

**Coping with the Effects of Exposure to Trauma: Exploring the  
Link Between Posttraumatic Stress Symptoms and Problematic  
Substance Use in Adolescents**

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## Declaration

"This thesis has been composed by myself and the work contained herein is my own"

Signed ...

. Elaine Sinclair

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## 1 Abstract

- Objectives:** To replicate the finding of an association between PTSD symptomatology and problematic drug/alcohol use in a clinical sample of young people in Scotland. To examine possible gender differences in this association, as well as the potential moderating effects of perceived social support and coping. To test the self-medication hypothesis (SMH).
- Design:** The present study is cross-sectional in design
- Method:** A series of five self-report questionnaires were administered, individually, to obtain measures of PTSD symptomatology, levels of problematic drug and alcohol use, perceived social support and coping. In addition, a short series of structured interview questions were asked, where appropriate, to elicit further information pertaining to drug and/or alcohol use.
- Results:** The results indicated a lack of a significant association between PTSD and substance use in the sample being studied. Some support for the SMH was obtained with the finding of an association between perceived relatedness of alcohol use and trauma effects, and levels of problematic alcohol use. Reported onset of alcohol use prior to the trauma experience was associated with higher levels of problematic use and individuals reporting prior onset of substance use, tended to report an increase in use following the trauma.
- Conclusions:** Results are discussed in the context of prior findings in the literature of a consistent relationship between PTSD and substance use, and methodological limitations of the present study are highlighted. It is suggested, with reservation, that the results provide some support for the SMH. Clinical implications and future recommendations are discussed.

## 2 Introduction

### **2.1 General Overview**

The problem of co-morbid Posttraumatic Stress Disorder (PTSD) and substance abuse is one, which is considered to be a significant public health concern (McFarlane, 1998). Co-occurring PTSD and substance use problems offer a challenge to services and it is recognised that this comorbidity of problems affords greater impairment of functioning as well as poorer treatment outcomes for those individuals affected (Brown & Wolfe, 1994; Giaconia et al. 2000; Ouimette, Brown & Najavits 1998). McFarlane (1998) points out that an understanding of the nature of the association, as well as the direction of causality is extremely important to guide both treatment planning and service delivery.

#### **2.1.1 Trauma Exposure, PTSD, and Comorbidity**

In the last decade researchers have shown increasing interest in the psychological correlates of exposure to violence and/or trauma in adolescence, and strong links have reportedly been found between violence exposure and depression, PTSD, childhood abuse, family conflicts and a variety of externalising behaviour problems including delinquency, aggression and substance abuse (Fehon, Grilo and Lipschitz, 2001). PTSD, in particular, has been reported to be a “highly co-morbid disorder” and has been shown to co-occur with depression, anxiety, and personality disorders as well as Substance Use Disorders (SUDs) (Lipschitz et al. 1999). According to DSM-IV PTSD is characterised by “the development of characteristic symptoms following exposure to an extreme traumatic stressor”. The characteristic symptoms referred to include re-experiencing phenomena, avoidance/numbing and hyperarousal. Full diagnostic criteria are detailed in Appendix I.

An association between PTSD and SUDs, has been well established in the literature and this is the area of focus in the present study which looks in particular at the association between

PTSD symptoms and substance use in adolescents; the nature of the association as well as the role of potential moderating variables, namely social support and coping, is explored.

### **2.1.2 Levels of Substance Use in Young People in the General Population**

Recent reports suggest that regular substance use, including both alcohol and illicit drugs, is on the increase, particularly amongst adolescents. Studies show that, while in 1999 21 percent of young people (aged 11-15 years) reported having drunk alcohol in the past seven days, this rose to 24 percent in the year 2000 (Institute of Alcohol Studies, 2002). It is reported also, that binge drinking is relatively common by the time young people reach mid-adolescence (Bienart et al, 2000) and a survey carried out in England (Home Office Research, Development and Statistics Directorate, 2000) found that almost ten percent of 15-16 year olds regularly exceeded the weekly recommended limits for adults (i.e. 14 units for women, 21 units for men). A survey carried out in Scotland also reported relatively high levels of alcohol use, with 50 percent of school children aged 14 years, admitting to having been drunk at least once (McKeganey, Forsyth, Hay & Gordon, 1996). With regard to illicit drug use, the number of 11-15 year olds who report having used drugs has also increased in recent years; in 1998, eleven percent reported use of illicit drugs while in the year 2000, the figure had risen to 14 percent. In a recent survey of 4,700 school pupils (aged 12-15), ten percent admitted having taken drugs in the last month while 14 percent reported using in the last year. The figures vary according to both age and gender with older adolescents using more frequently than younger ones, and males using more frequently than females (Department of Health & Scottish Executive, 2002).

Thus, it can be seen that drug and alcohol use amongst the younger generations is becoming increasingly common. In view of both this and the fact that the onset of substance use and its development into abuse is thought to occur primarily during the teenage years, Wills et

al. (2001) highlight the importance of studying the association between PTSD and substance use in adolescent populations.

This review will first outline some of the literature which supports the relatively established link between PTSD and substance use/abuse before going on to discuss the nature of this association and those factors which might serve as moderating variables. Finally, the aims and objectives of the present study will be outlined.

## **2.2 The Early Studies**

### **2.2.1 Combat Exposure and Substance Abuse**

The first studies investigating the link between PTSD and substance use/abuse were mainly carried out on populations of combat veterans in the United States. Keane, Caddell, Martin, Zimering and Fairbank (1983) are cited as one of the first groups of researchers to report high intake rates of caffeine and nicotine amongst combat veterans seeking treatment for PTSD (cited in Stewart et al. 1998). Research in this area has not been confined to smoking and caffeine intake, however, but has also involved measuring use of other substances, including illicit drugs and alcohol. Jordan et al. (1991), for example, found that current and lifetime rates of alcohol and/or drug problems were elevated among veterans with high levels of combat exposure compared with those who had lower levels of combat exposure, and non-exposed controls. High combat exposure was also associated with a diagnosis of PTSD, thus suggesting the presence of a link between PTSD and problematic substance use. Although many studies have reported an association between combat exposure and substance use disorders, the literature has not been entirely consistent and it would appear that problematic drug and alcohol use is linked more to the presence of PTSD as opposed to trauma exposure per se (McFall et al. 1992; Triffelman et al. 1995; Stewart 1996).

### **2.2.2 Comorbid PTSD and Substance Use Disorders in War Veterans**

Co-morbidity rates for PTSD and SUDs have been reported by a number of researchers. Keane et al. (1988), for example, carried out a study involving 25 treatment seeking Vietnam War veterans who met DSM-III criteria for PTSD. They found that 80 percent of this sample had self-reported drug and/or alcohol problems, while 24 percent met diagnostic criteria for substance abuse or dependence, and 28 percent met criteria for alcohol abuse or dependence. Nace (1988) also reports fairly high levels of alcohol abuse amongst individuals with war related PTSD, with prevalence rates being documented as above 50 percent and, according to Ruzek et al. (1998), the literature documents lifetime rates of comorbid PTSD/alcoholism ranging from 47 to 77 percent, in veterans seeking treatment for PTSD. Lifetime rates of drug abuse are reportedly slightly lower (25-54 percent). Research has not been limited to treatment seeking veterans but has also been carried out with non-treatment seeking veterans. Kulka et al (1990), for example, in the National Vietnam Veterans Readjustment Study, reported that 74 percent of male veterans and 29 percent of female veterans who met DSM-III-R criteria for PTSD also met criteria for a SUD.

Whilst these early studies involved mainly male sufferers (although Jordan et al. 1991, and Kulka et al. 1990, did find that an association between PTSD and problematic drug or alcohol use was evident in female as well as male veterans), later studies were carried out with clinical populations of both male and female substance abusers, who had experienced a wide variety of trauma-types as opposed to war-related trauma only.

### **2.2.3 Clinical Studies**

Research has been carried out both with samples of individuals with PTSD, as well as samples of individuals with SUD's and, in both cases, relatively high rates of co-occurring PTSD and problematic substance use have been documented.

### 2.2.3.1 *Substance Use Samples*

Brown, Recupero & Stout (1995) found that PTSD symptoms were reported by approximately 25 percent of their sample of both male and female's seeking treatment for substance abuse, while Fullilove et al. (1993), document PTSD rates of 59 percent in their sample of 105 female outpatients with drug addiction problems. Najavits et al (1997) report that 20.5 percent of their sample of cocaine dependent outpatients also met DSM-III criteria for PTSD. Gender differences in comorbidity rates of 30.2 percent for females and 15.2 percent for males are also reported. Other studies which report high rates of comorbidity in substance abusing samples include Grice et al (1995) who report (DSM-III-R) PTSD rates of 34 percent in a sample of male and female inpatients with substance-dependency problems and Kovach (1986) who found that 40 percent of women in treatment for substance abuse also presented with PTSD. Grice et al. (1995) also report further findings that 66 percent of their total sample (n=100) reported histories of sexual and/or physical assault and women were more likely than men to have experienced sexual assault. Based on studies such as these, co-morbidity rates within populations of treatment seeking substance abusers range from around 20-59 percent.

### 2.2.3.2 *Samples of PTSD Sufferers*

With regard to those studies, which involve samples drawn from PTSD populations, Cashman, Molnar & Foa (1995) and Resnick, Griffin & Mechanic (cited in Stewart et al., 1998) report SUD rates of 25 to 39 percent in women with PTSD following assault. Zlotnick, Zimmerman, Wolfsdorf & Mattia (2001) also report relatively high comorbidity rates in a sample drawn from a private outpatient treatment clinic and of the total sample (n=1130), 138 met diagnostic criteria for PTSD. Saladin, Brady, Danzky & Kilpatrick (1995) compared a group of women with PTSD and substance use with a group with PTSD alone and found that the co morbid group had increased exposure to traumatic events. Ouimette, Wolfe & Chrestman (1996) also compared two groups of females with PTSD; one group had a

comorbid alcohol disorder. Comorbid diagnosis was associated with increased severity of PTSD symptomatology and increased reports of sexually related trauma experiences.

In the literature, it is clear that many studies have concentrated on females with either substance abuse problems or PTSD. Those studies, which do investigate females only, or those which explore gender differences, tend to document higher rates of co-occurrence in females compared to males. High rates of PTSD have been reported in studies of female substance users as well as high rates of substance abuse being documented in women with PTSD (Rusek et al., 1998). Gender differences are discussed further in section 2.3.

In general, the literature suggests that SUD and PTSD comorbidity is associated with more psychopathology (including depressive symptomatology and anxiety symptoms), increased life problems (including interpersonal difficulties, poor health, stigmatisation and financial difficulties), increased trauma exposure, increased likelihood of having sexual trauma history and poorer treatment outcome (Najavits et al 1997; Brown & Wolfe, 1994; Ouimette et al 1996). Co-occurring PTSD and SUD offers a challenge to treatment services and research is required both to promote a greater understanding of the nature of this complex association and to inform future treatment planning and service delivery.

#### **2.2.4 Community Samples**

The association between PTSD and substance abuse problems has also been documented in studies carried out with community-based participants. Kessler et al's (1995) National Comorbidity Survey, for example reported lifetime prevalence rates of 7.8 percent for PTSD. Males with PTSD were reportedly 1.5 times more likely than those without PTSD to have a comorbid alcohol dependency disorder and 2.3 times more likely to have a comorbid drug dependency disorder. Females with PTSD compared to those without PTSD were 2.1 times more likely to have comorbid alcohol dependency and 3.5 times more likely to have

comorbid drug dependency. Overall, 2.6 percent of males (in the total sample) had comorbid PTSD and alcohol dependency while 1.7 percent had comorbid PTSD and drug dependency. With respect to females, 2.9 percent of the total sample had comorbid PTSD/alcohol abuse and 2.8 percent had comorbid PTSD/drug abuse. Cottler et al. (1992) found opiate users in the general population were more likely to have both a history of trauma and a diagnosis of PTSD than non-users, and a recent study carried out in Australia (Creamer, Burgess & McFarlane, 2001) found high levels of comorbid SUD in individuals with PTSD. Breslau et al. (1991) found that young adults (21-30yrs) with PTSD reported higher rates of alcohol abuse/dependence than those without a PTSD diagnosis in addition, a later study on the same sample (Breslau & Davis, 1992) indicated that those classified as having chronic PTSD were 2.7 times more likely to meet criteria for a substance use disorder than those considered non-chronic. Thus, the severity of PTSD seems to be an important factor in predicting presence of a SUD. Stewart, Conrod, Pihl & Dongier (1998), also carried out a community sample study involving non-treatment seeking substance abusing women and found that 63 percent met DSM-IV diagnostic criteria for PTSD. In addition, they report that those women who had been exposed to a trauma which met Criterion A of DSM-IV criteria for PTSD (see Appendix 1) had higher scores on a measure of alcohol dependence than those women who did not report exposure to such a trauma. Thus, exposure to trauma itself was also associated with alcohol problems.

The studies described above involved community-based participants who had been exposed to a wide range of trauma types, indicating that the PTSD/substance abuse link is not limited to specific types of trauma such as combat exposure or sexual assault, nor is it unique to clinical populations. Co-morbidity rates in community sample studies tend to be somewhat lower than those documented in clinical samples which, it is argued, may be due to the fact that seeking help tends to be influenced by the total distress being experienced

and thus, clinical populations have higher levels of distress than non-treatment seeking community-based individuals (Berkson, 1946, cited in Deykin & Buka, 1997).

### **2.2.5 Trauma, PTSD and Substance Use in Adolescents**

Studies have also been carried out with young people and these too support the association between trauma exposure, development of PTSD symptomatology and substance use/abuse. Horowitz, Weine, & Jekel (1995) report a positive correlation between level of exposure to violence, and severity of PTSD in young community-based females (n=79, age 12-21 yrs). This study was carried out with a sample of urban adolescents and highlighted the high risk of both being exposed to violence within their own community and going on to develop PTSD symptoms. Singer, Anglin, Song & Lunghofer (1995) also found an association between trauma exposure and reported PTSD symptoms in a school based survey of 14-19 years olds (n= 3735). In this particular study, female gender was noted as a risk factor for development of trauma symptoms. Lipschitz, Winegar, Hartnick, Foote, and Southwick (1999), document extremely high rates of trauma exposure in their inpatient sample of male and female adolescents; 93 percent of the sample had been exposed to at least one traumatic event. Consistent with Singer et al. (1995), those who met criteria for a diagnosis of PTSD were also more likely to be female

### **2.2.6 Comorbid PTSD in Substance Abusers**

While the above studies look at the relationship between trauma exposure and subsequent development of PTSD symptomatology, a number of studies have also been carried out which look more specifically at the association between PTSD symptoms and problematic substance use. Clark et al (1997), for example, carried out a study with a sample of 133 young people who had a diagnosis of alcohol dependence and found that significantly more of these individuals met criteria for a diagnosis of PTSD than did a control group of 86 young people without alcohol dependence (cited in Stewart et al., 1998). Deykin & Buka

(1997) report PTSD/SUD co-morbidity rates of 12 percent for males and 40 percent for females in a sample of substance abusers and Clark, Bukstein, Smith, Kaczynski, Mezzich and Donovan (1995) reported current anxiety disorder (including PTSD) rates of 40 percent in a sample of hospitalised substance abusers.

### **2.2.7 Adolescent Psychiatric Inpatients**

A number of studies have also been carried out with adolescent inpatients in a psychiatric unit, by a group of researchers in the United States. Fehon, Grilo and Lipschitz (2001), for example, compared psychiatric inpatients with a history of exposure to community violence with a group of non-exposed inpatients and found that the traumatised group reported significantly more PTSD symptoms and significantly more drug use than the non-exposed group. The exposed group were also more likely to have been victims of child abuse. In another study by the same group of researchers (Lipschitz, Grilo, Fehon, McGlashan and Southwick, 2000), 23 percent, of psychiatric inpatients, reportedly met diagnostic (DSM-IV) criteria for PTSD while 37 percent and 34 percent met criteria for problematic drug and alcohol use respectively. In this particular study, levels of problematic drug and alcohol use were positively associated with PTSD symptomatology in females only.

### **2.2.8 Community-based Studies with Adolescents**

As is the case with the adult studies, the association between PTSD symptomatology and substance use is not limited to clinical samples but has also been documented in community-based samples. Lipschitz, Rasmusson, Anyan, Cromwell and Southwick (2000), for example, found higher rates of tobacco and marijuana use in a group of trauma exposed adolescent girls with a diagnosis of PTSD compared with a non-PTSD group and Giaconia, Reinherz, Hauf, Paradis, Wasserman and Langhammer (2000) found that 3.6 percent of their community based sample of 18 year olds met diagnostic criteria (DSM-III-R) for both PTSD and a SUD.

### 2.2.9 Summary of Findings

The link between PTSD and substance use/abuse certainly appears to be an established one which has been replicated with a wide variety of different populations including both clinical and community samples, which include both male and female participants who have been victims of a variety of different trauma types from combat related to physical and/or sexual assault. It has been suggested that the presence of PTSD may act as a mediator between exposure to trauma and substance abuse since the severity of PTSD symptoms *“appears more highly associated with substance abuse than does trauma exposure per se”* (Stewart et al., 1998). It therefore appears to be the case that investigation of the link between PTSD symptom severity and substance use severity may be more relevant than measuring the association of severity of trauma alone.

Prevalence rates for both PTSD and SUDs vary across studies and there are a number of possible reasons for this discrepancy. Studies vary in the definitions used for both PTSD and substance use; while some use DSM-IV criteria, earlier studies use DSM-III or DSM-III-R. Similarly, other studies may use various versions of the ICD diagnostic criteria. In the case of definitions of substance use, again studies vary in their use of formal diagnostic criteria and, while some studies are specifically interested in substance use disorders, others are interested in varying levels of use and/or abuse. Studies also vary in the methods used to establish diagnoses/levels of PTSD and substance use/abuse. While some studies use structured clinical interviews, others rely solely on self-report measures. Variation exists also in terms of the schedule used when structured clinical interviews are carried out; while some use the Structured Clinical Interview for DSM-III-R (SCID, Spitzer et al., 1987), others use the Diagnostic Interview Schedule (DIS, Robins et al., 1981) or the Clinician Administered PTSD Scale (CAPS, Blake et al., 1990). There is some evidence to suggest that in comparison with the SCID the DIS may to some extent provide an underestimate of

comorbidity rates (Stewart 1996). Differences in prevalence rates also vary according to gender and the age of the population under study.

One criticism which could be made of the studies discussed thus far, is that there is a failure to take into account individual difference factors, other than age and gender, which may have an impact on the development of comorbid PTSD and substance use problems. Factors such as coping and availability of resources, such as social support, may well play an important role, though these have not yet been adequately investigated in the literature. Consideration of these factors is warranted, particularly given the findings in the literature which suggest that a lack of adequate social support as well as use of maladaptive coping, are implicated in the development of PTSD (e.g. La Greca et al. 1996) and substance use problems (Wills & Cleary, 1996; Kliewer et al 1998; Wills et al 2001).

Gender differences, in the association between PTSD and substance use/abuse have been reported by a number of researchers, though not all, and these are outlined in more detail below.

## **2.3 Gender Differences**

Najavits et al (1997), in their review of the association between PTSD and substance use in females, highlight two main gender differences, which have been documented in the literature, namely comorbidity rates and type of trauma exposure.

### **2.3.1 Comorbidity Rates**

Firstly, the co-occurrence of PTSD and problematic substance use reportedly occurs more commonly in the female gender. Brown et al (1995), for example, document rates of PTSD for substance abusing women as being 43 percent compared with only 12 percent for men and Najavits, Gastfried & Barber et al (1998) found that women substance abusers were

twice as likely as their male counterparts to suffer PTSD. Based on studies such as these, it has been estimated that substance-abusing females are 2-4 times more likely to suffer PTSD (symptoms or diagnosis) than male substance abusers. Consistent with the findings in the adult literature, Lipschitz et al (2000), report a significant positive correlation between PTSD and drug/alcohol problems in adolescent females in a psychiatric inpatient unit, while a similar correlation was not found for male adolescents. Giaconia et al's (2000) cross-sectional community-based study of 18 year olds found (DSM-III-R) comorbidity rates of 5.3 percent for females and 2.1 percent for males, though this difference was not statistically significant. In contrast to the studies outlined above, Zlotnick et al (2001) reported fairly similar clinical profiles for male and female outpatients of a private clinic. Although a higher proportion of women met DSM-IV diagnostic criteria for PTSD than men (14.1 percent vs. 9.1 percent), men were significantly more likely than women to meet criteria for a SUD. It is noteworthy, however, that this particular sample was drawn from a privately run clinic and given the increased psychopathology and life problems which have been documented in women with SUDs (e.g. Najavits et al. 1997), as a group they are unlikely to possess the financial resources required to access such a service. This study may therefore provide an underestimate of the prevalence of co-morbidity in clinical populations.

