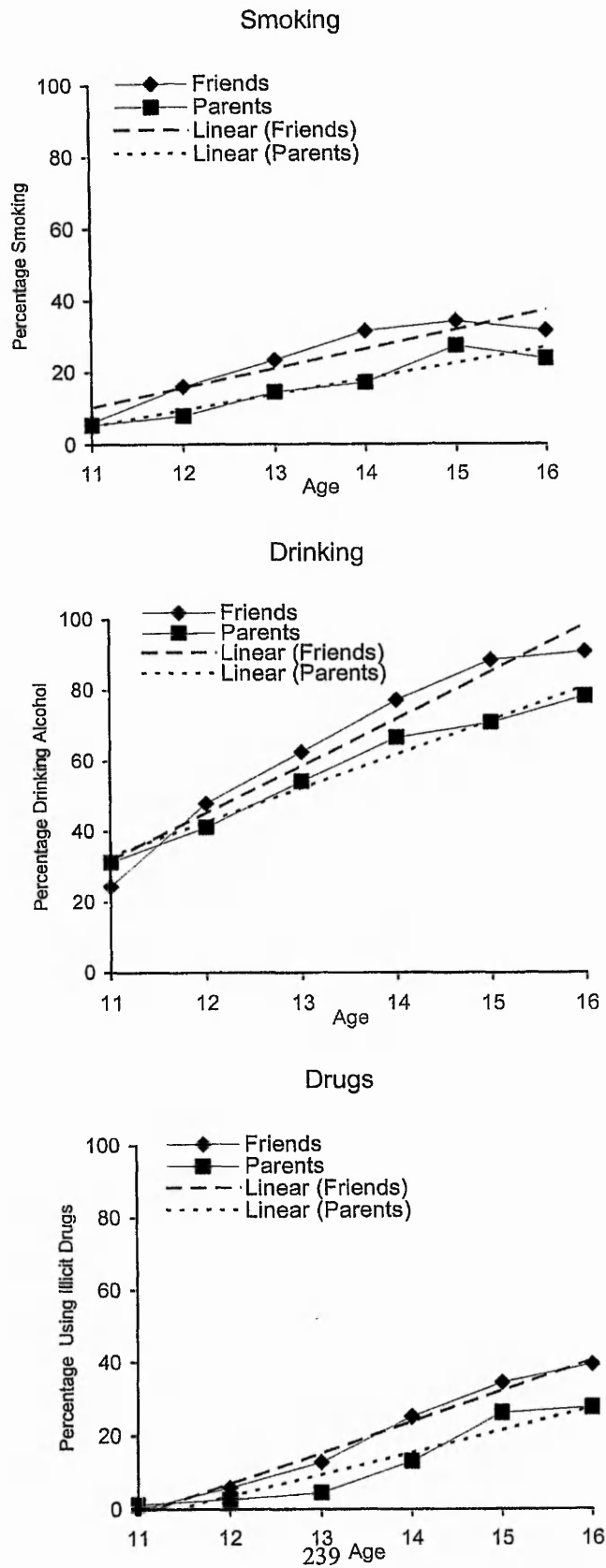
## Drugs



### Family versus peer influence

Whether adolescents valued their friends' opinions more than those of their parents also differentiated between those who did and did not regularly use cigarettes, alcohol and illicit drugs. Of those who thought their parents' opinions were the most important, overall 60.6% used a psychotropic substance compared with 67.9% of those who valued their friends views most ( $\chi^2 = 51.1$ ,  $p < .0001$ ). Again, there were differences within the individual substance groups: cigarettes, 15.3% and 26.7% ( $\chi^2 = 83.1$ ,  $p < .0001$ ); alcohol, 59.4% and 65.9% ( $\chi^2 = 17.6$ ,  $p < .0001$ ) and illicit drugs 13.4% and 19.1% ( $\chi^2 = 24.9$ ,  $p < .0001$ ). Figure 8.8 shows that this factor became increasingly important as children developed. Across substances, at age 11, no difference was found between the two groups, but the trajectories diverged as children grew older.

Figure 8.8



## Interactions

Logistic regression was employed to develop a predictive model for each of the different substances. With all three models, use of either of the other two substances was heavily predictive, either in combination or alone, of use of the substance under consideration, indicating that when young people use cigarettes, alcohol or drugs, they tend to be poly-users. Before models could be developed, it was also considered that the relative importance of each of the factors needed to be examined.

However, before any comparisons could be made between, say, the influence of family structure and the influence of academic performance, cross-influences had to be removed. For instance, if data are being examined to see if coming from a 'non-intact family' is a greater risk factor than 'low academic performance' then comparing percentages of use directly means that the comparison could be contaminated by, for instance, the presence of 'low religiosity'.

Therefore, for example, what was done in this analysis was to compare those subjects who come from a single parent family, and have no other risk factors, with those subjects who have a high religiosity risk factor, but no other risk factor. Needless to say, this cut down the numbers in each cell considerably, but there were still significant results.

Table 8.2 shows the relationship of all the social risk factors in relation to any adolescent substance use. It is clear from these findings that, when controlling for the influence of the other variables, the most significant predictor of adolescent substance use is negative contact with the police followed by, interestingly, low religiosity. Table 8.2 can be found at the end of the thesis in Appendix 2.

When cigarette smoking was considered, the model predicting most of the variance ( $90.2\% \chi^2 = 1300.0$ ,  $df\ 10\ p < .0001$ ), comprised concurrent illicit drug use (odds ratio: 7.6 (6.1-9.4),  $p < .0001$ ); concurrent alcohol use (odds ratio: 4.7 (3.5-6.4),  $p < .0001$ ); police contact (odds ratio: 2.4 (1.9-2.9),  $p < .0001$ ); gender (odds ratio: 1.9 (1.6-2.4),  $p < .0001$ ); family structure (odds

ratio: 1.8 (1.5-2.1),  $p < .0001$ ); suspension from school (odds ratio: 1.5 (1.1-1.9),  $p < .006$ ); and peer influence (odds ratio: 1.3 (1.1-1.5),  $p < .02$ ).

Regular alcohol use presented a similar picture with the model predicting most of the variance (72.1%  $\chi^2 = 1397.0$ ,  $df\ 10$   $p < .0001$ ) being: Illicit drug use (odds ratio: 8.4 (4.9-14.4),  $p < .0001$ ); cigarette smoking (odds ratio: 8.4 (4.2-5.7),  $p < .0001$ ); police contact (odds ratio: 2.9 (2.3-3.6),  $p < .0001$ ); lack of religious faith (odds ratio: 2.3 (2.0-2.7),  $p < .0001$ ); age (odds ratio: 1.5 (1.4-1.6),  $p < .0001$ ); peer influence (odds ratio: 1.4 (1.2-1.7),  $p < .0001$ ); gender (odds ratio: 1.3 (1.1-1.5),  $p < .0001$ ) and perceived low academic achievement (odds ratio: 1.3 (1.0-1.6),  $p < .03$ ).

For illicit drug use, the model correctly predicting 87.9% of the variance ( $\chi^2 = 1632.4$ ,  $df\ 10$   $p < .0001$ ), comprised concurrent alcohol use (odds ratio: 13.0 (7.4-22.9),  $p < .0001$ ); concurrent cigarette smoking (odds ratio: 8.6 (6.9-10.8),  $p < .0001$ ); police contact (odds ratio: 3.0 (2.3-3.8),  $p < .0001$ ); suspension from school (odds ratio: 2.1 (1.8-2.8),  $p < .0001$ ); age (odds ratio: 1.9 (1.8-2.1),  $p < .0001$ ); peer influence (odds ratio: 1.7 (1.3-2.1),  $p < .0001$ ); gender (odds ratio: 1.6 (1.2-2.0),  $p < .0001$ ); lack of religious faith (odds ratio: 1.5 (1.2-1.8),  $p < .001$ ) and perceived low academic achievement (odds ratio: 1.3 (1.0-1.7),  $p < .03$ ).

## Discussion

The findings presented here suggest a strong link between substance use and the various social variables being examined. However this is not to say that these links are necessarily causal. For instance, if family structure is considered, it would be dangerous to suggest that the higher level of substance use by children in one-parent families is caused by the fact that a natural parent is missing. In all cases it should be borne in mind that the causality of substance use in adolescents is almost certainly biopsychosocial in nature (Wallace, 1993) and that no single factor is responsible. Past research has shown that risks are not simply additive, but multiplicative and cumulative (Hall & Round, 1994).

The reliability and validity of self-report questionnaires is open to debate, and this is particularly so with adolescents when the issue under investigation is a sensitive one, as in this case. However, earlier research in this area found that young people report truthfully about sensitive matters when appropriate precautions are taken ( Winters et al, 1991).

Another area where caution should be exercised in the interpretation of these findings is in considering the direction of causality. As mentioned above, it is difficult to assess if the variable being investigated is antecedent, concurrent or consequent to the substance using behaviour. With the variables studied here, it is possible to say that an association exists, but not whether one was responsible for the other. There seems little doubt however, from the results of this study, that some factors are more important than others, that there are differential effects with time and that the age of about 13-years is important in changing rates of substance use with age.

However, for some of the sub-groups, substance use far exceeded the level expected in an adolescent population. For instance, recent work (Sutherland & Willner, 1998a) found that 15.3% of 11-16 year olds regularly use illicit drugs. Within this population, 37.4% of 11-16 year olds who had been in trouble with the police used illicit drugs. This correlational relationship does not allow for an inference of causality, but the relationship between the two variables is striking.

### **Trouble with the Police**

Those children who had been in trouble with the police were 4.3 times more likely to use drugs as those with no contact, 3.2 times as likely to smoke and 1.5 times as likely to drink alcohol. This was found to be the most discriminating of the factors investigated.

It is possible that early drug and alcohol use caused users to offend. For example, if use were particularly high, users may have been coerced into committing crime in order to fund their use. However, these data do not include the extent, type or severity of offending, simply that

the respondents had been in trouble with the police. Farrington (1998) has found a strong relationship between youths who commit violent offences and a range of anti-social behaviour, including substance abuse. Farrington (1999) also identified twelve risk factors for youth violence that had been replicated on an international basis: of these low academic achievement and a non-intact family were also found in the study reported here giving further support to the hypothesis that there is a strong link between criminal activity (or 'trouble with the police' in this study) and substance use.

However, when considering the issue of direction of causality, rather than substance use leading these respondents to offend, it seems more likely that early delinquent behaviour led these adolescents to associate with high risk peer groups and so begin to use cigarettes, alcohol and drugs.

### **Suspension from school**

Although those children who had been suspended from school were 3.2 times more likely to use cigarettes as those who had not been suspended; 2.2 times as likely to drink alcohol and 4.5 times as likely to use illicit drugs, it is probable that this variable is an outcome measure in its' own right rather than a causal agent.

Although these data do not investigate the question, it is probable that early substance use contributed to a constellation of other behaviours which caused the users to be suspended. Very few of the younger children were suspended, but the proportion increased as the children grew older.

It was reported earlier that the relationship between suspension and cigarette smoking remained constant over age, whereas use of alcohol by the two groups converged after age 15 and diverged across the age range for illicit drug use. This may be interpreted as showing the normative influence of alcohol use, but also indicates the strong relationship between

suspension and illicit drug use in older children. It also makes it particularly important to further consider the direction of causality in this variable.

### **Academic achievements and expectations**

The ability of perceived academic achievements and expectations to discriminate between users and non-users was also considerable. In particular, there was a very strong association between perceived past school achievements and substance use. Links with low future academic expectations were weaker. In this study, respondents with perceived low academic achievement were over two and a half times as likely to use illegal drugs as those with high perceptions. In addition, low achievers were found to be over twice as likely to smoke cigarettes as higher achievers and 1.3 times as likely to drink alcohol. A similar, although less striking, pattern was found with those who planned to continue their education after school and those who did not.

This is also an area where direction of causality is important. Clearly, heavy use of alcohol or drugs can effect academic performance (Jenkins, 1995), but taking substances may also be a response to perceived poor academic achievement.

The influence of perceived poor academic achievement as a risk factor increases with age for cigarettes and illicit drugs, but decreases for alcohol. In the case of alcohol, this could be because of the normative use of alcohol by society, but in the other two cases, this may be because of the increasing importance of academic achievement as the children grow older.

These data do not take IQ into account, a factor which is strongly associated with substance use (Farrington, 1998). However, this work was not designed to assess that relationship, but rather, how young people perceive their achievements, a factor more linked to issues of self-esteem than to IQ. It is probable that the substance use itself does not cause low achievement, but exists concurrently and results from low levels of pre-school education and early parental support.

## **Religious Belief**

The differences in adolescent substance use found in religious children compared to non-religious children was considerable and supports the hypothesis that religious faith is a strong protective factor against substance use of all kinds. Adolescents without religious convictions were nearly 2.1 times as likely to smoke cigarettes than those with religious beliefs, 2.8 times as likely to drink alcohol and 2.5 times as likely to use illicit drugs.

The reasons why religious faith and practice might protect against smoking are numerous. It may be due not so much to religious faith, but to linked influences such as altered peer group pressure. By definition, adolescents who worship regularly socialise with persons of similar beliefs and may avoid contact with peers who are not involved in religious activities and are more liable to smoke. If this is the case and these groups are being avoided, it is also likely that religious children are less likely to have been suspended from school and to have come into contact with the police. In other words, the presence of religious convictions protects children indirectly by steering them away from other, high risk, activities and associations, in addition to any direct effect of belief itself.

One of the strongest associations was found in relation to alcohol: just over 31% of those who worshipped regularly drank compared to 68.3% of non-worshippers. This difference is greater than that suggested by previous work (Engs & Mullen, 1999).

A possible partial explanation for this may lie in the ethnic composition of the sample. Although no information was sought about the nature of religious beliefs, a high proportion of children in the study could have been Moslem. This could help to explain the finding as Islam is a religion that prohibits alcohol consumption. However, as with smoking, it may be that religious faith tends to reduce either contact with or the influence of, peers who are involved with high risk activities. A similar difference was found with illegal drug use. As with cigarettes and alcohol, avoidance of high risk peers may be one explanation. It is also possible that adolescents with religious beliefs are more concerned not to break the law than those with no religious beliefs. Linked to strong beliefs and a strong prescriptive code, regular worship

tends to embed children in a non-delinquent community.

Alternatively it is possible that religious belief gives adolescents a degree of peace of mind and religious experience which negates the need for psychotropic substances. Positive parental religious beliefs may also mediate and neutralise other risk factors as may religious experiences in modern, colourful, charismatic places of worship may act as a substitute for the experiences available from legal and illegal drugs. These data do not shed any light on these questions and clearly more research is needed to address these issues. In particular, the effects of different faiths needs to be investigated.

### **Family Structure**

The results obtained here suggest that of all the variables considered, family structure had one of the weakest links to substance use in adolescents. Adolescents who did not come from a traditional, intact family, were just under twice as likely to smoke cigarettes and use illicit drugs as those from an intact family, although the differences were more pronounced for the older children. Few differences were found in regular use of alcohol.

Of the three substance areas considered, adolescent cigarette smoking differentiated most clearly between intact and non-intact families. The link between parental cigarette use and adolescent smoking is well established: smoking prevalence is higher in non-intact families than in intact families ( Flay, 1994). Flay's work found that 65.5% of adolescents who came from a non-intact family had a parent who smoked compared to 50.8% of those adolescents from intact families. Oygard et al (1995), reporting a longitudinal study in Oslo which looked at the influence of family structure, concluded that the single most important long term predictor of daily smoking in young adults was whether or not the mothers had smoked cigarettes. Given that, following a parental separation, the majority of children live with their mother rather than their father, the smoking status of their mother may therefore be more important.

Adolescent alcohol and illegal drug use also showed slightly elevated levels in non-intact families and although still highly significant, the percentage differences were not as large as for cigarettes. It is possible that these findings were influenced by the broad nature of the variable being assessed. If smaller more specific groups such as single-parent families with only the father present or families where there had been a parental death, had been examined, these links may have been different.

### **Family versus peer influence**

The differences in reported prevalence of substance use between those who valued the opinions of their families over those of their friends was not as great as expected from previous research (Blechman, 1982; Elliott et al, 1985; Johnson, et al, 1987; Needle et al, 1986; Orcutt, 1987). Overall, there was only a difference of 7.3% between family orientated and peer orientated children when any substance use was considered. Although there were differences in alcohol and illegal drug use between the two groups those differences, whilst still significant, were relatively small. The main variation was found in cigarette smoking: nearly twice as many peer influenced children smoked as family focused children. This finding agrees with the findings of Coombs et al (1991) who found peer group influence greater than that of the family in substance users and Shilts (1991) who found that substance users spent more time with friends than with family.

It can be hypothesised that peer influence is stronger than that of the family when substances that are perceived to be of relatively minor importance, such as tobacco, are involved, but that family influence is stronger when more harmful or illegal substances are considered.

### **Conclusions**

Many of the findings presented here indicate a significant relationship between various aspects of adolescents social lives and their substance using behaviour. Factors which are

relatively stable or which the adolescent has little control over appear to be less important in terms of influencing substance use than those which are liable to change. For instance, as already noted, the family structure has only a relatively slight influence over substance using behaviour whereas police contact was a very significant factor.

Although this work has been largely exploratory in nature it has shown specific issues that are in need of further consideration. In particular the question of direction of causality needs to be resolved and attention needs to be paid in this respect to the issues raised by the findings on academic achievement and delinquency.

If these findings are replicated, particularly longitudinally, and areas such as delinquency and academic performance are shown to be contributory factors in substance use then it is possible that education programmes will need to address these more fundamental, and possibly causal, issues before looking at cigarette, alcohol and drug use.

## **CHAPTER 9 - MODELS OF ADOLESCENT SUBSTANCE ABUSE**

This chapter will discuss the relationship between Sections 1 and 2 of the SASI and models of adolescent substance abuse will be presented which will be used to form the basis of further work in this area which will seek to assess, longitudinally, the predictive power of the SASI. It should be remembered that the purpose of his work has always been to develop an instrument capable of identifying individuals before they begin their substance using careers. This chapter will look at some of the issues surrounding this ideal.

### **The Relationship Between Sections 1 and 2**

By taking a biopsychosocial stance, this research maintains that identified risk factors do not exist in isolation, but rather are subject to the influence of all the other factors a person may be exposed to. When considering the relationship between the psychological and sociological variables this is particularly true. Clearly the psychological traits are dependent upon the other factors being considered and one type of variable cannot be considered without taking the others into account. For instance, on its own the presence of low levels of self-esteem place an adolescent at greater risk from substance abuse, but how will this risk be affected if the cause of the low self-esteem is a substance abusing household member?

It may well be the case that there exists a strong flow of causal influence from the situational variables addressed in Section 2 to the personality variables assessed in Section 1 with a weaker reverse flow in the opposite direction. However strong this relationship is, and whichever direction this flow travels, there clearly exists a significant relationship between the two areas, but whether this relationship is causal in nature would need further research to establish.

Collateral evidence for this relationship exists in the links found between the levels of the four Factors described earlier and such areas as academic performance and delinquency.

An examination was made of this relationship and, as can be seen in Table 9.1, a relationship was found between increasing levels of Neurotic Susceptibility to Substance Abuse (NSSA)

and poor academic standing ( $\chi^2 = 232.5$ ,  $p < .0001$ ); delinquency ( $\chi^2 = 194.8$ ,  $p < .0001$ ), low religiosity ( $\chi^2 = 53.2$ ,  $p < .0001$ ) and also between those who valued their peers opinions over their parents' ( $\chi^2 = 144.9$ ,  $p < .0001$ ). The use of the term 'delinquency' in this context has been applied loosely and has been measured by those who have been suspended from school and those who have been in trouble with the police.

**Table 9.1** - Neurotic Susceptibility to Substance Abuse levels and various social variables

	Neurotic Susceptibility to Substance Abuse				
	Level 1	Level 2	Level 3	Level 4	$\chi^2$
<b>Low Academically</b>	4.4%	9.4%	14.8%	26.5%	232.5, $p < .0001$
<b>High Delinquency</b>	16.2%	25.2%	29.4%	44.1%	194.8, $p < .0001$
<b>Low Religiosity</b>	41.3%	46.4%	50.5%	57.3%	53.2, $p < .0001$
<b>Values Peers Opinions Over Parents</b>	20.3%	19.5%	30.4%	40.3%	144.9, $p < .0001$

Similar relationships were found with self-esteem (Table 9.2), Lack of self-concern (Table 9.3) and, to a lesser extent, with Depression (Table 9.4) and Anxiety (Table 9.5).

The nature of these relationships remains unclear, but given each item's association with substance use, it is of more than passing interest that this secondary relationship should exist so noticeably and these relationships will be included in the models which follow.

**Table 9.2** - The relationship between Self-esteem levels and various social variables

	Self-Esteem				$\chi^2$
	Level 1	Level 2	Level 3	Level 4	
<b>Low Academically</b>	2.5%	6.1%	11.9%	28.6%	401.3, p < .0001
<b>High Delinquency</b>	8.1%	19.5%	29.9%	49.0%	483.9, p < .0001
<b>Low Religiosity</b>	39.6%	44.8%	48.8%	59.2%	85.3, p < .0001
<b>Values Peers Opinions Over Parents</b>	17.3%	24.8%	23.4%	38.0%	125.4, p < .0001

**Table 9.3** - The relationship between Self-concern levels and various social variables

	Self-concern				$\chi^2$
	Level 1	Level 2	Level 3	Level 4	
<b>Low Academically</b>	6.1%	13.0%	12.5%	18.5%	67.2, p < .0001
<b>High Delinquency</b>	23.2%	26.1%	27.8%	31.6%	17.6, p < .001
<b>Low Religiosity</b>	42.2%	47.6%	49.0%	53.0%	23.3, p < .0001
<b>Values Peers Opinions Over Parents</b>	15.2%	23.9%	28.3%	36.6%	120.0, p < .0001

**Table 9.4** - The relationship between Depression levels and various social variables

	Depression				$\chi^2$
	Level 1	Level 2	Level 3	Level 4	
<b>Low Academically</b>	10.5%	9.6%	11.6%	18.7%	56.5, p < .0001
<b>High Delinquency</b>	25.0%	25.5%	28.4%	30.6%	11.9, p < .008
<b>Low Religiosity</b>	50.6%	46.1%	47.7%	48.7%	4.9. NS
<b>Values Peers Opinions Over Parents</b>	24.2%	25.0%	24.5%	30.9%	17.7, p < .001

**Table 9.5** - The relationship between Anxiety levels and various social variables

	Anxiety				$\chi^2$
	Level 1	Level 2	Level 3	Level 4	
<b>Low Academically</b>	12.3%	11.5%	11.9%	14.7%	6.3, NS
<b>High Delinquency</b>	24.7%	27.1%	23.9%	33.5%	30.6, p < .0001
<b>Low Religiosity</b>	43.6%	47.9%	45.5%	55.1%	31.7, p < .0001
<b>Values Peers Opinions Over Parents</b>	23.3%	27.3%	24.1%	29.8%	14.9, p < .002

The nature of the interaction between the various variables which have been looked at is complex and it would be simplistic to suggest an equation such as:

**Substance abusing parent → Low self-esteem → Drug use**

It would certainly be a very tidy solution if this scenario proved to be the case, but unfortunately this is unlikely given the number of external variables each adolescent is exposed to. Indeed the relationship between, for instance, self-esteem and areas such as delinquency serves to further indicate just how complex the etiology of adolescent substance

use actually is and reinforces the criticism made earlier that no single focus model would ever be found to account for all aspects of adolescent substance use.

### **Models of Adolescent Substance Abuse 1**

Although interesting findings have been made from these data, the primary purpose of this chapter is to validate the models developed in Chapter 8, therefore the same analyses were carried out using the same criteria as earlier.

#### **Cigarettes**

The starting point for the development of the logistic regression model was the findings described in Chapters 2, 3 and 7. It was known that all the four factors identified from Section 1 of the SASI showed they could discriminate between cigarette smokers and non-smokers and that the higher the tendency towards the pathological end of the four point severity scale the higher was the percentage of people who smoked. Additionally, it was shown that several of the areas examined in Section 2 could discriminate between smokers and non-smokers to a significant degree so these areas were also used as a basis for the model. The logistic regression model was developed through the forward stepwise procedure utilising a maximum likelihood paradigm and the p-value of the analysis of deviance was less than 0.01, indicating that a statistically significant relationship exists between the variables in the model at the 99% confidence level. Table 9.6 shows the model able to account for most of the variance, and therefore best suited to predicting cigarette use.

**Table 9.6**

<b>Factors</b>	<b>Odds Ratio</b>
Current drug use	5.6
Current alcohol use	4.1
Household cigarette use	2.1
Problem drinking	1.9
Gender (F)	1.9
Delinquency	1.7
Depression	1.7
Peer influence	1.6
Low self-esteem	1.4
Low self-concern	1.3
<b>Mean odds ratio</b>	<b>2.3</b>

The regression formula for this model was: Cigarette smoking =  $\exp(\eta) / (1 + \exp(\eta))$  where  $\eta = -5.43 + 1.45661 \cdot \text{Alcohol use} + 0.597492 \cdot \text{Delinquency} + 1.74056 \cdot \text{Drug use} + 0.622704 \cdot \text{Drunkenness} + 0.150461 \cdot \text{Low self-esteem} + 0.113904 \cdot \text{Low self-concern} + 0.176804 \cdot \text{Depression} + 0.168430 \cdot \text{Peer influence} + 0.619938 \cdot \text{Gender} + 0.521615 \cdot \text{Family cigarette use}$ .

The mean square error for this model was 0.017, the mean absolute error was 0.32 and the mean error was 0.007, all these low figures indicate the validity of this model. In addition, confirmatory validation analysis was carried out on the model and in this case it was found that the figures were similar to the originals with the mean square error for the validation sample being 0.019, the validation figure for the mean absolute error being 0.22 and the mean error being 0.002. These figures indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out on the model and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 2.71$ ;  $p < 0.439$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist. Overall the model was capable of accounting for 85.9% of the variance with 95.2% of non-smokers being correctly identified compared to 46.2% of smokers at a confidence level of 95%.

The final model revealed few unexpected anomalies. It comes as no surprise that successful prediction of adolescent smoking should, in a large part, be reliant on existing drug and alcohol use. Given the findings relating to poly-substance use reported in Chapter 3, it would have been surprising if their influence had not been considerable. Additionally, and in light of the results reported in Chapter 7, the fact that family cigarette smoking also has a strong influence is not unexpected and given the rise in female adolescent smoking it is also unsurprising that gender should be predictive. It is perhaps odd that peer influence did not have a larger role to play and it can only be speculated that this might be because of the very powerful effect of current and household use.

The role of the personality variables is less definitive, but nevertheless they are strongly associated with cigarette use although it has been shown by this model that external variables have a greater influence than those measured by Section 1.

Given these figures, it can be said that this model could be a useful tool in predicting current or future cigarette smoking in adolescents. In particular, it might be possible to utilise some of the non-substance use variables in order to ascertain incidents of cigarette use without the use of direct questions.

However, it should be noted that the model only accurately identified 46.2% of current smokers. Now that the main areas of risk have been isolated and the main factors identified, it would appear necessary to concentrate on these areas and develop further, more subtle and more discriminating questionnaire items.

If this is undertaken, it seems likely that a 'cigarette specific' version of the SASI would need to be developed as this model differs in various ways to the two concerned with alcohol and drug use.

It may be a mistake to attempt further development of an overall generic instrument and these findings form a sufficiently strong basis for developing a discreet instrument.