### **2.3.2 The Nature of the Trauma**

A second gender difference that has been consistently documented in the literature, relates to the type of trauma to which individuals have been exposed. According to Najavits et al. (1997), females with both PTSD and substance use problems are more likely to report histories of physical and/or sexual assault, while men are more likely to have been victims of crime, disasters or to have combat experiences. Consistent with this Ouimette, Wolfe & Chrestman (1996) report that women with PTSD and a SUD are more likely to report experience of child sex abuse and other sexually related traumas than women with PTSD alone. Grice et al (1995) report that women are more likely to have histories of repeated

trauma exposure (which would fit in with the increased likelihood of women being exposed to childhood sexual abuse) than male substance abusers and Zlotnick et al. (2001) similarly found that women were more likely to report a history of sexual assault. Similar findings have also been documented in studies carried out with adolescent populations. Lipschitz et al., (2000), for example, found that females were more likely to report experiences of unwanted sexual contact while males more commonly reported experience of physical assault.

Najavits et al. 1997, point out that rape has been documented as the trauma type most likely to lead to the development of PTSD symptoms in both males and females (Kessler et al. 1995) and since females are more likely to be victims of sexual assault, it may be that rape victims are particularly vulnerable to developing substance use problems. Najavits et al. do not, however, go on to explain or suggest why it is that such individuals should necessarily be more vulnerable to developing substance use problems. It may be that the severity of the trauma and the subsequent development of severe PTSD symptomatology have the effect of disrupting an individual's normal capacity to cope with stress and use the resources normally available to them. If we adopt a self-medication model of substance use, as has been argued by a number of researchers (e.g. Khantzian, 1997; Stewart et al., 1998) then it may be that individuals turn to substances of abuse in an effort to cope with both the trauma itself and the severe psychological distress associated with it. This self-medication hypothesis is discussed in more detail in section 2.4.

The majority of the studies which have been discussed thus far have tended to be cross-sectional comparisons or correlational in design and researchers such as Stewart (1996) and Najavits et al. (1997) highlight the need to explore further the nature of the association between PTSD and drug/alcohol use and to look, in particular, at the function served by use of such substances. As is highlighted by Koefed et al (1993), statistical association between

two variables is far from proof of cause and effect and further investigation of function is required.

## 2.4 The Nature of the Association: the Self-Medication Hypothesis

One theory, which has been proposed to account for the high rates of co-occurrence of PTSD and substance abuse, is the self-medication hypothesis (Khantzian, 1997). This theory has generated a great deal of interest and is summarised in the following quote:

*“According to this hypothesis, drug abuse begins as a partially successful attempt to relieve painful feelings. This does not mean seeking “pleasure” from the use of drugs. Individuals predisposed by biological or psychological vulnerabilities find that drug use corresponding to their particular problems are powerfully reinforcing”.*

*R.M.Glass (cited in Khantzian, 1997)*

Khantzian (1997) suggests that there are two main aspects to the self-medication hypothesis (SMH). Firstly, drugs, abused by individuals, have the propensity to relieve psychological distress and suffering and secondly, a certain degree of pharmacological specificity is thought to underlie an individual's preference for a particular drug/drug type. It is then, that individuals experimenting with drugs, find that a particular type of drug is powerfully reinforcing due to its alleviation of negative affect states. The symptoms associated with a diagnosis of PTSD are extremely distressing for sufferers and it is suggested that the frequent co-occurrence of PTSD and substance use disorders is a reflection of an attempt to control or regulate (through use of drugs) the aversive emotional states that are experienced by individuals suffering from PTSD. It is not assumed that all individuals who have experienced trauma and go on to develop PTSD will necessarily abuse alcohol or other drugs, rather Khantzian proposes that it is those individuals who have some degree of vulnerability or predisposition towards difficulties in affect-regulation. He suggests that there is an interaction between certain personality characteristics and psychological distress such that each increases the likelihood of a particular individual turning to drug use. He believes that individuals who experience difficulties in tolerating a wide range

states and who, therefore, find the symptoms and distress associated with PTSD unbearable are the ones who are most likely to employ substance use as a means of affect regulation.

#### **2.4.1 Maintenance of Substance Use**

Ruzek et al. (1998) suggest that substance use in PTSD sufferers, as well as providing relief from aversive affect states may also be maintained by some positive consequences; individuals may for a while, experience an increased sense of control and confidence which may enable engagement in social interaction which was previously very difficult. Drug effects may also increase positive affect, which may be especially reinforcing in the context of numbing/avoidance symptoms. Thus, once a person has started using drugs he/she will find them powerfully reinforcing, at least in the short term.

Abuse of drugs, such as alcohol and opiates, however, also brings with it withdrawal symptoms which themselves can both mimic and exacerbate PTSD symptoms. This then has the effect of increasing an individual's distress, and degree of dependency consequently increases as amelioration of emotional and psychological distress is sought through further substance use. Kosten and Krystal (1988) suggest that this cyclical process (of drug use, withdrawal and PTSD) may be a classically conditioned one whereby the withdrawal symptoms (the conditioned stimulus) elicit PTSD symptoms (the conditioned response), the PTSD symptoms incite further substance use, which then leads to increased dependency and associated withdrawal symptoms. They suggest that drug users may experience cravings and withdrawal symptoms when in a setting where they previously took the drug and these conditioned symptoms may be the result of noradrenergic system activity. In individuals with a comorbid diagnosis of PTSD, these withdrawal symptoms may be subjectively perceived as PTSD symptoms and this potential misattribution may serve to exacerbate both PTSD symptomatology and drug misuse. This may go some way towards explaining the comparatively poorer outcomes, which have been associated with comorbid diagnosis, since

the goal of abstinence, in the context of continuing PTSD symptomatology, may become more difficult to achieve (Koefed et al. 1993).

#### **2.4.2 The “Drug of Choice”**

According to Khantzian’s SMH, an individual is assumed to have a “preferred drug” or “drug of choice”. The drug of choice has the effect of ameliorating those painful affect states, which are associated with PTSD and experienced as intolerable. The drug of choice for any one individual can vary at any one time according to the constellation of symptoms currently being experienced. Opiates for example are known to have a calming effect and thus may serve to relieve feelings of intense anger and rage. Khantzian (1997) discusses how Vietnam veterans with whom he worked reported that such drugs helped them to contain and control their anger. Brown & Wolfe (1994) suggest that central nervous system depressants, such as alcohol, help with sleep difficulties and irritability (hyperarousal symptoms) while use of stimulants such as amphetamines may “help boost sociability”, which may be particularly reinforcing in the presence of numbing/avoidance symptoms. For individuals with high levels of re-experiencing phenomena, avoidance/numbing and hyperarousal symptoms, a number of different drugs may be used to aid affect regulation and symptom control, at any one time.

It should be noted that the SMH is not intended to be an all encompassing theory of the nature of the association between substance use/abuse and PTSD and does not claim to replace or ignore the relevance of biological/genetic and sociocultural factors. Rather it is intended as an attempt to address the role of emotional and psychological factors involved in substance abuse (Khantzian, 1997). Koefed et al (1993) point out that clinicians often assume that individuals with comorbid SUD and PTSD are self-medicating and Najavits et al. (1997) warns against making this assumption without clear evidence.

Evidence consistent with the SMH comes from a number of different sources including studies, which look at the neurobiological mechanisms underlying PTSD and SUDs, studies that examine relative onset of both disorders and studies that investigate the existence of pharmacological specificity.

### **2.4.3 Biological Studies**

Kosten and Krystal (1988) review biological studies, which are posited to complement the SMH. They discuss the role of the central noradrenergic systems, which are thought to be involved in alarm responses to threatening (or traumatic) stimuli. The locus ceruleus, in particular, appears to be inhibited by administration of a number of substances of abuse (including heroin, benzodiazepines and alcohol) and this deactivation of the locus ceruleus leads to a reduction in alarm responses. It is also suggested that withdrawal states may result in exacerbation of PTSD symptoms due to an increase in noradrenergic activity (which is already elevated due to PTSD).

Koefed et al. (1993) also provide some evidence for a neurobiological model, which appears to complement the SMH. They suggest that dysregulation of a number of different types of neurobiological systems including the adrenergic, opioid and serotonergic systems may increase an individual's vulnerability to drug and alcohol problems. Studies carried out with animals have shown that a deficiency in the opioid system occurs when an animal is exposed to inescapable shock and a similar deficiency is also posited to occur in PTSD patients. Some of the commonly abused drugs (e.g. alcohol) are reported to have effects on the endogenous opioid system such that this deficiency is to some extent reversed. Jacobson, Southwick & Kosten (2001) point out that there are many neurobiological systems which are thought to be associated with both PTSD and substance use and that the interactions occurring amongst these systems are extremely complex. They highlight the need for

further neurobiological studies in this area in an attempt to better inform pharmacological treatment of comorbid PTSD/SUD.

#### **2.4.4 Pharmacological Specificity**

Koefed et al. (1993) suggest that the SMH is not well supported in the literature due to a lack of specificity of the drug of choice. Stewart et al (1998) however, argue that, given that an individual may experience a variety of different PTSD symptoms including hyperarousal, avoidance/numbing and re-experiencing phenomena, a wide variety of drug effects may become reinforcing.

A set of two studies carried out by Saladin, Brady, Dansky & Kilpatrick (1995) found that comorbid PTSD and SUD was associated quite specifically with increased avoidance/numbing symptoms as well as more arousal symptoms (e.g. sleep disturbance) than a diagnosis of PTSD alone. They also found that patients with alcohol dependency problems reported increased levels of arousal compared with cocaine dependent patients. It is suggested that this is consistent with the SMH since individuals who are experiencing increased arousal symptoms are more likely to self-medicate with substances which will reduce their level of arousal (i.e. alcohol) while individuals lacking arousal may be more likely to use drugs that serve to enhance arousal levels (i.e. stimulants). Saladin et al. (1995) acknowledge that their sample may well have been in states of withdrawal at the time of assessment which may have mimicked PTSD symptoms and caused difficulty in distinguishing between symptoms of PTSD and symptoms relating to drug dependency. This highlights a need to consider carefully, the timing of the assessment, in individuals with dependency problems.

McFall, MacKay & Donovan (1992) found that alcohol problems were significantly associated with levels of both arousal and intrusion symptomatology, while drug problems were positively correlated with avoidance/numbing symptoms as well as intrusions.

Stewart et al. (1998) also investigated the association between substance dependency and specific clusters of PTSD symptoms and similarly found that degree of alcohol dependency was positively associated with arousal levels. Levels of dependency on opioid analgesics were most highly positively correlated with numbing symptoms followed by intrusion symptoms and, to a lesser extent, arousal symptoms. Finally, Lipschitz et al. (2000) also looked more specifically at the association between clusters of PTSD symptoms and problematic substance use in their adolescent sample, and found that for females only, drug use correlated most highly with hyperarousal symptoms ( $r=.47$ ,  $p=.001$ ), followed by, avoidance symptoms ( $r=.41$ ,  $p=.002$ ) and re-experiencing symptoms ( $r=.37$ ,  $p=.004$ ). Alcohol use in female adolescents correlated most highly with hyperarousal symptoms ( $r=.38$ ,  $p=.004$ ), followed by re-experiencing symptoms ( $r=.38$ ,  $p=.005$ ) and avoidance symptoms ( $r=.29$ ,  $p=.03$ ).

Based on studies looking at the association between alcohol and/or drug problems and PTSD symptom clusters, it appears that problematic alcohol use is most consistently associated with arousal symptoms and intrusions. The association with drug problems is slightly less clear and appears to depend upon both the types of drugs being used and the measure used. When drugs are taken to represent a single entity, however, and are measured using scales such as the DAST (Drug Abuse Screening Test, Skinner 1982), levels of drug abuse appear to be most highly associated with avoidance/numbing symptoms as well as intrusions. Clearly the associations found will depend on the specific types of drugs being used (Stewart et al., 1998).

With respect to the relationship between intrusions and SUD's, it is posited that individuals with PTSD use drugs such as alcohol, benzodiazepines and marijuana, to help dampen their heightened recall of trauma related stimuli; a premise which is supported by findings that drugs such as these have been shown to impair memory in humans. With respect to

avoidance/numbing symptoms it is posited that individuals use stimulants (such as amphetamines) in an attempt to increase positive affect as well as alleviate unpleasant states of diminished arousal, and perhaps promote social interaction. In the case of arousal symptoms it is suggested that substances such as alcohol, anxiolytics and opioid analgesics have the effect of dampening arousal thereby relieving unpleasant hyperarousal symptomatology. Both animal and human studies support this assertion since the startle response has reportedly been found to decrease following administration of alcohol and other "arousal dampening" substances (e.g. morphine, diazepam, alprazolam). Conversely, alcohol withdrawal as well as withdrawal symptoms from other drugs has the effect of increasing the startle response, which, presumably, may then lead to increased drinking/drug use in individuals with PTSD (Stewart et al., 1998).

#### **2.4.5 Relative Onset of PTSD and Substance Use**

It is often assumed that if the SMH holds true then the onset of PTSD should occur prior to the onset of the substance abuse. Najavits et al. (1997), however, highlight that the studies investigating relative onset of PTSD and SUD's have mixed findings. Goldenberg et al. (1995) for example, reported that the onset of anxiety disorders (including PTSD) occurred a mean of 11 years prior to the onset of substance abuse in their sample, which Najavits et al. suggest argues against a cause and effect association between PTSD and substance abuse. It is perhaps noteworthy, however, that the number of individuals suffering from PTSD in the sample was small ( $n = 7$ ). Cottler et al. (1992) also found that the onset of substance use (though not abuse) occurred prior to the onset of PTSD in their community sample, which was posited to demonstrate that intoxication with drugs/alcohol might lead to an increased risk of exposure to trauma. Kessler et al. (1995), however, reported in the National Comorbidity study that exposure to trauma was more likely to occur prior to the onset of substance abuse, though this was true for females only. Cottler et al.'s (2001) community sample study found that onset of illicit drug use occurred prior to the trauma in men only

while for women initiation of drug use and exposure to the trauma occurred at around the same time. Giaconia et al. (2000) found no significant differences in relative onset of substance use and trauma exposure in 14 individuals with a comorbid diagnosis. In 50 percent of this small sample SUD preceded PTSD, in 35.7 percent SUD and trauma occurred in the same year and in 14.3 percent, SUD developed one year after the onset of PTSD.

These mixed findings suggest that there may be different subsets of people who have comorbid PTSD and substance use problems. For some individuals, it may be that substance use occurred prior to the trauma/onset of PTSD but that substance use subsequently changed in some way; frequency and/quantity of drug use may change, and a self-medicating function might develop. Individuals who have used substances prior to trauma exposure may also have increased risk of exposure due to the environments in which they obtain/use drugs and also as a result of engaging in risky behaviour when intoxicated (e.g. driving). Some individuals may also become involved in criminal activity (including theft and prostitution) in an attempt to secure money for drugs, which also places them at increased risk of traumatic exposure. For other individuals, substance use may occur after exposure and onset of PTSD and it may be the case that individuals find the drug effects relieve their PTSD symptoms and the behaviour is thus reinforced.

Chilcoat & Breslau (1998) carried out a study, which examined the temporal sequence of PTSD and substance use in a large community sample. Over a period of five years individuals with PTSD alone and substance use alone were followed-up and the results indicated that individuals with PTSD were indeed at an increased risk of developing a SUD compared with the normal population. Individuals who already had a SUD, however, were no more likely than the normal population to experience trauma, though they were significantly more likely to develop PTSD following traumatic exposure.

In the present study, it is suggested that individuals who use substances of abuse prior to the trauma experience, may actually be more likely to self-medicate following the trauma and subsequent development of PTSD symptoms. A self-medicating function of substance use may develop in individuals with a prior history of substance use following trauma since, in the absence of other resources and adaptive coping mechanisms, pre-learned strategies (i.e. drug use) are employed in an effort to cope with distressing symptoms.

Stewart (1996) points out that a causal link between PTSD and substance use/abuse cannot be assumed simply because PTSD has been found in some studies to precede the onset of substance abuse. Despite the fact that biological studies and studies looking at the correlation between drug effects and specific PTSD symptoms provide some support for the SMH, the need for further research looking in detail at the nature of the association and exploring in particular the “functional connectedness” of the two disorders, is highlighted.

#### **2.4.6 Assessing Functional Connectedness**

Assessment of comorbidity is acknowledged to be a complex task and, in view of this, Rachman (1991) puts forward some guidelines to aid researchers and clinicians. He proposes that as well as looking at rates of occurrence of the two disorders in question, attempts should be made to explore the individual patients perception of the functional connectedness of their difficulties. This could be measured by asking an individual to what degree he felt one problem was related to the other and a rating scale of some sort could be used to aid the individual in their estimate. Some studies have investigated this phenomenon and report that individuals with PTSD and SUD do indeed perceive a causal relationship between their PTSD symptoms and substance use. Bremner et al. (1996) for example, report that their sample of combat veterans described improvements in PTSD symptoms resulted from use of a variety of arousal-dampening drugs (including alcohol, heroin and marijuana). Rachman (1991) also points out, however, that such subjective

estimates of a causal link should not be taken alone as evidence of cause and effect since it has been documented elsewhere that individuals are not always explicitly aware of the underlying motives driving their behaviour and therefore may unintentionally provide an under or over-estimate. In order to go some way towards controlling for this possibility, Rachman suggests that each individual should be asked to predict what they would expect to happen to one problem if the other were to increase or decrease in severity.

With the exception of the study by Lipschitz et al. (2000), the majority of the studies that provide some degree of support for the SMH have been carried out with participants drawn from the adult population. Further research is required to clarify young people's perception of their drug and alcohol use and its functional connectedness with experience of trauma and PTSD.

Stewart (1996) suggests that further exploration of individual difference factors, including gender and age, is warranted. Social support and coping are two other individual difference factors, which have been shown to be predictive of the development of PTSD, and it is hypothesised, in the present study, that these factors may serve to moderate the association between PTSD and problematic drug/alcohol use. The role of social support and coping as potential moderating variables of the association between PTSD and problematic drug and alcohol use will be explored in the current study. If we assume that individuals with co-occurring PTSD symptomatology and problematic drug and/or alcohol use are self-medicating, then it could be hypothesised that these particular individuals may have less adaptive coping skills and/or fewer coping resources, such as social support, than those individuals who have PTSD alone. Both coping and social support have been shown to have buffering effects in the face of stress (Cohen & Wills, 1985; Lazarus & Folkman, 1984) and both these factors are discussed below.

## 2.5 Coping

Lazarus and Folkman (1984) define coping as:

*“ constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (pg.141).*

The need to assess what a person *actually* thinks or does when coping with a specific situation or problem, as opposed to what they would *usually* think or do, is emphasised. Thus, it is important to examine coping in a specific context. In other words, we need to know what the person is coping with in order to understand coping.

Lazarus and Folkman make a distinction between two different types of coping, problem-focussed coping (sometimes called positive or approach-focussed coping) and emotion-focussed coping (also referred to by researchers as avoidant or negative coping). Problem-focussed coping refers to those strategies, which aim to manage or alter the problem, which is causing the individual to experience distress. These strategies are similar to problem-solving strategies described by Hawton & Kirk (1989). Emotion-focussed coping, on the other hand, encompasses those strategies that aim to regulate the individual's emotional response to the problem. Examples of emotion-focussed coping, from the literature, include avoidance, minimisation, distancing and selective attention.

Lazarus and Folkman also highlight the importance of resources upon which an individual draws in order to help them cope with a problem. The nature of these resources may be physical (e.g. health and energy), psychological (e.g. internal locus of control), competency based (e.g. problem solving/social skills) and environmental (e.g. social support and material resources). These are viewed as factors that both precede and influence coping, which then mediates the experience of stress.

### 2.5.1 Coping and PTSD

A number of studies have been carried out which investigate the relationship between the type of coping strategies used by an individual and the level of psychological problems they present with. In relation to PTSD, it has been found that individuals who use more negative coping strategies (e.g. distraction, social withdrawal, and blaming others) are more likely to develop PTSD symptomatology than those who use fewer negative strategies (Berman et al. 1996). Stallard, Velleman, Langsford & Baldwin et al. (2001) for example, carried out a prospective study with 97 children (mean age 14.6 years), all of whom had been in some form of road traffic accident. They found that individuals who went on to develop PTSD were more likely to report use of avoidant/emotion focussed strategies than those who did not go on to develop PTSD. More specifically, a tendency to cope by blaming others and withdrawing from social support was associated with a diagnosis of PTSD.

Berman, Kurtines, Silverman & Seratin (1996), looked at coping in a school-based sample (n=96) of 14-18 year olds, and used a model of coping which classifies strategies as either being positive or negative. According to Berman et al. positive coping strategies (including cognitive restructuring, problem-solving, emotional regulation and social support) are those, which are more likely to elicit adaptive responses in an individual whilst negative strategies (distraction, withdrawal, criticising self, blaming others, wishful thinking and resignation) are those, which are considered maladaptive since they are thought to be unlikely to facilitate adjustment. This study employed the Kidcope (Spirito et al. 1988) as a measure of coping, and it was reported that while use of negative coping strategies was a significant predictor of PTSD symptoms, positive coping was not. Berman et al. suggest that it is the adverse effects of using negative strategies as opposed to the protective function of using positive coping strategies that impacts development of PTSD symptomatology. Thus, use of positive strategies may not protect against development of psychopathology. Springer and Padgett (2000) investigated a particular type of cognitive coping as a predictor of PTSD

symptoms in a school based sample of 621 adolescents (11-14 year olds). Multiple regression analyses indicated that minimisation coping (defined as “cognitive down-playing of stressful events”) was a significant predictor of PTSD symptomatology in both male and female adolescents.