## Alcohol

Throughout this work, one of the with the problems with the assessment and prediction of alcohol use has been its prevalence and normative influence. In our society alcohol drinking is a normal social pastime, indeed use of alcohol is pivotal in numerous social activities and it has been shown many times that little harm comes from moderate drinking and that it is a normal and healthy activity for parents to introduce their children to it (i.e. Lowe et al, 1993). Therefore, given that the vast majority of people in western society drink alcohol, the development of a straightforward model to predict future drinking would not be a particularly useful exercise.

However, as previously noted, excessive use of alcohol, particularly at a very young age, is an increasing problem not only resulting in increased health and other social costs, but, as discussed in Chapter 3, through the danger of further drug use too. Therefore it was felt that it would be more productive to develop a model that was capable of both assessing and predicting 'problem drinking'.

Naturally this leads onto the question of how to define problem drinking. Earlier in Chapter 3, episodes of drunkenness were looked at and related to types of drink as well as to other activities and it was broadly noted that increased episodes of intoxication correlated with increased drug use, increased police contact and so on. In so far as this goes it enables some interesting conclusions to be drawn, but it does not appear specific enough, particularly given the spread of ages involved. For instance if 'problem drinking' is defined as including anyone who has been drunk in excess of 5 times then this clearly has different implications for an 11-year old than for a 16-year old. Given the prevalence of underage drinking it could be argued that it was not particularly abnormal for a 16-year old to have been drunk two or three times and that it would be unreasonable to classify them as a problem drinker solely on that basis, but the same can clearly not be said of an 11-year old who had been drunk the same number of times. With this in mind it was decided to develop a sliding scale for defining 'problem drinkers' which related episodes of drunkenness to age. This was done after re-examining the

data presented in Chapter 3 and through a brief review of the literature on adolescent intoxication. Nevertheless, these figures are essentially arbitrary and need empirical validation. Problem drinkers can be defined as those who have been drunk in the past year:

Age 11: On 1+ occasions

Age 12: On 2+ occasions

Age 13: On 3+ occasions

Age 14: On 4+ occasions

Age 15-16: On 5+ occasions

It was this criteria that has been used throughout the development of the models under discussion. When this model was under development, all four factors from Section 1 and all the Section 2 variables were included for assessment. As for cigarettes, the logistic regression model was developed through the forward stepwise procedure utilising a maximum likelihood paradigm. The p-value of the analysis of deviance was less than 0.01, indicating that a statistically significant relationship exists between the variables in the model at the 99% confidence level. The model able to account for most of the variance can be found in Table 9.7.

**Table 9.7**

<b>Factors</b>	<b>Odds Ratio</b>
Current drug use	4.7
Family problem drinking	3.8
Current cigarette use	2.3
Delinquency	1.9
Age	1.6
Peer influence	1.6
Lack of religiosity	1.5
Low academic standard	1.5
Low self-esteem	1.5
Low self-concern	1.5
<b>Mean Odds Ratio</b>	<b>2.2</b>

The regression formula for this model was: where Problem drinking =  $\exp(\eta) / (1 + \exp(\eta))$   $\eta = -6.12698 + 1.74539 * \text{Drug use} + 0.0653668 * \text{Household drunkenness} +$

1.02652\*Cigarette use+0.494375\*Delinquency + 1.06275\*Age + 2.18342\*Lack of religiosity + 0.722677\*Academic standard + 2.17449\*Peer influence + 0.0847901\*Low self-esteem + 0.178617\*Low self-concern.

The mean square error for this model was 0.013, the mean absolute error was 0.30 and the mean error was 0.0008, once again, all these low figures indicate the validity of this model. Confirmatory validation analysis was again carried out on the model and in this case it was found that the figures were similar with the mean square error for the validation sample being 0.08, the validation figure for the mean absolute error being 0.17 and the mean error being 0.0007. These figures again indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 4.19$ ;  $p < 0.123$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Overall the model was capable of accounting for 88.5% of the variance with 96.2% of non-problem drinkers being correctly identified compared to 42.7% of problem drinkers at a confidence level of 95%.

As with the model for cigarette smoking, the model developed here did not indicate that any factors should be left out that research has shown are relevant to adolescent intoxication and, at the same time did not include any unexpected factors either.

It can be seen from the table, above, that current drug use is the highest risk factor which, given the previous findings reported earlier, is not surprising. Family intoxication also has a strong influence with adolescents living in households where at least one family member has been drunk in excess of 20 occasions in the past year being considerably more at risk than adolescents from households with low levels of intoxication. Cigarette smoking was also found to be predictive of problem drinking as were levels of delinquency and, in spite of the criteria described earlier, age with the risk of becoming a problem drinker increasing with age. Again, the influence of peers was relatively weak and it is difficult, particularly when

considering the large amount of previous research in this area (i.e. Reed & Rowntree, 1997; Smith et al 1994) to understand why this should be the case.

Lack of religious beliefs and low academic standards were also predictive, but, particularly in the last case, direction of causality should be called into question.

The two personality variables low self-esteem and low self-concern were also significant factors, but it is perhaps surprising that these were not predictive to a greater degree. It is also surprising, particularly in light of the findings on household use reported in Chapter 5, that family drug use was not a factor.

Although this model overall accounted for 88.5% of the variance, it only correctly identified 42.7% of the problem drinkers. It appears likely that a more subject specific tool would be more appropriate and might be capable of identifying a greater proportion of the problem drinkers.

### **Drug Use**

Modeling contributory causal factors of illegal adolescent drug use was relatively straightforward and the resulting model accounts for a significant percentage (88.5%) of the variance found. Indeed, it was found to be the most powerful of the three models developed which given that the primary purpose of this research was to develop a causal model for adolescent drug use, rather than adolescent substance use, was gratifying.

As with the previous models the findings described earlier were used as a starting point for the development of the model. As described earlier, the model was developed through the forward stepwise procedure utilising a maximum likelihood paradigm. The p-value of the analysis of deviance was less than 0.01, indicating that a statistically significant relationship exists between the variables in the model at the 99% confidence level. The most effective combination of factors can be found in Table 9.8:

**Table 9.8**

<b>Factors</b>	<b>Odds Ratio</b>
Current alcohol use	7.9
Household drug use	7.3
Current cigarette use	5.4
Problem drinking	4.5
Delinquency	2.7
Age	1.6
Peer influence	1.6
Low self-concern	1.5
Low self-esteem	1.4
Lack of religiosity	1.3
<b>Mean Odds Ratio</b>	<b>3.5</b>

The regression formula for this model was: Drug Use =  $\exp(\eta)/(1 + \exp(\eta))$   $\eta = -7.46395 + 1.97541 \cdot \text{Household drug use} + 1.69619 \cdot \text{Alcohol use} + 2.12172 \cdot \text{Cigarette use} + 1.58621 \cdot \text{Problem drinking} + 0.672969 \cdot \text{Delinquency} + 0.22839 \cdot \text{Low self-esteem} + 0.53725 \cdot \text{Religiosity} + 0.00445 \cdot \text{Lack of self-concern} + 0.13467 \cdot \text{Age} + 0.14359 \cdot \text{Peer influence}$ .

The mean square error for this model was 0.011, the mean absolute error was 0.32 and the mean error was 0.002, once again, all these low figures indicate the validity of this model. Confirmatory validation analysis was again carried out on the model and in this case it was found that the figures were similar with the mean square error for the validation sample being 0.07, the validation figure for the mean absolute error being 0.14 and the mean error being 0.007. These figures again indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 1.31$ ;  $p < 0.725$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Overall the model was capable of accounting for 88.5% of the variance with 96.2% of non-drug users being correctly identified compared to 42.7% of drug users at a confidence level of 95%.

It can be seen in the table above that the most powerful predictor of drug use was the current use of alcohol with adolescents who regularly drink being nearly eight times as likely to use drugs as teetotal adolescents. Clearly this is a significant risk factor, but given the findings described in Chapter 3 on patterns of substance use it is surprising that this figure is not even larger as it was found that drug use was almost unheard of without the accompanying use of alcohol. The adolescents who were termed problem drinkers also presented with a significant odds ratio of 4.5 which further indicates the influence of alcohol and excessive alcohol use.

One of the other major risk factors was found to be drug use by another household member, a factor which increases the risk of an adolescent using by over seven times. Again, this is supportive of the findings reported earlier which indicated the strong influence of substance use by other household members. However, as with the previous models, peer influence was not as strong as might have been expected and given that this has been a feature of all three models, it points to a methodological flaw in the Substance Abuse Susceptibility Index which is an area that will be addressed later.

Delinquency can also be seen to play a part although, in this particular case it is important to remember considerations of directions of causality.

As with the previous models, the personality variables are weaker in predictive power with the odds ratios generally being substantially lower (although still statistically significant) than the lifestyle factors.

This was the most definitive of the three models developed and it is believed that it can reasonably be used as a sound basis for further work in this area aimed not only at testing the model, but also for further refining the SASI.

### **Comparison of the Three Models**

It was not the original intention to develop three distinct models, rather it was hoped that a single model could explain a reasonable amount of the variance in adolescent substance use,

however there were sufficient differences between cigarette use, problem drinking and drug use to make discreet models necessary.

Having said that, the three models were, broadly, very similar in nature with the differences mainly being on emphasis rather than on actual content. These commonalities could be used to argue that adolescent substance abuse should be considered as a single entity rather than being broken up into separate substance groups, but this argument does not take into account many of the external variables that apply. For instance, if a single common model were used it could not account for the wide acceptance of alcohol as a socially respectable recreational drug compared to marijuana which is illegal. Therefore, it is believed that although the models are similar, it is important to retain individual models for each of the areas under examination.

One of the most striking features about all three models is the prominent presence of the two substances not being modeled. In each case some of the largest odds ratios, and consequently the greatest risk factors, were found with the additional substance use. Clearly the use of one psychoactive substance puts an individual at considerable risk of using others and although the odds ratios differed slightly depending on the model, their influence was consistent. Again, this might be interpreted as suggesting that adolescents tend to be poly-substance users. However, is the development of a model designed to, say, predict future illegal drug use particularly helpful if alcohol drinking and cigarette smoking has to be included?

At the heart of this work has been the desire to produce an instrument that is capable of predicting future use before individuals begin their substance using careers. As this work has shown, there is a clear relationship between drug use and the drinking of alcohol and therefore if it is found that a 14-year old boy is using alcohol to excess it may be assumed that if he is not already using drugs, then he is a considerable risk of doing so at some time in the future. The point being that if an instrument of this type has to rely on evidence of excessive use of one substance to predict use of another, then it is of little value as the child in question has already begun their substance using career.

In the models developed so far, logistic regression has shown that current use of other substances is strongly related to use of the substance being modeled and it can be speculated that this has been achieved at the expense of the other variables. For instance, it has already been mentioned that peer influence did not appear to be the strong risk factor that previous research suggested it might be (i.e. Barnes & Windle, 1987) and although this finding is in agreement with Reed & Rowntree (1997) who found that peer influence was not a factor in adolescent substance use, it was felt that the weight of research indicated that peer influence should be included in any model. Another area where the research being reported here had found considerable differences between substance users and non-users was in academic standing and yet this area was hardly included in the models described earlier.

It was therefore decided that, in light of this unexpectedly weak showing by several areas, to see what effect taking other substance use out of the various equations might have. In addition, in order to gain a clear picture of the effect of each of the lifestyle variables, it was decided to develop model based purely around those variables.

This was done for two purposes, firstly to gain a true understanding of the worth of the lifestyle variables without the influence of other types of substance use and personality factors and secondly, to enable the possible future further development of the SASI to proceed without the need to pose questions about substance use.

### **Models of Adolescent Substance Abuse 2**

The procedure adopted for developing these additional models was precisely the same as for the models described earlier. Except that the only variables included in the model building process were: Academic standing, Delinquency, Lack of religiosity, Family structure, Household cigarette use, Household drug use, Household alcohol use, Household problem drinking, Gender, Age and Peer influence.

## Cigarettes

**Table 9.9**

Factors	Odds Ratio
Delinquency	6.5
Household drug use	4.1
Household problem drinking	2.8
Family structure	2.5
Gender (F)	2.3
Household cigarette use	1.7
Academic standing	1.7
Lack of religiosity	1.5
Age	1.4
Peer influence	1.3
<b>Mean Odds Ratio</b>	<b>2.6</b>

The regression formula for this model was: Cigarette smoking =  $\exp(\eta) / (1 + \exp(\eta))$  where  $\eta = -5.05581 + 0.29808 \cdot \text{Age} + 0.93376 \cdot \text{Family structure} + 0.54629 \cdot \text{Household cigarette use} + 1.41468 \cdot \text{Household drug use} + 1.03153 \cdot \text{Household problem drinking} + 0.81409 \cdot \text{Gender (females)} + 0.28865 \cdot \text{Peer influence} + 0.5557 \cdot \text{Academic standard} + 1.87585 \cdot \text{Delinquency} + 0.38445 \cdot \text{Religiosity}$ .

The mean square error for this model was 0.02, the mean absolute error was 0.33 and the mean error was 0.01, all these low figures indicate the validity of this model. In addition, confirmatory validation analysis was carried out on the model and in this case it was found that the figures were similar to the originals with the mean square error for the validation sample being 0.01, the validation figure for the mean absolute error being 0.25 and the mean error being 0.003. These figures indicate the soundness of the developed model. A Hosmer and Lemeshow goodness-of-fit test was also carried out on the model and it was found that the chi-square value was less than .01, therefore it could not be said that the model adequately fitted the observed data at a confidence level of 99% ( $\chi^2 = 14.42$ ,  $p < .002$ ). However, the p-values for the residuals were greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Overall the model was capable of accounting for 82.8% of the variance with 97.0% of non-smokers being correctly identified compared to 22.6% of smokers at a confidence level of 95%. In relation to the mean odds ratios, this model for cigarette smoking is slightly more powerful than the earlier one which included other substance use. The mean odds ratio for the previous model was 2.3 and for this one it was 2.6. An advantage of this formulation is that contentious questions about drugs and alcohol use are not needed and that a broader range of areas can be included when making an assessment. However, a serious drawback for this model is that although it was capable of accounting for 82.8% of the overall variance with 97.0% of non-smokers being correctly identified, it was only able to identify 22.6% of smokers compared to the earlier model which identified 46.2% of smokers at a confidence level of 95%.

#### **Alcohol (Problem drinking)**

**Table 9.10**

<b>Factors</b>	<b>Odds Ratio</b>
Household problem drinking	4.1
Household drug use	3.1
Delinquency	2.8
Academic standing	1.9
Religiosity	1.9
Age	1.9
Family structure	1.9
Peer influence	1.2
<b>Mean Odds Ratio</b>	<b>2.4</b>

The regression formula for this model was: where Problem drinking =  $\exp(\eta)/(1 + \exp(\eta))$   
 $\eta = -6.0015 + 0.62283 \cdot \text{Academic standard} + 0.64234 \cdot \text{Age} + 1.02414 \cdot \text{Delinquency} +$   
 $0.06184 \cdot \text{Family structure} + 1.11392 \cdot \text{Household drug use} + 1.40998 \cdot \text{Household problem}$   
 $\text{drinking} + 0.21350 \cdot \text{Peer influence} + 0.63090 \cdot \text{Religiosity}.$

The mean square error for this model was 0.017, the mean absolute error was 0.33 and the mean error was 0.0006, once again, all these low figures indicate the validity of this model.

Confirmatory validation analysis was again carried out on the model and in this case it was found that the figures were similar with the mean square error for the validation sample being 0.09, the validation figure for the mean absolute error being 0.19 and the mean error being 0.001. These figures again indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 3.29$ ;  $p < .192$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Although this model had a slightly better mean odds ratio than the earlier one (2.4/2.2) and accurately accounted for 87.0% of the overall variance, it only managed to identify 26.5% of the problem drinkers compared with the earlier model which identified 42.7%.

## Drugs

**Table 9.11**

<b>Factors</b>	<b>Odds Ratio</b>
Household drug use	27.1
Delinquency	7.8
Academic standing	2.0
Lack of religiosity	2.0
Household alcohol use	1.8
Age	1.7
Family structure	1.3
Family problem drinking	1.2
Peer influence	1.1
<b>Mean Odds Ratio</b>	<b>5.1</b>

Drug Use =  $\exp(\eta)/(1 + \exp(\eta))$   $\eta = -6.50708 + 0.68040 \cdot \text{Academic standard} + 0.76059 \cdot \text{Age} + 2.05714 \cdot \text{Delinquency} + 0.61080 \cdot \text{Household alcohol use} + 0.05012 \cdot \text{Family structure} + 3.29877 \cdot \text{Household drug use} + 0.16316 \cdot \text{Household problem drinking} + 0.06698 \cdot \text{Peer influence} + 0.51052 \cdot \text{Religiosity}$ .

The mean square error for this model was 0.014, the mean absolute error was 0.31 and the mean error was 0.001, once again, all these low figures indicate the validity of this model. Confirmatory validation analysis was again carried out on the model and in this case it was found that the figures were similar with the mean square error for the validation sample being 0.09, the validation figure for the mean absolute error being 0.17 and the mean error being 0.007. These figures again indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 3.87$ ;  $p < 0.143$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist. The mean odds ration for this model was greater than for the earlier one which included other substance use (5.1/3.4), however, this figure appears to have been skewed by the large odds ratio achieved for the effect of household drug use (27.1). In addition, although this model was able to account for 88.2% of the variance with 98.0% of non-drug users being correctly identified, it was only able to identify 33.7% of the users compared to the previous model which identified 42.7% at a confidence level of 95%.

#### **Any Substance Use**

As a final exercise it was decided to see if a model could be developed which was capable of adequately describing the variables involved with any type of substance use in adolescents. The model was developed using only items not related to personal substance use. The model able to account for most of the variance, and therefore best suited to predicting any substance use, was composed of:

**Table 9.12**

<b>Factors</b>	<b>Odds Ratio</b>
Household alcohol use	6.4
Delinquency	4.1
Household drug use	2.7
Academic standard	2.0
Household problem drinking	2.0
Peer influence	2.0
Age	1.8
Religiosity	1.7
Family structure	1.4
<b>Mean odds ratio</b>	<b>2.7</b>

The regression formula for this model was: Any substance use =  $\exp(\eta) / (1 + \exp(\eta))$  where  $\eta = -3.71042 + 1.40332 * \text{Academic standard} + 0.57042 * \text{Age} + 0.84398 * \text{Delinquency} + 1.84749 * \text{Household alcohol use} + 0.34540 * \text{Family structure} + 0.88983 * \text{Family drug use} + 0.68647 * \text{Family problem drinking} + 0.54965 * \text{Religiosity} + 0.681767 * \text{Peer influence}$ .

The mean square error for this model was 0.029, the mean absolute error was 0.37 and the mean error was 0.0003, all these low figures indicate the validity of this model. In addition, confirmatory validation analysis was carried out on the model and in this case it was found that the figures were similar to the originals with the mean square error for the validation sample being 0.158, the validation figure for the mean absolute error being 0.31 and the mean error being 0.003. These figures indicate the soundness of the developed model. A chi-square goodness of fit test was also carried out on the model and it was found that the model adequately fitted the observed data at a confidence level of 95% ( $\chi^2 = 1.36$ ;  $p < .505$ ). In addition, the p-value for the residuals was greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Overall the model was capable of accounting for 76.4% of the variance with 85.2 % of non-substance users being correctly identified compared to 61.6% of users at a confidence level of 95%.

This final model was interesting as it consolidated all the earlier findings and confirmed the roles and influences of the various lifestyle risk factors. However, the practical usefulness of the model should be questioned as it includes alcohol which, as has been discussed before, is subject to what might be best described in this context as 'noise'. Nevertheless the model does show clearly the role of family substance use and also highlights delinquency and academic standards more clearly than the other models.

### **Discussion**

A major advantage in using the second set of models is that they do not directly relate to an individual's substance use, therefore a questionnaire could be developed which assessed a person's potential for future substance abuse without specifically asking about current use. This would clearly be very useful as questions into non-threatening areas are more likely to be answered truthfully than those that deal with difficult areas. However, given that the second set of models asks about household substance use it is unclear how much of an advantage this might prove to be.

A serious drawback with this second set of models is that although, with the exception of the model for drugs, the mean odds ratio for each of the sets are comparable, the degree to which they identify current users is not. In each particular instance, the second set of models is considerably worse in this aspect than the first and this ability to identify current users is clearly of importance.

It is possible that if a questionnaire were developed that specifically explored the areas identified by the second set of models more closely then a greater percentage of the variance could be accounted for.

However, it was decided that although there are certain disadvantages associated with asking direct questions about substance use, the first set of models provided a more accurate and informative picture than the second and should therefore be carried forward for future development.

In addition to concurrent use of other substances being associated with use of the substance under examination, a finding in agreement with the results earlier, another consistent factor was the influence of substance use by other household members. With each model the presence of substance users within the home made it far more likely that an adolescent would use the same substance, or, in the case of problem drinkers, follow the same substance using patterns. That household use of a substance should be such a strong predictor is unsurprising in light of the large body of work showing a positive correlation between family and adolescent substance use (i.e. Anderson & Henry, 1994) and confirms the findings reported in Chapter 7. Although this research earlier described a cross-over effect, this factor was not modeled here because of the likelihood of poly-substance use within household members which would result in an unstable or misleading model.

However, although substance use by household members was important, with the exception of the second set of models, the actual structure of the family did not appear to be influential. This is somewhat surprising, particularly in light of previous research which has shown that adolescent substance use is higher in non-standard families (i.e. Lowe, 1993; Doherty & Needle, 1991; Glyn, 1981). It seems likely that this factor did not warrant being in any of the models, not because family structure has no influence, but because of the inadequate nature of the instrument in this particular area. Quite possibly had further questions been asked about family structure, in particular about the effects of coming from a non-standard household, then it might have proved to have been a significant area.

What was particularly surprising was the relatively minor effect of peer influence. Although this was a risk factor in all three areas modeled, it was a relatively weak one and it might be speculated that the strong household influence made any peer influence largely irrelevant although Smith et al (1989) said that peer influence tended to be stronger than that exerted by the family. As noted earlier, numerous studies have documented the powerful influence of peers on adolescent drug use with various authors suggesting that one of the best predictors of adolescent substance use is the extent to which one associates with peers who are substance users (Hops et al, 1999; Blechman, 1982; Elliott et al, 1985; Johnson, et al, 1987; Needle et

al, 1986; Orcutt, 1987) so it is surprising that it peer influence did not produce higher odds ratios. This may of course, be due to poor design, but it may also be confirming Reed & Rowntree (1997) who examined data gathered during an American national survey during 1977-79 and concluded that there was no evidence that peer influence was a contributory factor in adolescent substance use.

Delinquency was found in the middle order of all three models which is interesting, particularly in relation to cigarette smoking. It seems intuitively obvious why the drug use and problem drinking models should feature delinquency, but is unclear why this should be the case with cigarette use. One possible explanation might be the poly-substance nature of adolescent use with the cigarette smoking group also containing a significant number of problem drinkers and drug users. However, although the odds ratios may have generally been around the 2.0 area for the three models, the placing of delinquency seems to be in line with other research in this area (Stice et al, 1998; Winters, 1993; Brook et al 1992; Van Kammen et al, 1991).

That academic standing was only found in the model of problem drinking is surprising particularly given earlier findings (i.e. Jenkins, 1995; Schulenberg, 1994), however this may give a clue as to the direction of causality with this particular area. Previously it was speculated that either low academic standing initiated adolescent substance use or that use caused lower marks, now, in light of these logistic regression results, it can be speculated that low academic standing is dependent upon substance use rather than antecedent to it. However, this would need considerably more work to establish empirically.

Lack of religious belief was another relatively weak predictor which was only found in the drug and problem drinking models, however its presence adds another dimension to any assessment made of future risk of substance abuse. In particular it might be useful in giving a general insight into lifestyle perspectives. As noted earlier, the idea that strong levels of religiosity are equated with a rejection of substance use has been found to be empirically robust (Engs & Mullen, 1999; Francis, 1977) and it could be that a more in depth assessment of adolescents beliefs would reveal a greater relationship with substance abuse.

It was always expected that of the personality related variables, low self-esteem and low self-concern would be the two which stood out as the strongest predictors of substance use, but their comparatively low odds ratios were unexpected. This is particularly true when considered in the light of the results presented earlier where large odds ratios were found for these factors. Clearly when these personality factors were modeled alongside the lifestyle variables their relative odds ratios would decrease, but it was not expected they would fall to this level. In addition the virtual non-appearance of depression and anxiety was also unexpected. Anxiety was always the weakest predictor, but depression was expected to play a part, particularly in light of its close relationship with the most powerful factor, low self-esteem.

These findings may however be quite useful as they give a clue as to the nature of the relationship between the two types of variable. On their own the personality constructs are powerfully related to adolescent substance use of all kinds, but they are obviously 'overshadowed' by the presence of the lifestyle factors. This supports the notion that the strongest flow of influence is from lifestyle to personality rather than the other way round. In turn this leads to the conclusion that although, for instance, low levels of self-esteem are related to substance use, the actual cause for these levels might well reside in the various lifestyle factors which has clear implications for health education programmes.

## **CHAPTER 10 – STUDY 5: VALIDATING THE MODELS**

This final chapter will present a study (Study 5) which sought to validate the Substance Abuse Susceptibility Index as well as the findings from the studies preceding. In addition, this study was designed to test the models developed in Chapter 9.

### **Participants**

Participants were a total of 6980 adolescents from 11 English secondary schools. Of the 6980 participants, 997 participants were excluded (14.3%) because they did not supply data on their age and/or gender. The data reported were supplied by the remaining 5983 respondents: their age and gender breakdown is detailed in Table 10.1.

Four schools were from a large Local Education Authority (LEA) in Northern England, three were from South Wales, three were from North Devon and one was from the Thames Valley region.. The schools came from varying locations including inner-city and rural. No specific information was available from the LEA's on school characteristics. The sample is not intended to be representative of British youth.

**Table 10.1** – Participants

<b>Age</b>	<b>Boys</b>	<b>Girls</b>	<b>TOTAL</b>
<b>11</b>	280	254	534
<b>12</b>	692	709	1401
<b>13</b>	628	690	1318
<b>14</b>	549	582	1131
<b>15</b>	474	479	953
<b>16</b>	334	312	646
<b>TOTAL</b>	<b>2957</b>	<b>3026</b>	<b>5,983</b>

### **Materials**

As with the previous study, the Substance Abuse Susceptibility Index was used, details of which can be found in Chapter 5.

## **Results**

These data will not be presented in a great deal of depth as they are intended to be confirmatory in nature. The findings will be used to verify the models presented in Chapter 9.

### **Substance Use**

#### **Cigarettes**

Cigarette smoking increased from 6.2% of 11-year olds to 30.1% of 16-year olds ( $\chi^2 = 253.7$ ;  $p < .0001$ ). Table 10.2 shows a clear difference between male and female smoking with 15.8% of boys smoking compared with 20.8% of girls ( $\chi^2 = 253.7$ ;  $p < .0001$ )

**Table 10.2** – Cigarette use by age and gender

	11	12	13	14	15	16	Mean
<b>Males</b>	6.8	8.7	13.9	18.4	23.6	26.4	<b>15.8%</b>
<b>Females</b>	5.5	9.6	20.6	27.0	28.6	35.6	<b>20.8%</b>
<b>Mean</b>	<b>6.2%</b>	<b>9.1%</b>	<b>17.4%</b>	<b>22.9%</b>	<b>26.1%</b>	<b>30.8%</b>	<b>18.3%</b>

#### **Alcohol**

The levels of alcohol use were higher in this study than in Study 4, but still slightly lower than was found in Study 2. 12.6% of 11-year olds said they drank regularly compared to 66.3% of 16-year olds ( $\chi^2 = 725.2$ ;  $p < .0001$ ) and it was found that more boys than girls drank alcohol (39.4% vs. 31.5%;  $\chi^2 = 40.5$ ;  $p < .0001$ ) (Table 10.3).