La Greca et al. (1996) reported that use of a greater number of coping strategies was associated with higher levels of PTSD in children who had been exposed to a natural disaster (Hurricane Andrew in Florida, U.S). This was posited to be a reflection of children’s efforts to process trauma memories. A 10-month follow-up indicated that children who had reported a higher frequency of ‘blaming others’ and use of anger strategies, in the initial period following the trauma were more likely to present with higher levels of PTSD symptoms. Again, the use of more avoidant/emotion-focussed strategies were predictive of PTSD.

Some gender differences have been noted, in the use of coping strategies and development of PTSD, with girls tending to use a greater number of strategies and tending to use more distraction and avoidance than boys following exposure to trauma. In addition, girls appear to be more vulnerable to the development of PTSD symptoms (Stallard et al, 2001; Curle & Williams, 1996), which, it is suggested, may be partially related to their tendency to use more avoidant coping strategies than boys.

### **2.5.2 Coping and Substance Use**

A number of studies have also been carried out which look at the link between use of coping strategies and substance use. Overall these studies tend to report a negative association between active/problem-focussed coping and levels of alcohol problems and smoking (Wills, 1986; Pederson, Koval & O’Connor, 1997; Windle & Windle, 1996), thus suggesting that use of these coping strategies may serve a protective function in the face of developing

substance problems. Conversely, using more negative strategies, such as coping through use of anger and emotional outbursts, tends to be associated with increased alcohol problems and smoking (Wills, 1986; Sussman et al. 1993; Pederson et al. 1997; Johnson & Pandina, 1993). The relationship between avoidant coping (such as distraction) and cognitive coping (e.g. reappraisal) and substance use is reported to be less consistent (Wills et al. 2001). While some studies report a main effect of avoidant coping on alcohol problems (e.g. Windle & Windle 1996), other studies report only an interaction effect whereby, use of avoidant coping is associated with increased alcohol problems at levels of high stress (Laurent, Cantanzaro & Callan 1997; Wills et al. 2001). Results of studies investigating the association of cognitive coping (e.g. reappraisal) and substance use are also reported to be fairly inconsistent (Wills et al 2001). Johnson & Pandina (1993), for example, found that cognitive appraisal was associated with increased alcohol problems at high levels of stress only. It is suggested that these discrepancies and inconsistencies may be due to methodological differences including the age of participants (interaction effects tend to have been found with younger adolescents), as well as the types of measures used to assess coping and substance use.

The studies, which have been discussed, tend to have been carried out with young people at school and research with clinical samples has been somewhat neglected. Given the high rates of comorbidity between PTSD and substance use which have been found, both in general population studies and clinical studies, it seems worthwhile to investigate further the relationship between coping and substance use in a clinical population of trauma exposed adolescents.

## **2.6 Social Support**

Social support is posited to act as a buffer to stress and the negative psychological and physical health problems that are associated with exposure to stress; it is seen as a valuable

resource in the process of coping with stressful experiences (Lazarus and Folkman, 1984). Pearlin et al. (1981) define social supports as *“the access to and use of individuals, groups, or organisations in dealing with life’s vicissitudes”*. It is acknowledged that there are individual differences in the ways in which people are affected by stressful life events and it is suggested that these differences are partially explained by resources such as social support, as well as actions such as coping.

Cohen & Wills (1985) review the evidence for two different models of social support. The first model is termed the “main-effect” model whereby it is assumed that the existence of social support will have a beneficial effect on well-being regardless of whether a person is under high or low levels of stress. The buffering hypothesis model on the other hand suggests that social support serves to protect an individual from the potentially damaging effects of stress. In the case of the buffering hypothesis, social support is only of importance in the face of stress; when stress-free, social support will not greatly influence well-being. Support for both models of the positive effects of social support has been documented in the literature and results vary according to the type of measure used to assess social support; findings appear to differ according to whether the measure looks only at the structure of the social support or considers, also, the function and whether it is a global or specific measure.

Cohen & Wills (1985) outline 4 main types of social support: esteem support, informational support, social companionship and instrumental support. Esteem support involves the communication of acceptance and non-conditional positive regard. It has also been referred to as emotional support. Informational support (also called appraisal support and cognitive guidance) occurs when others assist an individual in making sense of, appraising and coping with stressful events. Social companionship (also called “belongingness”) occurs when time is spent engaging in recreational activities with other people; this is thought to alleviate stress by facilitating distraction or increasing positive affect. The fourth type of social

support is instrumental support (also called practical or material support). This involves providing an individual with financial and/or material aid. Cohen & Wills suggest that the presence of both emotional support and informational support is likely to be important in determining an individual's response to a wide range of different sources of stress. Social companionship and instrumental support, however, are thought to be beneficial only when they fit the needs generated by a specific event.

The present study uses a measure of social support, which provides a measure of overall perceived social support as well as sub-scores for emotional and instrumental social support, social integration (feeling of belongingness) and social strain (which might be considered a lack of informational support). The relationship of all four types of social support as well as overall social support score to the development of drug and alcohol problems will be explored in the current study. Within the literature, an important distinction is made between the actual support available (e.g. the size of the individual's social network) and the individual's perception of social support received. Kaniasty and Norris (1992) suggest that it is perceived social support as opposed to actual social support that is more strongly associated with a stress-buffer effect. It is perceived social support, which will be measured, in the present study.

### **2.6.1 Social Support and PTSD**

A number of studies have been carried out which look at the association between social support and development of PTSD symptomatology, following exposure to violence and other types of trauma. Berman et al. (1996) for example, in their school based sample, found that PTSD symptomatology was mediated by perceived social support for both males and females while Springer & Padgett (2000) found the same to be true for females only. Interestingly, Springer and Padgett found that for female adolescents, higher levels of perceived support from friends was a significant predictor of increased PTSD symptoms,

which seems to run counter to the theories discussed above. Conversely, Rossman et al. (1997) found that social support from parents was associated with fewer symptoms and better adaptive functioning. Consistent with this, Vernberg et al. (1996) found that 3 months after a natural disaster (Hurricane Andrew), children with high levels of perceived social support reported lower levels of PTSD symptoms. Ten months later, in a later study with the same sample (La Greca et al., 1996), it was found that perceived social support continued to be negatively correlated with levels of PTSD.

A study by Kliewer et al. (1998) found that children (aged 8-12yrs) who had either lower levels of social support or high levels of social strain were more likely to develop psychological symptoms following exposure to violence. Social strain refers to an individual's perception that to discuss their thoughts and feelings relating to the traumatic experience(s) would be frowned upon by significant others in their social network. Lepore (1997b; Lepore et al., 1996) highlight the importance of being able to disclose one's thoughts and feelings as part of the healing process following trauma. If social constraints inhibit this process then the individual is thought to be more at risk of developing psychological symptoms.

## **2.6.2 Social Support and Substance Use**

Studies exploring the role of social support in relation to the development of drug and alcohol problems have tended to show that social support acts as a protective factor in the development of substance abuse problems (Spooner, 1999). Averna & Hesselbrock (2001), for example, found that lower perceived social support was associated with both earlier initiation of marijuana use, heavier use of marijuana, more frequent smoking and higher overall number of drugs used. Similarly, Pederson, Koval & O'Connor (1997) report that individuals who had smoked at some point in their lives had significantly lower social support scores than those who had never smoked. Wills & Cleary (1996) found that

emotional and practical support from parents was negatively correlated with substance use, again suggesting that higher levels of support are associated with lower levels of substance use. In this study, emotional support, in particular, was reported to be uniquely predictive of substance use and social support also had a buffering effect in the face of the occurrence of major life events.

Although the effects of both coping and social support, in relation to well being, have been well documented in the literature (Cohen & Wills 1985), no attempt has been made to explore the potential moderating effect of such variables on the relationship between PTSD and problematic substance use, particularly in adolescence. In the current study, it is expected that social support and coping will explain additional variance over and above that explained by levels of PTSD symptomatology in drug and alcohol problems. It would also appear possible that there may be an interaction effect of social support on the development of drug and alcohol problems since it is expected that high social support will buffer the effects of high levels of stress (reflected by a high level of PTSD symptomatology in the current study).

## **2.7 The Current Study**

### **2.7.1 Theoretical Background**

An association between PTSD symptomatology and drug and alcohol problems has been well documented in the literature. High rates of comorbid PTSD and SUD are not restricted to clinical samples but have been also been reported in community samples. A number of gender differences have been noted in the literature, in particular the finding that PTSD and problematic substance use is more commonly found in the female gender. There is some suggestion that this difference may be due to the type of trauma which females are more likely to report (namely sexual assault/abuse), though it is hypothesised that variables such

as coping and social support may also play a role. This hypothesis has not been tested in the literature, to date.

Despite the plethora of research being carried out in North America, looking at the link between PTSD and problematic substance use, very few attempts have been made to investigate the functional nature of the relationship, at least in adolescents. In the UK in particular there is a relative dearth of research in this field.

Researchers highlight the need to carry out more research, which takes into account age, gender and other variables, which may serve to moderate or interact with the association between PTSD and substance use. There is need to investigate further the nature of the association between PTSD and substance use, and to identify variables that moderate this relationship. In the current study, an attempt will be made to investigate the functional nature of the association between PTSD and problematic substance use in a group of young people, attending outpatient or day programme appointments at 2 adolescent psychiatric units in Lothian, Scotland. In addition, the potential moderating effects of coping and social support will also be investigated, and the existence of gender differences will be explored. Increasing our understanding in this way it is hoped will help inform future service delivery and treatment planning. The aims and objectives of the present study are as follows:

### **2.7.2 Aims and Objectives**

- To replicate the finding, of an association between PTSD symptomatology and problematic drug and alcohol use in a sample of young people in Scotland.
- To examine possible gender differences in this association.
- To investigate the possible moderating effects of coping, perceived social support and social strain on the relationship between PTSD symptomatology and substance use problems.

- To test the self-medicating hypothesis, using the guidelines suggested by Rachman (1991) and Stewart (1996) for the assessment of co-morbidity.

### 2.7.3 Hypotheses

#### 2.7.3.1 *The Association between PTSD and Problematic Substance Use:*

- There will be an association between specific PTSD symptoms and levels of problematic drug and alcohol use. The effects of social support and coping will mediate this association and gender will account for some of the variance in the above association.
  - Social support followed by coping will be predictive of substance use scores (for both problematic alcohol and drug use) when first gender and then PTSD symptoms are controlled for.
  - The association between gender and drug/alcohol use will be such that females will have higher levels of problematic use.
  - In the case of alcohol use, arousal symptoms and intrusion symptoms will be more highly associated with alcohol score than avoidance/numbing, based on the notion of psychopharmacological specificity.
  - In the case of drug use, avoidance/numbing symptoms and intrusion symptoms will be more highly associated with drug score, again based on the notion of psychopharmacological specificity.
  - The associations between perceived social support and drug/alcohol use will be in a negative direction (i.e. high perceived social support will be associated with lower drug and alcohol problems).
  - The association between social strain and drug/alcohol use will be in a positive direction (i.e. increased levels of social strain will be associated with problematic drug/alcohol use).

- The association between negative coping strategies and drug/alcohol use will be in a positive direction (i.e. increased frequency of use of negative strategies will be predictive of problematic drug/alcohol use).
- The association between positive coping strategies and drug/alcohol use will be in a negative direction (i.e. increased frequency of use of positive strategies will be associated with lowered levels of problematic drug/alcohol use).

#### 2.7.3.2 *Functional Connectedness of PTSD and Problematic Substance Use*

- Individuals with co-occurring PTSD and problematic substance use will perceive a relationship between drug/alcohol use and the effects of the traumatic experience/s.
- Individuals with co-occurring PTSD and problematic alcohol use will report an expectation that an increase in intrusion symptoms and hyperarousal symptoms will lead to an increase in alcohol consumption.
- Individuals with co-occurring PTSD and problematic drug use will report an expectation that an increase in intrusions and avoidance/numbing will lead to an increase in drug use.
- Individuals with co-occurring PTSD and problematic drug and/or alcohol use are more likely to report onset of substance use prior to the trauma.
  - Initiation of substance use prior to the trauma will be associated with an increase in use following the trauma (in terms of frequency of use, amount taken/consumed and number of different types used).

## **3. Method**

### **3.1 Design**

The current study is cross-sectional in design and involves between-subjects comparisons. Multiple regression analysis will be used to investigate the value of perceived social support and social strain variables and then coping in predicting alcohol and drug scores when the predictive effects of first gender and then PTSD symptoms have been controlled for. Testing the self-medication hypothesis will involve comparison of probable PTSD sufferers with problematic drug and/or alcohol use and probable PTSD sufferers with non-problematic drug and/or alcohol use.

### **3.2 Participants**

#### **3.2.1 Inclusion/Exclusion Criteria**

All participants were required to meet the following inclusion/exclusion criteria:

##### Inclusion Criteria:

- Participants must be aged between 14 and 18 years.
- Participants will have been exposed to a trauma or series of traumas recognised as such in DSM-IV. The trauma experienced must be judged, by the researcher, to meet Criterion A of the DSM-IV diagnostic criteria for PTSD (see Appendix 1).
- Participants will be attending the Young Peoples Unit or Willowgrove House for assessment and/or treatment.

##### Exclusion Criteria:

- Participants will be excluded if they have suffered a brain injury or are suspected to have a learning disability since this may make participation in the study problematic.

### **3.2.2 Sample Size and Participant Characteristics**

In the planning stages of the study, and prior to submitting a research proposal for ethical approval, a power analysis was required in order to determine the optimum sample size. Cohen's (1992) guidelines were consulted and, based on the results of Lipschitz, Grilo, Fehon, McGlashan & Southwick (2000), a large effect size (as defined by Cohen, 1992) was assumed. Thus, for power = .80 with alpha = .05, the study required  $n = 50$  (Cohen, 1992; Table 2, p.158). This calculation was based on use of 8 independent variables but, as will be seen, the multiple regression analyses (section 4.3) involve entry of 10 independent variables. It is therefore acknowledged that the initial power analysis provides an underestimate of the required sample size. It is further acknowledged that more recent guidelines (e.g. Tabachnik & Fidell, 2001) for determining appropriate sample sizes are more stringent than those employed in the present study.

In the course of the study, only 22 participants were recruited to and took part in the study. Five of these individuals were male and the remaining 17 were female. Two were later excluded as they failed to meet Criterion A of DSM-IV criteria for PTSD. The mean age was 16.5 years ( $SD = 1.28$ ; range = 14-18). Participants were recruited from outpatient and day-patient services. No participants were recruited from the in patient services though, this service had been approached and staff chose not to allow participation of young people under their care.

### **3.3 Recruitment**

The researcher first met with members of staff at both the Young People's Unit in Edinburgh and Willowgrove House, in Livingston (the West Lothian NHS Trust adolescent unit). Meetings were arranged with all staff that were involved in clinical work and were, therefore, in a position to identify potential participants (i.e. multi-disciplinary out-patient

teams, day services, early onset psychosis services, and inpatient services). Background information about the study was given to all relevant staff and the aims and objectives of the study as well as the criteria for participation were outlined. Staff who agreed to consider clients on their current caseload for participation were provided with an information pack containing a therapist information sheet, participant information sheet and parent information sheet (to be given to the parent/guardian of all individuals under 16 years of age). Copies of the Information Sheets can be found in Appendix 2.

When a therapist had identified a potential participant he/she was asked to broach the subject of the study at the individual's next appointment and provide the individual with a copy of the Participant Information Sheet. The invitation to participate was extended by the therapist rather than the researcher in order to avoid placing undue pressure on the young person to participate. Individuals were requested to read the information and then take some time to consider whether or not they would like to take part in the study. If they had any questions, which were not answered in the information sheet, they were informed that they could either ask their therapist or contact the researcher or independent advisor (contact name contained in Information Sheet). For individuals who required extra information, or who indicated that they would like to meet the researcher prior to agreeing to take part, a meeting with the researcher was arranged. Given the sensitive nature of the topic under study, it was felt that the opportunity to meet the researcher in advance of committing oneself to taking part would help to clarify any queries about the study as well as relieve anxiety. This opportunity was, however, taken advantage of by relatively few participants.

Potential participants were not required to decide immediately whether or not they would like to take part but instead, at their following appointment were invited to participate. It was emphasised by all therapists that the young person was under no obligation to take part

in the study and their decision would have no effect on their care either now or in the future. In addition, it was explained that if they did choose to take part they could still withdraw at any time and again, this would have no effect on their continuing care.

### **3.4 Measures**

The following self-report questionnaires were used to measure level of Posttraumatic stress symptomatology, drug and alcohol use, level of different aspects of perceived social support, and frequency and type of coping strategies used following the traumatic experience/experiences. Copies of all questionnaires can be found in Appendix 4.

#### **3.4.1 PTSD Symptomatology**

##### *3.4.1.1 The Impact of Event Scale (IES)*

The Impact of Event Scale (Horowitz, Wilner and Alvarez, 1979) is a 15 item self-report questionnaire, designed to measure two types of response to trauma, namely intrusions and avoidance. Seven items describe episodes of intrusion and the remaining eight are descriptions of avoidance. This scale has been extensively used in literature with adults and adolescents, as well as younger children. Curle & Williams (1996) use this measure as part of a battery of assessments, which they state is “*increasingly becoming standard in the UK*” (Curle & Williams, 1996, pp. 298), for the identification of children at high risk of developing PTSD. Udwin & Yule (1991) suggest a cut-off of 40 on the total IES score is indicative of children “at risk”. In the original validation study, Horowitz et al. (1979) report good internal consistency for the intrusion and avoidance subscales ( $\alpha = .78$  and  $\alpha = .82$ , respectively) and adequate test-retest reliability ( $r = .87$  and  $r = .79$ , respectively). In a recent review of the literature, Sundin & Horowitz (2002) confirm the utility of the IES as an assessment tool, citing studies which report moderate correlations between the IES subscales and other existing measures including the Symptom Checklist-90 (SCL-90) and the General Health Questionnaire (GHQ). Adequate convergent validity is also reported based on

findings of moderate correlations between the IES subscales and the Clinician Administered PTSD scale (CAPS, Blake et al. 1990). Some studies, employing factor analytical techniques (e.g. Foa et al., 1995) report that the avoidant subscale contains two factors; one avoidance, the other numbing. For this reason the avoidance score is taken to be a measure of avoidance/numbing symptoms.

Cronbach's alpha for the IES total score as well as the intrusions subscale in the current study were indicative of high internal consistency ( $\alpha = .88$  and  $\alpha = .89$ , respectively). Internal consistency for the avoidance/numbing subscale was slightly lower ( $\alpha = .69$ ).

One obvious drawback of the Impact of Events Scale (IES) is that it is based on criteria for PTSD which actually predates the publication of DSM-III and therefore does not measure symptoms of hyperarousal, which are specified in currently used DSM-IV criteria. Since the literature suggests that there is a relationship between the level of drug and/or alcohol use in adolescents and the experience of hyperarousal symptoms (Lipshitz, Grilo, Fehon, McGlashan and Southwick, 2000) it was felt important to include a measure of such symptoms.

#### *3.4.1.2 Hyperarousal Subscale: The Davidson Trauma Scale*

The six items, which have been found by Davidson et al. (1997) using factor analytical techniques to load onto the same arousal symptoms factor, have been taken from the Davidson Trauma Scale (Davidson, Book, & Colket et al., 1979) to measure hyperarousal. This scale is based on DSM-IV criteria for PTSD. It has been shown to have good reliability and validity with a sample of adults ( $n=353$ ) though has not been validated with a population of young people aged 14-18, hence was not used in place of the IES in the current study. The DTS validation study was carried out with a large sample of mixed gender trauma victims who had been exposed to a wide variety of different trauma types, including

combat exposure, natural disasters and physical/sexual assault. Good 2 week test-retest reliability was reported ( $r = .86$ ) as was high internal consistency ( $\alpha = .97$ ). Comparison of the DTS and the SCID (Spitzer et al., 1990) revealed good concurrent validity and the scale was also shown to have good convergent validity when compared with both the CAPS (Blake et al., 1990) and the IES (Horowitz et al. 1979).

Cronbach's alpha for the hyperarousal subscale of the DTS in the current study was  $\alpha = .85$  which is indicative of acceptable internal consistency.

### **3.4.2 Drug Use**

The Drug Abuse Screening Test for Adolescents (DAST-A; Martino, Grilo and Fehon, 2000) was employed as a measure of drug use. This is a 27 item self-report questionnaire with a total possible score of 27. The authors suggest that a score above 6 is indicative of drug problems. Marino et al. (2000) report that the DAST-A has good internal consistency (coefficient alpha = .91), and high test-retest reliability (1wk;  $r = .89$ ;  $n = 42$ ), in a sample of U.S. psychiatric in-patients (mean age 15.8 years; range = 13-19). It is also reported to have good concurrent validity and positive predictive powers of 82.3% in differentiating adolescent inpatients with and without drug abuse problems.

Cronbach's alpha for the DAST-A, as measured in the current study, reflected high internal consistency ( $\alpha = .92$ ).

### **3.4.3 Alcohol Use**

The Adolescent Alcohol Involvement Scale (AAIS; Mayer and Filstead, 1979) was used as a measure of alcohol usage. This is a 14 item self-report questionnaire designed to identify adolescents who have alcohol problems as measured by the extent to which alcohol use interferes with psychological functioning, social relations and family living. There is a

possible total score of 79 and the suggested cut-off indicative of alcohol misuse is 42. This cut-off was based on psychiatrists' ratings and test scores of a sample of hospitalised alcohol dependent adolescents. Mayer and Filstead (1979), report high (2-week) test-retest reliability ( $r = .91$ ) with a sample of alcohol dependent adolescents ( $n = 52$ , mean age 17 years).