**Table10. 3** – Alcohol use by age and gender

	11	12	13	14	15	16	Mean
<b>Males</b>	17.5	22.7	24.6	40.8	59.7	70.1	<b>39.4%</b>
<b>Females</b>	7.1	15.5	26.1	37.3	48.9	62.2	<b>31.5%</b>
<b>Mean</b>	<b>12.6%</b>	<b>19.1%</b>	<b>30.1%</b>	<b>38.9%</b>	<b>54.3%</b>	<b>66.3%</b>	<b>35.4%</b>

Drunkenness was also examined and it was found that 80.2% of drinkers claimed to have been drunk at least once in the past year. No gender differences were found overall. Of those

who said they had been drunk, 33.8% claimed that they had been drunk in excess of twenty times in the past year while just over 45% of 15-year olds and nearly 50% of 16-year olds made the same claim (Table 10.4).

**Table 10.4** – Occasions of drunkenness in the past year amongst drinkers by age

<b>Times Drunk</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>1-2</b>	55.2	35.2	26.4	15.7	11.2	8.2	<b>17.4%</b>
<b>3-5</b>	17.2	24.7	27.1	25.7	17.5	17.8	<b>21.7%</b>
<b>6-15</b>	17.2	21.4	20.1	20.2	16.6	14.1	<b>17.9%</b>
<b>16-20</b>	3.5	5.0	7.8	11.8	9.3	10.1	<b>9.2%</b>
<b>20+</b>	6.9	13.7	18.7	26.7	45.5	49.7	<b>33.8%</b>

### **Illicit Drugs**

Illicit drug use rose from 4.7% at age 11 to 25.0% at age 15 and 25.3% at age 16 ( $\chi^2 = 175.4$ ;  $p < .0001$ ). There was a gender difference found with 17.4% of boys using illicit drugs compared with 12.6% of girls ( $\chi^2 = 17.9$ ;  $p < .0001$ ) (Table 10.5).

**Table 10.5** – Drug use by age and gender

	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Mean</b>
<b>Males</b>	7.0	11.1	10.3	16.5	30.2	27.8	<b>17.4%</b>
<b>Females</b>	1.8	4.6	9.4	14.1	20.1	22.9	<b>12.6%</b>
<b>Mean</b>	<b>4.7%</b>	<b>7.6%</b>	<b>9.8%</b>	<b>15.2%</b>	<b>25.0%</b>	<b>25.3%</b>	<b>14.9%</b>

### **Family Substance Use**

As found previously, the use of any substance within a household had a profound effect on the substance using habits of the children within that home and this was, again, found to be the case ( $\chi^2 = 27.3$ ;  $p < .0001$ ) (Table 10.6).

**Table 10.6** – Adolescent use of cigarettes, alcohol and drugs by family use

Family use	N	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
<b>Cigarettes</b>				
Not used	1952	258 (13.2%)	633 (32.4%)	169 (10.0%)
Used	2522	716 (28.4%) $\chi^2=148.7$ p<.0001	1038 (41.2%) $\chi^2=35.8$ p<.0001	355 (17.8%) $\chi^2=45.3$ p<.0001
<b>Alcohol</b>				
Not used	418	59 (14.1%)	88 (21.1%)	27 (8.0%)
Used	3826	833 (21.8%) $\chi^2=13.3$ , p<.0001	1474 (38.5%) $\chi^2=49.4$ p<.0001	459 (14.6%) $\chi^2=10.9$ p<.001
<b>Drugs</b>				
Not used	3934	757 (19.2%)	1355 (34.4%)	279 (8.2%)
Used	457	232 (50.8%) $\chi^2=233.2$ p<.0001	297 (65.0%) $\chi^2=162.7$ p<.0001	241 (64.8%) $\chi^2=903.4$ p<.0001
<b>Overall</b>	<b>5983</b>	<b>1096 (18.3%)</b>	<b>2117 (35.4%)</b>	<b>602 (14.9%)</b>

As before, these data could have been contaminated by cross use, so the influence of family cigarette smoking, when controlling for other substance use, can be found in Table 10.7.

**Table 10.7** - Adolescents use of each substance for each combination of family use.

Family use	Total number of adolescents	Number and % of adolescents using		
		Cigarettes	Alcohol	Drugs
No Use	496	85 (17.1%)	133 (26.8%)	26 (6.5%)
C Only	464	110 (23.7%)	172 (37.1%)	45 (12.8%)
A Only	1735	227 (13.1%)	584 (33.7%)	117 (8.0%)
D Only	47	17 (36.2%)	28 (59.6%)	23 (65.7%)
C & A Only	425	425 (24.5%)	658 (37.9%)	150 (10.9%)
C & D Only	56	34 (60.7%)	37 (66.1%)	26 (65.0%)
A & D Only	89	34 (38.2%)	61 (68.5%)	58 (71.6%)
C & A & D	265	147 (55.5%)	171 (64.5%)	134 (62.0%)

### Cigarettes Smoking Households

56.4% of children from Study 5 came from families with at least one smoker. Within families where there was a smoker, 28.4% of children smoked compared with 13.2% of children from non-smoking homes ( $\chi^2 = 148.7$ ; p < .0001). Children from smoking homes also drank more

(41.2% vs. 32.4%;  $\chi^2 = 35.8$ ;  $p < .0001$ ) and more used illicit drugs (17.8% vs. 10.0%;  $\chi^2 = 45.3$ ;  $p < .0001$ ) (Table 10.9).

**Table 10.9**

Adolescents who smoke from smoking and non-smoking households.

AGE	11	12	13	14	15	16
Non-Smoking households	7.9	8.2	13.1	14.3	17.7	17.2
Smoking households	12.7	15.6	25.4	32.9	37.5	43.9
Significance	$p < .159$	$p < .001$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .0001$

Adolescents who drink alcohol from smoking and non-smoking households.

AGE	11	12	13	14	15	16
Non-Smoking households	8.6	13.2	23.6	29.1	51.4	72.1
Smoking households	17.6	23.7	34.2	45.7	59.1	64.5
Significance	$p < .01$	$p < .0001$	$p < .0001$	$p < .0001$	$p < .02$	$p < .05$

Adolescents who use illicit drugs from smoking and non-smoking households.

AGE	11	12	13	14	15	16
Non-Smoking households	3.3	5.0	6.1	10.5	16.9	17.2
Smoking households	5.0	8.2	12.3	18.0	32.0	29.6
Significance	$p < .501$	$p < .075$	$P < .003$	$p < .005$	$p < .0001$	$p < .001$

### Alcohol Drinking Households

90.2% of children came from households where alcohol was used. Within alcohol using families, 38.5% of children drank compared with 21.1% of children from non-drinking homes ( $\chi^2 = 49.4$ ;  $p < .0001$ ). Children from alcohol using homes smoked more (21.8% vs. 14.1%;  $\chi^2 = 13.3$ ;  $p < .0001$ ) and more used illicit drugs (14.6% vs. 8.0%;  $\chi^2 = 10.9$ ;  $p < .0001$ ). (Table 10.10).

**Table 10.10**

Adolescents who smoke from drinking and non-drinking households.

AGE	11	12	13	14	15	16
Non-Drinking households	4.3	9.6	15.6	16.9	23.0	18.2
Drinking households	10.5	12.9	20.3	24.8	27.1	31.9
Significance	p < .181	p < .314	p < .281	p < .105	p < .483	p < .175

Adolescents who drink from drinking and non-drinking households.

AGE	11	12	13	14	15	16
Non-Drinking households	4.3	12.2	15.6	27.7	42.6	40.9
Drinking households	15.1	19.1	31.1	40.9	53.8	70.0
Significance	p < .04	p < .076	p < .002	p < .02	p < .095	p < .004

Adolescents who use drugs from drinking and non-drinking households.

AGE	11	12	13	14	15	16
Non-Drinking households	0.0	1.1	10.0	7.5	23.4	16.7
Drinking households	4.9	7.7	8.8	16.2	24.2	23.1
Significance	-	p < .01	p < .744	p < .059	p < .907	p < .527

**Illicit Drugs Households**

10.4% of children came from households where illicit drugs were used. Within drug using families, 64.8% of children themselves used illicit drugs compared with 8.2% of children from non-using homes ( $\chi^2 = 903.4$ ;  $p < .0001$ ). Children from drug using homes also smoked more (50.8% vs. 19.2%;  $\chi^2 = 233.2$ ;  $p < .0001$ ) and more used drank alcohol (65.0% vs. 34.4%;  $\chi^2 = 162.7$ ;  $p < .0001$ ) (Table 10.11).

**Table 10.11**

Adolescents who smoke from drug using and non-drug using households.

AGE	11	12	13	14	15	16
Non-Drug using households	7.6	11.4	18.6	22.0	25.6	27.9
Drug using households	59.9	40.9	53.0	52.3	46.5	59.0
Significance	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

Adolescents who drink from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug using households	12.9	16.6	29.1	35.4	51.2	65.3
Drug using households	13.6	47.0	57.6	69.4	72.8	83.3
Significance	p < .924	p < .0001	p < .0001	p < .0001	p < .002	p < .002

Adolescents who use illicit drugs from drug using and non-drug using households.						
AGE	11	12	13	14	15	16
Non-Drug using households	1.8	3.8	5.3	8.7	15.0	14.4
Drug using households	42.9	57.1	52.7	60.7	73.2	76.8
Significance	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001	p < .0001

### **Social Variables**

It was decided to look at the variables which had previously been found to be the most discriminating. Therefore this section will deal with family substance use (although not in as much detail as in Chapter 9), religiosity, academic standing and delinquency. The latter has been defined as those who have been in trouble with the police and suspended from school.

#### **Religiosity**

As previously found, substance use was related to whether or not the participants believed in any form of god. Only 44.0% of those who believed in a god used any of the substances being looked at compared with 53.7% of those who did not believe in a god ( $\chi^2 = 40.2$ ,  $p < .0001$ ). Similar differences were found for the individual substance groups: Cigarettes, 18.8% and 26.8% ( $\chi^2 = 38.5$ ,  $p < .0001$ ); Alcohol, 35.0% and 41.7% ( $\chi^2 = 20.3$ ,  $p < .0001$ ) and Illicit Drugs 11.9% and 17.1% ( $\chi^2 = 20.0$ ,  $p < .0001$ ).

#### **Academic Standing**

Differences were found between low and high academic achievers. Of those who believed they had done well at school only 44.5% used substances compared with 70.3% of those who

believed they had done badly ( $\chi^2 = 168.8$ ,  $p < .0001$ ). Differences in use of the individual substance groups were also found: Cigarettes, 19.1% and 42.1% ( $\chi^2 = 189.1$ ,  $p < .0001$ ); Alcohol, 35.2% and 54.5% ( $\chi^2 = 98.7$ ,  $p < .0001$ ) and Illicit Drugs 11.5% and 29.6% ( $\chi^2 = 142.2$ ,  $p < .0001$ ).

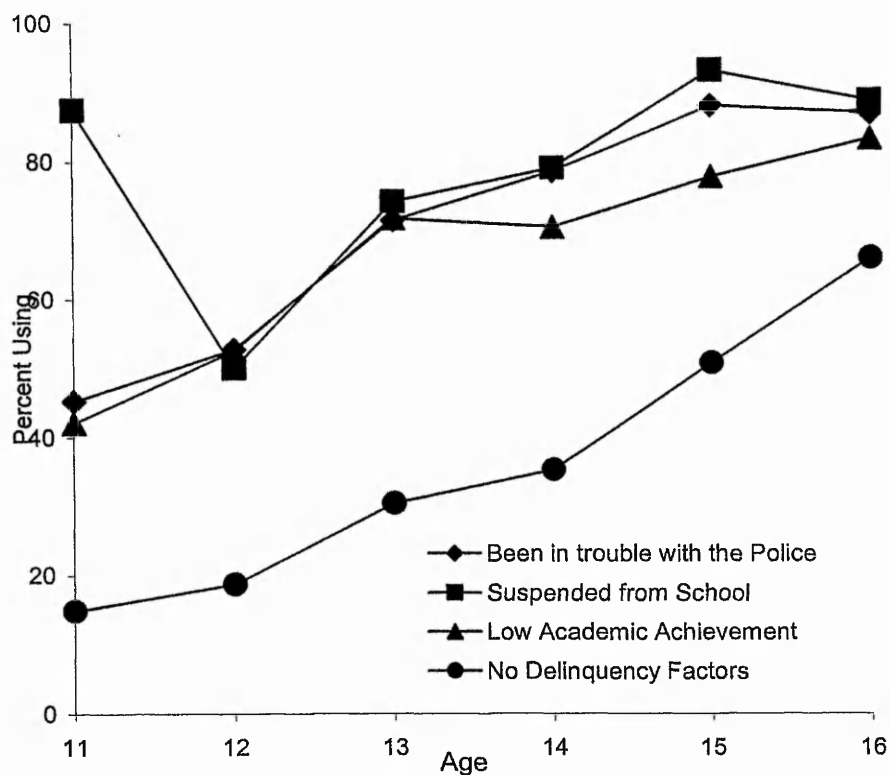
### **Delinquency**

Delinquency was assessed by looking at two main areas: Suspension from school and contact with the police. Of those who had not been suspended from school 45.6% said they used substances compared with 79.4% of those who had been suspended ( $\chi^2 = 186.6$ ,  $p < .0001$ ). Differences in the individual substance groups were found: Cigarettes, 19.3% and 54.7% ( $\chi^2 = 288.0$ ,  $p < .0001$ ); Alcohol, 35.9% and 62.8% ( $\chi^2 = 124.3$ ,  $p < .0001$ ) and Illegal Drugs 11.8% and 41.0% ( $\chi^2 = 236.7$ ,  $p < .0001$ ).

Of those who had never been in trouble with the police 37.2% had used one of the substance groups being examined here, a figure which compares to 74.9% of those who had been in trouble with the police ( $\chi^2 = 549.1$ ,  $p < .0001$ ). Again, differences in the individual substance groups was found: Cigarettes, 14.4% and 42.3% ( $\chi^2 = 420.7$ ,  $p < .0001$ ); Alcohol, 29.5% and 58.4% ( $\chi^2 = 340.4$ ,  $p < .0001$ ) and Illegal Drugs 7.6% and 31.1% ( $\chi^2 = 360.2$ ,  $p < .0001$ ).

A further grouping was developed that combined the three most discriminating categories: Low academic achievement, suspension from school and contact with police. Of those children who did not have any of these specific factors 34.7% used a psychotropic substance of some kind, of those with one risk factor 64.7% used, of those with two factors 79.3% used and of those children with three risk factors 88.7% used some kind of psychotropic substance ( $\chi^2 = 626.3$ ,  $p < .0001$ ) (Figure 10.1).

**Figure 10.1** - Percentage of adolescents in various risk groups who use illegal drugs

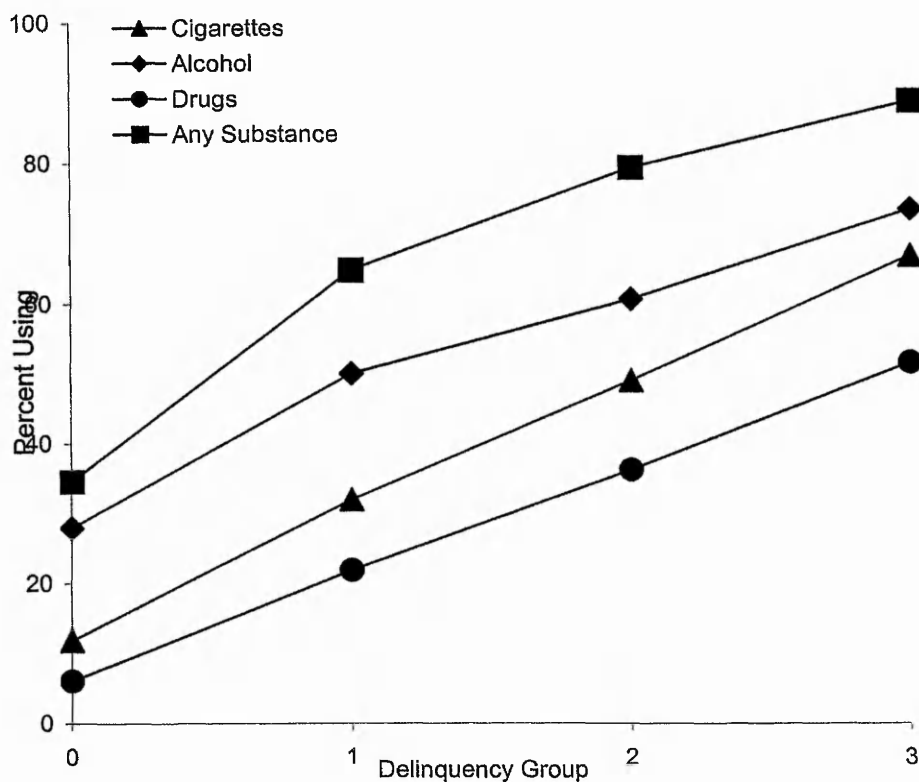


Of those with none of these risk factors 11.9% smoked cigarettes, as did 31.9% with one factor, 49.0% with two factors and 66.7% with three ( $\chi^2 = 605.7$ ,  $p < .0001$ ) (Figure 10.2)

The pattern was similar for alcohol: Of those children with none of the risk factors 27.9% drank alcohol, as did 50.0% with one factor, 60.6% with two factors and 73.3% with three ( $\chi^2 = 379.8$ ,  $p < .0001$ ).

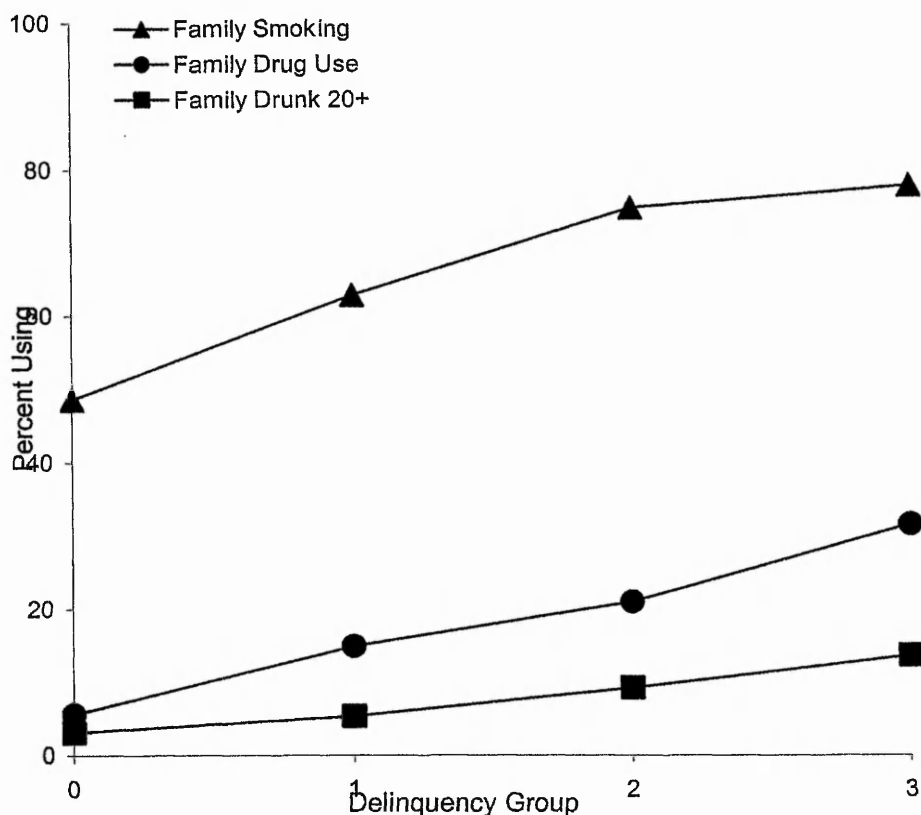
Once again, the pattern was similar for illegal drug use: Of those children with none of these risk factors 6.1% used drugs, as did 21.8% with one factor, 36.2% with two factors and 51.5% with three ( $\chi^2 = 472.6$ ,  $p < .0001$ ) (Figure 10.2).

**Figure 10.2** - Percentage of adolescents using any substance by delinquency group.



For the first time, the relationship between these delinquency levels and family substance use was looked at (Figure 10.3). It was found that in the low delinquency group 48.6% of children came from families where cigarettes were smoked compared with 77.7% from the high delinquency groups ( $\chi^2 = 161.8, p < .0001$ ). A similar picture was found for household illicit drug use with only 5.6% of children from the low delinquency group coming from homes where drugs were used. This was compared to 31.5% for children in the high delinquency group ( $\chi^2 = 206.6, p < .0001$ ). Levels of household drunkenness were also considered and of those children in the low delinquency group, only 3.1% said someone in their home had been drunk on more than twenty occasions compared with 13.6% of those in the high delinquency group ( $\chi^2 = 186.7, p < .0001$ ).

**Figure 10.3** - Household substance use by adolescent delinquency group.



### Psychological Variables

As previously described, the overall psychological risk factor of Neurotic Susceptibility to Substance Abuse (NSSA) was compared to actual use as were the four sub-traits of self-esteem, Lack of Self-concern, Depression and Anxiety.

#### **NSSA**

Increased levels of NSSA were found to be closely related to increasing substance use of all kinds ( $\chi^2 = 277.8, p < .0001$ ). NSSA was measured as Low (Level 1 through High (Level 4). 12.9% of adolescents who achieved low NSSA levels smoked compared to 32.2% with high levels ( $\chi^2 = 174.3, p < .0001$ ); 25.1% with low levels drank alcohol compared with 53.4%

who had high levels ( $\chi^2 = 222.6$ ,  $p < .0001$ ) and 10.0% of those with low levels took illicit drugs compared to 27.4% with high levels ( $\chi^2 = 129.5$ ,  $p < .0001$ ) (Table 10.12).

**Table 10.12** – The relationship of Neurotic Susceptibility to Substance Abuse to adolescent substance use (figures are percentages).

	Neurotic Susceptibility to Substance Abuse				
	1	2	3	4	$\chi^2$
<b>Any Use</b>	32.0	38.2	48.3	64.1	277.8, $p < .0001$
<b>Cigarettes</b>	12.9	14.4	19.3	32.2	174.3, $p < .0001$
<b>Alcohol</b>	25.1	31.0	38.2	53.4	222.6, $p < .0001$
<b>Drugs</b>	10.0	10.0	16.2	27.4	129.5, $p < .0001$

### Self-esteem

Low self-esteem was also found to be closely related to increasing substance use of all kinds ( $\chi^2 = 161.3$ ,  $p < .0001$ ). 15.0% of adolescents with high self-esteem (Level 1) smoked compared to 43.5% with low self-esteem (Level 4) ( $\chi^2 = 192.0$ ,  $p < .0001$ ); 32.5% with high self-esteem drank alcohol compared with 53.4% who had low levels ( $\chi^2 = 105.4$ ,  $p < .0001$ ) and 11.3% of those with high self-esteem took illicit drugs compared to 31.5% with low self-esteem ( $\chi^2 = 136.0$ ,  $p < .0001$ ) (Table 10.13).

**Table 10.13** – The relationship of self-esteem to adolescent substance use

	Self-esteem				$\chi^2$
	1	2	3	4	
<b>Any Use</b>	40.0	54.7	68.4	67.2	161.3, p <.0001
<b>Cigarettes</b>	15.0	27.2	36.9	43.5	192.0, p <.0001
<b>Alcohol</b>	32.5	41.7	57.4	53.4	105.4, p <.0001
<b>Drugs</b>	11.3	23.3	34.1	31.5	136.0, p <.0001

**Self-concern**

Levels of self-concern was also found to be closely related to increasing substance use of all kinds ( $\chi^2 = 207.3$ ,  $p < .0001$ ). 12.5% of adolescents with high self-concern smoked compared to 26.9% with low self-concern ( $\chi^2 = 99.9$ ,  $p < .0001$ ); 26.9% with high self-concern drank alcohol compared with 48.3% who had low levels ( $\chi^2 = 146.9$ ,  $p < .0001$ ) and 9.3% of those with high self-concern took illicit drugs compared to 23.2% with low self-concern ( $\chi^2 = 84.3$ ,  $p < .0001$ ) (Table 10.14).

**Table 10.14** – The relationship self-concern to adolescent substance use

	Lack of Self-concern				$\chi^2$
	1	2	3	4	
<b>Any Use</b>	33.2	38.2	47.7	59.6	207.3, p <.0001
<b>Cigarettes</b>	12.5	15.5	21.0	26.9	99.9, p <.0001
<b>Alcohol</b>	26.9	30.7	38.0	48.3	146.9, p <.0001
<b>Drugs</b>	9.3	10.9	16.2	23.2	84.3, p <.0001

## Depression

Depression was not so discriminating, but was still useful in distinguishing between users and non-users.

38.1% of adolescents with low levels of depression used one or more of the psychotropic substances under examination compared with 51.9% of those with high levels of depression ( $\chi^2 = 81.5$ ,  $p < .0001$ ). Similar findings were true for cigarettes (15.4% vs. 24.3%,  $\chi^2 = 60.8$ ,  $p < .0001$ ); alcohol (30.2% vs. 44.1%,  $\chi^2 = 73.1$ ,  $p < .0001$ ) and illicit drugs (11.2% vs. 22.3%,  $\chi^2 = 43.8$ ,  $p < .0001$ ) Table 10.15.

**Table 10.15** – The relationship of Depression to adolescent substance use

	Depression				$\chi^2$
	1	2	3	4	
<b>Any Use</b>	38.1	46.0	50.5	51.9	81.5, $p < .0001$
<b>Cigarettes</b>	15.4	16.1	23.7	24.3	60.8, $p < .0001$
<b>Alcohol</b>	30.2	38.7	40.1	44.1	73.1, $p < .0001$
<b>Drugs</b>	11.2	16.0	16.2	22.3	43.8, $p < .0001$

## Anxiety

As expected, Anxiety was the least discriminating of the four sub-traits, but was still useful in distinguishing between users and non-users. 23.2% of adolescents with low Anxiety smoked cigarettes compared with 20.5% of those with high Anxiety ( $\chi^2 = 18.7$ ,  $p < .0001$ ). A similar pattern was found with alcohol (30.3% vs. 42.1%,  $\chi^2 = 51.4$ ,  $p < .0001$ ) and with illicit drugs (14.5% vs. 19.4%,  $\chi^2 = 30.9$ ,  $p < .0001$ ) (Table 10.16).

**Table 10.16** – The relationship of Anxiety to adolescent substance use.

	Anxiety				$\chi^2$
	1	2	3	4	
<b>Any Use</b>	41.5	41.1	40.2	51.0	51.2, $p < .0001$
<b>Cigarettes</b>	23.2	17.8	16.0	20.5	18.7, $p < .0001$
<b>Alcohol</b>	30.3	32.2	33.4	42.1	51.4, $p < .0001$
<b>Drugs</b>	14.5	12.2	12.8	19.4	30.9, $p < .0001$

### **Models of Adolescent Substance Use**

Although interesting findings have been made from these data, the primary purpose of this chapter is to validate the models developed in Chapter 9, therefore the same analyses were carried out using the same criteria as earlier.

#### **Cigarettes**

In light of the findings of the previous chapter, it was decided to include other current substance use in the model. It had been hoped not to have to include these, but given the amount of variance which was excluded when these areas were not built in, it has been decided to factor them into the models.

Overall the model, below, was capable of accounting for 73.6% of the variance with 85.9% of non-smokers being correctly identified compared to 55.6% of smokers at a confidence level of 95%. A Hosmer and Lemeshow goodness-of-fit test was carried out on the model and it was found that the chi-square value was in excess of .01, therefore it can be said that the model adequately fits the observed data at a confidence level of 99% ( $\chi^2 = 12.7$ ,  $p < .07$ ). The p-values for the residuals were greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

**Table 10.17**

<b>Factors</b>	<b>Odds Ratio</b>	<b>Significance</b>
Problem Drinking	5.6	.0001
Illicit drug use	5.1	.0001
Delinquency	2.8	.004
Household drug use	2.8	.0005
Gender (F)	2.7	.0001
Household problem drinking	2.2	.0001
Family structure	2.1	.003
Household cigarette use	2.0	.0001
Academic standing	1.8	.01
self-esteem	1.5	.0008
Lack of religiosity	1.5	.0006
Age	1.2	.0001
<b>Mean Odds Ratio</b>	<b>2.6</b>	<b>-</b>

### **Alcohol (Problem Use)**

As discussed previously (Chapter 9) simple alcohol use was not modeled as it a fairly normal part of our society, but problem drinking, or alcohol abuse, will be examined. As before, problem drinkers were defined as those who had been drunk in the past year:

Age 11: On 1+ occasions

Age 12: On 2+ occasions

Age 13: On 3+ occasions

Age 14: On 4+ occasions

Age 15-16: On 5+ occasions

Overall the model, below, was capable of accounting for 80.8% of the variance with 9.3% of adolescents without a drinking problem being correctly identified compared to 66.1% of those with a problem (C.I. 95%). A Hosmer and Lemeshow goodness-of-fit test was carried out on the model and it was found that the chi-square value was in excess of .01, therefore it can be said that the model adequately fits the observed data at a confidence level of 99% ( $\chi^2 = 9.4$ ,  $p < .311$ ).

The p-values for the residuals were greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No serious multicollinearity was found to exist.

Table 10.18

Factors	Odds Ratio	Significance
Illicit drug use	5.1	.0001
Cigarette Use	4.9	.0001
Household problem drinking	3.4	.0001
Age	3.0	.0001
Delinquency	2.4	.0001
Household drinking	2.3	.0001
Family structure	2.0	.003
Household drug use	1.6	.07
Lack of religiosity	1.5	.0006
Academic standing	1.4	.03
Lack of Self-concern	1.3	.0001
<b>Mean Odds Ratio</b>	<b>2.6</b>	<b>-</b>

### Illicit Drugs

Overall the model, below, was capable of accounting for 90.4% of the variance with 97.6% of non-drug users being correctly identified compared to 44.3% of drug users at a confidence level of 95%.

A Hosmer and Lemeshow goodness-of-fit test was carried out on the model and it was found that the chi-square value was in excess of .01, therefore it can be said that the model adequately fits the observed data at a confidence level of 99% ( $\chi^2 = 10.5$ ,  $p < .225$ ). The p-values for the residuals were greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No multicollinearity was found to exist.

Table 10.19

Factors	Odds Ratio	Significance
Household drug use	13.5	.0001
Cigarette Use	5.1	.0001
Household problem drinking	3.4	.0001
Delinquency	2.2	.0001
Alcohol use	2.1	.0001
Age	2.1	.0001
Academic standing	1.8	.004
Lack of religiosity	1.6	.006
Lack of Self-concern	1.2	.02
<b>Mean Odds Ratio</b>	<b>3.7</b>	<b>-</b>

### Any Substance Use

As a final exercise it was decided to see if a model could be developed which was capable of adequately describing the variables involved with any type of substance use in adolescents. The model was developed using only items not related to personal substance use. The model able to account for most of the variance, and therefore best suited to predicting any substance use, was composed of:

**Table 10.20**

<b>Factors</b>	<b>Odds Ratio</b>	<b>Significance</b>
Contact with the police	3.6	.0001
Household drug use	3.5	.0001
Age	2.8	.0001
Suspension from school	1.9	.0001
Household drunkenness	1.7	.0001
Household alcohol use	1.5	.04
Low self-esteem	1.4	.0002
Lack of Self-concern	1.3	.0001
<b>Mean Odds Ratio</b>	<b>2.2</b>	<b>-</b>

Overall the model, below, was capable of accounting for 72.2% of the variance with 79.8% of non-substance users being correctly identified compared to 63.3% of substance users at a confidence level of 95%. A Hosmer and Lemeshow goodness-of-fit test was carried out on the model and it was found that the chi-square value was in excess of .01, therefore it can be said that the model adequately fits the observed data at a confidence level of 99% ( $\chi^2 = 19.2$ ,  $p < .013$ ). The p-values for the residuals were greater than 0.10, indicating that the model was not significantly worse than the best theoretical model for this data at a 95% or higher confidence level. No multicollinearity was found to exist.

### Prevalence rates across Studies 2, 4 and 5

As a final exercise, prevalence rates across Studies 2, 4 and 5 were compared.

## Cigarettes

Differences were found in levels of cigarette smoking across the three main studies, particularly within age groups and genders. An overall difference was also observed ( $\chi^2 = 34.41$ ;  $p < .0001$ ). (Table 10.21).

**Table 10.21** – Cigarette use by age and gender across three studies

### Study 2

	11	12	13	14	15	16	Mean
<b>Males</b>	2.3	6.6	15.8	21.3	26.5	26.4	17.3%
<b>Females</b>	7.7	12.3	17.6	22.3	32.4	26.8	20.9%
<b>Mean</b>	5.5	9.1	16.7	21.8	29.5	26.6	19.1%

### Study 4

	11	12	13	14	15	16	Mean
<b>Males</b>	4.5	5.4	10.6	19.0	19.8	21.1	13.2%
<b>Females</b>	3.7	7.1	10.6	18.9	28.0	29.6	15.7%
<b>Mean</b>	4.1	6.2	10.6	18.9	23.8	25.4	14.4%

### Study 5

	11	12	13	14	15	16	Mean
<b>Males</b>	6.8	8.7	13.9	18.4	23.6	26.4	15.8%
<b>Females</b>	5.5	9.6	20.6	27.0	28.6	35.6	20.8%
<b>Mean</b>	6.2	9.1	17.4	22.8	26.1	30.8	18.3%

## Alcohol

A difference was also found in alcohol use with Studies 2 and 4 reporting higher levels than Study 5 ( $\chi^2 = 723.85$ ;  $p < .0001$ ).

**Table 10.22** – Alcohol use by age and gender across three studies

### Study 2

	11	12	13	14	15	16	Mean
<b>Males</b>	32.3	45.0	57.2	70.3	72.1	73.6	60.4%
<b>Females</b>	29.2	38.7	55.3	69.5	80.1	90.7	62.8%
<b>Mean</b>	30.5	42.2	56.3	69.9	76.6	82.8	61.6%

#### Study 4

	11	12	13	14	15	16	Mean
<b>Males</b>	24.1	25.2	39.1	49.5	68.0	68.3	<b>44.3%</b>
<b>Females</b>	10.2	17.8	34.9	52.4	70.7	64.8	<b>41.9%</b>
<b>Mean</b>	<b>17.3</b>	<b>21.6</b>	<b>37.1</b>	<b>51.0</b>	<b>69.3</b>	<b>66.5</b>	<b>43.1%</b>

#### Study 5

	11	12	13	14	15	16	Mean
<b>Males</b>	17.5	22.7	34.6	40.1	59.7	70.1	<b>39.4%</b>
<b>Females</b>	7.1	15.5	26.1	37.3	48.9	62.2	<b>31.5%</b>
<b>Mean</b>	<b>12.6</b>	<b>19.1</b>	<b>30.1</b>	<b>39.0</b>	<b>54.3</b>	<b>66.3</b>	<b>35.4%</b>

### Drugs

Differences were also found in drug use across the studies ( $\chi^2 = 175.13$ ;  $p < .0001$ ) with Study 4 showing less use than either Study 2 or Study 5.

**Table 10.23** – Drug use by age and gender across three studies

#### Study 2

	11	12	13	14	15	16	Mean
<b>Males</b>	1.1	4.6	6.7	20.4	34.2	34.0	<b>17.2%</b>
<b>Females</b>	1.2	1.4	6.5	13.8	23.8	29.9	<b>13.3%</b>
<b>Mean</b>	<b>1.2</b>	<b>3.2</b>	<b>6.6</b>	<b>17.2</b>	<b>28.9</b>	<b>31.8</b>	<b>15.3%</b>

#### Study 4

	11	12	13	14	15	16	Mean
<b>Males</b>	0.9	1.4	5.0	10.0	14.7	13.0	<b>7.2%</b>
<b>Females</b>	0.9	1.3	1.4	7.7	13.8	8.8	<b>5.5%</b>
<b>Mean</b>	<b>0.9</b>	<b>1.3</b>	<b>3.3</b>	<b>8.8</b>	<b>14.3</b>	<b>10.9</b>	<b>6.4%</b>

#### Study 5

	11	12	13	14	15	16	Mean
<b>Males</b>	7.0	11.1	10.3	16.5	30.2	27.8	<b>17.4%</b>
<b>Females</b>	1.8	4.6	9.4	14.1	20.1	22.9	<b>12.6%</b>
<b>Mean</b>	<b>4.7</b>	<b>7.6</b>	<b>9.8</b>	<b>15.2</b>	<b>25.0</b>	<b>25.3</b>	<b>14.9%</b>

## **Conclusions**

Adolescent substance use is bound to fluctuate, and when research is carried out in geographically diverse areas across several years this is particularly true. When comparing data from numerous different schools, none of which have been matched, it can be expected that considerable differences will be found in prevalence rates, however these data were remarkably consistent.

In addition, the models which were developed were also stable across studies. The conclusion which can be made as a result of this research is that the Substance Abuse Susceptibility Index is a valid instrument capable of identifying adolescents at risk from substance abuse. Having said that, questionnaire design is a dynamic process and future iterations of the questionnaire will change, not only to reflect changing societal values, but also to respond to changes in the psychometric values returned by ongoing analysis.

## **Limitations and Values**

The main limitations of this series of studies was the fact that they were all cross-sectional. Clearly, more significant findings would have emerged if longitudinal data had been obtained. The practical value of this work is that an instrument has been developed which can discriminate between users and non-users of cigarettes and alcohol. In addition, many factors, such as self-esteem which have been examined individually have now been coalesced into a single model.

## **CHAPTER 11 – THE BIOPSYCHOSOCIAL MODEL**

The purpose of this thesis was to develop a psychometric instrument designed to identify adolescents at risk from future substance abuse before the beginning of their substance using careers. The behaviour of adolescents is multifaceted and coupled with substance use gives the researcher an exceptionally complex interaction that is difficult to assess. When the two facets of adolescence and substance use are combined it makes research into causality extremely complex and, to date, unsatisfactory. The conclusions reached by this research is that the only logical way forward is to integrate this work into a biopsychosocial approach. Given the limitations of the work (the lack of a biological component and the cross-sectional nature of the data), it is believed that the development of the SASI has been of only a limited success, but has proved sufficiently robust upon which to form a foundation for further work which is currently ongoing.

Before a detailed discussion of a biopsychosocial model and its' relationship to this work a definition of a theory is needed. An addiction philosophy or theory is an abstract framework that organizes the concept of substance misuse into a set of fundamental intuitive principles. As such, any theory permits its adherents to prioritize problems and to search for and discover solutions to these problems within the context or boundary conditions of the theory. Through distinct relationships between terms and concepts, each theory provides a unique perspective of substance misuse easily recognizable to its proponents. Finally, a good theory is testable and replicable, and rigorous scientific evaluation via randomized controlled trials is considered to be the "gold" standard. Such a verification mechanism permits adherents to become increasingly confident in the correctness of their choice as empirical support accumulates (Roth, 2000).

### **An overview of the biopsychosocial model**

Over the past two decades, researchers and clinicians have been developing and testing the biopsychosocial theory. It should be stated that this research has not been confined to

substance abuse but has been applied to everything from cardiac disease, anxiety to diabetes (Sutherland & Willner, 1998). However, to return to substance use, this theory postulates that substance misuse is the net result of a complex interaction between a combination of biological, psychological, social, and, on occasion, spiritual determinants. By adopting a multivariate approach, the biopsychosocial theory has provided a new conception of substance misuse that directs attention towards a new set of questions about the nature of substance misuse, although the causes may be vague. One writer has summarized these questions as follows: "what substance misuse syndromes at which stage of their development and in what kinds of patients respond under what conditions in what short and long range ways to what measures by whom?" (Lindstrom, 1992). This latter quote appears at first reading to be somewhat confusing, but once the language is deciphered, it does make intuitive sense.

Although knowledge of causality remains elusive, several hypotheses related to how we think about and respond to addictions can be generated from the biopsychosocial theory including:

1. Substance misuse embraces a variety of syndromes including dependency syndrome and substance misuse related disabilities.
2. Substance misuse lies upon a continuum of severity from mild craving to death.
3. The development of substance misuse follows a variable pattern over time and may or may not progress to a fatal stage depending on the type of syndrome and/or the degree of severity.
4. Because the elements in the experience of addiction will differ between individuals, there is no one superior treatment for all substance misuse.
5. The population of substance misusers is heterogeneous and defy stereotyping.
6. Successful treatment is contingent upon accurate and comprehensive assessment and matching of affected individuals to the most appropriate treatment.
7. Recovery may or may not require abstinence, depending upon the degree of severity and/or the type of syndrome.

Importantly the biopsychosocial model recognizes that substance abuse problems may develop in anyone and may produce many, and differing consequences. A variety of treatment/intervention options must therefore be considered so treatment can be matched to the needs, strengths and circumstances of each resident.

However, although the basics of the biopsychosocial model have just been outlined, what actually is a biopsychosocial model? Broadly speaking it is a model which brings together the three main areas which effect each individual: Biology (genetics), Psychological influences (personality conditions such as self-esteem, beliefs and attitudes) and Social factors (such as family and peer influences).

Models have been developed which show clearly that a range of variables affect an adolescents propensity to substance use. These include family use, family structure, peer pressure, academic expectations, religiosity and various psychological variables such as low self-esteem (Sutherland & Shepherd, 2001). However, it is acknowledged that further variables will undoubtedly emerge in the future which will necessitate additional research. This will, in particular, include genetically orientated research.

If a 'typical' adolescent development pattern is examined, it may shed some light on why a biopsychosocial approach is so necessary for future research in this and other areas. During the adolescent period, adolescents are primarily charged from turning from children into adults with all the responsibilities that bares. For instance they face splitting from their family of origin, they have to form new relationships from positive or negative peer groups, they are socially expected to find a boy/girlfriend and they have to consider, for the first time, looming financial responsibilities. Simultaneously, whether male or female, they are facing significant hormonal changes and are having to come to terms with their growing sexuality. The world of adolescents in the 1990s is nothing like it was in the 1960s, 1970s and even the 1980s (Taibbi, 1990). Although adolescents have always gone through emotional and physical changes they are now faced by a barrage of additional obstacles, for instance: Constant advertising on what they should be wearing, eating and drinking; teenage pregnancy; sexually transmitted

diseases; dysfunctional parents; gang and peer pressure, something seen more and more in the UK in recent years.

As noted earlier in this thesis (Chapter 1), there are numerous, often single factor, but sometimes multi-dimensional theories of adolescent substance abuse. Although many of these models are useful in painting a small piece of the overall picture they are often confusing and, above all, conflicting (Lawson & Lawson, 1992). It has been suggested by Shedler and Block (1990), (and is also an idea supported by this thesis), that adolescent substance abuse is a symptom rather than a cause of social and personal maladjustment and that it is only within the context of an individual's personality and upbringing that substance abuse can be understood. This is fine as far as it goes, but it leaves out the genetic component of the biopsychosocial model. However, in a study Lawson et al, (1984) they developed an early biopsychosocial model which still appears to apply today. Their model consisted of:

#### **Physiological factors**

1. Physical addiction
2. Disease or physical disorders
3. Related medical problems
4. Inherited risk (genetic factors)
5. Adolescent hormonal factors
6. Physical development level
7. Mental disorders (with physiological factors).

#### **Sociological Factors**

1. Ethnic and cultural differences
2. Family background
3. Education

4. Employment
5. Peer relationships
6. School environment.

#### **Psychological Factors**

1. Social skills
2. Emotional levels
3. Self image (Self-esteem)
4. Attitude toward life
5. Defensive mechanisms
6. Developmental levels
7. Mental obsessions
8. Judgment
9. Decision making skills.

In earlier work, Tarter and Schneider (1976) identified fourteen variables which they claimed were responsible to alcoholism. As discussed earlier in this thesis (Chapter 1), there are few true differences between alcohol abuse and illicit substance abuse other than on a legal and cultural level, therefore it is worth presenting their early model here. Although it is not a true biopsychosocial model, but is more family based, it does have elements of the biopsychosocial model within it and shows how early scholars within this area were beginning to think. Such factors include:

Childhood exposure to alcohol and excessive drinking models; The quantity of alcohol that is considered appropriate or excessive within the family; Family drinking customs; The type of alcohol used; Levels of inhibition considered safe within the family; The symbolic meaning of alcohol; Family attitude towards public intoxication; The social group associated with

drinking; Activities associated with drinking; The amount of pressure exerted for an individual to drink, including quantity drank; The use of alcohol in social or private context; The individual's mobility in changing drinking preference groups; The permanence of drinking; The social rewards of drinking.

In addition, four parent types have been associated with increased adolescent drinking by Lawson et al (1983): The alcoholic parent; the teetotal parent; the over-demanding parent and the overprotective parent.

In particular Lowe et al (1993) agree with Lawson et al (1983), but, again, this is not a true biopsychosocial explanation for adolescent substance, but rather focuses on the family which is the antithesis of the biopsychosocial model which should encompass all aspects of a person and take an holistic view.

As already noted (Chapter 1), the earlier models developed, although not ideal or complete, are supported by the background literature. For instance at the heart of the Adaptive Model is a combination and interaction of faulty upbringing, environmental inadequacy and genetic unfitness (Alexander, 1987) and although the latter premise was untested, the rest of Alexander's propositions were supported. One of the most important areas where this research was conducted was in the area of personality and after considerable discussion in Chapter 1, it can be concluded that Costa and McCrae's (1985) Five Factor theory of personality has emerged as one that appears likely to unify researchers (Deary & Matthews, 1993). This is true not only in the field of substance abuse, but in many other areas of psychology too, but it must be stated that this does not support the concept of a unique 'addictive personality'. Graham and Strenger (1988) concluded that no single personality type is characteristic of all alcoholics and, as such, the continued acceptance of an addictive personality was not appropriate. This evidence suggests that substance abusers are not necessarily united by a common, addictive, personality, however, they may differ in other aspects of personality to non-users or non-abusers. Nevertheless, aspects of personality have also received considerable support (Angleitner, 1991; Wiggins & Broughton, 1991; Digman,

1990) in the field of substance abuse. Although not specifically utilising Costa and McCrae's formulation of Neuroticism, several studies have found that this general trait is elevated in substance users (Tartar, 1988; Sieber & Bentler, 1982), lending credence to the idea that Neuroticism might be a valid construct to look at in this particular area.

Other theories such as the self-medication hypothesis first put forward by Khantzian (1985, 1986) and the tension reduction hypothesis (Conger, 1956) were discussed earlier in Chapter 1, but no support within the framework of the SASI was found. That does not mean that these theories do not have merit and are not worthy of further study.

The biopsychosocial theme is the only logical one to pursue, not only in the field of substance abuse, but in all forms of psychology and, latterly, medicine. It is impossible to gain a true picture of a person's behaviour without looking at all aspects of their lives. For instance, the Bio part of the model refers, mainly, to genetic influences. Central to this view is that no level of analysis is sufficient to explain either the etiology or maintenance of substance abuse behaviour, and that all research, at whatever level of analysis, is context bound and should be analysed from a biopsychosocial perspective

Substance abuse is a complex, multi-dimensional activity that is not going to be explained by any single theory. Instead, this research is best served by a biopsychosocial model which stresses the individuality and idiosyncratic nature of the development of substance abuse problems, and the role of contextual factors internal and external to the process of drug use itself.

By examining substance abuse as a biopsychosocial behaviour it becomes evident that individual differences must be considered and not ignored. What is more, habitual behaviours alter the perceived experience of the individual and this needs to be taken into account in a therapeutic context. As Gambino and Shaffer (1979) pointed out over two decades ago, individuals are self determining agents and that a taxonomy of situations must be developed that describes the vast majority of contexts and conditions in which people use substances or engage in habitual behaviours to alter their perceived experience. They also make the

important point that these behaviours are not completely self developed or understood by the people themselves and therefore must be compensated for. When it comes to treatment more generally (and taking a biopsychosocial overview), it can be concluded that it is better to be treated than not to be treated, it does not seem to matter which treatment you go for, no one treatment is better than any other and a variety of treatments simultaneously appear to be beneficial (Peele, 2000).

### **Advantages of the Biopsychosocial Theory**

The biopsychosocial theory is a conceptual framework that allows attention to be focused on all problems related to substance misuse. This allows those who develop policy and programs for, or provide services to, people affected by substance misuse (either their own or someone else's) to address the broad range of problems, from problems which are just beginning to those that are long standing. The continuum of substance misuse generates a continuum of services. Furthermore, early intervention services for those clients with less severe substance misuse problems are considered to be as important as services for people with more severe problems.

The biopsychosocial theory characterizes the population of substance misusers as heterogeneous and recognizes the importance of comprehensive individual assessment in order to adequately determine client treatment needs. The biopsychosocial theory also allows for the delivery of harm reduction services that minimize health risk to substance misusers who continue to engage in high risk behaviour. The theory considers substance misuse as embracing a variety of substance misuse disabilities and supports the concept of a hierarchy of harm reduction outcome goals including abstinence related goals.

One of the great advantages of the biopsychosocial approach is that it is open to empirical scrutiny unlike some other treatments such as self-help groups (Narcotics Anonymous and Alcoholics Anonymous for example) who refuse scientific scrutiny. Sometimes misrepresented as a Disease and/or Moral Model, the Twelve Step Spiritual Theory pioneered

by Alcoholics Anonymous has been studied to a very limited degree. However, most outcome research pertaining to AA is correlational and frequently confounded by other treatment variables. Therefore, the relationship between AA involvement and reduction or cessation of drinking is uncertain. There is a paucity of prospective and longitudinal studies, and both female and young AA members are underrepresented in existing research, especially considering nearly a third of AA members in North America are female (Emrick et al., 1993). Future prospective, as opposed to retrospective, research is needed in order to better understand AA; hopefully some of the traditional barriers to researching this very popular and important organization will be removed.

The various hypotheses generated by the biopsychosocial theory can be tested scientifically. Moreover, the intuitive appeal of these hypotheses creates a sense of optimism that scientific support is attainable. At present, this theory is still primarily a set of working hypotheses requiring further testing and verification. It is important to understand that the purpose of scientific investigation is not to verify the theory absolutely. Contemporary philosophers of science have argued persuasively that no theory can be proven absolutely right or wrong (Kuhn, 1970). No amount of empirical evidence can remove all scepticism nor does a single falsification necessarily result in negation. However, the level of confidence in the correctness of the theory heightens as increasing empirical support is gathered. Support for this theory should accumulate as more studies are developed and scientific trials are performed. Already, research exists supporting the notion that there is no one superior treatment for all substance misuse, and at least one large multi centre trial is currently underway testing the matching hypothesis (Sutherland & Shepherd, 2001).

Historical empirical support for the older theories of addiction ranges from none for most to substantial for a few. For example, there is virtually no scientific support for the Moral Model (Brickman, 1982). The hypothesis that low moral standards or bad character cause substance misuse has not been substantiated by research. In fact, studies show that antisocial behaviour is normally a consequence of addiction rather than a cause. Although the Symptomatic Model predicts remission of substance misuse if the underlying mental disorder is treated, the

scientific literature shows poor outcome results with insight oriented psychotherapy along with high drop out rates during treatment. Most would now agree that, although substance misuse and psychiatric illnesses co-exist and interact, these conditions are distinct. With respect to the Social Theory, there is little evidence to support a direct causal relationship between social problems alone and the development of substance misuse.

In the spirit of preserving empirically sound elements of older theories, the biopsychosocial theory incorporates both the concept of chemical dependency as well as certain principles of learning theory.

The biopsychosocial theory hypothesizes that substance misuse lies upon a continuum of severity and embraces a variety of syndromes and substance misuse related disabilities including dependency syndrome. Therefore, prior research related to chemical dependency syndrome is acknowledged; dependency syndrome is accepted as a real condition; clinical application and future research pertaining to this syndrome is encouraged. As biotechnology improves (medical imaging, genetic screening) the role of biology in the development and maintenance of addiction should become clearer. Furthermore, the biopsychosocial theory hypothesizes that successful treatment is contingent upon thorough assessment and proper matching of clients to appropriate treatment options. By incorporating important principles of learning theory, the biopsychosocial theory preserves many valid concepts that have lead to the development of effective behavioural therapies successfully applied in the treatment of substance misuse.

The biopsychosocial theory preserves appealing intuitive concepts of older theories that have either not been previously tested or, in some instances, not tested properly. This theory postulates a role for social and spiritual factors in the development of and recovery from substance misuse and allows for future analysis of these elements.

The biopsychosocial theory unifies prior biological, psychological, and social theories of addiction. The net result is the synthesis of a unique conceptual framework comprised a unique set of hypotheses. The new theory is not simply a bolted together version of the older theories, each of which: prioritizes problems differently, but has its own distinct relationships

between terms and concepts; and essentially locks practitioners of different theories into separate worlds isolated from one another. The biopsychosocial theory appears to be a ideal candidate that integrates a diverse population of addiction professionals to work together towards solutions to a wide variety of serious problems under the umbrella of common terminology and concepts.

The biopsychosocial theory of substance misuse is congruent with other modern theories of health and education. To cite two examples, both women's and older adults' health issues are beginning to be framed within models that: 1) acknowledge population diversity on all dimensions of health; 2) promote the matching of individuals with certain characteristics to specific treatments; and 3) measure treatment success along more than one dimension. Within the context of these models, assessment is crucial to understanding the needs of the client and emphasis is directed towards achieving outcomes that are in the client's best interest. Similarly, in education, modern constructivist learning theories accent the importance of understanding the individual learner's capabilities and potential. Comprehensive assessment is followed by the selection of an educational experience most suited to specific needs and abilities.