Cronbach's alpha for the AAIS, in the current sample was indicative of relatively low internal consistency ( $\alpha = .66$ ).

#### 3.4.4 Coping

The Kidcope (Spirito, Stark and Williams, 1988) is a short screening questionnaire designed to identify different types of coping behaviour used in a specific situation (in this case, the trauma). Knapp, Stark, Kurkjian & Spirito (1991) in their review of coping assessment measures indicate that the Kidcope is the most "widely researched coping questionnaire for this age group". There are two versions of the questionnaire, one for younger children (aged 7-12 yrs) and one for older children (aged 13-18yrs). The latter, used in the present study, consists of 10 items on which the respondent can rate the frequency and efficacy of alternative coping strategies. The participant was asked to focus on the ways in which he/she coped with the traumatic experience (as opposed to being asked to generate an example of a problem themselves) when responding to questions and, as is suggested by the authors, the researcher read out the questions. Test re-test reliability (3-7 days) was reported by Spirito et al. (1988) to range from moderate ( $r = .41$ ) to high ( $r = .83$ ) for frequency ratings. Comparable test-retest reliability for the efficacy ratings was reportedly less consistent and for this reason, only frequency ratings are used in the current study. The validity of the Kidcope was established by comparison with the Coping Strategies Inventory (CSI) and the Adolescent Coping Orientation for Problem Experiences (ACOPE). Moderate to high correlations were reported with the CSI ( $r = .33-.77$ ), while correlations with the ACOPE were somewhat lower ( $r = .08 - .62$ ). Scoring of the Kidcope in the current study, followed Berman

et al.'s scoring method for identifying negative and positive coping "style" subscales. Cronbach's alpha for these scales in the present study was extremely low ( $\alpha = .35-.67$ ), which is indicative of poor internal consistency. For this reason, the coping scores were not included in the main analysis.

### **3.4.5 Social Support**

The Social Support Questionnaire (SSQ) (Sommer and Fydrich, 1987) was used to measure different aspects of perceived social support. This self-report questionnaire has four factors, each of which yields a score: social strain, emotional support, practical support, and social integration. The Social Support Questionnaire was developed in Germany and is widely used in Europe. It has also been successfully administered to a group of adolescents in Scotland (personal communication, Schwannauer, 2002) and there is no reason to assume that anything has been lost in the translation. The SSQ was felt to be an appropriate measure of social support for the purposes of the present study since it includes a measure of overall social support as well as a measure of different types of social support that may be differentially associated with problematic drug and alcohol use.

The SSQ has been well validated with samples of both clinical and non-clinical participants, including students, widows, community-based individuals, young adults, relatives of schizophrenic patients, chronic schizophrenic patients, and psychosomatic patients. The subscales were shown to have good internal consistency: emotional support:  $\alpha = .92-.84$ ; practical support:  $\alpha = .73-.82$ ; social integration:  $\alpha = .77-.86$ ; social strain:  $\alpha = .78-.84$ ; total social support:  $\alpha = .90-.94$ . Factor analysis of the scale supports the validity of the scale, with a coherent and stable factor structure being revealed. The subscales have also been shown to be sensitive to the presence of emotional disorders with moderate to high negative correlations being found between each of the subscales (with the exception of social strain

for which the direction of the association was positive) and scores on the Beck Depression Inventory and SCL-90-R.

Cronbach's alpha for each subscale in the present study is indicative of high internal consistency; the alpha coefficient for each subscale is as follows: emotional support,  $\alpha = .93$ ; practical support,  $\alpha = .80$ ; social integration,  $\alpha = .95$ ; social strain,  $\alpha = .89$ ; overall support score,  $\alpha = .99$ .

#### **3.4.6 Self-Medication**

Only those individuals who indicated that they use drugs and/or alcohol (as measured by the AAIS and the DAST-A) took part in this part of the study. A short structured interview was conducted, the aim of which was to elicit information pertaining to the perceived function of the individual's drug and/or alcohol use. The questions asked were based on Rachman's (1991) guidelines for the assessment of co-morbidity. Topics covered included the different types of drug/alcohol used, frequency of use, perceived functional relatedness between the effects of the trauma and substance use, expectations of change in substance use following a change in PTSD symptom levels, onset of use relative to the trauma experience and any change in use which occurred following the trauma (See Appendix 5).

#### **3.5 Procedure**

It was explained to participants that they had been invited to take part in the study because they had, at some point in their lives, had a very difficult experience, which most people would describe as being traumatic. They were asked if they knew what experience was being referred to. The researcher then indicated what this experience was to ensure that both researcher and participant had a shared understanding of what was being discussed and to ensure that the participant was able to give informed consent. Participants were then asked whether or not they had read the Participant Information Sheet, given to them by their

therapist, and if they had any questions relating to this. If it was apparent that the Participant Information Sheet had not been read the researcher went through it with the participant. It was emphasised that they could withdraw from the study at any time without explanation and that this would have no effect on their continuing care either now or in the future. When the researcher was satisfied that the young person understood what they were being asked to do and why, they were then asked to complete a consent form if they still wished to take part (see Appendix 3 for copies of consent forms). For those participants who were under 16 years of age a completed parental consent form was also required prior to participation in the study. The self-report questionnaires were administered first, following which the self-medication questions were administered to the relevant participants only. The order in which the questionnaires were administered was randomised. When all measures had been completed the participant was given some information about the main aims of the study and hypotheses and was asked if he/she had any further questions. The participant was also asked if participation in the study had raised any concerns for them or if there had been anything they had found surprising or difficult. The researcher was available to discuss any concerns, which might arise, and it was agreed as part of the informed consent procedure that any issues, which were considered important to the continuing care, would be discussed with the participant's own therapist. None of the participants in the current study reported having any concerns about the topics that had been discussed.

### **3.6 Ethical Approval**

An application for ethical approval was submitted to Lothian Research Ethics Committee; a detailed protocol along with copies of all questionnaires was included. Ethical approval was granted prior to commencement of the study.

## 4. Results

A sequential regression analysis was carried out to test the hypotheses that gender, levels of PTSD symptomatology and social support were associated with, and predictive of, levels of drug and alcohol problems in a clinical sample of Scottish adolescents. It was hypothesised, more specifically, that levels of, firstly, PTSD symptoms and then social support would improve the prediction of drug and alcohol levels when the difference due to gender was controlled for. Statistical analyses were then run, where appropriate, to test the hypothesis that individuals with PTSD are self-medicating. Some results, relating to the Self-Medicating Hypothesis (SMH), are presented descriptively due to small sample size and nominal level of measurement. Prior to carrying out any formal analysis the data was screened to enable evaluation of assumptions associated with multiple regression analysis.

It is acknowledged that the sample size in the present study falls far short of that required to conduct multiple regression analyses (see section 3.2.2). This was the type of analysis, however, which had been planned from the outset, and this was reflected in the operational framework of the hypotheses. The regression analyses were therefore carried out, though are acknowledged to be exploratory in nature. Demographic information will be presented first, followed by information relating to data screening and, lastly the analyses themselves will be presented.

### **4.1 Demographics**

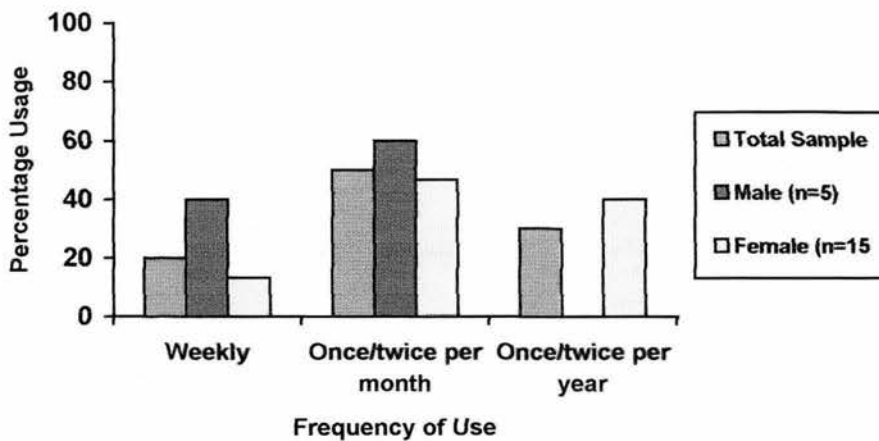
A total of 54 young people were identified as potential participants for the study. Of these, 11 declined to take part, 5 initially agreed to participate but later failed to attend the pre-arranged appointment, and 16 were not approached either because the relevant therapist was unwilling for them to take part or because their irregular attendance at out-patient appointments prevented an invitation being extended.

Although a total of 22 participants were recruited to and took part in the study, 2 were excluded from the analyses due to a failure to meet Criterion A of the DSM-IV diagnostic criteria for PTSD (see Appendix 1). Of the remaining 20 participants 5 (25%) were male and 15 (75%) were female. The mean age of the sample as a whole was 16.5years (SD = 1.28; range =14-18), while the mean age for female gender was 16.27 (SD = 1.39; range 14-18) and for male gender was 17 (SD = .72).

#### 4.1.1 Alcohol Use

All 20 participants reported using alcohol, though not all on a regular basis. Four individuals (20% of the total sample; 40% of males; 13.3% of females) reported drinking alcohol on a weekly basis, while 10 individuals (50% of the total sample; 60% of males; 46.7% of females) reported drinking once or twice a month. The remaining 6 individuals (30%) reported drinking only once or twice a year; all six were female, making up the remaining 40% of the females). Forty five percent of the total sample had drunk alcohol in the previous week (46.7% of the females and 40% of the males). This information is summarised in Graph 4.1, which gives details of the percentage of the total sample as well as the percentage of males and females falling into each frequency category.

**Graph 4.1: Frequency of Alcohol Use**

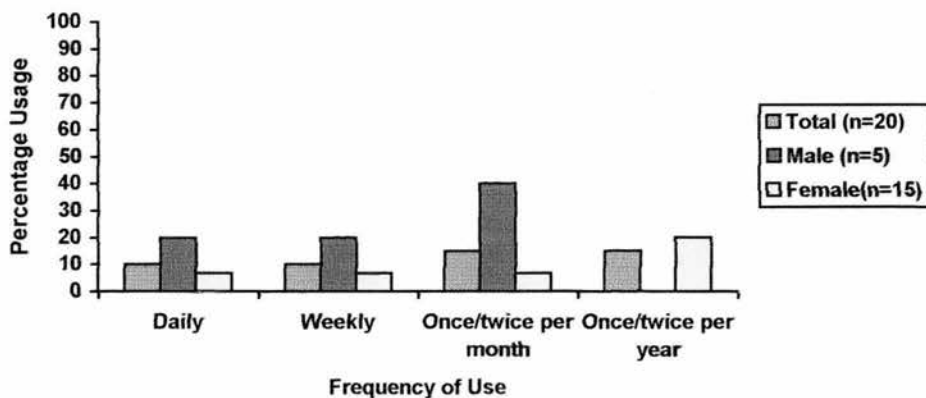


The mean alcohol score (as measured by the AAIS) was 30.45 (SD = 7.82; range = 18-43). For males the mean alcohol score was 31 (SD = 7.25; range = 21-40), while for females the mean score was 30.27 (SD = 8.24; range = 18-43). The test developers (Mayer & Filstead, 1979) suggest a cut-off of 42 is indicative of problematic alcohol use and based on this, only 2 participants (both female) were classified as having problematic alcohol use. “Designer drinks” (i.e. bottles of mixed alcoholic drinks) were the most commonly consumed alcoholic beverages with 45% of the total sample reporting consumption. Wine was the second most common (40%), followed by beer/lager (35%), and spirits (30%). Females were most likely to report consumption of “designer drinks” while males most commonly reported drinking beer/lager.

#### 4.1.2 Drug Use

Ten participants (50% of the total sample) reported use of drugs. Of these 10, 4 were male (80% of males) and 6 were female (40% of females). Four individuals reported using drugs on a weekly basis (2 males, 2 females) and of these four, 2 were daily users (1male; 1 female). Three young persons (2 male; 1 female) reported using drugs once or twice a month and the remaining three (all female) reported using drugs only once or twice a year. This information is summarised in Graph 4.2, which gives details of the percentage of the total sample falling into each frequency category as well as the percentages of males and females.

**Graph 4.2: Frequency of Drug Use**



The mean drug problems score (as measured by the DAST-A) for the total sample was 3.7 (SD = 5.12; range = 0-18); the mean score for males was 7.8 (SD = 7.16; range = 0-18), while for females the mean drug score was 2.33 (SD = 3.60, range = 0-11). The test developers (Martino, Grilo & Fehon, 2000) suggest that a cut-off of 6 identifies individuals with problematic use, and based on this cut-off, 30 percent of the total sample (60% of males; 20% of female) presented with problematic drug use. The most commonly used illicit drug was reported to be marijuana with 9 young people (45% of the total sample and 90% of the self reported drug users) reporting use of this drug. The next most commonly used drug was ecstasy (20% of the total sample) and benzodiazepines (10% of the total sample). One individual reported having abused prescription anti-depressants, one reported having used cocaine and one reported having taken heroin.

#### 4.1.3 *Trauma History*

All 20 participants met Criterion A of the DSM-IV diagnostic criteria for PTSD, though did not necessarily have a diagnosis of PTSD. The mean IES score for the total sample was 38.6 (SD = 18.28; range = 6-67). The mean score for the males was 41.4 (SD = 20.73; range = 6-60), while the mean for the females was 37.7 (SD = 18.09; range = 14-67). A cut-off of 40 on the IES is suggested by Udwin & Yule (1991) to be indicative of children who are likely to have a diagnosis of PTSD. Using this same cut-off, 11 participants were classified as having a high likelihood of having PTSD (probable-PTSD group) while 9 were less likely to have PTSD (non PTSD group). Table 4.1 outlines the percentage of participants who were exposed to varying types of trauma.

**Table 4.1: Types of Trauma Experienced**

<b>Trauma Type</b>	<b>Percentage of Males (n = 5)</b>	<b>Percentage of Females (n = 15)</b>	<b>Percentage of Total Sample (n = 20)</b>
Sexual assault	20%	26.7%	25%
Physical assault	60%	40%	45%
Witness to trauma	0%	26.7%	20%
Unexpected death of family member/close friend	20%	6.7%	10%

As can be seen from the table, the most commonly experienced trauma was physical assault; this was true both for males and females.

## **4.2 Screening the Data**

### **4.2.1 Normality, Linearity & Homoscedasticity**

A standard multiple regression was first run to check for normality, linearity, homoscedasticity and independence of residuals. Separate analyses were run for each dependent variable, namely alcohol score and drug score, and a plot of the standardised residuals against predicted scores was obtained for each. Examination of the plot for drug score, in particular, was indicative of some violation of assumptions and the distribution of each individual variable was therefore, subsequently examined. There was no evidence of outliers; none of the residuals in either analysis had a value of  $>3$  which Field (2000) cites as the level beyond which residuals must be considered outliers.

SPSS FREQUENCIES was used to examine the distribution of each variable and a logarithmic transformation was employed to reduce the skewness of one of the dependent variables (drug score), which was found to be positively skewed. Re-run of the analysis and examination of the plot of standardised residuals against predicted scores was marginally improved. Some data were missing for one measure, namely the Social Support Questionnaire. However, given that the missing data did not account for more than 5% of

the data for any one question on the scale, in each case the mean for that variable was substituted for the missing data (Tabachnick & Fidell, 2001).

#### 4.2.2 The Correlation Matrix

A correlation matrix (see Appendix 6) was produced in order to identify any significant associations, which might exist between the Independent and Dependent Variables. In addition, it is also important to identify Independent Variables, which are highly correlated with each other since they can have the effect of weakening the regression model. This will be discussed further in section 4.2.3 (Multi-collinearity & Singularity).

Examination of the correlation matrix reveals that none of the variables of interest are significantly correlated with the Dependent Variables, thus suggesting that there is no real association between problematic substance use and PTSD. Nor does there appear to be an association between problematic substance use and social support. Current age of participants is, however, noted to have a positive correlation with alcohol score ( $r = .49$ ;  $p < .05$ ), suggesting that as age increases so too does problematic drinking. In addition, the correlation between gender and (log of) drug score *approaches* significance ( $r = -.42$ ;  $p = .07$ ), suggesting that problematic drug use *may* be more commonly associated with the male gender. Based on the magnitude of this correlation co-efficient (which constitutes a medium/large effect size as defined by Cohen, 1988), a sample size of  $n = 46$  would be required in order to reach acceptable levels of power (.8) at a 95% probability level (Cohen, 1988). A number of the Independent Variables are noted to be significantly correlated with one another and this is discussed further in section 4.2.3, below.

As an additional test of the assumption of linearity, bivariate scatterplots were produced for each Independent Variable with each of the Dependent Variables. None of the scatterplots were indicative of curvilinear relationships and no obvious outliers were observed.



### 4.2.3 Multi-collinearity & Singularity

Multi-collinearity occurs when two (or more) variables are highly correlated and, as was seen in the correlation matrix, a number of the Independent Variables in the present study are indeed highly correlated. Collinearity diagnostics were computed in the initial regression run and the presence of multi-collinearity was indicated (evidenced by tolerances approaching zero and high VIF values. Belsely et al. (1980, cited in Tabachnick & Fidell, 2001) suggests that a Conditioning Index (measure of the dependency of one variable on the others) of  $>.30$ , together with a minimum of at least two variance proportions of  $>.50$  for two variables, associated with the same eigenvalue, is indicative of multicollinearity. According to Field (2000) a tolerance value of  $<.2$  is considered cause for concern while a value of  $<.1$  is indicative of a serious problem. Similarly, VIF values  $>10$  are also indicative of collinearity.

In the initial regression run, the SPSS program excluded two variables, namely, total IES score and total social support score, due to tolerance limits being reached on these variables. Rather than base the exclusion of variables on statistical grounds only, it was preferred that the researcher choose the variables to be excluded on theoretical grounds. The correlation matrix was, therefore, examined to look for high correlations between the Independent Variables (see Appendix 6 for correlation matrix).

#### 4.2.3.1 Measures of PTSD Symptomatology

Examination of the correlation matrix indicates that the intrusion and avoidance subscales of the IES are significantly positively correlated, both with each other ( $r = .709$ ;  $p < .001$ ) and with the total IES score ( $r = .945$ ;  $p < .001$  &  $r = .90$ ;  $p < .001$  respectively). Neither intrusion scores, avoidance scores nor total IES scores were significantly associated with arousal scores. Given that the total IES score is the product of the sum of the intrusion and

avoidance scores, this variable was excluded, in favour of the subscale scores, from further analysis in an attempt to limit multicollinearity.

#### *4.2.3.2 Measures of Social Support*

Emotional and practical support are significantly positively associated ( $r = .83$ ;  $p < .001$ ) and both variables have a significant positive correlation with social integration ( $r = .81$ ;  $p < .001$  &  $r = .72$ ;  $p < .001$ , respectively). Amongst the social support variables, the highest correlations occur between each of the afore-mentioned sub-scales and the total social support score, which is a product of these three variables. The correlations between total social support score and emotional support, practical support and social integration are  $r = .95$ ,  $p < .001$ ;  $r = .91$ ,  $p < .001$ ;  $r = .92$ ,  $p < .001$ , respectively. Given that the current study is interested in the association between different types of social support and drug and alcohol use the total support score was excluded from further analysis whilst the individual subscale scores were retained.

#### *4.2.3.3 Interaction terms*

Interaction terms, to test for an interaction between PTSD and social support, were computed by first expressing each variable (the total IES score for a measure of PTSD, the social support subscale scores and the total social support score) as a deviation from the mean and then creating a cross product of PTSD with each social support score. The following interaction terms were found to have high significant correlations: PTSD x emotional support, and PTSD x practical support ( $r = .92$ ,  $p < .001$ ); In addition, PTSD x total social support was highly correlated with both PTSD x emotional support and PTSD x practical support ( $r = .96$ ,  $p < .001$  and  $r = .97$ ,  $p < .001$ , respectively), as well as the PTSD x social integration interaction term ( $r = .94$ ,  $p < .001$ ). Since the interaction terms involving the emotional and practical subscales were highly correlated it was decided that these subscales, along with the social integration subscale interaction terms would be excluded from further

analysis and only the total support and social strain interaction terms would be entered into the final regression analyses. Although PTSD x social strain was significantly positively correlated with the other PTSD x social support interaction terms, the size of the correlations was smaller and was certainly well below .9, which is the value at which Field (2000) suggests consideration of exclusion is warranted.

### **4.3 Hierarchical Multiple Regression Analyses**

As was discussed in Section 4 (p.46), the sample size is such that multiple regression would not normally be used and the analyses that follow are therefore intended to be exploratory in nature.