By adopting a substance misuse theory that is consistent with other helping disciplines, linkages to prevention and treatment components within and outside of the health care domain are facilitated. True case management becomes possible through the medium of common terminology and concepts. Smoother, less traumatic, movement of clients through the broad system of care eases the stress to both providers and beneficiaries of services. Because most substance misuse prevention efforts are through the application of education strategies, consistency between substance misuse and education theory is essential in order to maximize success in the area of prevention

### **Disadvantages of the Biopsychosocial Theory**

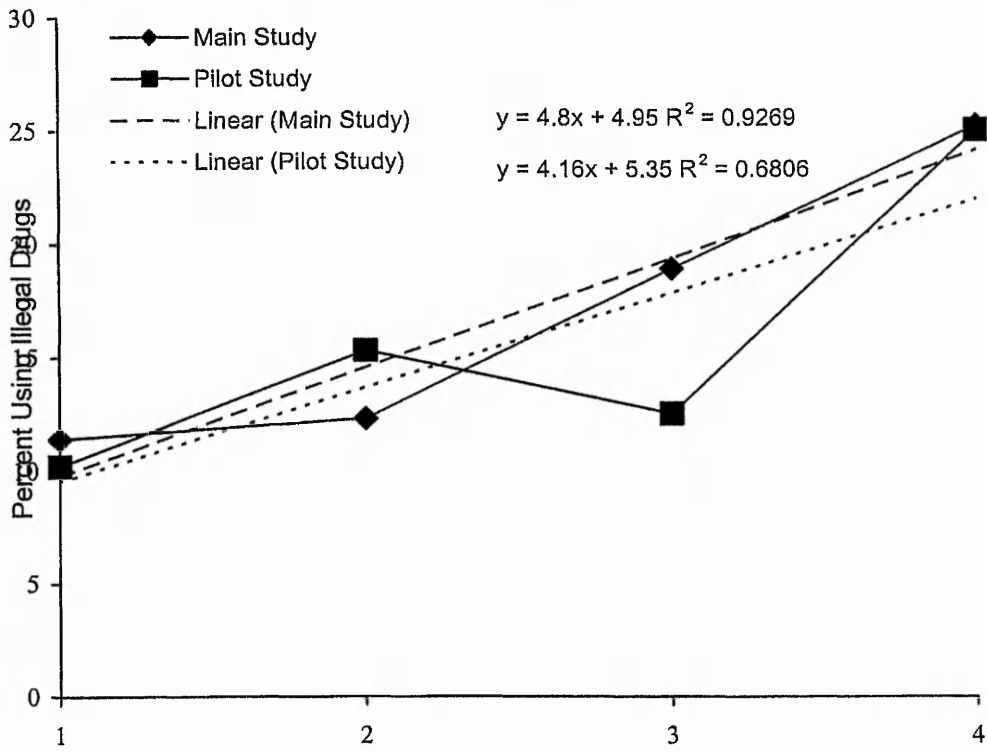
Unusually in psychology, as well as other related disciplines, it is very difficult to see any major disadvantages to the biopsychosocial theory. One criticism may be that it is overly complex, but, as pointed out earlier, substance use, especially adolescent substance use, is a particularly complex area. However, with improved computer aided techniques such as structural equation modeling, teasing apart the variables should become easier, particularly on an individual level.

### **Conclusions**

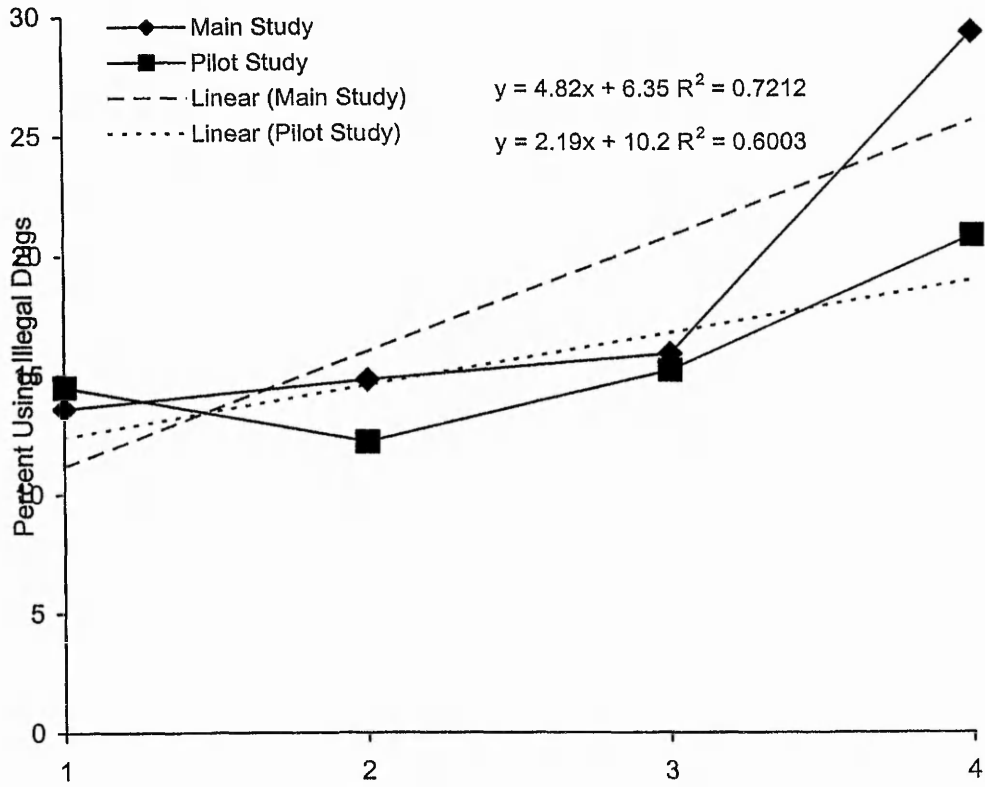
The research presented in this thesis is by no means complete. Questionnaire development is a dynamic process and needs to respond not only to new discoveries in the field, but also to changes in biopsychosocial conditions. It is the author's intention, funding permitting, to carry out a longitudinal programme of research incorporating a genetic component. This is necessary in order to complete work on an adolescent based substance abuse biopsychosocial model. However, it is believed that this research is the beginning of a strand of ongoing work and that although not complete from a biopsychosocial perspective, it has drawn together the psychological and sociological strands of the overall model.

## APPENDIX 1

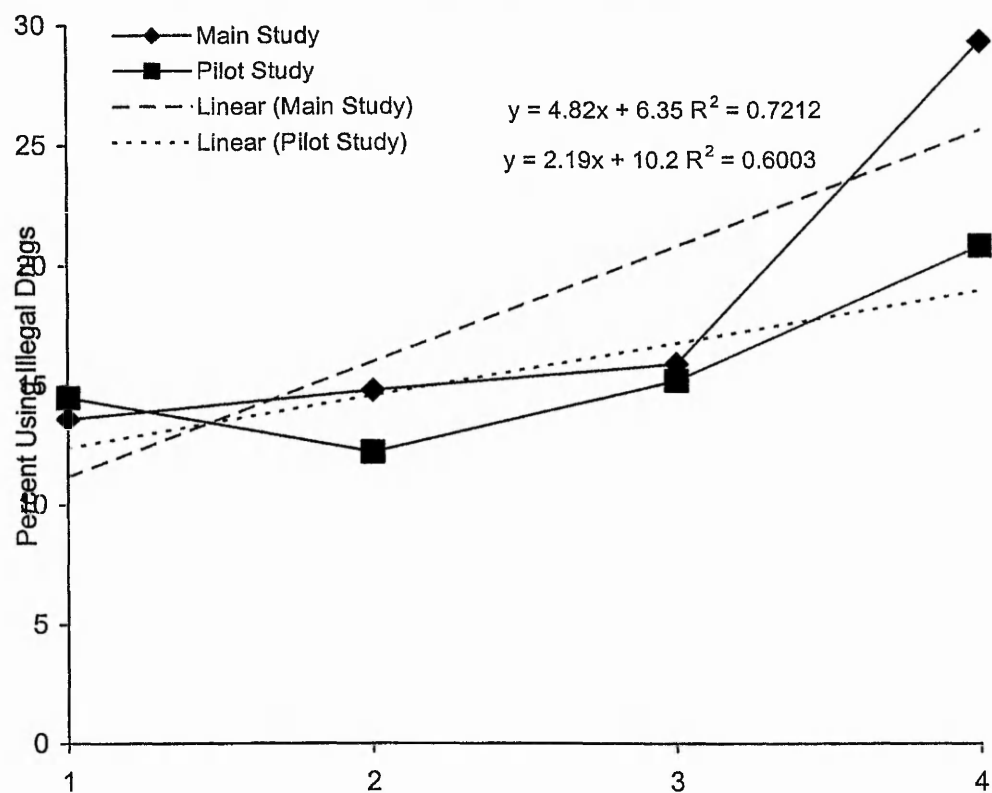
Regression analysis Depression 1: Main Study and Pilot Study



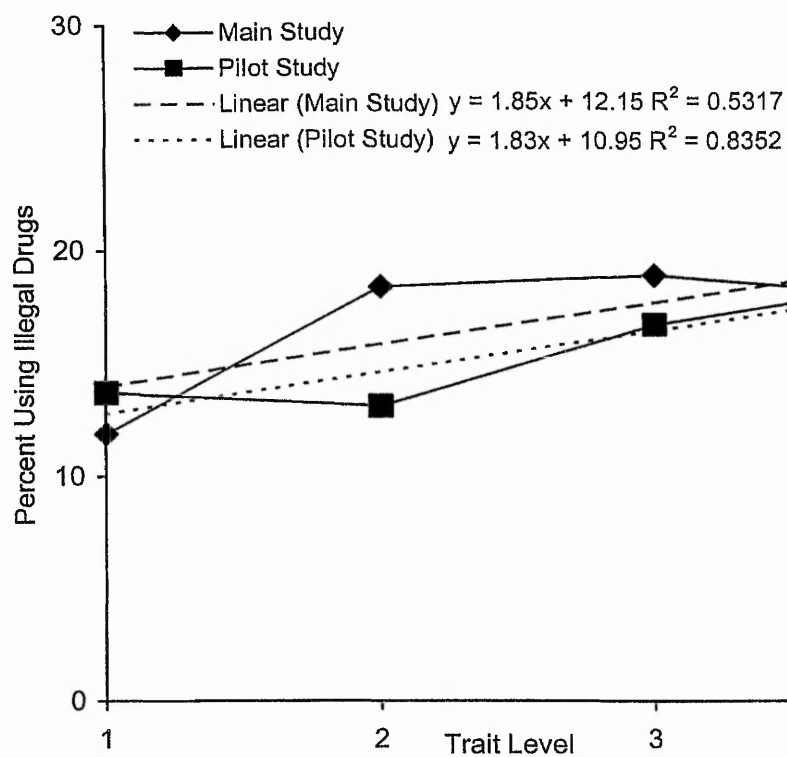
Regression analysis Self-esteem 1: Main Study and Pilot Study



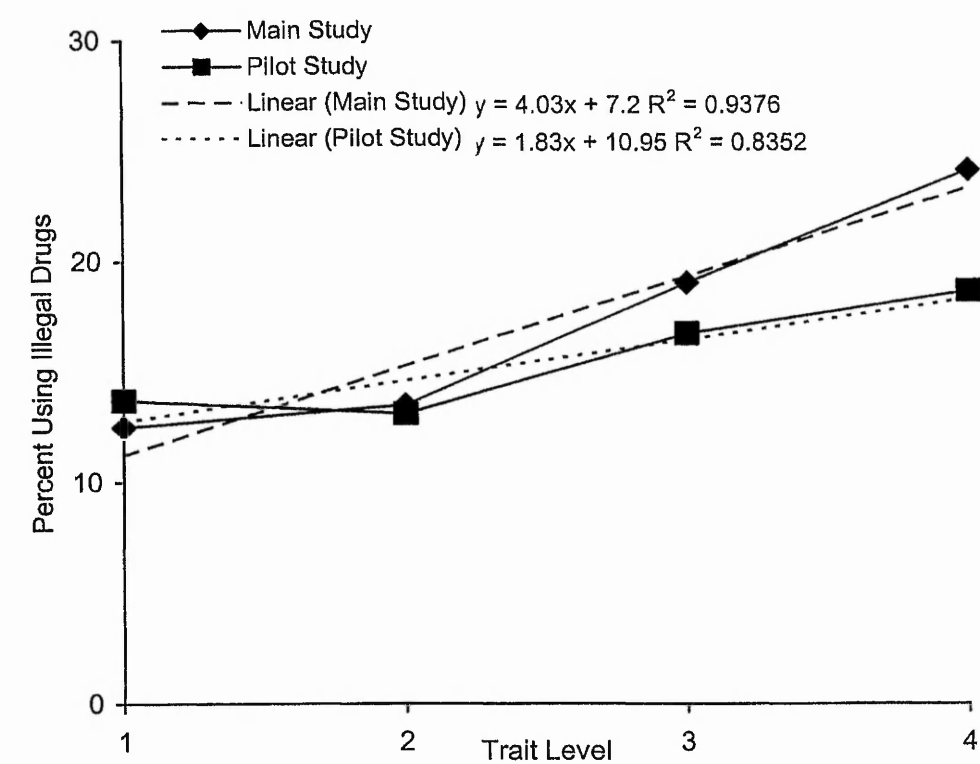
# Regression analysis Hypochondria 1: Main Study and Pilot Study



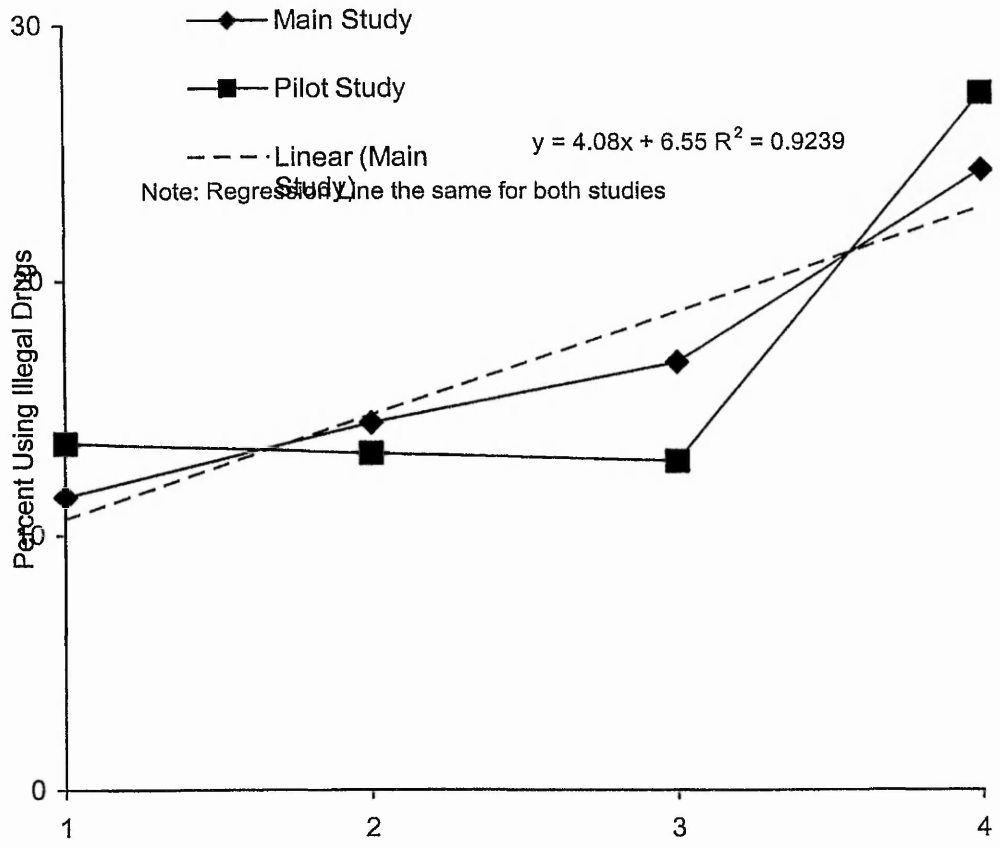
Regression analysis Hostility 2: Main Study and Pilot Study



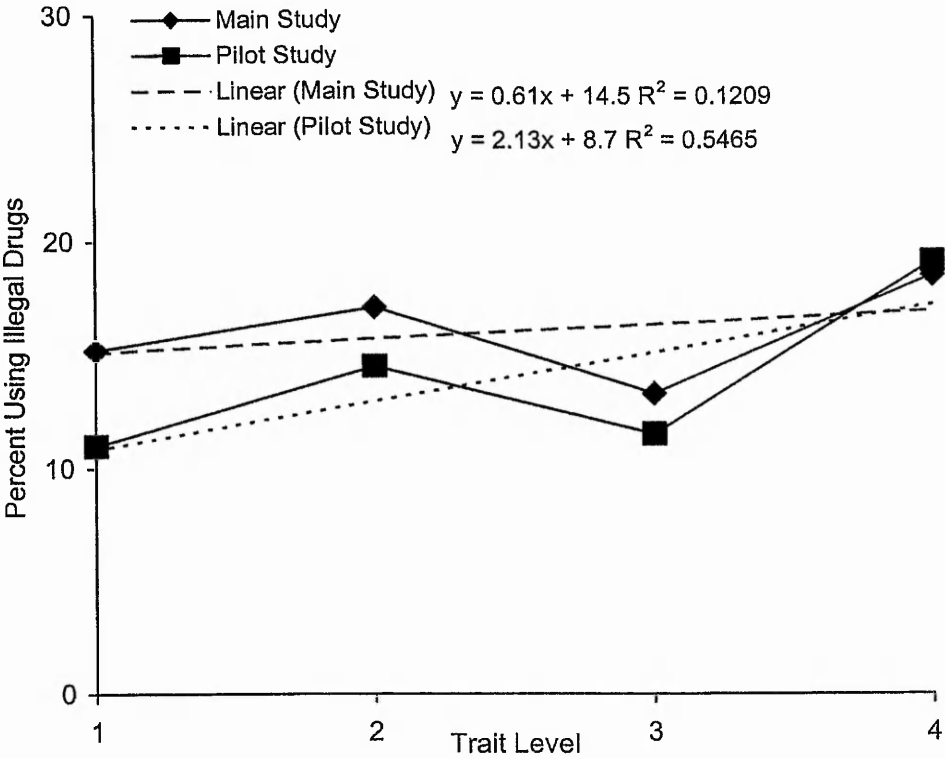
Regression analysis Self-esteem 2: Main Study and Pilot Study



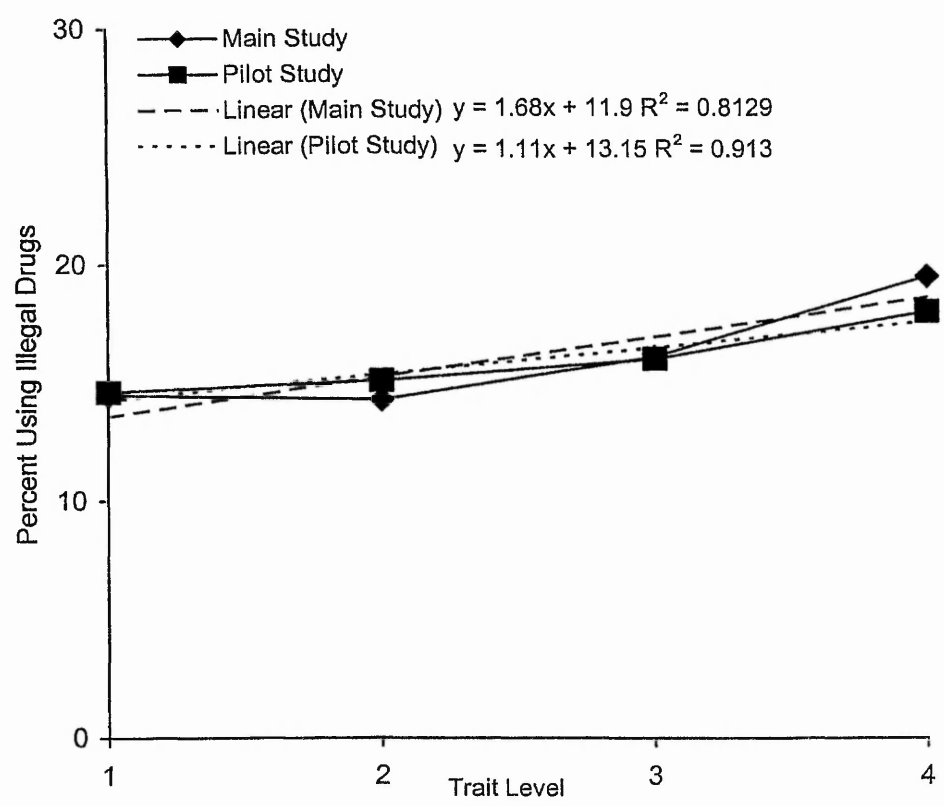
Regression analysis Anxiety 1: Main Study and Pilot Study



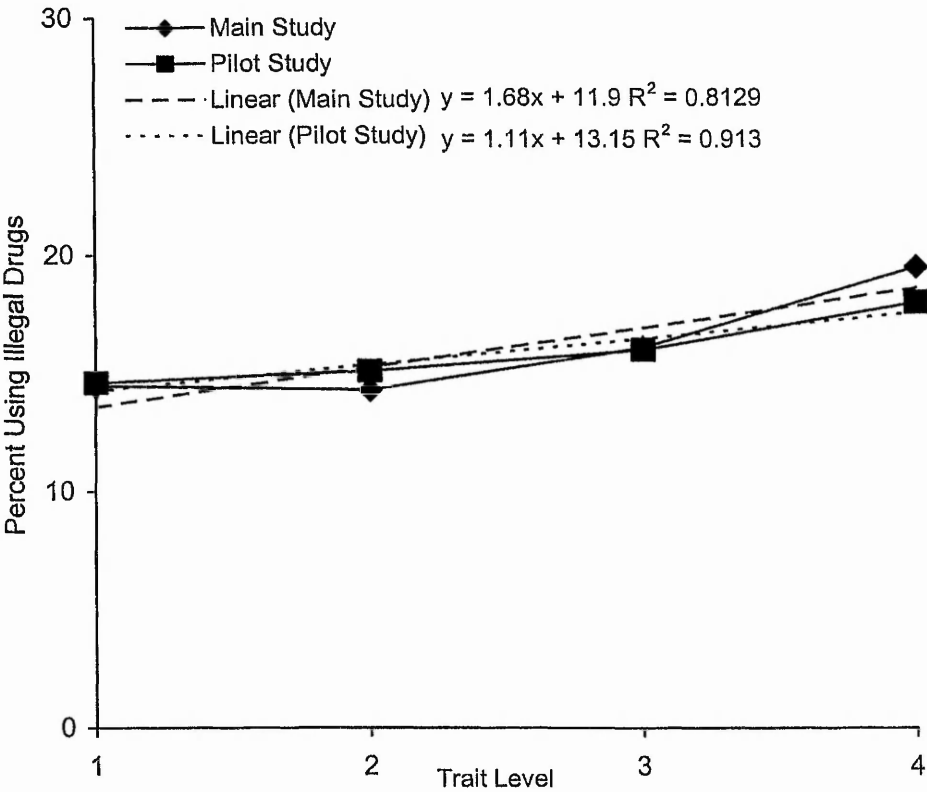
Regression analysis Depression 2: Main Study and Pilot Study



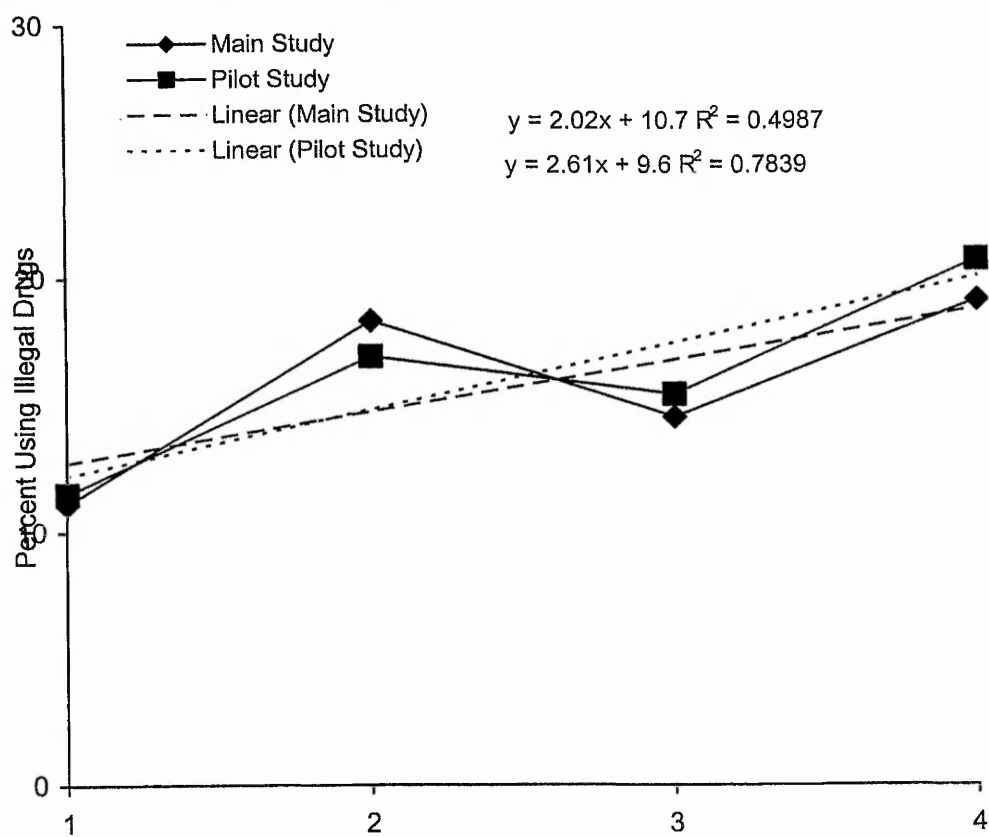
Regression analysis Depression 3: Main Study and Pilot Study



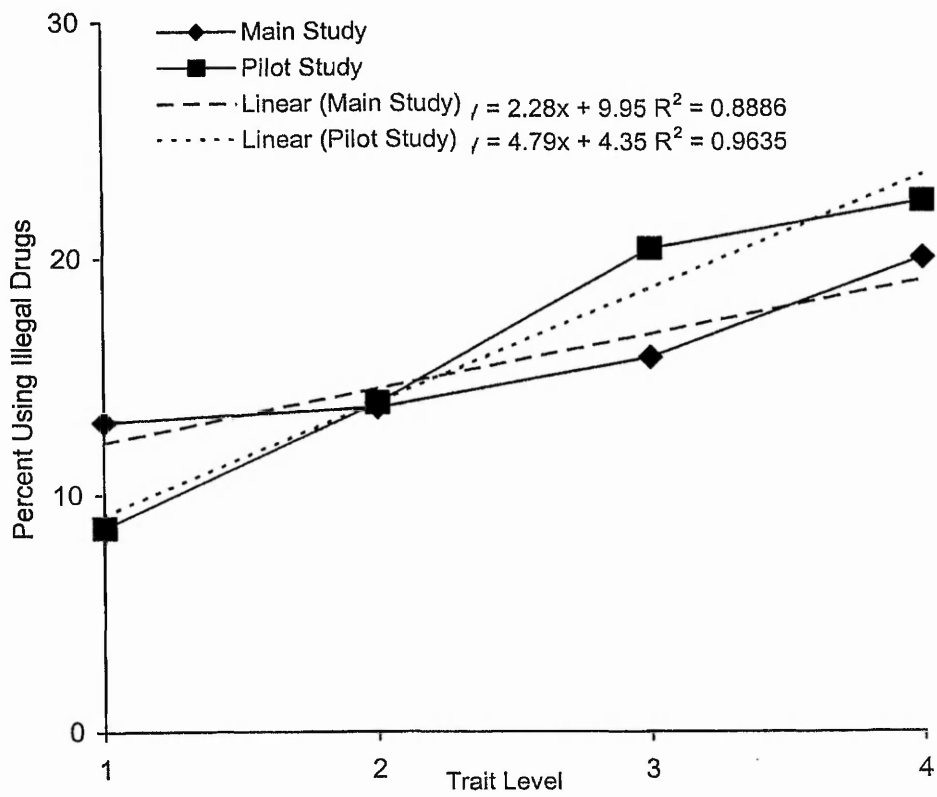
Regression analysis Hostility 4: Main Study and Pilot Study