#### **4.3.1 Problematic Alcohol Use, Gender, PTSD and Social Support**

It was hypothesised that social support would significantly add to the prediction of problematic alcohol use when the explained variance associated with first gender and then PTSD symptoms was controlled for. Gender was entered in the first step of the analysis. The PTSD symptom scores, namely intrusions, avoidance and arousal were entered in the second step of the analysis. In the third step, the different types of social support (emotional and practical support, social integration and social strain) were entered and, finally, the interaction terms (PTSD x total social support and PTSD x social strain) were entered on the fourth step. Examination of the plot of standardised residuals against predicted scores was indicative of only minimal violation of the assumptions of normality, homoscedasticity and linearity.

Table 4.2 gives details of the unstandardised regression coefficients (B) and intercept (the constant in the regression equation), along with the standardised regression co-efficients ( $\beta$ ), the semi-partial correlations ( $sr_i^2$ ), and R,  $R^2$ , and adjusted  $R^2$  after entry of all variables. The value of R was not significantly different from zero after all variables had been entered ( $R =$

.67;  $F_{(10,9)} = .73$ ;  $p = .69$ ), nor was it significantly different after each step in the analysis. None of the Independent Variables significantly added to the prediction of the Dependent Variable (alcohol problem score). Based on these results, gender, PTSD symptoms, and social support do not appear to be good predictors of alcohol problem scores. It is noted, however, that the value of  $R^2$  is at a level, which constitutes a statistically large effect size ( $f^2 = .47$ ), as defined by Cohen (1992), though admittedly this may be a consequence of the small sample size. The value of adjusted  $R^2$  is  $< 0$ , which is a reflection of the increased chance fluctuation in small samples compared with larger samples. Adjusted  $R^2$  provides an indication of the generalisability of the regression model; the closer the value is to the value of  $R^2$  the better the generalisability. As can be seen from table 4.2, the generalisability of the current model is highly restricted.

**Table 4.2: Multiple Regression Analysis with Alcohol Score as Dependent Variable**

	Variables & Intercept	B	$\beta$	$Sr_i^2$	$R^2$	Adjusted $R^2$	R
Step1	Intercept	33.59					
	Gender	2.50	.14	.002			
Step2	Intrusions	.47	.68				
	Avoidance	-.16	-.18				
	Arousal	-.003	-.003	.042			
Step3	Emotional Support	4.20	.47				
	Practical Support	-9.08	-1.04				
	Social Integration	2.56	.33				
	Social Strain	-2.06	-.28	.257			
Step4	IES x Social Support	0.03	.20		.32	-.45	.56
	IES x Social Strain	0.08	.20	.015			

#### 4.3.1.1 Collinearity Diagnostics

Examination of the collinearity diagnostics in the SPSS output indicated tolerance levels above .2 for all variables with the exception of emotional support (tolerance = .16). All variables had VIF values below 10 and no eigenvalue had more than one variance

proportion with a value  $>.5$ . Based on these diagnostics, it is acknowledged that there is some risk of collinearity, which may increase the likelihood of a Type II error.

#### 4.3.2 Problematic Drug Use, Gender, PTSD and Social Support

It was hypothesised that social support would significantly predict variation in drug problems scores over and above that predicted by first gender and then PTSD symptomatology. The Independent Variables were entered into the regression equation in the same order as above (gender on the first step, PTSD symptom scores on the second, social support scores on the third and interaction terms on the fourth. Table 4.3, contains the following statistics: unstandardised regression co-efficients (B) and intercept, standardised regression co-efficients ( $\beta$ ), the semi-partial correlations ( $sr_i^2$ ), R,  $R^2$  and Adjusted  $R^2$  after all variables have been entered.

**Table 4.3: Multiple Regression Analysis, (log of ) Drug Score as Dependent Variable**

	Variables & Intercept	B	$\beta$	$Sr_i^2$	$R^2$	Adjusted $R^2$	R
Step1	Intercept	.33					
	Gender	-.17	-.15	.17			
Step2	Intrusions	.01	.33				
	Avoidance	.01	.02				
	Arousal	.08	.12	.04			
Step3	Emotional Support	-.19	-.34				
	Practical Support	-.21	-.39				
	Social Integration	.43	.91				
	Social Strain	-.03	-.05	.21			
Step4	IES x Social Support	.02	.26				
	IES x Social Strain	.07	.29	.03	.45	-.17	.67

The value of R at the end of the last step of the regression analysis was not found to be significantly different from zero ( $R = .669$ ;  $F_{(10, 9)} = .728$  ;  $p = .687$ ). After the first step of the analysis in which only gender had been added, Adjusted  $R^2 = .127$ ;  $F_{inc(1,18)} = 3.767$ ;  $p = .068$ . This value of  $F_{inc}$  approaches significance at the  $p = .05$  level, suggesting that 12.7 percent of the

variance may be explained by gender ( $\beta = -.416$ ,  $t = 1.94$ ,  $p = .07$ ). Further addition of Independent Variables to the analysis did not significantly improve prediction of the Dependent Variable since the value of  $R^2$  was not reliably improved. It is noted, however that the beta value of social integration upon entry of this variable in the third step of the model, was relatively large though it failed to reach significance ( $\beta = .928$ ,  $t = 1.86$ ,  $p = .09$ ). It is speculated that, in a larger sample with appropriate power, this association may have reached significance, which might suggest that increased social integration (feeling of belongingness) is associated with higher levels of problematic drug use.

Based on the results given, it is suggested that while gender may be predictive of problematic drug use (since it approaches significance at the .05 level), PTSD symptom level and perceived social support (with perhaps the exception of social integration) do not appear to be good predictors. It is noted that the value of  $R^2$ , after entry of all Independent Variables constitutes a statistically large effect size (as defined by Cohen, 1992), though the value of adjusted  $R^2$  is  $< 0$ , which may be a reflection of the small sample size.

#### *4.3.2.1 Collinearity Diagnostics*

Examination of the collinearity diagnostics in the SPSS output, reveal acceptable tolerance levels and VIF values. In the 3<sup>rd</sup> and 4<sup>th</sup> steps of the model, however, emotional support has a tolerance level of  $< .2$ , which Field (2000) suggests is indicative of multicollinearity. Presence of multicollinearity may have the effect of biasing the regression model and increasing the likelihood of Type II Errors (where a good predictor of the Dependent Variable is found to be non-significant and rejected from the model). Examination of the standardised residuals plot revealed that some violation of the assumption of homoscedasticity is likely. This, again, weakens the model.

#### **4.4 The Self-medication Hypothesis (SMH)**

It is hypothesised that there is a functional connectedness between PTSD symptoms and drug and/or alcohol use. Only individuals who admitted to having used drugs and/or alcohol were included in this part of the analysis, which is based on the answers given in the short structured interview. All 20 participants in the study reported use of alcohol while only 10 admitted to taking drugs. Thus, for the sub-sample of drug users,  $n=10$  (4 male, 6 female), and for the alcohol use sample  $n=20$  (5 males, 15 females). Individuals who admitted to having used drugs on a one-off occasion only (e.g. in the context of an attempted overdose) were excluded from the analysis.

In order to test the hypothesis that individuals with trauma histories and drug and alcohol use are self-medicating, it had been intended to group the data set into sub-samples; those who had probable-PTSD (P-PTSD) as well as substance use problems versus those who had P-PTSD alone. Due to the small sample size and extremely unequal group sizes (only 11 individuals are classified as having PTSD and of these 11 only 1 is considered to have problematic alcohol use) this analysis was felt to be inappropriate. Rather than disregard the data collected however, it was decided to look at individuals' perceptions of the function of their alcohol use in the sub-sample of alcohol users ( $n = 20$ ) as a whole (rather than just those with PTSD). Based on findings in the literature (e.g. Bremner et al., 1996; Stewart et al., 1998), it is assumed that individuals who are self-medicating will be aware of this function of their substance use.

Each original sub-hypothesis (as outlined in section 2.6.3.2), relating to the main SMH, is outlined below and then details of the analyses employed and the results obtained are given.

**4.4.1. Individuals with co-occurring PTSD and problematic substance use will perceive a relationship between drug/alcohol use and the effects of the traumatic experience/s (i.e. individuals with P-PTSD and problematic use will have significantly higher “functional relatedness” scores).**

Given the small sample size, it was not possible to carry out the group comparison as planned and instead the association between functional relatedness scores and drug/alcohol scores was tested. In view of this, the hypothesis was re-formulated as follows: The expectation that drug and /or alcohol use is related to the trauma experience(s) is more likely to occur in individuals with higher levels of drug/alcohol problems. (i.e. drug/alcohol problems is associated with an awareness of a relationship between problematic use and trauma experience(s)).

In order to test this hypothesis, a correlational analysis (Pearson’s product-moment) was carried out separately for each of the dependent variables, namely alcohol score and (log of) drug score. Each individual had been asked to use a visual analogue scale to indicate the extent to which they thought their drug/alcohol use was related to the effects of their experience(s) of trauma.

#### *4.4.1.1 Alcohol Users*

The functional relatedness score for alcohol users had a mean of 2.44 (SD = 2.83). Analysis with Pearson’s product-moment yielded a significant positive correlation between alcohol score and functional relatedness score ( $r = .60$ ;  $p < .01$ ). This suggests that individuals who perceive their alcohol use to be functionally related to the effects of their traumatic experience(s) have higher levels of problematic alcohol use. Post hoc power analysis (based on a sample size of  $n = 20$  and effect size index of .6) yielded power of .83 at a 95% probability level (Cohen, 1988).

#### 4.4.1.2 *Drug Users*

The above analysis was repeated with (log of) drug score as the dependent variable. The positive correlation between (log of) drug score and functional relatedness score was non-significant at the 95% probability level ( $r = .45$ ,  $p = .10$ ). This suggests that a perception of functional relatedness between the effects of the trauma experience(s) and drug use is not associated with levels of problematic drug use. The magnitude of the correlation co-efficient is indicative of a medium to large effect size (as defined by Cohen, 1988). To reach power of .8, at a 95% probability level a sample size of 28 would be required.

#### **4.4.2 Individuals with co-occurring PTSD and problematic alcohol use will report an expectation that an increase in intrusion symptoms and hyperarousal symptoms will lead to an increase in alcohol consumption.**

As mentioned previously (see section 4.4), due to small sample size it was not possible to carry out group comparisons (i.e. P-PTSD and problematic alcohol use compared with P-PTSD alone). Thus, it is hypothesised, in line with past research on pharmacological specificity of substance use, that individuals who are self-medicating with alcohol will report an expectation that alcohol use will increase when intrusions and arousal symptoms increase but will decrease or stay the same when avoidance increases (The 'Self-Med' group). Individuals whose patterns of responses do not fit this pattern are considered not to be self-medicating (Non-Med). When the data were grouped according to these rules, the sub sample of self-medicators had  $n = 5$  (3 males, 2 females), while the non-medicators had  $n = 15$  (2 males, 13 females). Based on the original hypothesis, it is proposed that these "self-medicators" will have higher scores on the alcohol use measure compared with the non-self-medicators. This hypothesis was tested using a Mann-Whitney test. Table 4.4 details the means and SD's for each group along with the mean ranks, z-score and significance level (1-tailed).

**Table 4.4: Alcohol Scores in Self-Med and Non-Med Groups**

Group	Mean (SD)	Mean Rank	z	Significance (1-tailed)
Self-Med (n = 5)	33.6 (8.05)	13.30	-1.23	.11
Non-Med (n = 15)	29.4 (7.73)	9.57		

As can be seen from the table, the self-medicating group do not have significantly higher alcohol scores than the non-medicating group. This may suggest that individuals are not using alcohol to self-medicate. Individuals who appear to be self-medicating do not therefore appear to have higher levels of alcohol problems, based on the assumption that the individual has insight into the function of use and it may be the case that people simply are not self-medicating.

In order to test whether or not the perceived functional relatedness score actually corresponds with the (slightly) more objective measure of what happens to alcohol use when each type of symptoms increase, a Mann Whitney test was used to compare the mean functional relatedness scores of each group (i.e. the Self-Med group compared with the Non-group). The table below (Table 4.5) presents the mean scores and SD's, along with the mean ranks, z-value and significance level (1-tailed). It is expected that, if individuals are truly self-medicating, there will be a significant difference in mean functional relatedness scores, with the self medicators perceiving a higher level of relatedness between the effects of their trauma(s) and their alcohol use.

**Table 4.5 Functional Relatedness Scores (Alcohol) in Self-Med and Non-Med Groups**

Group	Mean (SD)	Mean Rank	z	Significance (1-tailed)
Self-Med (n = 5)	4.94 (3.75)	14.30	-1.66	.049
Non-Med (n = 15)	1.61 (1.97)	9.23		

As can be seen from the table, self-medicators are significantly more likely to perceive a relationship between the effects of their trauma experience(s) and their alcohol use.

#### **4.4.3 Individuals with co-occurring PTSD and problematic drug use will report an expectation that an increase in intrusions and avoidance/numbing will lead to an increase in drug use.**

As outlined above, due to the small sample size, the individuals who are self reported drug users ( $n = 10$ ), are split into two groups according to whether or not they appear to be self-medicating (based on the premise that those who self-medicate have some insight into the function of their drug use and will be aware of the effect of changes in symptom level on subsequent drug use). In the case of drug use, individuals who are self-medicating are likely to expect an increase in drug use when intrusions and/or avoidance increase but no change when arousal increases (based on principles of pharmacological specificity). When the sample of drug users ( $n = 10$ ) is grouped according to those who appear to be self-medicating (Self-Med) and those who do not (Non-med), the group sizes are  $n=1$  (1 male) and  $n=9$  (3 males, 6 females), respectively. Due to the fact that the Self-Med group has only a single case, use of formal statistical tests was considered inappropriate. The drug score of the Self-Medicating case is 10, compared with the Non-Med group mean of 7.1 ( $SD = 5.21$ ; range = 2-18). Clearly, little can be concluded from a single case but suffice to say that the lone self-medicator has a drug score higher than the mean of the non-self-medicators. Given that the range of scores in the Non-Med group has a minimum of 2 and maximum of 18, it seems unlikely that the "Self-medicating" case is significantly different from the non-Med group with regards to problematic drug use.

In terms of the (drug) functional relatedness scores (i.e. the extent to which a relationship between the effects of the trauma experience(s) and drug use is perceived), the mean score for the Non-Med group is 5.98 ( $SD = 2.97$ ; range = .30-9.2) compared with the single Self-

Medicator who has a score of .2. Based on these scores there appears to be no relationship between the perception of a functional relationship between drug use and the trauma in drug users, who are either self-medicating or not. It is acknowledged however, that little can be concluded from comparing a single case in this way.

**4.4.4 Individuals with co-occurring PTSD and problematic drug and/or alcohol use are more likely to report onset of substance use prior to the trauma. (Initiation of substance use prior to the trauma will be associated with an increase in use following the trauma (in terms of frequency of use, amount taken/consumed and number of different types used)).**

As before, due to small sample size, it was not possible to test the hypothesis in its original form, thus it is suggested that relative onset of substance use will be predictive of problematic use such that onset prior to the trauma will be predictive of increased problems. In addition, those who report onset prior to the trauma will report an increase in use following the trauma.

#### *4.4.4.1 Alcohol Users*

Six individuals reported onset of alcohol use prior to the onset of the trauma(s), while 14 reported onset following the trauma. A biserial correlation co-efficient was used to measure the association between alcohol score and relative onset of alcohol use, since one of the variables in the analysis is continuous (alcohol score) while the other is dichotomous (relative onset). In addition, the dichotomous variable can be considered to have an underlying continuum since individuals vary according to how soon before or after the trauma, onset of alcohol use occurs, thus the biserial correlation co-efficient is chosen in preference to the point-biserial correlation coefficient (Field, 2000). Relative onset of alcohol use is found to be significantly negatively correlated with alcohol score ( $r_{pb} = -.39$ ;  $r_b = -.51$ ;  $p < .05$ ). This suggests that, as hypothesised, onset of alcohol use prior to the traumatic

experience(s) is associated with higher levels of problematic alcohol use. Post hoc power, based on a correlation co-efficient of .5 and sample size of  $n = 20$ , is approximately .6 at 95% probability level (Cohen, 1988).

Seven individuals reported that the onset of their alcohol use occurred prior to the trauma(s) and of these, 4 (57.14%) reported an increase in alcohol use in terms of the frequency of use, and quantity consumed. One individual (14.28%) reported a decrease in alcohol use in terms of frequency of use and amount consumed, and two (28.57%) reported no change. Four individuals (57.14%) reported that the number of different types of alcoholic beverage consumed increased following the trauma while the remaining three (42.86%), reported no change.

#### 4.4.4.2 *Drug Users*

The number of individuals who reported onset of drug use occurred prior to the traumatic experience(s) was four compared with six who reported initiating drug use following the trauma. As above a biserial correlation coefficient was used to measure the association between relative onset of drug use and level of problematic drug use (log of drug score). A significant negative correlation was found between relative onset and problematic drug use ( $r_{pb} = -.78$ ;  $r_b = -.99$ ;  $p < .01$ ). In line with the hypothesis, this suggests that onset of drug use prior to the trauma (s) is associated with higher levels of problematic drug use. Post hoc power analysis at the 95% probability level, with a correlation co-efficient of .9 and  $n = 10$ , yields power of .9.

Four individuals reported using drugs prior to the onset of the trauma and of these four, three (75%) reported that drug use had increased in the period following the trauma, in terms of the frequency of use, quantity used, and number of different types of drugs used.

The results suggest that there may be a temporal relationship between the onset of drug and alcohol use and levels of problematic use, at least within this sample. More specifically, reported onset of substance use prior to the onset of the trauma experience(s), is associated with increased levels of drug and alcohol problems.

#### 4.5 Coping Strategies

Due to the low Cronbach's alpha (varying from .67 to -.34), which was obtained using Berman et al.'s "cognitive style", scoring method for the Kidcope, all coping variables were excluded from the regression analysis. However, use of individual strategies, will be outlined in this section. It is hypothesised that those strategies which would be considered, by Berman et al., to be negative ones will be positively correlated with the dependent variables, namely alcohol and drug score. Positive strategies will be negatively associated with the dependent variables. Overall percentage usage of each strategy is given in Table 4.6 below along with the mean frequency with which each strategy was used and standard deviation (SD).

**Table 4.6: Percentage Usage and Mean frequency of Use (N=20)**

Coping Strategy		Percentage Usage	Mean Frequency (Standard Deviation)
<i>Negative</i>	Distraction	55%	1.3 (1.34)
	Social withdrawal	90%	2.45 (.10)
	Self-criticism	70%	1.8 (1.36)
	Blaming others	65%	1.35 (1.23)
	Wishful thinking	100%	2.55 (.69)
	Resignation	70%	1.65 (1.27)
<i>Positive</i>	Cognitive re-structuring	15%	.25 (.64)
	Problem-solving	70%	1.2 (1.06)
	Emotional regulation	85%	1.9 (1.02)
	Social support	60%	1.15 (1.18)

As can be seen from the table, the most commonly used strategies were wishful thinking (100%) and social withdrawal (90%), both of which are classed as negative strategies by Berman et al. (1996). The most commonly used positive strategy was emotional regulation, which was reportedly employed in 85% of cases. With regard to the frequency with which

each strategy was used, again the negative strategies, social withdrawal and wishful thinking were used most frequently ( $M = 2.45, SD = .10$ ;  $M = 2.55, SD = .69$  respectively).

#### 4.5.2 Association Between Coping, Problematic Alcohol Use, and Problematic Drug Use

A non-parametric correlation matrix was produced using Kendall's Tau ( $\tau$ ) (see Appendix 7). The non-parametric statistical test was chosen since the data being used was ordinal in nature; although the measure of coping was a frequency measure, the numerical values were tied to given labels (i.e. 0=not at all, 1=sometimes, 2=a lot of the time, 3=almost all the time). Field (2000) suggests that Kendall's Tau should be used in preference to Spearman's Rho since it is a better estimate of the correlation in the population and therefore can be more accurately generalised.

##### 4.5.2.1 Alcohol Use

As can be seen from the correlation matrix, none of the coping strategies were significantly correlated with alcohol use, although the positive strategy, cognitive re-structuring, does have a negative correlation with alcohol use, which approaches significance at the .05 level ( $\tau = -.31, p = .06$ ). This suggests that increased use of cognitive re-structuring as a coping strategy may be associated with the development of fewer alcohol problems.

##### 4.5.2.2 Drug use

There is a negative correlation between the positive coping strategy, cognitive re-structuring, and drug use ( $\tau = -.34, p < .05$ ). This suggests that increased use of cognitive re-structuring is associated with fewer drug problems. The negative coping strategy of social withdrawal has a positive correlation, which approaches significance at the .05 level ( $\tau = .31, p = .06$ ), suggesting that increased use of social withdrawal is associated with an increase in problematic drug use. Social withdrawal also has a small/medium correlation with gender

( $\tau = -.36$ ;  $p = .053$ ), which approaches significance at the 95% probability level and suggests that female gender may be associated with less frequent use of this particular coping strategy.

## **5. Discussion**

The main aims of the current study were to replicate the finding of an association between PTSD and problematic drug and alcohol use in a sample of young people in Scotland, to look at the possible moderating effects of coping and social support on this relationship, and to test the self-medicating hypothesis. It was also intended to explore any gender effects, which may exist in the relationship between PTSD, problematic substance use, coping and social support. Each of the main hypotheses is outlined below and the associated results are discussed. Methodological limitations of the present study will also be outlined, as will the clinical implications. Finally, recommendations for future research will be considered.