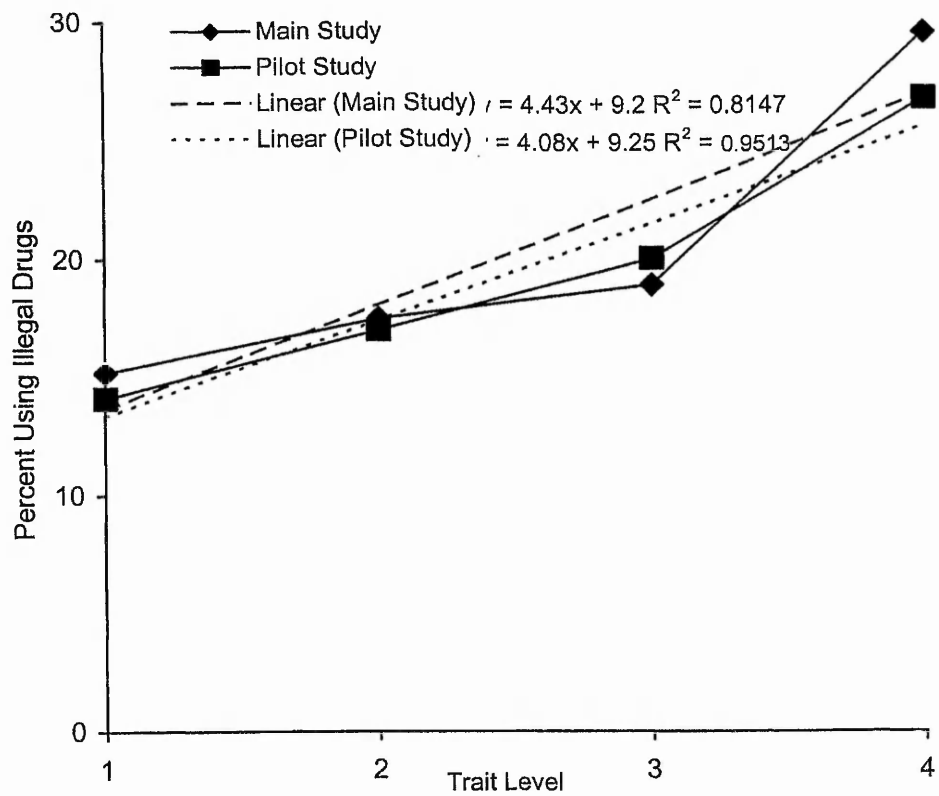
Regression analysis Depression 4: Main Study and Pilot Study



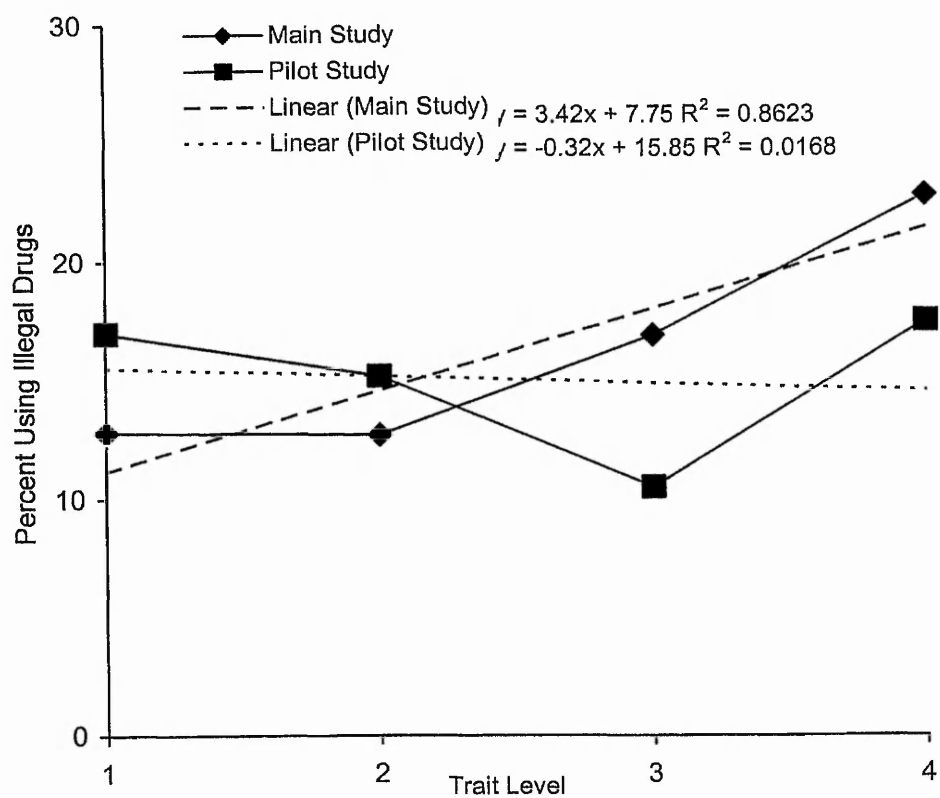
Regression analysis Anxiety 2: Main Study and Pilot Study



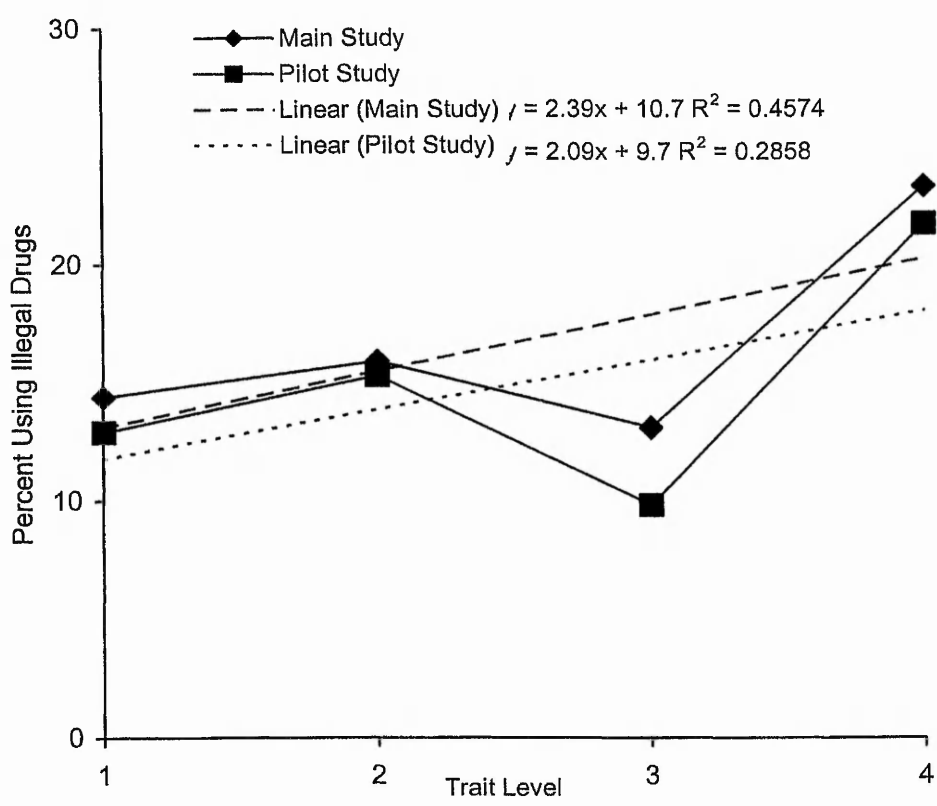
Regression analysis Self-esteem 3: Main Study and Pilot Study



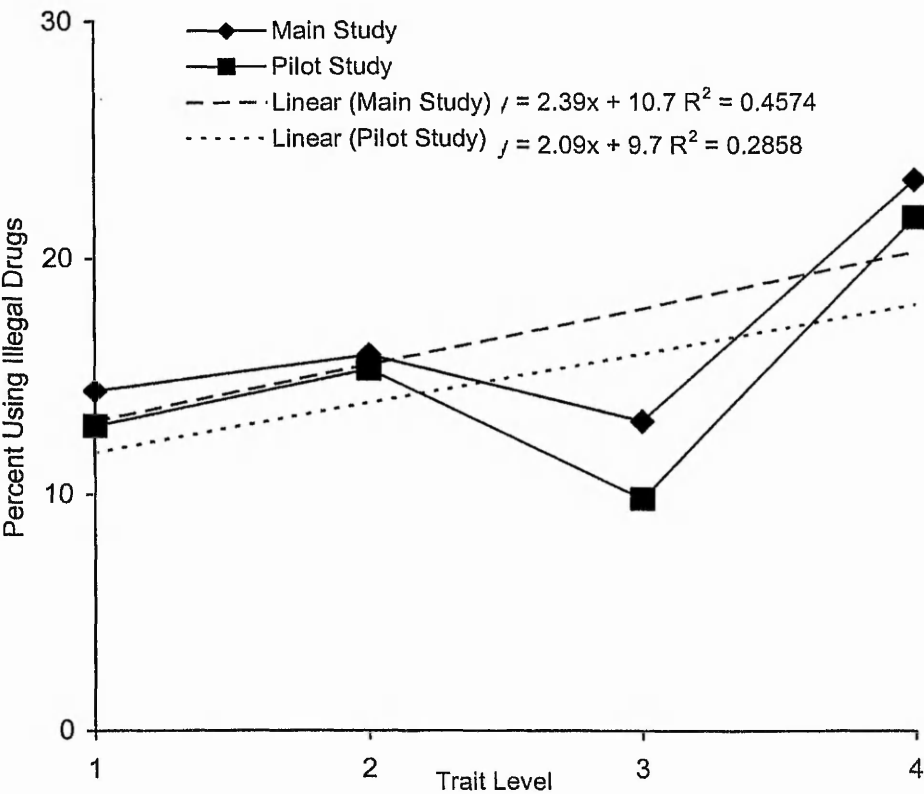
Regression analysis Self-esteem 4: Main Study and Pilot Study



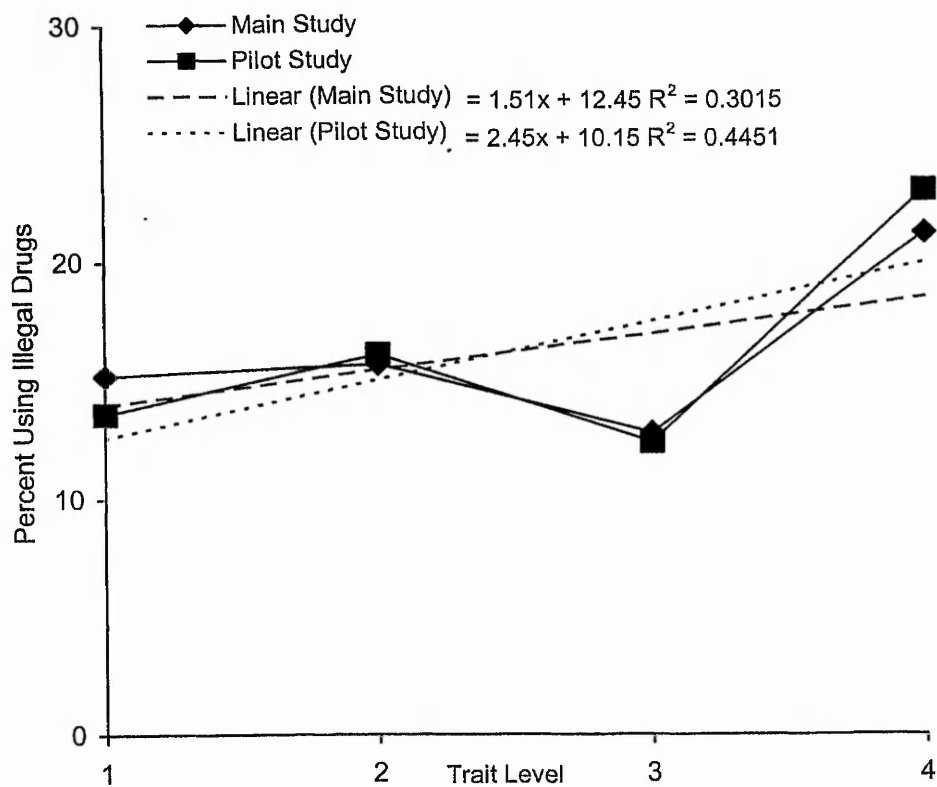
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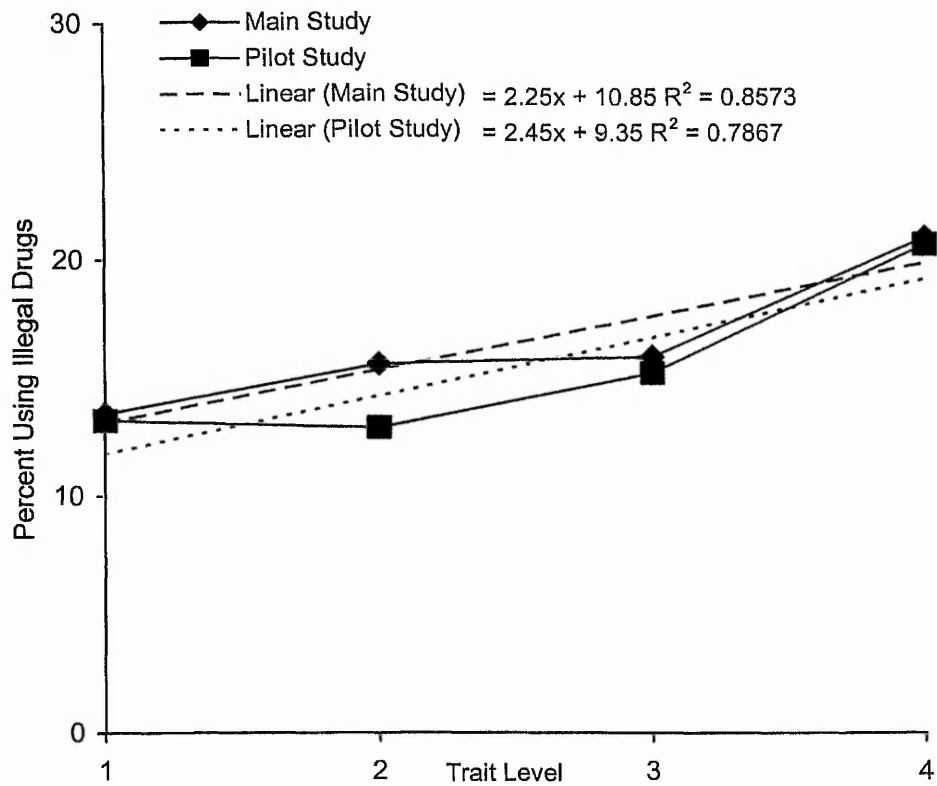
Regression analysis Anxiety 5: Main Study and Pilot Study



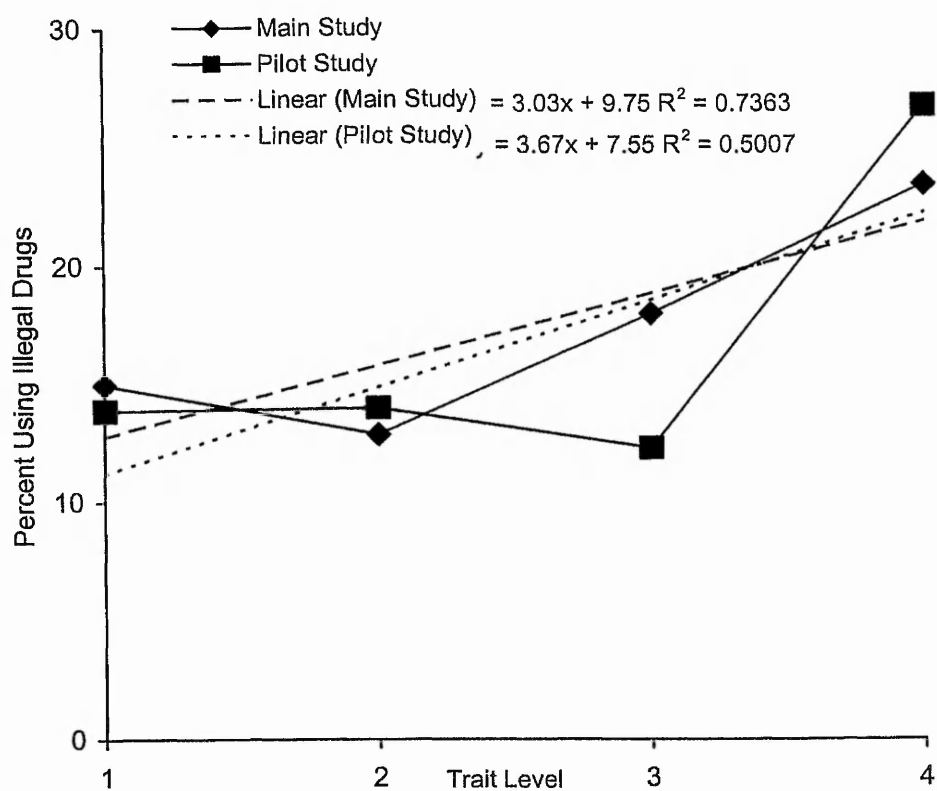
Regression analysis Anxiety 5: Main Study and Pilot Study



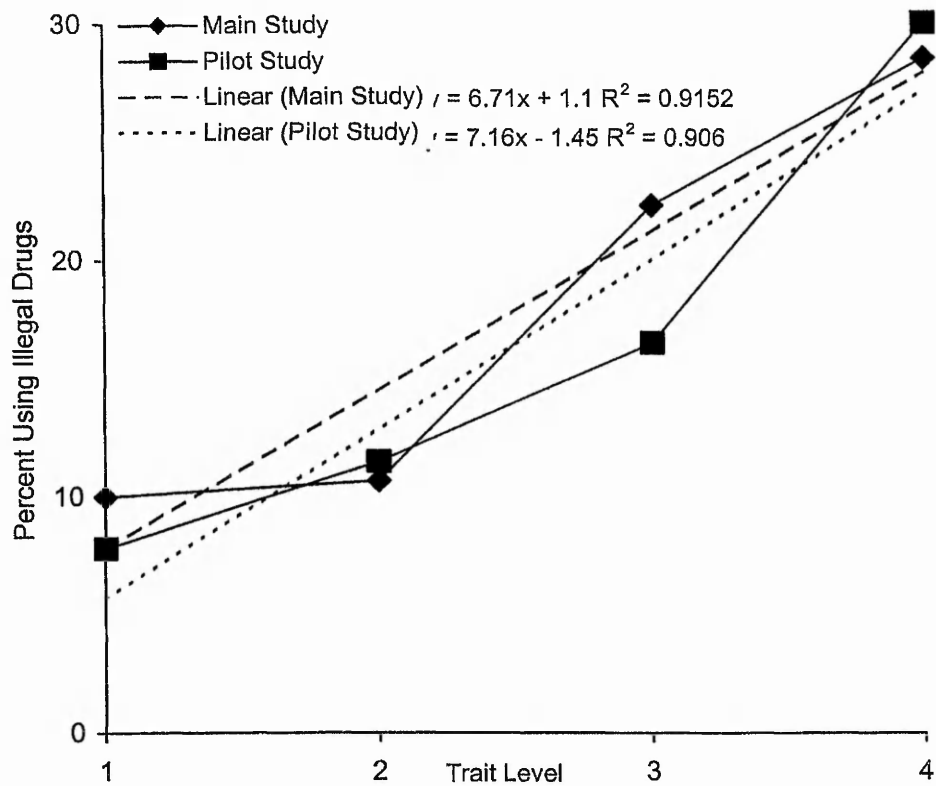
Regression analysis Hypochondria 3: Main Study and Pilot Study



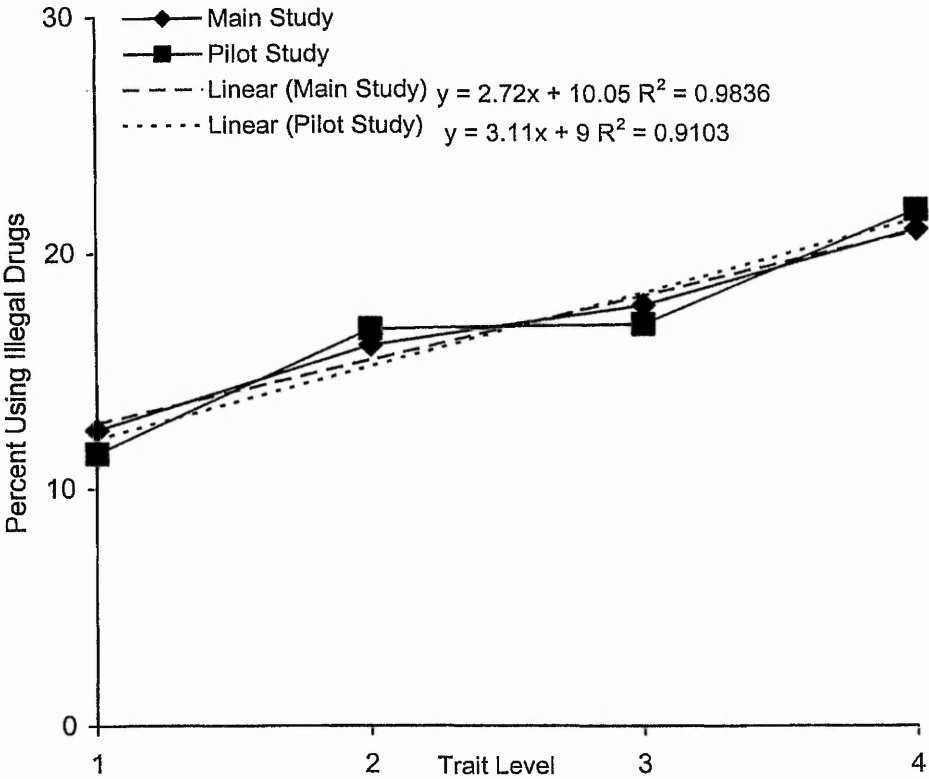
# Regression analysis Self-esteem 5: Main Study and Pilot Study



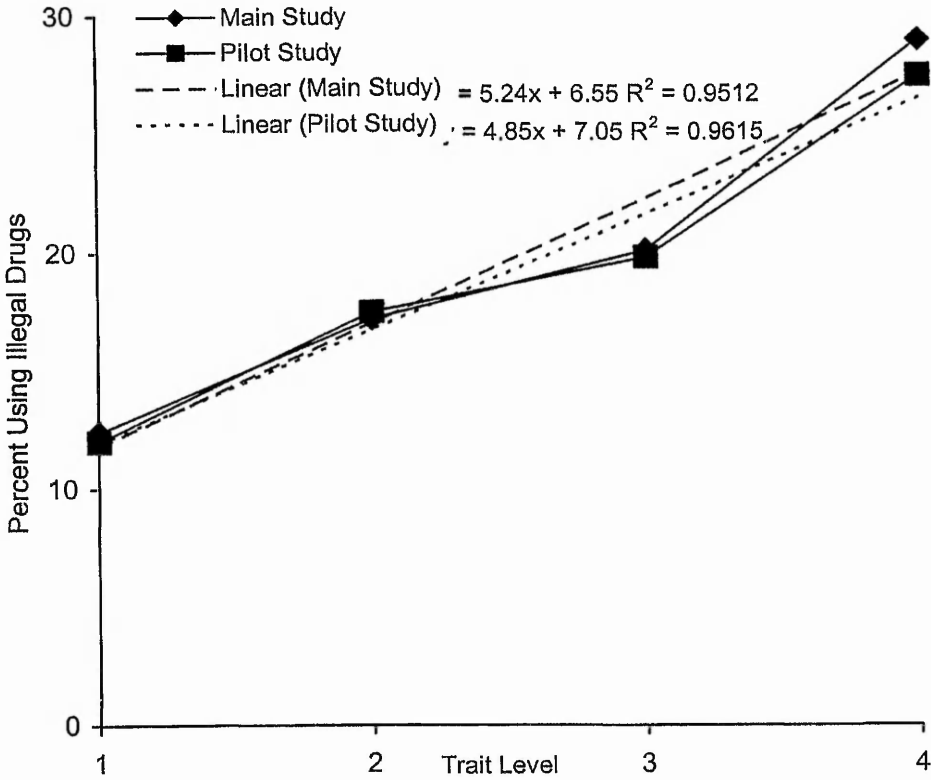
Regression analysis Self-esteem 6: Main Study and Pilot Study



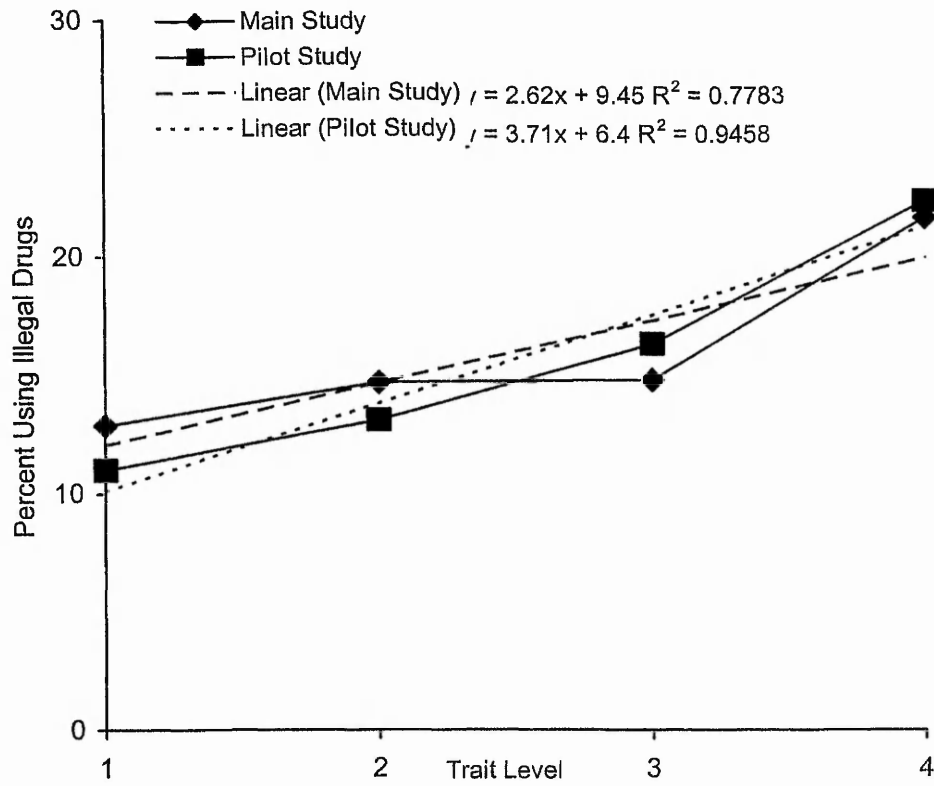
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Regression analysis Self-esteem 7: Main Study and Pilot Study



Regression analysis Anxiety 6: Main Study and Pilot Study



## REFERENCES

- Abraham, H. D. & Fava, M. (1999) Order of onset of substance abuse and depression in a sample of depressed outpatients, Comprehensive Psychiatry, 40, 1, 44-50.
- Acker, C. J. (1993). Stigma or legitimisation? A historical examination of the social potentials of addiction disease models. Journal of Psychoactive Drugs, 25(3), 193-205.
- Adler, I. & Kandel, D. B. (1981) Cross-cultural perspectives on developmental stages in adolescent drug abuse, Journal of Studies on Alcohol, 42, 701-715.
- Ahmed, S. W., Bush, P. J. (1984) Predicting children's use and intentions to use abusable substances, Anaheim, American Public Health Association.
- Alcoholics Anonymous (2000) 12-step programs help maintain abstinence, www.jointogether.org
- Alexander, B. K. (1987). The disease and adaptive models of addiction: A framework evaluation. Journal of Drug Issues, 17(1-2), 47-66.
- Alexander, B. K. (1990). The empirical and theoretical bases for an adaptive model of addiction. The Journal of Drug Issues, 20(1), 37-65.
- Allison, K. R. (1992) Academic stream and tobacco, alcohol, and cannabis use among Ontario high school students, International Journal of the Addictions, 27, 5, 561 - 570.
- Allport, G. (1937) Personality: A Psychological Interpretation, New York, Holt.
- Anderson, A. R. & Henry, C. S. (1994) Family system characteristics and parental behaviours as predictors of adolescent substance use, Adolescence, 29, 114, 405 - 420.
- Andrews, J. A., Hops, H., Ary, D. and Tildesley, E. (1993) Parental influence on early adolescent substance use: Specific and non-specific effects, Journal of Early Adolescence, 13, 3, 285 - 310.
- Angleitner, A. (1991) Personality psychology: Trends and developments, European Journal of Personality, 5, 3, 185 - 197.
- Aseltine R.H, Gore, S., & Colten M.E. (1998) The co-occurrence of depression and substance abuse in late adolescence, Development and Psychopathology, 10, 3, 549-570
- Athanasiadis, L. (1999) Drugs, alcohol and violence, Current Opinion in Psychiatry, 12, 3, 281-286.
- Bagnall, G. (1988) Use of alcohol, tobacco and illicit drugs amongst 13- year olds in three areas of Britain, Drug and Alcohol Dependence, 22, 241-251.
- Bahr, S.J., Maughan, S.L., Marcos, A.C. & Li, B.D. (1998) Family, religiosity, and the risk of adolescent drug use, Journal of Marriage and the Family, 60, 4, 979-992.