It is acknowledged that, due to the unexpectedly small sample size, some alterations to the intended analyses were made, as was previously noted (see section 4.4) and the post hoc nature of these analyses is recognised.

### **5.1 PTSD and Alcohol Use**

It was hypothesised that there would be an association between PTSD and problematic alcohol use and this association would be moderated by both social support and coping. Thus, when outlined in terms of the operational framework, social support and coping, were hypothesised to be predictive of alcohol score when first gender and then PTSD symptoms were controlled for. Due to low internal consistency of the Kidcope (using Berman et al.'s 1996 scoring criteria), coping was not included in the main regression analysis and will therefore be discussed in a later section (5.4). It was also hypothesised that there would be a gender difference in the association between the predictor variables and problematic alcohol use, such that female gender would be a stronger predictor of alcohol score than male gender.

### 5.1.1 Alcohol Use and Intrusions, arousal and avoidance

It was hypothesised, based on the notion of pharmacological specificity, that there would be an association between PTSD symptoms and problematic alcohol use. More specifically, arousal symptoms and intrusions, would add more to the prediction of alcohol use score, in the regression model, than would numbing/avoidance symptoms. The fact that none of the core PTSD symptoms were found to be significantly associated with the dependent variable calls into question the notion of pharmacological specificity which is a central concept of the self-medication hypothesis (SMH). Assuming that young people are using alcohol to self-medicate, some evidence of psychopharmacological specificity would be expected such that an association between particular types of PTSD symptoms and the “drug of choice” would be observed. Thus, in the case of alcohol, which is a depressant and is thought to be used to self-medicate in response to intrusion and hyperarousal symptoms (McFall et al. 1992; Stewart et al. 1998), it would be expected that these particular symptoms would correlate more highly with the level of alcohol use than the level of avoidance/numbing symptoms. Given the lack of any significant association between the core PTSD symptoms and the dependent variable, alcohol use in the current sample does not appear to have a self-medicating function.

There are a number of possible reasons for this observed lack of a significant association. Firstly, it may be that a true association between PTSD symptomatology levels and alcohol use does exist but due to the extremely small sample size and related low power of the analysis, this association has gone undetected and a Type II Error may have been made. The presence of multi-collinearity among the variables, as well as some violation of assumptions may also have served to weaken the regression model and increase the likelihood of a Type II Error.

A second possible explanation for the lack of a significant association is that, contrary to findings in North America (e.g.; Fehon et al., 2001; Giacomonia et al. (2000); Lipschitz et al., 1999; Lipschitz et al., 2000) there is no true association between PTSD symptoms and alcohol use. It may be that cultural differences exist in the use of alcohol and that in the population under study, alcohol simply is not used as a strategy for coping with emotion regulation. Alcohol use in the U.K. may also be seen as less problematic compared with North American countries; the lower legal age for drinking alcohol in the U.K. may be accompanied by more accepting attitudes towards adolescent drinking. Alternatively, it may be that the current sample is simply not representative of the population under study (i.e. young people with trauma history). It is acknowledged, due to recruitment difficulties (discussed in more detail in section 5.5.1) that a number of young people who were identified as meeting criteria for the study were de-selected at the discretion of their therapist who felt it was inappropriate for them to take part in such a study at that point in their treatment. The main reason given was that the young person was too “chaotic” at present to take part. In addition a number of young people who initially agreed to take part later chose to withdraw due to reservations about taking part in a study, which might trigger trauma memories. It seems possible that these young people are indeed struggling with affect regulation (and possibly also PTSD symptoms) and are engaging in avoidance of a potential reminder of their trauma. It is suggested, in view of this, that perhaps the current sample was skewed in favour of individuals whose current functioning was at a more adaptive level than those who either chose not to take part or whose therapist chose not to invite their participation.

Another reason for the failure to find a significant association may be related to the low rate of alcohol problems in the current sample

Another factor that may have led to a result contrary to those reported in the literature relates to the measures used in the current study. Again, this issue will be discussed in more detail in a later section (see 5.5.3.1) but it is noted that while the PTSD measure assesses current PTSD (frequency of symptoms experienced in the last 7 days) the alcohol measure assesses lifetime use of alcohol.

### **5.1.2 Gender and Problematic Alcohol Use**

Contrary to the hypothesis, gender did not significantly add to the prediction of problematic alcohol use. Again, this is somewhat inconsistent with previous findings in the literature that the association between PTSD and problematic alcohol use occurs more commonly in females (Fehon et al. 1999; Giaconia et al 2000; Najavits et al, 1997). As before, it is difficult, and indeed unwise, to draw firm conclusions based on such a small sample as is employed in the current study. The fact that the majority of the participants were female may have affected the result since each male case exerts a greater influence over the result compared with each individual female case. Future research should recruit larger sample sizes as well as a greater number of male participants.

### **5.1.3 Social Support and Problematic Alcohol Use**

The lack of a significant association between perceived social support and alcohol use, within the context of PTSD, suggests that perceived social support does not add to the prediction of problematic alcohol use when gender and PTSD symptomatology have been controlled for. It is acknowledged, however, that the small sample size and associated lack of appropriate power limits the generalisability of these results to similar populations of young people with trauma histories. The results of the current study stand in stark contrast to the results of other studies, which have found high levels of perceived social support to be associated with improved outcome (e.g. Cohen & Wills, 1985; La Greca et al., 1996; Wills & Cleary, 1996). However, to date, the role played by social support as a potential moderating

variable in the relationship between PTSD and problematic substance use has not been adequately assessed. While some studies have found an inverse association between social support and PTSD (e.g. Rossman et al., 1997; Vernberg et al., 1996) and others have found correlation between low social support and increased dependency problems (e.g. Averna & Hesselbrock, 2001; Pederston et al., 1997), no study has looked at the association between different types of social support and substance use/misuse within the context of PTSD. The current study attempted to explore this relationship, through use of multiple regression statistical techniques, though was severely limited by the lack of adequate power. It is suggested that further investigation into the utility of social support within this context is warranted.

#### 5.1.4 Age and Problematic Alcohol Use

Although, an association between age and problematic alcohol use had not been hypothesised it was nevertheless noted, during exploration of demographical data, that a significant positive correlation between alcohol score and age was found. This suggests that, in the current sample at least, older adolescents are more likely to report higher levels of problematic alcohol use than younger adolescents. This is consistent with reports from recent national surveys (Department of Health & Scottish Executive, 2002), which suggest that increased alcohol use occurs in older age groups. This may be a reflection of the fact that as young people approach the legal age (18 years) it becomes increasingly easy to obtain alcohol; friends are reaching the legal age and may buy the alcohol, older friends may provide false identification and as the young person develops physically, a requirement to provide proof of age may be imposed less often. This suggestion is supported by comments which were made by a number of the older adolescents in the current study to the effect that they had no difficulty in obtaining alcohol and knew which shops would not request identification. As before, it is acknowledged that the lack of appropriate power limits

generalisability of these results and further research is required with larger samples of adolescents with trauma histories.

## 5.2 PTSD and Drug Use

It was hypothesised that social support and then coping would add to the prediction of problematic drug use when first gender, and then, PTSD symptoms had been controlled for. The regression analysis, in which all the above independent variables (with the exclusion of coping, for the same reasons as given in section 5.1) were entered, yielded a non significant result. The value of  $R^2$ , however, was such that it is speculated that, in a larger sample size, with appropriate power, a significant result may well have been produced. Further research with larger samples is required to test this suggestion. The association between drug scores and each of the independent variables will be discussed in turn.

### 5.2.1 Gender and Problematic Drug Use

It was hypothesised that there would be an association between female gender and increased levels of drug problems. The beta value ( $\beta$ ) for gender after the first step of the analysis was at a level that approached significance at the .05 level (i.e. approached the point at which there is a 95% chance of finding a significant result) and as such it is tentatively suggested that this may be an indication that gender is indeed predictive of levels of problematic drug use. The direction of the association in the current study indicated that it was *male* gender which was associated with higher levels of drug problems, a finding which runs contrary to reports in the PTSD literature which describe an association between *female* gender and problematic substance use in both adults and adolescents (e.g. Giaconia et al. 2000; Lipschitz et al., 2000; Najavits et al. 1997).

An association between male gender and drug abuse has been found in a number of studies focusing on substance abuse (as opposed to comorbid PTSD and SUD) and it has been

suggested that men are twice as likely to be heavy drinkers and four times as likely to use marijuana compared with women (Spooner, 1999; Stewart, 1996). It may be that the composition of the current sample is more representative of a non-specific psychiatric clinical sample as opposed to a representative sample of traumatised young people. Although, PTSD and substance use is the focus of the current study, it is acknowledged that the participants recruited were not required to have either a diagnosis of PTSD or substance use disorder and it may be that the sample employed in the current study is too non-specific to reveal an association between the two problems, particularly given the limitations afforded by the small sample size. What is perhaps revealed in the current study is a more general finding in psychiatric populations of a gender difference in the types of problems being presented with.

The results relating to a gender difference, reported in the present study are *suggestive* of an association between gender and drug problems, and it is acknowledged that the correlation coefficient does not reach significance and cannot be generalised beyond the current sample. It is also acknowledged that only 25% of the total sample consisted of male participants while the other 75% were female, and, as such, each male case exerts a greater influence over the result than each comparable female case, which may have inflated the observed association between gender and problematic drug use.

### **5.2.2 PTSD Symptoms and Problematic Drug Use**

It was hypothesised that there would be a positive association between PTSD symptoms and problematic drug use. More specifically, based on the notion of psychopharmacological specificity, it was hypothesised that avoidance/numbing and intrusion symptoms would be more highly associated with the dependent variable than arousal symptoms.

The beta values (standardised regression co-efficients) for each of the core symptoms of PTSD (intrusions, avoidance/numbing and arousal), as well as the semi-partial correlation, after addition of these variables to the regression equation, were found to be non-significant. This suggests, contrary to findings in the literature (e.g. McFall et al., 1992; Stewart, et al., 1998; Lipschitz et al., 2000) that there is no significant relationship, between PTSD symptoms and problematic drug use. These findings call into question the validity of the self-medication hypothesis, especially given the lack of support for pharmacological specificity. One obvious methodological limitation of the current study is, as was the case in the previous section on alcohol use, the use of poorly matched measures of PTSD and problematic drug use; while the IES looks at current PTSD symptoms, the DAST-A assesses lifetime drug problems. Thus, the definition of PTSD used is a current one while the definition of problematic drug use encompasses past as well as current use. Further research, with larger samples and better-matched measures, (i.e. either lifetime and/or current measures of both drug use and PTSD) is required to tease out any relationship between specific PTSD symptoms and drug use which may, or indeed may not, exist.

### **5.2.3 Social Support and Problematic Drug Use**

It was hypothesised that social support would predict problematic drug use when the variance accounted for by first gender and then PTSD symptoms was controlled for. Based on the results of the regression analysis, no significant association between (log of) drug score and social support was found. Given the lack of a significant association between PTSD symptoms and problematic drug use, it was of course difficult to test the hypothesis adequately and further research is perhaps warranted. As before, generalisation of the failure to find a significant relationship between perceived social support and the dependent variable is limited by small sample size and the lack of adequate power.

A small positive correlation between social integration and drug score was found but this failed to reach significance. It is suggested that further exploration of the relationship between different types of social support and drug use may be worthwhile. This trend towards an association between a perceived sense of belongingness and increased drug problems is consistent with a finding in the literature that female adolescents who have high perceived peer support are more likely to have substance use problems (Springer and Padgett, 2000). Further research is required to explore further the potential predictive value of social integration. Research should perhaps also consider the source of social support since the Springer and Padgett study did not report a similar association with high perceived family support. Perhaps when young people feel they belong in a group they are more likely to take part in the activities of that group and adopt the values of that group. If the group is one in which experimentation with drugs is an accepted pastime such youngsters may have easier access to drugs and also may feel it is more acceptable. In addition, they are more likely to discover the powerfully reinforcing effects of drug use in the presence of severe PTSD symptomatology.

#### **5.2.4 Summary: PTSD and Drug/Alcohol Use**

Although, no significant association was found between PTSD symptoms and problematic drug and alcohol use it is noteworthy that the current sample presented with increased levels of both drug and alcohol use compared with the levels of use in the general population. National surveys (Institute of Alcohol Studies, 2002; Department of Health & Scottish Executive, 2002) which have been carried out to assess levels of alcohol use in British schoolchildren (aged 11-15; comparable statistics for the 14-18 age group were not available) reported that 24 percent of young people in this age group admitted to having drunk alcohol in the past week compared to 45 percent in the current sample. In addition, 14 percent of youngsters in the same age group reported having used illicit drugs compared with 50 percent of the total sample in the current study. Clearly, the current sample consists

of a group of slightly older adolescents, which may explain the higher levels of drug and alcohol use. On the other hand, the higher levels of drug and alcohol use may be a manifestation of difficulties in affect regulation which are associated with emotional disorders; the sample employed in the current study are drawn from a population of psychiatric out-patients and it is likely that all will have some degree of difficulty with affect regulation and engagement in maladaptive coping. Further research, employing control groups of age-matched non-clinical adolescents are required to adequately assess the apparently heightened levels of substance use in the current study.

The results suggest that very few young people in the current sample actually engaged in problematic levels of alcohol misuse (as measured by the AAIS), which may go some way towards explaining the lack of an observed association between problematic alcohol use and PTSD symptomatology. The low prevalence of alcohol problems may have been a true reflection of adaptive functioning or it may be related to the low internal consistency of the assessment tool in the current study and the fact that the measure was validated on a potentially more culturally diverse sample. Given the restricted range of alcohol (and drug) scores (e.g. only 2 participants reported problematic levels of alcohol use) the likelihood of obtaining a significant association between PTSD and problematic substance use may well have been reduced thus increasing the probability of a Type II Error. Gravetter & Wallnau (2000), emphasise that caution must be exercised when correlations are computed from data, which is not representative of the full range of available scores, as was the case in the present study, since real associations may not be detected. Thus, the fact that no significant association between PTSD and substance use was found might be a reflection of the type of measures used, the small sample size and restricted range of scores, or perhaps the type of sample itself. It may be that participants recruited to other studies reported in the literature presented with higher levels of psychopathology. Some studies, for example, looked specifically at alcohol and/or drug dependent individuals or samples of individuals with a

clinical diagnosis of PTSD, while the sample employed in the current study was a non-specific psychiatric sample, the only inclusion criteria being presence of trauma history. Perhaps there is a need to look more specifically at adolescent substance use disorder populations or clinical populations with a clinician-made diagnosis of PTSD.

Other studies, particularly in the adolescent literature, have also studied non-specific clinical populations (e.g. Fehon et al., 2001; Lipschitz et al., 1999; Lipschitz et al., 2000). These studies did find an association between PTSD and substance use using the same measures of alcohol and drug problems (i.e. The AAIS and DAST-A) as were used in the current study. However, there were a number of important differences in the design of these studies. Firstly, although the sample used was a non-specific psychiatric one, all participants were in-patients of a psychiatric adolescent unit, compared with the current study in which all participants were either out-patients or daily attendees, thus the current study may have lower levels of emotional disturbance. Given the focus on emotion regulation in the use of drugs and alcohol in the context of PTSD, it is suggested that perhaps the individuals in the current sample may be less likely to have problems in affect regulation, which necessitate self-medication. Secondly, the studies carried out by Lipschitz et al. involved assessment of PTSD and drug and alcohol use when individuals were first admitted to the unit, whereas in the current study, all individuals had been known to the service for some time (therapists were unwilling to invite participation of new patients) and therefore were some way through therapy. Thus it may be that these participants were less emotionally disturbed than they might have been had they been assessed for the study prior to engaging in therapy.

It is perhaps noteworthy that a number of young people commented during the interview that, while they were doing pretty well at that time, with respect to PTSD symptomatology, they had in the past experienced quite severe levels of intrusive imagery, trouble sleeping,

and difficulty talking about the trauma experience etc. In the case of these individuals, at the time of assessment, they were relatively asymptomatic in terms of PTSD but their scores for lifetime drug and or alcohol problems was relatively high.

Taken at face value, the results of the regression analyses fail to support the commonly observed association in the literature between PTSD symptomatology and problematic drug and/or alcohol use. In addition, the pharmacological specificity principle of the SMH is not supported. This suggests that, in the current sample at least, there is no significant association between PTSD and problematic substance use and this in itself argues against the SMH. However, it is possible that the association in the current sample may in actual fact be underestimated due to the existence of self-medication. Given that the aim of self-medication is to reduce negative affect states, it is possible that those individuals who are self-medicating are actually reporting fewer PTSD symptoms as a result of the “success” of their somewhat maladaptive coping strategy. If young people are using alcohol, for example, to help reduce arousal and intrusion symptoms then it is perhaps to be expected that the levels of these symptoms will be reduced. Longitudinal studies employing prospective self-report and self-monitoring are required in order to obtain a clearer picture of the interplay between PTSD symptoms and substance use.

### **5.3 The Self-Medication Hypothesis (SMH)**

#### **5.3.1 Perceptions of Functional Relatedness**

According to Rachman (1991), in order to determine the nature of the association between two disorders (in this case probable-PTSD and problematic substance use), it is important to assess the individual’s own perception of the functional connectedness between the two variables of interest. Individuals were asked to rate the degree of functional relatedness between the effects of their trauma experience(s) and their drug/alcohol use and then they were asked, what they would expect to happen to their drug/alcohol use when specific

PTSD symptoms increase. It was hypothesised that there would be a positive correlation between perception of functional relatedness and drug/alcohol use. This hypothesis was supported for alcohol use only (though mean scores were quite low), suggesting that those individuals with higher levels of alcohol problems do indeed perceive a relationship between their substance use and the effects of their trauma(s). It also suggests that while some young people appear to be using alcohol as a means of managing the distressing symptoms of PTSD, the use of other substances is not being utilised in the same way or for the same reason. It may be that societal attitudes make consumption of alcohol more acceptable or it may be simply that alcohol proves easier to obtain than illicit drugs, which in itself may make alcohol a more preferable means of self-medication.

### **5.3.2 Expectations of changes in alcohol use in response to increased PTSD symptoms**

It was also hypothesised that individuals with high levels of problematic alcohol use and PTSD, would expect an increase in alcohol use when intrusions and/or arousal increased, but no change (or a decrease) in response to increased numbing/avoidance. Unfortunately, as was pointed out in section 4.4.2, this hypothesis was difficult to test due to the small sample size. Given that only eleven of the total sample would be classified as having PTSD and of these only one had a score above the cut-off for alcohol problems, it was felt inappropriate to test the hypothesis in this way. Rather than disregard the data however, an attempt was made to identify individuals who appeared to be self medicating, based on principles of pharmacological specificity (i.e. if an individual is using alcohol to self-medicate he/she should predict that alcohol use will increase in response to an increase in intrusions and avoidance). Based on this assumption 25 percent of the total sample was classified as self-medicating with alcohol. It was hypothesised that these self-medicators should have higher alcohol scores than the non medicators, which would be indicative of alcohol problems but this was not supported. It is difficult to draw any conclusions from

this given the small sample size and, of course, the fact that this comparison is a post-hoc one.

In order to test whether or not an individual's rating of the functional connectedness between alcohol use and effects of the trauma is consistent with their self-medication classification, the functional relatedness scores of the two groups (Self-Med and Non-med) were compared. It was found that the self-medicators were significantly more likely to perceive a relationship between the effects of their trauma and their alcohol use. This finding suggests that individuals may indeed be reliable reporters of the function served by their alcohol use and that they do have an awareness of the relationship between the two. It is acknowledged that this finding cannot be readily generalised outwith the confines of the current study due to small sample size, post-hoc comparisons and low power.

### **5.3.3 Expectations of change in drug use in response to increasing PTSD symptoms**

With respect to the pharmacological specificity of drug use it was hypothesised (post-hoc) that individuals who were using drugs to self-medicate would report higher levels of drug use. The self-medicators were identified as those who reported an increase in drug use in response to increased intrusions and/or avoidance/numbing but no change or a decrease in response to arousal. Given that only one individual was classified as a self medicator it was impossible to draw any conclusion based on comparison of mean drug scores. Although the raw drug score for this individual is admittedly higher than the mean group score, given the range of scores within the Non-Med group as well as the magnitude of the standard deviation, it does seem unlikely that the self-medicator has a higher level of problematic use than the non self medicators. It may seem surprising that a greater number of individuals were not classified as self-medicators, given that 6 out of the 10 participants who admitted to using drugs were classified as having problematic use. It may be that the difficulty lies in the conceptualisation of pharmacological specificity in drug use. As is the case in many

studies in the literature, the present study looks at drug use as if it were one entity despite the fact that this encompasses a wide range of different types of drugs, which have different pharmacological effects. Much of the literature, which concentrated on the link between avoidance/numbing and drug use, was carried out with adult populations who were using a number of “hard” drugs (such as heroin and cocaine) (e.g. McFall et al. 1992; Stewart 1998). In comparison the majority of the participants in the present study reported use of marijuana and a much smaller proportion reported use of stimulants such as amphetamines (which might be expected to relieve numbing/avoidance). Marijuana has similar pharmacological effects as alcohol and thus, it may be that the self-medicators amongst the drug users were actually those who reported an increase in drug use in response to intrusions and arousal rather than avoidance. This might also go some way towards explaining the finding, of Lipschitz et al.(1999), that hyperarousal symptoms were most highly associated with drug use in comparison with avoidance and intrusion symptoms. This is a difficult issue to disentangle particularly with a small sample. Further research is required to look at specific types of drugs and their effects in the context of PTSD symptoms. Future studies could, perhaps, also consider the potential self-medicating function served by smoking, since nicotine is likely to be another easily obtainable drug for teenagers.