- Bailey, G. W. (1992) Children, adolescents, and substance abuse. Special Section: Substance abuse, Journal of the American Academy of Child and Adolescent Psychiatry, 31, 6, 1015-1018
- Bandura, A. (1977) Social Learning Theory. Englewood Cliffs, Prentice-Hall.
- Bandura, A. (1977a). Self-efficacy: Toward a unifying theory of behavioural change. Psychological Review, 84, 191-215.
- Barnes, G. M., & Windle, M. (1987). Family factors in adolescent alcohol and drug misuse. Paediatrician, 14, 13-18.
- Barratt, E.S, Slaughter, L. (1998) Defining, measuring, and predicting impulsive aggression: A heuristic model, Behavioural Science and the Law, 16, 3, 285-302.
- Bauman, K. E., Foshee, V. A., Linzer, M. A. & Koch, G. G. (1990) Effect of parental smoking classification on the association between parental and adolescent smoking, Addictive Behaviours, 15, 5, 413-422.
- Baumeister, R. F., Bushman, B. J. & Campbell, W. K. (2000) Self-esteem, narcissism and aggression: Does violence result from low self-esteem or from threatened egotism? Current Directions in Psychological Science, 9, 1, 26-29.
- Baumrind, D. (1983) Why adolescents take chances - and why they don't. Bethesda, NICHD.
- Becona, E. & Vazquez, F. L. (1997) Does using relapse prevention increase the efficacy of a program for smoking cessation? An empirical study, Psychological Reports, 81, 1, 291-296.
- Begun, J. H. (1977) The Addictive Personality: Narcotics Addiction, International Journal of Social Psychiatry, 22, 4, 304 - 308.
- Benda, B. B. (1997) An examination of a reciprocal relationship between religiosity and different forms of delinquency within a theoretical model, Journal of Research in Crime and Delinquency, 34, 2, 163 - 186.
- Beschner, G. M. & Treasure, K. G. (1979) Female adolescent drug use, in Beschner, G. M. & Friedman, A. S. (Eds), Youth drug abuse: Problems, issues and treatment, Lexington, Lexington Books.
- Bierut, L. J., Dinwiddie, S.H., Begleiter, H., Crowe, R.R, Hesselbrock, V., Nurnberger, J.I, Porjesz, B., Schuckit, M.A, & Reich T. (1998) Familial transmission of substance dependence: Alcohol, marijuana, cocaine, and habitual smoking - A report from the collaborative study on the genetics of alcoholism, Archives of General Psychiatry, 55, 11, 982-988.
- Blechman, E. A. (1982) Conventional wisdom about familial contributions to substance abuse, American Journal of Drug and Alcohol Abuse, 9, 35 - 53.

- Block, J., Block J. H. & Keyes, S. (1988), Longitudinally foretelling drug usage in adolescence: Early childhood personality and environmental precursors, Child Development, 59, 336 - 355.
- Boomsma, D. I., Koopmans, J. R., Van Doornen, L., & Orlebeke, J. F. (1994). Genetic and social influences on starting to smoke: A study of Dutch adolescent twins and their parents. Addiction, 89, 2, 219-226.
- Brickman, P., Rabinowitz, V. C., & Karuza, J. (1982). Models of coping and helping. American Psychologist, 37, 368-384.
- Brismar, B. & Bergman, B. (1998) The significance of alcohol for violence and accidents, Alcoholism-Clinical and Experimental Research, 22, 7, 299-306.
- Brook, J. S., Whiteman, M. M. & Finch, S. (1992) Childhood aggression, adolescent delinquency, and drug use: A longitudinal study, Journal of Genetic Psychology, 153, 4, 369 - 383.
- Brook, J. S., Lukoff, I. F. & Whiteman, M. (1980), initiation into adolescent marijuana use, Journal of Genetic Psychology, 137, 133 - 142.
- Browne, A., & Finklehor, D. (1986). Impact of child sexual abuse: A review of the research. Psychological bulletin, 99, 66-77.
- Bry, A. H. (1983). Predictive drug abuse: Review and reformulation. Journal of the Addictions, 18, 223-233.
- Bry, B. H., McKeon, P., & Pandina, R. J. (1982). Extent of drug use as a function of number of risk factors, Journal of Abnormal Psychology, 91, 4, 273-279.
- Bukstein, O. G. (1995). Adolescent substance abuse: Assessment, prevention and treatment. New York: Wiley.
- Bukstein, O. G., Brent, D. A., & Kaminer, Y. (1989). Comorbidity of substance abuse and other psychiatric disorders in adolescents. American Journal of Psychiatry, 146, 1131-1141.
- Bushman, B. J. & Baumeister, R. F. (1998) Threatened egotism, narcissism, self-esteem and direct and displaced aggression: Does self-love or self-hate lead to violence? Journal of Personality and Social Psychology, 75, 1, 219-229.
- Byram, B. M. & Fly, J. W. (1984) Family structure, race and adolescents' alcohol use: A research note, American Journal of drug and Alcohol Abuse, 10, 467 - 478.
- Cahalan, D. (1968) Correlates of respondent accuracy in the Denver validity survey, Public Opinion, 32, 607-621, 1968.
- Cannon, S. R. (1976) Social functioning patterns in families of offspring receiving treatment for drug abuse, Roslyn Heights, Libra.

- Carroll, K. M., & Rounsaville, B. J. (1993). History and significance and childhood attention deficit disorder in treatment-seeking cocaine abusers. Comprehensive Psychiatry, 34, 2, 75-82.
- Carroll, K.; Rounsaville, B.; Nich, C.; Gordon, L.; Wirtz, P.; and Gawin, F. (1994) One-year follow-up of psychotherapy and pharmacotherapy for cocaine dependence: Delayed emergence of psychotherapy effects. Archives of General Psychiatry 51, 989-997.
- Carson, R. C. (1989) Personality, Annual Review of Psychology, 40, 227- 248.
- Carvajal, S.C., Clair, S.D, Nash, S.G. & Evans, R.I. (1998) Relating optimism, hope, and self-esteem to social influences in deterring substance use in adolescents, Journal of Social and Clinical Psychology, 17, 4, 443-465.
- Cattell, R. (1970) The Scientific Analysis of Personality, Baltimore, Penguin.
- Caudill, B. D., Hoffman, J. A., Hubbard, R. L. & Flynn, M. (1994), Parental history of substance abuse as a risk factor in predicting crack smokers' substance use, illegal activities, and psychiatric status, American Journal of Drug and Alcohol Abuse, 20, 3, 341-354.
- Cavaola, A. A. & Kane, C. C. (1989) Basics of Adolescent Development for the Chemical Dependency Professional: Practical Approaches in Treating Adolescents With Chemical Dependency, Journal of Chemical Dependency Treatment, 2, 1, 11 - 24.
- Chassin, L, Curran, P. J, Hussong, A. M. & Colder, C. R. (1996) The relation of parent alcoholism to adolescent substance use - A longitudinal follow up study, Journal of Abnormal Psychology, 105, 1, 70 - 80.
- Chassin, L., Presson, C. C., Sherman, S. J. & Mulvenon, S. (1994) Family history of smoking and young adult smoking behaviour, Psychology of Addictive Behaviours, 8, 2, 102 - 110.
- Cherpitel, C. J. (1977) Alcohol and injuries resulting from violence: A comparison of emergency room samples from two regions of the US, Journal of Addictive Diseases, 16, 1, 25-40.
- Christo, G. & Sutton, S. (1994) Anxiety and Self-Esteem as a Function of Abstinence Time Among Recovering addicts Attending Narcotics Anonymous, British Journal of Clinical Psychology, 33, 2, 198 - 200.
- Cisin, I., & Parry, H.J. (1980) Sensitivity of survey techniques in measuring illicit drug use. In: Rittenhouse, J.D., ed. Developmental Papers: Attempts to Improve the Measurement of Heroin Use in the National Survey, Rockville, National Institute on Drug Abuse.
- Cochran, J. K. (1992), The effects of religiosity on adolescent self-reported frequency of drug and alcohol use, Journal of Drug Issues, 22, 1, 91 - 104.

- Comings, D. E. (1995) D2 receptor gene (DRD2) haplotypes and the defense style questionnaire in substance abuse, Tourette syndrome and controls, Biological Psychiatry, 37, 11, 798 – 805.
- Conger, J. J. (1956). Reinforcement theory and the dynamics of alcoholism. Quarterly Journal of Studies on Alcohol, 17, 296-305.
- Coombs, R., Paulson, M. and Richardson, M. (1991) Peer vs. parental influence in substance use among Hispanic and Anglo children and adolescents, Journal of Youth and Adolescence, 20, 1, 73 – 88.
- Cooper, M. L., Russell, M., & Frone, M. R. (1990). Work stress and alcohol effects: A test of stress-induced drinking. Journal of Health and Social Behaviour, 31, 3, 260-276.
- Cooper, M. L., Russell, M., Skinner, J. B., & Frone, M. R. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies, Journal of Abnormal Psychology, 101, 1, 139-152.
- Costa, P. T. & McCrae, R. R. (1985) The NEO Personality Inventory Manual, Odessa, Psychological Assessment Resources.
- Craig, R. J. (1993). Contemporary trends in substance abuse. Professional Psychology, 24, 2, 182-189.
- Cronin, C. (1995) Religiosity, religious affiliation, and alcohol and drug use among American college students living in Germany, International Journal of the Addictions, 30, 2, 231 - 238.
- Dackis, C. A., & Gold, M. S. (1985). New concepts in cocaine addiction: The dopamine depletion hypothesis. Neuroscience and Biobehavioral Reviews, 9, 469-477.
- Davis, V. E., & Walsh, M. D. (1970). Alcohol, amides and alkaloids: A possible basis for alcohol addiction. Science, 167, 1005-1007.
- Deary, I. J. & Matthews, G. (1993) Personality Traits are Alive and Well, The Psychologist, 6, 7, 299 - 309.
- Deasesmith, D., Brady, K.T, & Campbell, S. (1998) Co-morbid substance use and anxiety disorders in adolescents, Journal of Psychopathology and Behavioral Assessment, 20, 2, 139-148.
- Delatte, J. G. & Delatte, G. M. (1982) Young and Old Alcoholics: Some Personality Differences, Journal of Clinical Psychology, 40, 2, 613 - 616.
- Dembo, R., Berry, E., Williams, L., Getreu, A., Wish, E. D., Washburn, M., Dertke, M., & Schmeidler, J. (1988). The relationship between physical and sexual abuse and illicit drug use: A replication among a new sample of youths entering a juvenile detention centre. International Journal of the Addictions, 23, 11, 1191-1123.

- Denton, R. E. & Kampfe, C. M. (1994) The relationship between family variables and adolescent substance abuse: A literature review, Adolescence, 29, 114, 475-495.
- De-Piano, F. & Van-Hasselt, V. B. (1994) Literature and resource review, child and adolescent substance abuse: A comprehensive bibliography of scholarly references, Journal of Child and Adolescent Substance Abuse; 3, 1, 89-100.
- Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (1994) American Psychiatric Association.
- Dielman, T. E., Butchart, A. T., Shope, J. T. & Miller, M. (1990-1991) Environmental correlates of adolescent substance use and misuse: Implications for prevention programs. Special Issue: Environmental factors in substance misuse and its treatment, International Journal of the Addictions, 25, 7A-8A, 855 - 880.
- Digman, J. M. (1990) Personality structure: Emergence of the five-factor model, Annual Review of Psychology, 41, 417-440
- disorders in alcoholics and drug addicts. Comprehensive Psychiatry, 34(2), 87-94.
- Doherty, O. & Matthews, G. (1988) Personality characteristics of opiate addicts, Personality and Individual Differences, 9, 171 - 172.
- Doherty, W. J. & Needle, R. H. (1991) Psychological adjustment and substance use among adolescents before and after a parental divorce, Child Development, 62, 2, 328 - 337.
- Doherty, W. J. & Allen, W. (1994) Family functioning and parental smoking as predictors of adolescent cigarette use: A six-year prospective study, Journal of Family Psychology, 8, 3, 347-353.
- Donato, F., Monarca, S., Chiesa, R. & Feretti, D., (1995) Patterns and covariates of alcohol drinking among high school students in 10 towns in Italy: A cross-sectional study, Drug and Alcohol Dependence, 37, 1, 59 - 69.
- Donovan, J. E. & Jessor, R. (1978) Adolescent problem drinking: Psychosocial correlates in a national sample study, Journal of Studies on Alcohol, 39, 1506 - 1524.
- Dorus, W., & Senay, E. C. (1980). Depression, demographic dimensions, and drug abuse. American Journal of Psychiatry, 137, 6, 699-704.
- Duncan, T. E., Duncan, S. C. & Hops, H. (1996) The role of parents and older siblings in predicting adolescent substance use - Modeling development via structural equation latent growth methodology, Journal of Family Psychology, 10, 2, 158 - 172.
- Dupre, D., Miller, N., Gold, M., Rospenda, K., (1995) Initiation and progression of alcohol, marijuana, and cocaine use among adolescent abusers, American Journal on Addictions, 4, ,1 43-48.

- DuRant, R.H., Smith, J.A., Kreiter, S.R., & Krowchuk, D.P. (1999) The relationship between early age of onset of initial substance use and engaging in multiple health risk behaviours among young adolescents, Archives of Pediatrics & Adolescent Medicine, 153, 3, 286-291.
- Edwards, A.L. (1957) The Social Desirability Variable in Personality Assessment and Research, New York: Dryden.
- Eiser, J., Morgan, M., Gammage, P. & Gray, E. (1989) Adolescent smoking: Attitudes, norms and parental influence, British Journal of Social Psychology, 28, 3, 193 - 202
- Ellickson, P. L., Hays, R. D., & Bell, R. M. (1992). Stepping through the drug use sequence: Longitudinal scalogram analysis of initiation and regular use. Journal of Abnormal Psychology, 101(3), 441-451.
- Elliott, D. S., Huizinga, D. & Ageton, S. S. (1985) Explaining delinquency and drug use, Beverly Hills, Sage.
- Emrick, C.D., Tonigan, J.S., Montgomery, H., and Little, L. Alcoholics Anonymous: What is Currently Known? In: McCrady, B.S. and Miller, W.R., editors. Research on Alcoholics Anonymous: Opportunities and Alternatives. New Brunswick, NJ: Alcohol Research Documentation, Inc., 1993.
- Englehardt, H. T. (1981). The concepts of health and disease. In A. L. Caplan, H. T. Englehardt, & J. J. McCartney (Eds.), Concepts of health and disease: Interdisciplinary perspectives. Reading: Addison Wesley.
- Engs, R.C, & Mullen, K. (1999) The effect of religion and religiosity on drug use among a selected sample of post secondary students in Scotland, Addiction Research, 7, 2, 149-170.
- Erikson, E. H. (1968). Identity: Youth and crisis. New York: Norton.
- Espnes, G.A. (1996) The type 2 construct and personality traits: Aggression, hostility, anxiety and depression, Personality and Individual Differences, 20, 5, 641-648.
- Ewing, J. A. (1983). Alcoholism-another biopsychosocial disease. Psychosomatics, 21, 371-372.
- Eysenck, H. J. (1991), Dimensions of personality: 16, 5 or 3? Criteria for a taxonomic paradigm, Personality and Individual Differences, 12, 8, 773 - 790.
- Fagan, J., Weis, J. G., & Cheng, Y. (1990). Delinquency and substance use among inner-city students. Journal of Drug Issues, 20, 3, 351-402.
- Farrington, D. P. (1998) Predictors, causes and correlates of male youth violence, Crime and Justice, 24, The University of Chicago
- Farrington, D. P. (1999) Adolescent violence: Findings and implications from the Cambridge Study, In Press
- Feldman, R. D., & Quenzer, L. F. (1984). Fundamentals of neuropsychopharmacology. Sunderland: Sininauer Associates.

- Fergusson, D. M., Horwood, L. J., & Lynskey, M. T. (1995). The prevalence and risk factors associated with abusive or hazardous alcohol consumption in 16-year olds. Addiction, 9, 7, 935-946.
- Finney, J.W., Moos, R.H. & Humphreys, K.A. (1999) Comparative evaluation of substance abuse treatment: II. Linking proximal outcomes of 12-Step and cognitive-behavioural treatment to substance use outcomes, Alcoholism-Clinical and Experiment Research, 23, 3, 537-544
- Fiorentine, R. (1999) After drug treatment: Are 12-step programs effective in maintaining abstinence? American Journal of Drug and Alcohol Abuse, 25, 1, 93-116
- Firestone, R. W. (1993) The Psychodynamics of Fantasy, Addiction and Addictive Attachments, American Journal of Psychoanalysis, 53, 4, 335 - 352.
- Fishbein, D. H. (1998) Differential susceptibility to comorbid drug abuse and violence, Journal of Drug Issues, 28, 4, 859-890.
- Flay, B. R., Hu, F. B., Siddiqui, O., Day, L. E. (1994) Differential influence of parental smoking and friends' smoking on adolescent initiation and escalation of smoking, Journal of Health and Social Behaviour, 35, 3, 248 – 265.
- Fleming, J. P., Kellam, S. G. & Brown, C. H. (1982) Early predictors of age at first use of alcohol, marijuana and cigarettes, Drug and Alcohol Dependence, 9, 285 - 303.
- Foshee, V. A. & Hollinger, B. R. (1996) Maternal religiosity, adolescent social bonding and adolescent alcohol use, Journal of Early Adolescence, 16, 4, 451 - 468.
- Francis, L.J (1997) The impact of personality and religion on attitude towards substance use among 13-15 year olds, Drug and Alcohol Dependence, 44, 2-3, 95-103.
- Freud, S. (1901) The Psychopathology of Everyday Life, In J. Strachey (Ed) The Standard Edition of the Complete Psychological Works of Sigmund Freud, London, Hogarth Press.
- Frone, M. R., Russell, M., & Cooper, M. L. (1993). Relationship of work-family conflict, gender, and alcohol expectancies to alcohol use/abuse. Journal of Organizational Behaviour, 14, 6, 545-558.
- Frumkin, R. H., Cowan, R. A. & Davis, J. R. (1969), Drug use in a Midwest sample of metropolitan hinterland high school students, Correctional Psychiatrist, 15, 8 - 13.
- Gabel, S. & Shindledecker, R. (1992) Behaviour problems in sons and daughters of substance abusing parents, Child Psychiatry and Human Development, 23, 2, 99-115.
- Gambino, B. & Shaffer, H. (1979). The concept of paradigm and the treatment of addiction. Professional Psychology, April issue, 207-223.
- Gawin, F. H., & Ellinwood, E. H. (1989). Cocaine dependence. Annual Review of Medicine, 40, 149-161.

- Gawin, F. H., & Ellinwood, E. H. (1989). Cocaine dependence. Annual Review of Medicine, 40, 149-161.
- Gilvarry, E., McCarthy, S. & McArdle, P (1995) Substance use among schoolchildren in the North of England, Drug and Alcohol Dependence; 37, 3, 255 - 259.
- Glindemann, K.E, Geller, E.S. & Fortney, J.N. (1999) Self-esteem and alcohol consumption: A study of college drinking behaviour in a naturalistic setting, Journal of Alcohol and Drug Education, 45, 1, 60-71.
- Glynn, T. J. (1981) Adolescent drug use and the family environment: A review, Journal of drug Issues, 14, 271 - 295.
- Gold, M. S., & Miller, N. S. (1987). How effective is the disease model? Journal of Drug and Alcohol Dependence, 12 (11), 7
- Gold, M. S., & Vereby, K. (1984). The psychopharmacology of cocaine. Psychiatry Annual, 13, 714-723.
- Golub, A. & Johnson, B. D. (1994) The shifting importance of alcohol and marijuana as gateway substances among serious drug abusers, Journal of Studies on Alcohol, 55, 5, 607-614.
- Golub, A., Johnson, B. D., Kandel, D. B., Yamaguchi, K., & Chen, K. (1992). The shifting importance of alcohol and marijuana as gateway substances among serious drug abusers Stages of progression in drug involvement from adolescence to adulthood: Further evidence for the gateway theory. Journal of Studies on Alcohol, 53 (5), 447-457.
- Goodwin, D. W. (1979), Alcoholism and heredity: A review and hypothesis, Archives of General Psychiatry, 36, 57-61.
- Goodwin, D. W. (1985), Alcoholism and genetics: The sins of the fathers, Archives of General Psychiatry, 42, 171-174.
- Gossop, M. R. & Eysenck, S. B. G. (1980) A Further Investigation into the Personality of Drug addicts in Treatment, British Journal of Addiction, 75, 305 - 311.
- Gossop, M. R. (1976) Drug Dependence and Self-Esteem, The International Journal of the Addictions, 11, 741 - 753.
- Gossop, M. R. (1978) A Comparative Study of Oral and Intravenous Drug Dependent Patients on Three Dimensions of Personality, The International Journal of the Addictions, 13, 135 - 142.
- Graham, J. R. & Strenger, V. E. (1988) MMPI Characteristics of Alcoholics: A Review, Journal of Counselling and Clinical Psychology, 28, 2, 197 - 205.
- Griffiths, M. (1994) An exploratory study of gambling cross addictions, Journal of Gambling Studies, 10, 4, 371 - 384.

- Gruber, E.; Di-Clemente, R. J.; Anderson, M. M. & Lodico, M. (1996) Early drinking onset and its association with alcohol use and problem behaviour in late adolescence, Preventive Medicine, 25, 3, 293 - 300.
- Gutierrez, S. E. & Reich, J. W. (1988) Attributional Analysis of Drug Abuse and Gender: Effects of Treatment and Relationship to Rehabilitation, Journal of Social and Clinical Psychology, 7, 176 - 191.
- Hall, G. H. & Round, A. P. (1994), Logistic regression - explanation and use, Journal of the Royal College of Physicians of London, 28, 3, 242 - 246
- Han, C., McGue, M.K. & Iacono, W.G (1999) Lifetime tobacco, alcohol and other substance use in adolescent Minnesota twins: univariate and multivariate behavioural genetic analyses, Addiction, 94, 7, 981-993.
- Hardesty, P. H. & Kirby, K. M. Relation between family religiousness and drug use within adolescent peer groups, Journal of Social Behaviour and Personality, 10, 2, 421 - 430.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. Psychological Bulletin, 112, 1, 64 - 105.
- Hawkins, J. D., Graham, J. W., Maguin, E., Abbott, R., Hill, R. G. & Catalano, R. F. (1997), Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse, Journal of Studies on Alcohol, 58, 3, 280 - 290.
- Health Promotion Wales (1997) Technical Report 24: Young People in Wales: Life Style Changes 1986-1996.
- Hindelang, M.J., Hirschi, T. & Weiss, J.G. (1981) Measuring Delinquency, Beverly Hills, Sage Publications.
- Hoffman, A. L. & Slade, J. (1993) Following the Pioneers: Addressing Tobacco in Chemical Dependency Treatment. Special Issue: Towards a Broader View of Recovery: Integrating Nicotine Addiction and Chemical Dependency Treatments, Journal of Substance Abuse Treatment, 10, 2, 153 - 160.
- Hoffman, J.P. & Su, S.S. (1998) Stressful life events and adolescent substance use and depression: Conditional and gender differentiated effects, Substance Use and Misuse, 33, 11, 2219-2262.
- Hogan, R., Mankin, D., Conway, J. & Fox, S. (1970), Personality correlates of undergraduate marijuana use, Journal of Consulting and Clinical Psychology, 35, 58 - 63.
- Hops, H., Duncan, T. E., Duncan, S. C. & Stoolmiller, M. (1996) Parent substance use as a predictor of adolescent use: A six-year lagged analysis, Annals of Behavioural Medicine, 18, 3, 157 - 164.

- Horn, J. L., Wanberg, K. W. & Adams, G. (1974) Diagnosis of Alcoholism: Factors of Drinking, Background and Current Conditions in Alcoholics, Quarterly Journal of Studies on Alcohol, 35 1A, 147 - 175.
- Hughes, K., MacKintosh, A. M., Hastings, G., Wheeler, C., Watson, J. & Inglis, J. (1997) Young people, alcohol, and designer drinks: Quantitative and qualitative study, British Medical Journal, 314, 414 - 418.
- Hyman, H. (1944) Do they tell the truth? Public Opinion, 8, 557-559.
- Jellinek, E. (1960). The disease concept of alcoholism. New Brunswick: Hillhouse Press.
- Jenkins, P. H. (1995) School delinquency and school commitment, Sociology of Education, 68, 3, 221 - 239.
- Jessor, R. & Jessor S. L. (1978) Problem behaviour and psychosocial development: A longitudinal study of youth, New York, Academic press.
- Jessor, R. (1987). Problem-behaviour theory, psychosocial development and adolescent problem drinking. British Journal of Addiction, 82, 331-342.
- Johnson, G. M., Shontz, F. C., & Locke, T. P. (1984). Relationships between adolescent drug use and parental drug behaviours. Adolescence, 74, 295-299.
- Johnson, V., & Pandina, R. J. (1991). Effects of the family environment on adolescent substance use, delinquency and coping styles. American Journal of Drug Alcohol Abuse, 17, 1, 71-88.
- Johnson, V., Marcos, A. C. & Bahr, S. J. (1987) The role of peers in the complex etiology of adolescent drug use, Criminology, 25, 323 - 340.
- Johnston, L. D., & O'Malley, P. M. (1986). Why do the nation's students use drugs and alcohol? Self-reported reasons from nine national surveys. Journal of Drug Issues, 16, 1, 29-66.
- Johnston, L., O'Malley, P. & Eveland, L. (1978) Drugs and delinquency: A search for causal connections, In Kandel, D. B. (Ed) Longitudinal research on drug use: Empirical findings and methodological issues, New York, Wiley.
- Jung, C. (1927) The Structure of the Psyche, In Collected Works, Princetown, Princetown University Press.
- Kandel, D. B. & Andrews, K. (1987) Processes of adolescent socialization by parents and peers, International Journal of the Addictions, 22, 319 - 342.
- Kandel, D. B. (1992). Epidemiological trends and implications for understanding the nature of addiction. In C. P. O'Brien & J. H. Jaffe (Eds.), Addictive States. (pp. 23-40). New York: Raven Press.
- Kandel, D. B. (ed) (1978) Longitudinal research on drug use: Empirical findings and methodological issues, New York, Wiley.