Another explanation is that young people are simply not using illicit drugs to help manage their symptoms of PTSD and this may be due to other substances such as alcohol being more readily available. It should be noted however that recent surveys have shown that even in early to mid-adolescence 32 percent of youngsters surveyed report having been offered illicit drugs (Department of Health & Scottish Executive, 2002).

#### **5.3.4 Relative Onset of Drug and Alcohol Use**

It was hypothesised that onset of drug/alcohol use prior to the trauma would be associated with higher levels of problematic use. Significant associations were found between both

prior onset of alcohol use and alcohol problems, as well as prior initiation of drug use and drug problems, and the effect sizes were statistically large, as defined by Cohen (1992). There are a number of possible explanations for this finding. It may be that young people who use alcohol and/or drugs are actually at an increased risk of exposure to trauma due to the social environment in which they use these substances or it may be that young people who initiate onset of drug and/or alcohol use prior to the onset of trauma may be more susceptible to the development of later problematic use since they may already have learned to use substances to cope with difficulties in the past and in the absence of other resources turn to these pre-learned strategies in an effort to cope. The finding in the current study that the majority of pre-trauma substance users report changes in drug use such that it becomes more maladaptive supports this theory. Thus, pre-trauma drug/alcohol users may not necessarily be problematic users until after the occurrence of the trauma when, in the absence of other adaptive coping resources they find that a pre-learned strategy provides much needed relief from negative affect states and this means of coping is quickly and powerfully reinforced.

Alternatively, some researchers have put forward the proposition that substance use may increase an individual's vulnerability to development of PTSD following trauma since the induction of a hyper aroused state facilitates the expression of PTSD symptoms. Jackson, Southwick & Kosten et al. (2001) suggest that substance abuse increases vulnerability to developing PTSD in the context of higher levels of arousal and sensitisation of neurobiological stress systems which are known consequences of chronic substance use.

It is not possible within the confines of the present study to disentangle the direction of causality, since there is no prospective pre-trauma measure of substance use and the findings are reliant on retrospective self-report. It seems likely that the relationship between relative onset of initiation of substance use and the development of problematic use is a

complex one which may involve a variety of different pathways leading ultimately to substance abuse. While use of substances prior to the trauma may increase the risk of exposure to trauma in some cases, for others the onset of drug/substance use may be a consequence of experimentation following the trauma, which affords the learning experience that such substances can relieve emotionally painful states. Initially, use of substances will be reinforcing either as a consequence of the relief from negative affect states (associated with intrusion and hyperarousal symptoms) or the elicitation/encouragement of positive affect states (in presence of numbing/avoidance symptoms). As the individual becomes more dependent on the substance of choice, states of withdrawal, which may be similar to, and a trigger of, PTSD symptoms (e.g. irritability and difficulty sleeping) will elicit further substance use and increasing dependence.

A methodological flaw of the current study relates to the fact that only initial onset of drug and alcohol use is measured as opposed to onset of *problematic* use. Although an attempt was made to assess how use may have changed since the trauma, this is again based on retrospective self-report and gives no indication of whether alcohol/drug use was problematic prior to the trauma. One young person commented that, in actual fact his drug use had decreased following the trauma as he believed he would not have experienced the trauma had he not been using drugs. Understanding the function of drug and alcohol use is clearly important in guiding treatment interventions but it appears to be a complex relationship that cannot be adequately assessed in a cross-sectional study of this type. Longitudinal studies employing prospective measures of PTSD and substance use (as well as measures of individual difference factors such as coping and social support) are necessary to encourage a greater understanding of the complex associations between the variables under study.

An interesting point, relates to the assumption that drug and alcohol use is necessarily maladaptive. It is clear that if use of such substances increases the risk of exposure to trauma then efforts should be made to educate young people about such risks but given that certain types of medication may be prescribed to help with the symptoms of PTSD (Brady, 2001), it begs the question as to why substances such as alcohol, which may have similar pharmacological effects, should necessarily be considered maladaptive. Clearly, excessive use of alcohol is not only considered maladaptive in young people since the same is true for adults also. Excessive drug and alcohol use has been associated with a number of problems in emotional, psychological and psychosocial functioning (Fehon et al. (2001); Giaconia et al., 2000; Najavits et al. 1997; WHO Guidelines, 1986) and it is in the context of such difficulties that substance use is considered maladaptive and detrimental to the well-being of the affected young person. Thus, the use of substances becomes maladaptive when day-to-day functioning and emotional and psychological well-being becomes compromised.

#### **5.4 Coping and Problematic Drug/Alcohol Use**

It was hypothesised that use of negative coping strategies would significantly add to the prediction of drug and/or alcohol problems after the effects of gender, PTSD and social support had been accounted for. Unfortunately, due to the low internal consistency of the negative and positive coping strategy sub-scales, it was decided against entering these scores into the main analysis. These sub-scales had been based on a scoring method described by Berman et al. (1996), who reported an association between the frequency of use of negative coping strategies and development of PTSD symptoms. In order to validate such subscales of the Kidcope it would be necessary to carry out a factor analysis and given the small sample size of the current study this was felt to be inappropriate. Instead, the association between each of the individual strategies and each dependent variable (drug score and alcohol score) was examined. The fact that a significant negative correlation between use of cognitive re-structuring and both drug and alcohol use was found suggests that, contrary to

Berman et al's (1996) results, use of positive coping strategies may indeed be a protective factor in the development of substance use problems. Thus it *may* be that individuals who are able to change the way they think about the trauma may be less likely to use substances to help manage the distressing symptoms associated with PTSD. It could be suggested that this association is actually a reflection of a link between PTSD and substance use, though given the lack of a significant correlation between measures of PTSD and the dependent variables, this is unlikely, at least in the present study. Again, longitudinal research, employing prospective measures of coping would be necessary to disentangle the relationship between coping, PTSD and substance use further.

One of the negative coping strategies, social withdrawal, had a negative association with problematic drug use that approached significance at the 95% probability level. This suggests that increased frequency of use of social withdrawal may be associated with an increase in problematic drug use. This strategy was also associated with gender, such that females were less likely to report use of this strategy. Given that females were also less likely to report problematic drug use, this may be one factor underlying the gender difference in levels of drug use. Thus it may be that as individuals withdraw from their support network they start to rely more heavily on other means of coping with the distress associated with PTSD. However, the fact that there was a suggestion that perceived social integration might be associated with increased drug scores seems to oppose this interpretation. It may be that it is the source of perceived social support that is particularly important, though this is not assessed in the present study.

Clearly it is difficult to draw any firm conclusions based on the fact that the sample is small and there are a number of methodological flaws. With regard to the analyses carried out to test the association between individual coping strategies and the dependent variables, it is acknowledged, also, that there is a high likelihood of a Type I error occurring. Given the

high number of correlations being computed it is certainly possible that the significant association observed may have occurred by chance. Such results must therefore be treated with caution and further replication is indicated. Other methodological flaws in the current study will now be discussed in more detail.

## **5.5 Methodological Limitations**

There are a number of methodological limitations in the current study, some of which have already been alluded to. Issues relating to the composition of the sample, as well as the procedures used and the measures employed will be discussed in turn.

### **5.5.1 Recruitment**

Clearly the small sample size in the current study is a major methodological limitation. There were a number of possible reasons for the failure to reach power, some of which relate to difficulties in the recruitment of participants. Firstly, due to the fact that the researcher was unable to approach potential participants directly, it meant that there was a reliance on the interest and co-operation of therapists. A number of therapists indicated that they were unwilling to ask certain participants to take part as they felt it would be detrimental to the individual's well-being at that point in time. The majority of reasons given for not asking individuals (who clearly met the inclusion criteria) to participate related to the therapists judgement that these young people were too "chaotic" and distressed at the present time. In view of this it seems likely that many of the severely affected traumatised young people were not actually included in the study while the relatively well young people were. This may have resulted in a skewed sample and it is possible that had the less well individuals taken part, a higher level of drug and alcohol problems may have been apparent. It is acknowledged that these suggestions are speculative in nature, though clearly an important portion of the target population is under-represented. It is suggested that those who were

not given the opportunity to participate may well have been the ones with most difficulties in affect regulation and increased likelihood of self-medication.

Another issue relating to recruitment was the high refusal rate. A number of young people who were invited to participate declined to do so, and some volunteered the information that they found their traumatic experience difficult to cope with and did not want to discuss it with an unfamiliar adult. It is perhaps noteworthy that a number of young women who declined the invitation to participate had been victims of rape which is associated with high levels of both PTSD and substance use (Najavits et al., 1997). In addition a number of young people agreed to take part and then failed to turn up to their appointment. In some cases, young people who had been identified as potential participants were never given the opportunity to participate due to their poor attendance with their own therapist. This may have been a reflection of their distress and the magnitude of impaired functioning or it may have been a reflection of an improvement in their symptoms such that they no longer felt the need to maintain contact with the relevant therapist.

### 5.5.2 Sample

As mentioned already the most obvious methodological limitation of the current study relates to the small sample size. However, there are other issues relating to the composition of the sample, which are worthy of mention. Firstly, the gender split in the sample is strongly weighted towards females; only 25% of the total sample consisted of young men. One obvious effect of such an unequal gender split is that each male case exerts a greater influence than each female case and it is acknowledged that this may partially account for the observed association of male gender with drug use (which is contrary to previous findings in the literature), particularly since this association failed to reach significance (at the .05 level).

Another issue relates to the population being studied. While many of the studies in the adult literature involve samples of substance-use-disordered patients or individuals with a clinical diagnosis of PTSD, the current sample is a non-specific one. Lipschitz et al. in their studies of adolescents also studied a non-specific population but in their case the young people were actually in-patients whereas in the current study the participants were either day patients or out-patients. The level of distress within the sample in the current study may be less severe than would be observed in an in-patient sample.

Finally, it is acknowledged that, contrary to what had been expected, and what has been found in other studies (e.g. Lipschitz et al., 2000; Clark et al., 1997), there was a relatively low level of alcohol problems in the current sample, though both alcohol and illicit drug use does seem to be somewhat elevated compared with the population at large (Institute of Alcohol Studies, 2002; Department of Health & Scottish Executive, 2002).

### 5.5.3 Measures

#### 5.5.3.1 PTSD, Alcohol, and Drug Use Measures

A number of methodological limitations in the measures employed have been identified. Firstly, while the IES (the main measure of PTSD) provides a measure of current PTSD symptoms, the measures of alcohol and drug use, the AAIS and DAST-A, provide a measure of lifetime problematic use. This may go some way towards accounting for the lack of an expected association between levels of PTSD symptomatology and problematic drug and alcohol use. The finding of relatively low internal consistency (alpha co-efficient of  $<.75$ ) for the AAIS in the current study also calls into question the validity of this measure in this population. Previous studies using this measure have been carried out with populations of North American teenagers and it may be that due to cultural differences, this is not a suitable measure for identifying problematic substance use in the population of interest in the current study.

### 5.5.3.2 *Coping*

The extremely low alpha co-efficients for the subscales of the Kidcope (derived by Berman et al. 1996) are also indicative of a lack of internal consistency and, perhaps calls into question Berman et al.'s scoring method. Although, Berman et al.'s grouping of coping strategies into positive and negative styles has face validity, it is suggested that a need for further validation of the Kidcope, to ascertain its utility as a measure of coping in Scottish adolescents, is perhaps warranted. The grouping of strategies into "styles" of coping also may run contrary to Lazarus & Folkman's conceptualisation of coping as a fluid construct, the nature of which is specific to the stressor being experienced and the adequacy of the available resources at that particular point in time.

### 5.5.3.3 *Functional Relatedness of Substance Use and PTSD*

Another limitation relates to the measures of perceived functional connectedness. In the current study, participants are asked only what they expect to happen to their drug/alcohol use when PTSD symptoms increase, they are not asked what would happen to PTSD symptoms if alcohol/drug use were to increase. In addition, they are not asked specifically about the perceived relationship between PTSD symptoms and drug/alcohol use but rather "the effects of the traumatic experience"; it is perhaps unwise to assume that young people will refer to PTSD symptomatology when answering this question since they may in actual fact be thinking of effects other than core PTSD symptoms. One young person, for example, reported that he had to move house following his trauma and thus had to cope with the stress associated with moving house, meeting new people and making new peer relationships at a time when he was already vulnerable. One reason for asking the question in this way however, related to an awareness that not all participants would actually suffer from PTSD or indeed be aware of the symptoms associated with the disorder which might make answering the question difficult.

#### *5.5.3.4 Reliance on Retrospective Self-report*

Another limitation relates to the fact that the current study relies solely on self-report measures of assessment and no corroborative reports are available. Sole use of self-report is often criticised but in the present study it is suggested that the individual alone, will have the most insight into his/her drug/alcohol use and parental reports may yield less information since parents are not always aware of the existence or the extent of their child's substance use. In support of using self-report, some studies have found that adults (including parents and teachers) can greatly underestimate the level of distress, which is experienced by a child with a history of trauma (e.g. McFarlane et al. 1987; Yule & Williams, 1990, cited in Curle & Williams, 1996). In addition, Lipschitz et al. (2000), propose that self-report measures are extremely useful in obtaining information from adolescents, particularly when the areas under assessment are sensitive in nature. They suggest that use of self-report rather than face-to-face interview relieves some of the distress and embarrassment that might otherwise become intolerable for a youngster who may be struggling with emotion regulation.

A final limitation relating to the measures used concerns the reliance on retrospective measures of coping, drug use and alcohol use. Retrospective reports may be subject to distortion and details may be forgotten if the trauma happened in the quite distant past or at a young age. A number of researchers (e.g. Giaconia et al. 2000; Stewart, 1996) have pointed out, however, that the exploration of substance use and trauma in adolescent populations may be less hampered by this limitation than comparable adult studies. It is posited that in the case of adolescents, the trauma experience(s) may well have occurred in the more recent past and may, therefore, be subject to less distortion compared with adult populations where the trauma being recalled may have occurred many years ago.

## 5.6 Clinical Implications

### 5.6.1 High Levels of PTSD and Substance Use and the Need for Adequate Assessment

One issue, which is highlighted in the present study, is the relatively high level of PTSD symptomatology in a sample of young people who, though currently attending a psychiatric unit for assessment, are not necessarily being seen specifically for problems relating to trauma exposure. Just over fifty percent of the sample scored >40 on the IES, which was taken to indicate the presence of probable PTSD, and it has been suggested that it is likely that these young people may have been less distressed than those who elected not to participate or were deselected by their therapist. In addition, all twenty participants reported some level of alcohol use (though only two reached the cut-off indicative of problematic use), and while 50 percent of the total sample admitted to using illicit drugs, 60 percent of these individuals reached the cut-off for problematic use.

This perhaps highlights a need to carefully assess substance use in all young people who attend out-patient psychiatric clinics, particularly given the strong association between PTSD and problematic substance use, which has been found elsewhere in the literature. Comorbid PTSD and substance abuse has been found to be associated with a wide range of other related problems including poor health, increased emotional and psychological problems, interpersonal and family relationship problems, involvement in criminal activity, financial difficulties and overall poorer functioning (Fehon et al., 2001; Giaconia et al., 2000; Najavits et al, 1997; WHO, 1986;). Thus, early identification of individuals at risk of developing this comorbidity, may facilitate prevention efforts and enable a lessening of the potential for development of drug and alcohol problems.

It is acknowledged that by the time many youngsters come to the attention of clinical services, they may already have become entrenched in a maladaptive style of coping, which incorporates problematic drug and/or alcohol use. The importance of assessing for possible PTSD and substance use is important in order to facilitate successful engagement and

progress in ongoing therapy. If individuals are self-medicating with illicit drugs and alcohol to help control distressing PTSD symptoms, then this in itself may interfere with ongoing therapy whether it is focussed on PTSD or not. If a young person is engaging in problematic substance use, he/she will have to cope with increasing withdrawal symptoms, which will encourage further self-medication, and he/she may also have to cope with associated impairments in emotional, psychological and psychosocial functioning. This has the potential to make attendance increasingly erratic and an in-depth understanding of the nature of each individual's difficulties must be formulated in order to facilitate successful outcome.

### **5.6.2 Poor Treatment Outcome**

A number of studies have shown that co-occurring PTSD and substance use problems is associated with poorer treatment outcome and increased risk of relapse compared with either disorder alone (Najavits et al. 1997; Brown & Wolfe, 1994; Najavits et al. 1998; Grice et al. 1995). Treatment programs have traditionally been devised to treat one or other problem but not the two in combination. This causes problems since there are aspects of the treatment for one disorder that may have adverse effects on the other disorder. In the case of treatment of PTSD for example, evidence based treatments such as graded exposure may increase relapse of substance use as the individual struggles to cope with the high levels of PTSD symptoms and associated distress which are elicited in such treatments. Similarly, some of the traditional pharmacological treatments for PTSD, including benzodiazepines and monoamine oxidase inhibitors, may be problematic for the PTSD sufferer who is vulnerable to addiction (Brady, 2001). In the case of traditional "12-step" groups, which have been found to be effective in the treatment of a variety of substance use disorders, certain aspects of the treatment philosophy (e.g. sharing ones story) may be inappropriate and indeed detrimental for the trauma victim. Given the high levels of substance use, which have been documented in the current study, a greater understanding of the function of this

behaviour would be beneficial in designing appropriate treatment programs. The consistency with which an association between substance use and PTSD symptoms has been reported in the literature suggests that the lack of an association in the present study may be due to low power and methodological limitations. Thus, the need to better current understanding of the nature and function of this association in order to guide treatment planning and delivery is felt to be worthy of further research.

### **5.6.3 Coping and Social Support**

The finding that cognitive restructuring (a problem-focussed coping strategy) was associated with decreased levels of drug problems may be taken as an indication that treatment programs which facilitate the development of such strategies may be beneficial in the treatment of co-occurring PTSD and problematic substance use. Similarly the finding of an association (approaching significance) between social withdrawal (an avoidance strategy) and increased problematic drug use also supports this assertion. The fact that social withdrawal may be associated with increased levels of problematic use, may also argue for the use of group programs in which the development of adaptive coping strategies is facilitated through the provision of an accepting, supportive environment. Such group experiences may also help to reduce the feelings of isolation, and reduce a possible tendency towards social withdrawal, depression and stigmatisation, which are commonly associated with co-morbid PTSD and substance misuse (Najavits et al, 1997).

### **5.6.4 Prevention**

Another area of importance is that of prevention. Front-line health and social care professionals such as those working in health centres, voluntary agencies and schools may be in an ideal position to educate young people about the dangers associated with excessive drug and alcohol use, particularly in the context of traumatisation. Teachers, General Practitioners, social workers and community mental health workers, for example, should be

encouraged to identify the early signs of comorbidity, prior to the development of full blown comorbidity, to help facilitate early identification of at-risk children and prevent potential exacerbation of emotional and psychological distress.

## **5.7 Conclusions and Recommendations for Further Research**

The conclusions, which can be drawn from the current study, are somewhat limited in scope, given the small sample size, methodological limitations and associated low statistical power. However, the finding that quite a substantial proportion of the sample report relatively high levels of PTSD symptomatology as well as use of illicit drugs and alcohol (though alcohol use is not considered problematic in the majority of cases), suggests that further research with larger sample sizes and age-matched control groups may be warranted.

The existence of a link between PTSD and problematic drug and alcohol use is one, which has found widespread support in the literature both in adult and adolescent populations and clinical and non-clinical. This association was not found to be significant in the present study, though, there is reason to believe that this may be partially attributable to a number of methodological flaws. With reservation, it is suggested that there may well be a gender difference in the link between PTSD and substance use though in contrast to other studies, it appears that it is the male gender which is more susceptible to developing drug and alcohol problems than the female gender. This requires further investigation and replication.

To a certain extent, the frequency of use of particular types of coping strategy has been shown to be associated with substance use, though it was not possible in the present study to examine the role of coping as a potential moderator of the association between drug/alcohol use and PTSD. The need for further studies involving large samples with appropriate power and well-validated measures of coping are indicated.

Although perceived social support was not found to be a significant predictor of substance use in the current study it is again, proposed that a need for further research is indicated, since the presence of relatively high levels of perceived social support has been associated, in the literature, with decreased levels of both PTSD and problematic substance use. No study has as yet, however, adequately assessed the role of social support in the context of co-occurring PTSD and substance misuse. Future research could perhaps also consider the source of social support since there is some indication in the literature that while support from the family may protect against substance misuse problems and development of PTSD, support from peers may be associated with increased levels of substance use (Springer & Padgett, 1996).

Some limited evidence for the self-medication hypothesis was found in the form of the observation that individuals with higher alcohol scores were more likely to perceive an association between the effects of their trauma exposure and their alcohol use. Further research is required to promote a greater understanding of the pattern of drug and alcohol use and the interplay between PTSD symptoms and associated levels of substance use. Carrying out a functional analysis, and perhaps asking participants to keep diaries of both PTSD symptoms and levels of substance use may be useful in the assessment of the function of substance use, though this may be difficult to implement in practice particularly in an adolescent population.