- Kaplan, H. B., Martin, S. S. & Robbins, C. (1984) Pathways to adolescent drug use: Self-derogation peer influence, weakening of social controls and early substance use, Journal of Health and Social Behaviour, 25, 270 - 289.
- Keeler, M. H., Taylor, C. I. & Miller, W. C. (1979) Are all recently detoxified alcoholics depressed? American Journal of Psychiatry, 136, 4B, 586 - 588.
- Kendler, K. S., Gardner, C. O. & Prescott, C. A. (1997) Religion, psychopathology, and substance use and abuse: A multimeasure, genetic-epidemiologic study, American Journal of Psychiatry, 154, 3, 322 - 329.
- Kenrick, D. T., & Funder, D. C. (1988). Profiting from controversy: Lessons from the person-situation debate. American Psychologist, 43 (1), 23-34 .
- Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. American Journal of Psychiatry, 142, 11, 1259-1264.
- Khantzian, E. J. (1986) Limits of the self-medication hypothesis of addictive disorders: Reply, American Journal of Psychiatry, 143, 8, 1063-1064
- Kingsbury, S.J, Lambert, M.T, Hendrickse, W. A. (1997) two-factor model of aggression, Psychiatry-Interpersonal and Biological Process, 60, 3, 224-232.
- Kleckner, J. H. (1968), personality differences between psychedelic drug users and nonusers, Psychology, 5, 66 - 71.
- Kleinman, P. (1996). Onset of addiction: A first attempt at prediction. Journal of the Addictions, 13, 8, 1217 - 1235.
- Kleinman, P. H., Miller, A. B., Millman, R. B., & Woody, G. E. (1990). Psychopathology among cocaine abusers entering treatment. Journal of Nervous and Mental Disease, 178(7), 442-447.
- Kolb, L. (1925). Types and characteristics of drug addicts. Mental Hygiene, 9, 300-313.
- Konopka, G. (1983). Young girls: A portrait of adolescence: V. Drugs and alcohol. Child and Youth Services, 6(3-4), 101-111.
- Krebs, C. J. (1978). Ecology: The experimental analysis of distribution and abundance. New York: Harper & Row.
- Kushner, M. G., Sher, K. J., Wood, M. D., & Wood, P. K. (1994). Anxiety and drinking behaviour: Moderating effects of tension-reduction alcohol outcome expectancies. Alcoholism Clinical and Experimental Research, 18, 4, 852-860.
- Lainer, M.E., Palmer, R.S. & Marlatt, G.A. (1999) Relapse Prevention: An Overview of Marlatt's Cognitive-behavioural Model, Alcohol Research and Health, 23, 2, 151-160.
- Lam, T.H; Chung, S.F.; Betson, C.L; Wong, C.M. & Headley, A.J. (1998) Tobacco advertisements: One of the strongest risk factors for smoking in Hong Kong students, American Journal of Preventative Medicine, 14, 3, 217-223.

- Lawson, G. W. & Lawson, A. W. (1992) Adolescent substance abuse, Gaithersburg, Aspen.
- Lawson, G., Ellis, D. & Rivers, A. (1984) Essentials of chemical dependency Counselling, Gaithersburg, MD, Aspen Publishers.
- Lawson, G., Peterson, J. & Lawson, A. (1983) Alcoholism and the family: A guide to treatment and prevention, Gaithersburg, MD, Aspen Publishers.
- Lewis, D. C. (1991). Comparison of alcoholism and other medical diseases: An internist's view. Psychiatric Annals, 2, 15, 256-265.
- Lindblad, R. A. (1977) Self-Concept and Drug Addiction: A controlled Study of White Middle Socio-Economic Status addicts, National Institute on Drug Abuse, US Department of Health, Education and Welfare, Public Health Service.
- Lindstrom, L. Managing Alcoholism: Matching Clients to Treatments. Oxford, England: Oxford University Press, 1992.
- Lodhi, P. H. & Thakur, S (1993) Personality of Drug addicts: Eysenckian Analysis, Personality & Individual Differences, 15, 2, 121 - 128.
- Loeber, R., Stouthamer-Loeber, M., & White, H.R (1999) Developmental aspects of delinquency and internalizing problems and their association with persistent juvenile substance use between ages 7 and 18, Journal of Clinical and Child Psychology, 28, 3, 322-332.
- London, W. D. (1986). Handedness and alcoholism: A family history of left-handedness. Alcoholism: Clinical and Experimental Research, 10, 357
- Lowe, G., Foxcroft, D. R., & Sibley, D. (1993) Adolescent Drinking and Family Life, Harwood Academic Publishers, Reading, England.
- Lowry, R., Cohen, L. R., Modzeleski, W., Kann, L., Collins, J. L. & Kolbe, L. J. (1999) School violence, substance use, and availability of illegal drugs on school property among US high school students, Journal of School Health, 69, 9, 347-355.
- Malkus, B. M. (1994) Family dynamic and structural correlates of adolescent substance abuse - A comparison of families of non-substance abusers and substance abusers, Journal of Child and Adolescent Substance Abuse, 3, 4, 39 - 52.
- Manganiello, J. A. (1978) Opiate Addiction: A Study Identifying Three Systematically Related Psychological Correlates, International Journal of the Addictions, 13, 839 - 847.
- Marlatt, G. & Gordon, J.R., (1985) Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviours. New York: Guilford Press.
- Marlatt, G. A. (1983). The controlled-drinking controversy: A commentary. American Psychologist, 38, 1097-1110.
- Maslow, A. H. (1968) Toward a Psychology of Being, New York, Rheinhold.

- Mawson, A.R. (1999) Stimulation-induced Behavioural Inhibition: A New Model For Understanding Physical Violence, Integrative Psychological and Behavioural Science, 34, 3, 177-197.
- McClearn, G. E. (1983). Commonalities in substance abuse: A genetic perspective. In D. J. Levison, D. R. Gerstein, & D. R. Maloff (Eds.), Commonalities in substance abuse and habitual behaviour. (pp. 323-342). Lexington: Lexington Books.
- McKeganey, N., Forsyth, A., Barnard, M. & Hay, G. (1996) Designer drinks and drunkenness amongst a sample of Scottish schoolchildren, British Medical Journal, 313, 401.
- Measham F. (1996) The 'big bang' approach to sessional drinking: Changing patterns of alcohol consumption amongst young people in North West England, Addiction Research, 4, 3, 283 – 299.
- Merikangas K.R, Mehta, R.L, Molnar, B.E, Walters, E.E, Swendsen, J.D, Aguilar-Gaziola, S., Bijl, R, Borges, G., Caraveo-Anduaga, J.J., Dewi, D.J, Kolody, B., Vega, W.A, Wittchen, H.U. & Kessler, R.C. (1998) Comorbidity of substance use disorders with mood and anxiety disorders: Results of the International Consortium in Psychiatric Epidemiology, Addictive Behaviours, 23, 6, 893-907.
- Mieczkowski, T. (1990) The accuracy of self-reported drug use: An evaluation and analysis of new data, In: Weisheit, R., ed. Drugs and Crime and the Criminal Justice System. Cincinnati: Anderson Publishing.
- Milam, J. R., & Ketcham, K. (1983). Under the influence: A guide to the myths and realities of alcoholism. New York: Bantam Books.
- Milin, R., Halikas, J. A., Meller, J. E. & Morse, C., (1991) Psychopathology among substance abusing juvenile offenders, Journal of the American Academy of Child and Adolescent Psychiatry, 30, 4, 569 - 574.
- Miller, N. S., & Gold, M. S. (1990). The disease and adaptive models of addiction: A re-evaluation. The Journal of Drug Issues, 20, 1, 29-35.
- Miller, P., Plant, M. & Duffy, J. (1995) Alcohol, tobacco, illicit drugs, and sex: An analysis of risky behaviours among young adults, International Journal of the Addictions, 30, 3, 239-258.
- Miller, W. R. (1993). Alcoholism: Toward a better disease model. Psychology of Addictive Behaviours, 7, 2, 129-136.
- Miller, P. (1997) Family structure, personality, drinking, smoking and illicit drug use: A study of UK teenagers, Drug and Alcohol Dependence, 45, 1-2, 121-129.
- Mischel, W. (1968) Personality and Assessment, New York, Wiley.

- Moncher, M. S., Holden, G. W., & Schinke, S. P. (1991) Psychosocial correlates of adolescent substance use: A review of current etiological constructs. International Journal of the Addictions, 26, 4, 377-414.
- Moss, H. B., & Tarter, R. E. (1993). Substance abuse, aggression, and violence: What are the connections? American Journal on Addictions, 2, 2, 149-160.
- Mullen, K. & Francis, L. J. (1995) Religiosity and attitudes towards drug use among Dutch school children, Journal of Alcohol and Drug Education, 41, 1, 16 - 25.
- Nathan, P. E. (1988) The Addictive Personality is the Behaviour of the addict, Journal of Consulting and Clinical Psychology, 56, 2, 183 - 188.
- Needle, R., McCubbin, H., Wilson, M., Reineck, R., Lazar, A., & Mederer, H. (1986). Interpersonal influences in adolescent drug use - the role of older siblings, parents and peers. International Journal of the Addictions, 21, 7, 739-766.
- Neisen, J. H. (1993), Parental substance abuse and divorce as predictors of injection drug use and high risk sexual behaviours known to transmit HIV, Journal of Psychology and Human Sexuality, 6, 2, 29-49.
- Newcomb, M. D., Maddahian, E., & Bentler, P. M. (1986). Risk factors for drug use among adolescents: Concurrent and longitudinal analyses. American Journal of Public Health, 76(5), 525-531.
- Nicholson, M.E., Maney, D.W., Blair, K., Wamboldt, P.M, Mahoney, B.S, & Yuan, J.P. (1998) Trends in alcohol-related campus violence: Implications for prevention, Journal of Alcohol and Drug Prevention, 43, 3, 34-52.
- O'Connell, D. L., Alexander, H. M., Dobson, A. J., Lloyd, D. M., Hards, G. R., Springthorpe, H. S. & Leeder, S. R. (1981) Cigarette smoking and drug use in school children: 11 factors associated with smoking, International Journal of Epidemiology, 10, 223 - 231.
- Oetting, E. R., & Beauvais, F. (1983). A typology of adolescent drug use: A practical classification system for describing drug use patterns. Academic Psychology Bulletin, 5(1), 55-70
- Oetting, E. R., & Beauvais, F. (1987). Common elements in youth drug abuse: Peer clusters and other psychosocial factors. Journal of Drug Issues, 17, 2, 133-151.
- Orcutt, J. D. (1987) Differential association and marijuana use: A closer look at Sutherland, Criminology, 25, 739 - 358.
- Otero, L., Jose, M., Luengo, M. & Miron-Redondo, L. (1994) An empirical study of the relations between drug abuse and delinquency among adolescents, British Journal of Criminology, 34, 4, 459 - 478.

- Oygard, L., Klepp, K. I., Tell, G. S. & Vellar, O. D. (1995) Parental and peer influences on smoking among young adults: Ten-year follow-up of the Oslo youth study participants, Addiction, 90, 4, 561 - 569.
- Papps, B. P. & O'Carroll, R. E. (1998) Extremes of self-esteem and narcissism and the experience and expression of anger and aggression, Aggressive Behaviour, 24, 6, 421-438.
- Parker, R. N., Auerhahn, K. (1998) Alcohol, drugs, and violence, Annual Review of Sociology, 24, 291-311.
- Paulson, M. J., Coombs, R. H. & Richardson, M. A. (1990) School performance, academic aspirations, and drug use among children and adolescents, Journal of Drug Education, 20, 4, 289 - 303.
- Peele, S. (1987). A moral vision of addiction: How people's values determine whether they become and remain addicts. Journal of Drug Issues, 17(1-2), 187-215.
- Peele, S. (2000) AA's role in society - More negative than positive? [www.peele.org](http://www.peele.org)
- Pendorf, J. E. (1992) Leisure time use and academic correlates of alcohol abuse among high school students, Journal of Alcohol and Drug Education, 37, 2, 103 - 110.
- Peterson, L. A., & Cangemi, J. P. (1993). A look at addiction. Journal of Instructional Psychology, 20, 3, 246-255.
- Pierce, J. P. & Gilpin, E. A. (1995) A historical analysis of tobacco marketing and the uptake of smoking by youth in the United States: 1890-1977. Special Section: Health psychology and public policy, Health Psychology, 14, 6, 500 - 508.
- Plant, M. A., Peck, D. F., & E. Samuel, (1985) Alcohol, Drugs and School Leavers, London, Tavistock.
- Plant, M., Bagnall, G., Foster, J., & Sales, J. (1990). Young people and drinking: Results of and English national survey. Alcohol and Alcoholism, 25(6), 685-690.
- Platt, J. J. (1975) Addiction Proneness and Personality in Heroin addicts, Journal of Abnormal Psychology, 84, 3, 303 - 306.
- Reed, M. D. & Rowntree, P. W. (1997) Peer pressure and adolescent substance use, Journal of Quantitative Criminology, 13, 2, 143 - 180.
- Reiser, S. J. (1978). Medicine and the reign of technology. Cambridge: Cambridge University Press.
- Robins, L. N. & Przybeck, T. R. (1985) Age of onset of drug use as a factor in drug and other disorders, in Jones, C. L. & Battjes, R. J. (eds) Etiology of drug abuse: Implications for prevention, Washington, US Government Printing Office.
- Roizen, R., Cahalan, D., & Shanks, P. (1978). Spontaneous remission among untreated problem drinkers. In D. B. Kandel (Ed.), Longitudinal research on drug abuse. New York: Wiley.

- Roth, I. (2000) Introduction to psychology, Open University, Milton Keynes.
- Rotter, J. B. (1954) Social Learning and Clinical Psychology, Englewood Cliffs, Prentice-Hall.
- Rounsaville, B. J., Weissman, M. & Kleber, H. D. (1983) An Evaluation of Depression in Opiate addicts, Research in Community and Mental Health, 3, 257 - 289.
- Rowe, D. C. (1987). Resolving the person-situation debate: Invitation to an interdisciplinary dialogue. American Psychologist, 42, 3, 218-227.
- Sadava, S. W. (1978). Etiology, personality and alcoholism. Canadian Psychological Review, 19,3, 198-214.
- Samson, H. H., Tolliver, G.A., Lumeng, L. & Li, T. K. (1989) Ethanol reinforcement in the Alcohol Non-preferring rat: Initiation using behavioural techniques without food restriction. Alcoholism 13, 378-385.
- Scheier, L.M., Botvin, G.J., Griffin, K.W. & Diaz, T. (2000) Dynamic growth models of self-esteem and adolescent alcohol use, Journal of Early Adolescence, 20, 2, 178-209
- Schork, N. J. & Schork, C. M. (1998) Issues and strategies in the genetic analysis of alcoholism and related addictive behaviours, Alcohol, 16, 1, 71-83.
- Schuckit, M. A., Irwin, M. & Brown, S. A. (1990) The history of anxiety symptoms among 171 primary alcoholics, Journal of Studies of Alcohol, 51, 1, 34 - 41.
- Schulenberg, J., Bachman, J. G., O'Malley, P. M. & Johnston, L. D. (1994) High school educational success and subsequent substance use: A panel analysis following adolescents into young adulthood, Journal of Health and Social Behaviour, 35, 1, 45 - 62.
- Schultz, D. (1990) Theories of Personality, Belmont, Brooks Cole.
- Segal, B. (1991) Adolescent initiation into drug-taking behaviour: Comparisons over a 5-year interval, International Journal of the Addictions; 26, 3, 267-279.
- Shaffer, H. J., & Robbins, M. (1991). Manufacturing multiple meanings of addiction: Time-limited realities. Contemporary Family Therapy, 17(2), 65-76.
- Shannon, D. M., James, F. R. & Gansneder, B. M. (1993) The identification of adolescent substance misuse using school-reported factors, High School Journal, 76, 2, 118 - 128.
- Sharma, O. P. (1995). The dilemma of addictive personality and resolvability of drug dependence. Journal of Indian Psychology, 13, 1, 47-50.
- Sharp, D. L. (1994), Underage drinking in the United Kingdom since 1970: Public policy, the law and adolescent drinking behaviour, Alcohol and Alcoholism, 29, 5, 555-563
- Shedler, J. & Block, L (1990) Adolescent drug use and psychological health: A longitudinal enquiry, The American Psychologist, 45, 5, 612-630
- Shilts, L. (1991) The relationship of early adolescent substance use to extracurricular activities, peer influence, and personal attitudes, Adolescence, 26, 103, 613 – 617.

- Sieber, M. & Bentler, P. (1982) Causal model of personality and the consumption of legal and illegal drugs, Sepugtabzug, 41, 1 - 15.
- Sleisenger, M. H. (1985) Gastrointestinal Disease, In J. B. Wyngaarden & L. H. Smith (Eds) Cecil Textbook of Medicine, Philadelphia, Saunders.
- Smart, R. G. & Walsh, G. W. (1995) Do some types of alcoholic beverages lead to more problems for adolescents? Journal of Studies on Alcohol 56, 1, 35 - 38.
- Smart, R.G., Mann, R.E., & Tyson, L. A. (1977) Drugs and violence among Ontario students, Journal of Psychoactive Drugs, 29, 4, 369-373.
- Smith, D. E., Milkman, H., & Sunderwith, S. G. (1985). Addictive disease: Concept and controversy. In H. Milkman & H. G. Sunderwith (Eds.), The addictions: Multidisciplinary perspectives and treatments. Lexington: Lexington Books.
- Smith, G. T. & Goldman, M. S. (1994), Alcohol expectancy theory and the identification of high-risk adolescents. Special Issue: Preventing alcohol abuse among adolescents: Preintervention and intervention research, Journal of Research on Adolescence, 4, 2, 229-248.
- Smith, M. B., Canter, W. A. & Robin, A. L. (1989) A path analysis of an adolescent drinking behaviour model derived from problem behaviour theory, Journal of Studies on Alcohol, 30, 128 - 142.
- Speilberger, C. D. (1983) Manual for the State-Trait Anxiety Inventory STAI Form Y, Palo Alto, C.A., Consulting Psychologists Press.
- Stephenson, A. L., Henry, C. S. & Robinson, L. C. (1996) Family characteristics and adolescent substance use, Adolescence, 31, 121, 59 - 77.
- Stern, S., Northman, J. E. & Van Slyck, M. R. (1984) Father absence and adolescent 'problem behaviours': Alcohol consumption, drug use and sexual activity, Adolescence, 19, 74, 301 - 312.
- Stice, E., Myers, M.G., & Brown, S.A. (1998) Relations of delinquency to adolescent substance use and problem use: A prospective study, Psychology of Addictive Behaviours, 12, 2, 136-146.
- Sutherland, I. & Shepherd, J. P. (2001) Substance abuse: What works, In Progress
- Sutherland, I. & Shepherd, J. P. (2000) Adolescent substance use: A possible resurgence by 11-year olds, British Medical Journal, [www.bmj.com/cgi/eletters/320/7248/1536/a#EL2](http://www.bmj.com/cgi/eletters/320/7248/1536/a#EL2).
- Sutherland, I. & Shepherd, J. P. (2000) The prevalence of alcohol, cigarette and illicit drug use by English adolescent, Addiction, in press
- Sutherland, I. & Willner, P. (1998) The influence of household substance use on children's later cigarette, alcohol and drug use: A three factor model, Early Child Development and Care, 141, 111-126.

- Sutherland, I., (1997) The development and application of a questionnaire to assess the changing personalities of substance addicts during the first year of recovery, Journal of Clinical Psychology 53, 3, 1-9.
- Sutherland, I., (1997) The development and application of a questionnaire to assess the changing personalities of substance addicts during the first year of recovery, Journal of Clinical Psychology 53, 3, 1-9.
- Sutker, P. B., & Allain, A. (1988). Issues in personality conceptualisations of addictive behaviours. Journal of Consulting and Clinical Psychology, 56(2), 172-182.
- Swaim, R. C., Oetting, E. R., Edwards, R. W., & Beauvais, F. (1989). Links from emotional distress to adolescent drug use: A path model. Journal of Consulting and Clinical Psychology, 57, 2, 227 - 231.
- Taibbi, R. (1990) The uninitiated, The Family Therapy Networker, 14, 4, 31-35.
- Talbott, G. D. (1986). Alcoholism and other drug addictions: A primary disease entity. Journal of the Medical Association of Georgia, 75, 490-494.
- Tarter, R. E. & Schneider, D. V. (1976) Models and theories of alcoholism, In Tarter, R. E. & Singleman, A. A. (Eds) Alcoholism: Interdisciplinary approaches to an enduring problem, New York, Guildford Press.
- Tarter, R. E. (1988). Are there inherited behavioural traits that predispose to substance abuse? Journal of Consulting and Clinical Psychology, 2, 189 - 196.
- Tarter, R. E., & Edwards, K. (1986). Antecedents to alcoholism: Implications for prevention and treatment. Behaviour Therapy, 17(4), 346-361.
- Taylor, S. P. & Chermack, S. T. (1993) Alcohol, drugs and human physical aggression, Journal of Studies on Alcohol, 78-88.
- Teasdale, J. D. & Hinkson, J. (1971) Stimulant Drugs: Perceived Effect on the Interpersonal Behaviour of Dependent Patients, International Journal of the Addictions, 6, 407 - 417.
- Tec, N. (1974) parent-child drug abuse: Generational continuity or adolescent deviancy, Adolescence, 9, 35, 351 - 364.
- The National Institute on Drug Abuse (1999) Principles of drug addiction treatment: A research based guide, NIDA.
- Turner, R. A., Irwin, C. E. & Millstein, S. G. (1991) Family structure, family processes, and experimenting with substances during adolescence, Journal of Research on Adolescence, 1, 1, 93 - 106.
- Vaillant, G. E. (1983) The natural history of alcoholism, Cambridge, Harvard University Press.

- Van Kammen, W. B, Loeber, R. & Stouthamer-Loeber, M. (1991) Substance use and its relationship to conduct problems and delinquency in young boys, Journal of Youth and Adolescence, 20, 4, 399- 413.
- Vlajinac, H., Adanja, B. & Jarebinski, M. (1989) Cigarette smoking among medical students in Belgrade related to parental smoking habits, Social Science and Medicine, 29, 7, 891-894.
- Walfish, S., Massey, R. & Krone, A. (1990) Anxiety and anger among abusers of different substances, Drug and Alcohol Dependence, 25, 3, 253 - 256.
- Walfish, S., Massey, R., & Krone, A. (1990). Interpersonal relationships of adolescent substance abusers. Journal of Adolescent Chemical Dependency, 1, 2 , 5-13.
- Wallace, J. (1989). A biopsychosocial model of alcoholism. Social Casework, 70, 325-332.
- Wallace, J. (1993) Modern disease models of alcoholism and other chemical dependencies: The new biopsychosocial models, Drugs and Society; 8, 1, 69 - 87.
- Walters, G. D. (1992). Drug seeking behaviour: Disease or lifestyle? Professional Psychology Research and Practice, 23(2), 139-145.
- Walters, G.D. (2000) Disposed to aggress?: In search of the violence-prone personality, Aggression and Violent Behaviour, 5, 2, 177-190.
- Wang, M. Q., Fitzhugh, E. C., Westerfield, R. C. & Eddy, J. M. (1995) Family and peer influences on smoking behaviour among American adolescents: An age trend, Journal of Adolescent Health, 16, 3, 200-203.
- Weatherby, N.L., Needle, R., Cesari, H., Booth, R., McCoy, C.B., Watters, J.K., Williams, M. & Chitwood, D.D. (1994) Validity of self-reported drug use among injection drug users and crack cocaine users recruited through street outreach, Evaluation Programme Plan, 7, 4, 347-355.
- Webb, J.A.; Baer, P. E. (1995) Influence of family disharmony and parental alcohol use on adolescent social skills, self-efficacy, and alcohol use, Addictive Behaviours, 20, 1, 127 – 135.
- Weinberg, N. Z., Dielman, T. E., Mandell, W. & Shope, J. T. (1994) Parental drinking and gender factors in the prediction of early adolescent alcohol use, International Journal of the Addictions, 29, 1, 89-104.
- Weissman, M. M. & Myers, J. K. (1980) Clinical depression in alcoholism, American Journal of Psychiatry, 137, 3, 372 - 373.
- Wells, B. W., & Stacey, B. G. (1976). Social and psychological features of young drug misusers. British Journal of Addiction, 71, 3, 243-251.
- Welte, J. W., & Barnes, G. M. (1985). Alcohol: The gateway to other drug use among secondary-school students. Journal of Youth and Adolescence, 14, 6, 487 - 498.

- Wiggins, J. G. & Broughton, R. (1991), A geometric taxonomy of personality scales, European Journal of Personality; 5, 5, 343 - 365.
- Wilson, J. Q. & Hernstein, R. J. (1985) Crime and human nature, New York, Simon & Schuster.
- Wilson, P.H. (1996) Relapse prevention: Overview of research findings in the treatment of problem drinking, smoking, obesity and depression, Clinical Psychology & Psychotherapy, 3, 4, 231-248.
- Winters, K. C., Stinchfield, R. D., Henley, G. A., & Schwartz, R. H. (1990). Validity of adolescent self-report of alcohol and other drug involvement. Special Issue: Nonexperimental methods for studying addictions. International Journal of the Addictions, 25(11(A)), 1379-1395.
- Winters, K. C., Stinchfield, R. D., Henly, G. A. & Schwartz, R. H. (1990-1991) Validity of adolescent self-report of alcohol and other drug involvement. Special Issue: Nonexperimental methods for studying addictions, International Journal of the Addictions, 25, 11A, 1379-1395.
- Winters, K. C., Weller, C. L. & Meland, J. A. (1993) The extent of drug abuse among juvenile offenders, Journal of Drug Issues, 23, 3, 515 - 524.
- Winters, K.C., Stinchfield, R.D., Opland, E., Weller C. & Latimer, W.W. (2000) The effectiveness of the Minnesota Model approach in the treatment of adolescent drug abusers, Addiction, 95, 4, 601-612
- Wise, R. A. (1989). The brain and reward. In J. M. Leiden & S. J. Cooper (Eds.), The neuropharmacological basis of reward. Oxford: Oxford University Press.
- Yamaguchi, K., & Kandel, D. B. (1984). Patterns of drug use from adolescence to young adulthood: Sequences of progression. American Journal of Public Health, 74, 7, 668 - 672.
- Yeary, J. (1982). Incest and chemical dependency. Journal of Psychoactive Drugs, 8, 59-76.
- Young, M., Werch, C. E. & Bakema, D (1989) Area specific self-esteem scales and substance use among elementary and middle school children, Journal of School Health, 59, 6, 251 - 254.
- Yu, J., & Williford, W. R. (1992) The age of alcohol onset and alcohol, cigarette, and marijuana use patterns: An analysis of drug use progression of young adults in New York State, International Journal of the Addictions, 27, 11, 1313 - 1323.
- Zhang, L. N., Wieczorek, W.F. & Welte, J. W. (1997) The impact of age of onset of substance use on delinquency, Journal of Research in Crime and Delinquency, 34, 2, 253 - 268.
- Zucker, R. A. & Noll, R. B. (1982) Precursors and developmental influences on drinking and alcoholism: Etiology from a longitudinal perspective, in Alcohol Consumption and Related Problems, Rockville, NIAAA.

Zweben, J. E. (1993). Recovery oriented psychotherapy: A model for addiction treatment. Special Issue: Psychotherapy for the addictions. Psychotherapy, 30(2), 259-268.