Research involving prospective measures of both current and lifetime PTSD and substance use are indicated and there is perhaps also a need to use measures that have been validated with an appropriate population. This may reduce the possible confounding effect of cultural differences, which are a reflection of differences between the population being sampled and the population on which the measure was originally validated. In addition, close examination of the pharmacological effects of the use of specific classes of illicit drugs, as

opposed to grouping all types of drugs together in one category, is warranted since this will facilitate exploration of psychopharmacological specificity. Finally, longitudinal studies are required to assess more adequately, the temporal sequence of trauma exposure, development of PTSD, and both initiation of drug and alcohol use, and development of problematic drug and alcohol use.

It is suggested that adolescence is a crucial time to study the complex relationship between PTSD and substance use, since it is during the teenage years that much experimentation with drugs and alcohol is carried out as young people go through the secondary individuation process, forming strong bonds with peers of both sexes and forming a coherent sense of self and identity. Drug and alcohol problems may have the effect of isolating a traumatised young person, who is already struggling to cope with the shattering of their internal assumptions of themselves and the world, from his/her family and/or friends, who neither appreciate nor understand the young person's behaviour. Problematic substance use may also cause difficulties at school and/or work and have a negative impact on emotional, psychological and psychosocial functioning. In the absence of other resources or, as these resources fall away as a consequence of escalating substance use, reliance on drugs and alcohol may be increased.

In many ways the current study may be viewed as a pilot study, investigating the existence of an association between PTSD and problematic substance use in a clinical sample of Scottish adolescents with non-specific mental health problems. The failure to find a significant association is perhaps surprising, given the consistency with which this has been reported in previous studies with both adult and adolescent, clinical and community samples. A number of methodological limitations have, however, been identified which serve to limit the power of the study and restrict the generalisability of the results. Further investigations into the extent of comorbid substance use problems and PTSD in similar

samples should take into account the limitations and suggestions for future research which have been highlighted in the present study.

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# Appendix 1

## **DSM -IV Criteria for Posttraumatic Stress Disorder (PTSD) (American Psychiatric Association, 1994)**

## Diagnostic Criteria for Posttraumatic Stress Disorder

- A. The person has been exposed to a traumatic event in which both of the following were present:
- (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
  - (2) The person's response involved intense fear, helplessness or horror.
- Note: In children, this may be expressed instead by disorganised or agitated behaviour.
- B. The traumatic event is persistently re-experienced in one (or more) of the following ways:
- (1) Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
  - (2) Recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognisable content.
  - (3) Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). Note: In young children, trauma-specific re-enactment may occur.
  - (4) Intense psychological distress at exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.
  - (5) Physiological reactivity on exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.
- C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
- (1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma.
  - (2) Efforts to avoid activities, places, or people that arouse recollections of the trauma.
  - (3) Inability to recall an important aspect of the trauma.
  - (4) Markedly diminished interest or participation in significant activities.
  - (5) Feeling of detachment or estrangement from others.
  - (6) Restricted range of affect (e.g. unable to have loving feelings).
  - (7) Sense of a foreshortened future (e.g. does not expect to have a career, marriage, children, or a normal life span).

- D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
- (1) Difficulty falling or staying asleep.
  - (2) Irritability or outbursts of anger.
  - (3) Difficulty concentrating.
  - (4) Hypervigilance.
  - (5) Exaggerated startle response.
- E. Duration of the disturbance (symptoms in Criteria B, C and D is more than one month.
- F. The disturbance causes clinically significant distress or impairment in social, occupational or other important areas of functioning.

## **Appendix 2**

### **Information Sheets**

- (i) Therapist Information Sheet
- (ii) Participant Information Sheets
- (iii) Parent Information Sheet

# THERAPIST INFORMATION SHEET

## Project Title

Coping with the effects of exposure to trauma; exploring the link between posttraumatic stress symptoms and problematic substance use in adolescents.

## Introduction

In recent years, there have been a number of studies mainly carried out in North America, which suggest that there is a strong link between substance use/abuse and Posttraumatic stress disorder (e.g. Lipschitz et al., 2000). It has been suggested that the co-occurrence of these two problems is associated with greater impairment and poorer treatment outcome than would be expected with one or other difficulty alone (Giaconia et al., 2000). Despite the apparent gravity of the consequences of this co-occurrence, there is a relative dearth of similar research in the UK. Authors such as Stewart (1996) and Najavits et al. (1997) highlight the need for further research in this field and emphasise the need to move towards investigating the functional nature of the association between PTSD symptomatology and substance use.

## Aims and Objectives

The main aims of the study are as follows:

- To replicate the finding of an association between PTSD symptomatology and problematic drug and alcohol use, in a sample of young people in Scotland.
- To examine possible gender differences in this association.
- To investigate the possible moderating effects of coping, perceived social support and social strain on the development of PTSD symptoms and substance use problems.
- To test the self-medicating hypothesis, which posits that an individual, suffering from PTSD, develops problematic substance use in an attempt to manage or control the distressing symptoms associated with this disorder.

## Method

The principal researcher and the relevant therapist will identify potential participants. These young people will first be given information about the study by their therapist. They will be asked to consider whether or not they would like to take part and then, at their next appointment they will be invited to participate, again by their own therapist. The purpose of having each individual therapist rather than the principal researcher, approach each young person, is to avoid the individual feeling under pressure to participate. It will be made clear that the young person is under no obligation to take part and that participation will not affect their current or future treatment. In the case of young people under 16 years of age, consent to participate will be obtained from both the young person him/herself as well as a parent or guardian.

The following inclusion and exclusion criteria are in place:

*Inclusion Criteria:* Participants have been exposed to a trauma or series of traumas recognised as such in DSM-IV.  
Participants will be aged 14-18.

Participants will be attending the Young People' Unit for assessment and/or treatment.

*Exclusion Criteria:* Participants will be excluded from this study if they have suffered a brain injury.  
Participants will be excluded from this study they have or are suspected to have a learning disability.

Participants will be asked to complete 5 self-report questionnaires as well as take part in a short, semi-structured interview to explore the nature of substance use if applicable. The following measure will be administered:

1. Assessment of PTSD: Impact of Events Scale (Horowitz et al., 1979) and 6 extra items measuring hyperarousal.
2. Assessment of drug use: Drug Abuse Screening Test for Adolescents (Martino, Grilo & Fehon, 2000).
3. Assessment of alcohol use: Adolescent Alcohol Involvement Scale (Mayer & Filstead, 1979).
4. Assessment of Coping: Kidcope (Spirito, Stark and Williams, 1988).
5. Assessment of Social Support and Social Strain: Questionnaire for Social support (Fydrich and Sommer, 1987).
6. Assessment of self-medication: if applicable, a short interview will be carried out to obtain information about the function of a participant's substance use.

If you have any queries, please contact Elaine Sinclair, Trainee Clinical Psychologist at the Young People's Unit. She is on placement at the YPU on Wednesday, Thursday and Friday. At other times please leave a message in the Psychology students' pigeon hole and she will get back to you as soon as possible.

The study is being supervised by:

Matthias Schwannauer, Chartered Clinical Psychologist, Young People's Unit, Royal Edinburgh Hospital, Tipperlinn Road, Edinburgh, EH10 5HF (Clinical Supervisor).

Dr Suzanne O'Rourke, Lecturer in Clinical Psychology, University of Edinburgh, Department of Psychiatry, Kennedy Tower, Royal Edinburgh Hospital (Academic Supervisor).

## **Participant Information Sheet: Coping with the Effects of Trauma**

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

### **What is the purpose of the study?**

When people are exposed to a life-threatening or extremely stressful event it is likely that they will experience a great deal of distress and upset and this may affect their lives in many different ways. This study is being carried out to look in detail at how young people cope when these types of experiences happen to them. Previous research has shown that people who have experienced traumatic events are more likely to use a variety of different substances including drugs and alcohol and sometimes the use of such substances can make taking part in therapy difficult. It is hoped that this study will increase our understanding of the difficulties, which are faced by young people who had traumatic experiences.

### **What will I have to do?**

If you decide to take part, you will be asked to complete 5 questionnaires. The first will ask about the effects that your trauma has had on you, the second will ask about the ways in which you tried to cope with your experience, the third will ask about any support you may have received from other people and the last two ask about alcohol and drug use. Finally you will be asked a little bit more about some of the answers you gave in your questionnaires to help us to fully understand your views and experiences. It will take around half an hour to complete.

### **Why have I been asked to take part?**

The research project is taking place between March and July 2002. All young people aged 14-18, who are attending appointments at the Young People's Unit and have had a traumatic experience will be asked to consider participating. We would like to emphasise that participation in this study is entirely voluntary. If you decide not to take part, this will not affect your treatment here in any way. If you do decide to take part, you will always have the right to withdraw at any time and this will not influence your treatment in any way.

**Will my participation be kept confidential?**

All the information collected, as part of the research will be kept strictly confidential. Any information will have your name removed from it so that you cannot be recognised from it. If participation in the study raises any issues for you, the researcher will be happy to discuss them with you and, with your consent share any concerns with your therapist.

**Who is organising the Research?**

The research is being carried out by Elaine Sinclair (Trainee Clinical Psychologist) as part of the Edinburgh University Clinical Psychology training course requirements. She is being supervised by Matthias Schwannauer (Clinical Psychologist) at the Young People's Unit. This study has been reviewed by the relevant research ethics committee in Lothian.

**Local Independent Advisor**

If required, you can contact Ken Laidlaw, Lecturer in Clinical Psychology, as an independent advisor, to discuss any questions you may have about the research. He can be contacted at the following address: Ken Laidlaw, Lecturer in Clinical Psychology, Kennedy Tower, Royal Edinburgh Hospital, Morningside, Edinburgh Tel: 0131 537 6277

*Thank you for reading this and your consideration*

## Parent Information Sheet: Coping with the Effects of Trauma

Your child is being invited to take part in a research study. It is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with your child. Ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to allow your child to take part. Thank you for reading this.

**What is the purpose of the study?** When people are exposed to a life-threatening or extremely stressful event it is likely that they will experience a great deal of distress and upset and this may affect their lives in many different ways. This study is being carried out to look in detail at how young people cope when these types of experiences happen to them. Previous research has shown that people who have experienced traumatic events are more likely to use a variety of different substances including drugs and alcohol and sometimes the use of such substances can make taking part in therapy difficult. It is hoped that this study will increase our understanding of the difficulties, which are faced by young people as they struggle to cope with trauma.

**What will your child have to do?** If your child wishes to participate, and if you give your consent for him/her to do so, he/she will be asked to complete 5 questionnaires. The first will ask about the effects that the trauma has had, the second will ask about the strategies which were used in an attempt to cope with the experience, the third will ask about any support which was received from other people and the last two ask about alcohol and drug use. Finally a little bit more will be asked about some of the answers given in the questionnaires, to help us to fully understand your child's views and experiences. It will take around half an hour to complete.

**Why has my child been asked to take part?** The research project is taking place between March and July 2002. All young people aged 14-18, who are attending appointments at the Young People's Unit and have had a traumatic experience will be asked to consider participating. We would like to emphasise that participation in this study is entirely voluntary. If you would prefer your child not to take part or if your child decides not to participate, this will not affect his/her treatment here in any way. Your child will always

have the right to withdraw at any time and, again, this will not influence current or future treatment in any way.

**Will my child's participation be kept confidential?** All the information collected, as part of the research will be kept strictly confidential. Any information will have your child's name removed from it so that he/she cannot be recognised from it. If participation in the study raises any issues for your child, the researcher will be happy to discuss them with your child and, with consent, share any concerns with your child's therapist.

**Who is organising the Research?** The research is being carried out by Elaine Sinclair (Trainee Clinical Psychologist) as part of the Edinburgh University Clinical Psychology training course requirements. She is being supervised by Matthias Schwannauer (Clinical Psychologist) at the Young People's Unit. This study has been reviewed by the relevant research ethics committee in Lothian.

**Local Independent Advisor** If required, you can contact Ken Laidlaw, Lecturer in Clinical Psychology, as an independent advisor, to discuss any questions you may have about the research. He can be contacted at the following address: Ken Laidlaw, Lecturer in Clinical Psychology, Kennedy Tower, Royal Edinburgh Hospital, Morningside, Edinburgh, Tel: 0131 537 6277

*Thank you for reading this and your consideration*

## **Appendix 3**

### **Consent Forms**

- (i) Participant Consent Form
- (ii) Parent Consent Form (for parents of all young Persons under 16 years of age)

(Form to be on headed paper)

Centre Number:           :  
Study Number:  
Patient Identification Number for this trial:

## CONSENT FORM

**Title of Project:**           **Coping with the effects of exposure to trauma**

Name of Researcher:           Elaine Sinclair  
  Trainee Clinical Psychologist  
  Young People's Unit  
  Royal Edinburgh Hospital  
  Tipperlinn Road  
  Edinburgh  
  EH10 5HF  
  TEL: 0131 537 6364

**Please initial box**

1. I confirm that I have read and understand the information sheet dated .....   
(version .....) for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I understand that any information, disclosed during the course of the research, which is deemed important for my continuing care will be shared with my therapist
4. I agree to take part in the above study.

\_\_\_\_\_  
Name of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

(Form to be on headed paper)

Centre Number:                   :  
Study Number:  
Patient Identification Number for this trial:

## CONSENT FORM

**Title of Project:**                   **Coping with the effects of exposure to trauma**

Name of Researcher:                   Elaine Sinclair  
Trainee Clinical Psychologist  
Young People's Unit  
Royal Edinburgh Hospital  
Tipperlinn Road  
Edinburgh  
EH10 5HF  
TEL: 0131 537 6364

Please initial box

1. I confirm that I have read and understand the information sheet dated .....  
(version .....) for the above study and have had the opportunity to ask  
questions.
  
2. I understand that my child's participation is voluntary and that he/she  
is free to withdraw at any time, without giving any reason, without  
his/her medical care or legal rights being affected.
  
3. I understand that any information, disclosed during the course of the  
research, which is deemed important for my child's continuing care will  
be shared with my child's therapist.
  
4. I agree to allow my child to take part in the above study, should he/she  
wish to do so.

<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Name of Parent</p>	<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Date</p>	<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Signature</p>
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Researcher</p>	<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Date</p>	<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> <p>Signature</p>

## Appendix 4

### Self -report Questionnaires

- (i) Kidcope (Spirito, Stark & Williams, 1988)
- (ii) Impact of Event Scale (Horowitz, Wilner & Alvarez, 1979)
- (iii) Davidson Trauma Scale (Davidson, Book & Colket et al., 1997)
- (iv) Social Support Questionnaire (Sommer & Fydrich, 1991)
- (v) The Adolescent Alcohol Involvement Scale (Mayer & Filstead, 1979)
- (vi) Drug Abuse Screening Test - Adolescents (Martino, Grilo & Fehon, 2000)



Instructions: Please read each item and circle a phrase that *applies* (if any).  
Next, answer the question to the right of each *selected* item and circle the *best* answer.

	How often did you do this?			
	Not at all	Some-times	A lot of the time	Almost all the time
1. I thought about something else; tried to forget it; and/or went and did something like watch the telly or play games to get it out of my mind.	0	1	2	3
2. I stayed away from people; kept my feelings to myself; and handled that time on my own.	0	1	2	3
3. I tried to see the good side of things and/or concentrated on something good that could come out of it.	0	1	2	3
4. I realised I brought the problem on myself and blamed myself for causing it.	0	1	2	3
5. I realised that someone else caused the problem and blamed them for making me go through this.	0	1	2	3
6. I thought of ways to solve the problem; talked to others to get more facts and information about the problem and/or tried to solve the problem.	0	1	2	3
7a. I talked about how I was feeling; shouted, screamed or hit something.	0	1	2	3
7b. I tried to calm down by talking to myself, going for a walk and/or I just relaxed.	0	1	2	3
8. I kept thinking and wishing that this had never happened; and/or that I could change what had happened.	0	1	2	3
9. I turned to my family, other adults or friends to help me feel better.	0	1	2	3
10. I just accepted the problem because I knew I couldn't do anything about it.	0	1	2	3

## IMPACT OF EVENT SCALE

(Horowitz et al., 1979)

On..... you experienced.....  
 (date) (life event)

Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you DURING THE PAST SEVEN DAYS. If they did not occur during that time, please mark the "not at all" column.

### FREQUENCY

	Not at All	Rarely	Sometimes	Often
1. I thought about it when I didn't mean to.				
2. I avoided letting myself get upset when I thought about it or was reminded of it.				
3. I tried to remove it from my memory.				
4. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I stayed away from reminders of it.				
8. I felt as if it hadn't happened or it wasn't real.				
9. I tried not to talk about it.				
10. Pictures about it popped into my mind.				
11. Other things kept making me think about it.				
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.				
13. I tried not to think about it.				
14. Any reminder brought back feelings about it.				
15. My feelings about it were kind of numb.				

**Below to be completed by therapist:**

Intrusion subset = 1, 4, 5, 6, 10, 11, 14.      Avoidance subset = 2, 3, 7, 8, 9, 12, 13, 15.

Total = \_\_\_\_\_

Total = \_\_\_\_\_

Overall Total = \_\_\_\_\_

DAVIDSON TRAUMA SCALE (ABBREVIATED)

(Davidson et al., 1997)

Please read each of the following statements and then rate them on a scale of 0-4 according to how **frequently**, if at all, you experienced this OVER THE PAST SEVEN DAYS. A score of 1 would indicate that you do not experience this at all while a score of 4 would indicate that it has been present at all times.

	<b>Completely Absent</b>				<b>Present at all times</b>
1. Have you had trouble falling asleep or staying asleep?.....	0	1	2	3	4
2. Have you been irritable or had outbursts of anger?.....	0	1	2	3	4
3. Have you had difficulty concentrating?.....	0	1	2	3	4
4. Have you felt on edge, been easily distracted or had to stay on guard?.....	0	1	2	3	4
5. Have you been jumpy or easily startled?.....	0	1	2	3	4
6. Have you been physically upset by reminders of the event?.....	0	1	2	3	4

Participant No:

Date:

**Instructions:** This questionnaire is about your relationships towards significant people in general, e.g. to your spouse, your family, friends and acquaintances, colleagues and neighbours. We want to find out how you experience and appreciate these relationships.

Below are a number of statements. Beside each statement is a scale from 0 to 4. 0 means "not at all". 4 means "exactly right".

Please circle one number next to each statement, expressing how appropriate it is.

"People" in the statements mean people who are important for you.

		Not at all			Exactly right	
1.	I have people, who look after my flat (plants pets), while I am away.....	0	1	2	3	4
2.	There are people who accept me as I am .....	0	1	2	3	4
3.	It is important for my friend/acquaintances to hear my opinion on certain things.....	0	1	2	3	4
4.	Some of my friends/acquaintances exploit my helpfulness.....	0	1	2	3	4
5.	I feel that important people reject me.....	0	1	2	3	4
6.	If in need I can borrow some tools or food .....	0	1	2	3	4
7.	There are many situations when people ask me for practical help (e.g. to run errands, to lend them something.....	0	1	2	3	4
8.	Most people I know get on better with their acquaintances than I do.....	0	1	2	3	4
9.	Many of my friends/relatives have a similar attitude to life as I have.....	0	1	2	3	4
10.	If I suddenly need to get into a nearby town (up to 15 miles), I know immediately who to ask to take me .....	0	1	2	3	4
11.	I could live much more freely if I didn't always have to think about my family/friends.....	0	1	2	3	4
12.	I have friends/relatives who listen when I need to get something off my chest.....	0	1	2	3	4
13.	I hardly know anybody who I would like to go out with.....	0	1	2	3	4
14.	Sometimes I feel much better after a conversation.....	0	1	2	3	4

Participant No:

Date:

		Not at all			Exactly right	
15.	I have friends/relatives who sometimes give me a hug.....	0	1	2	3	4
16.	Sometimes when I'm under stress tasks are taken off my hands.....	0	1	2	3	4
17.	I need more people to do things with.....	0	1	2	3	4
18.	Sometimes I feel everybody has something to criticise about me.....	0	1	2	3	4
19.	If I'm ill I can easily ask friends/relatives to do important chores (e.g. shopping for me).....	0	1	2	3	4
20.	When I am really feeling down I know where to turn.....	0	1	2	3	4
21.	I have someone I also get on with sexually.....	0	1	2	3	4
22.	Often I bump into acquaintances who I feel easy about having a chat with.....	0	1	2	3	4
23.	I wish people didn't keep nagging me all the time.....	0	1	2	3	4
24.	I often feel like an outsider.....	0	1	2	3	4
25.	I can ask my friends/acquaintances to help me filling in forms.....	0	1	2	3	4
26.	There are people with whom I can share good and bad times.....	0	1	2	3	4
27.	With some friends/relatives I can really be at ease.....	0	1	2	3	4
28.	I feel my life is restricted by friends/relatives.....	0	1	2	3	4
29.	There is a person with whom I can confide with over personal trouble.....	0	1	2	3	4
30.	I wish others would give me more sympathy and affection.....	0	1	2	3	4
31.	I have enough people who help me if I get stuck.....	0	1	2	3	4
32.	I know people with whom I could stay temporarily.....	0	1	2	3	4
33.	I am often asked for advice.....	0	1	2	3	4
34.	I wish more security and closeness for myself.....	0	1	2	3	4
35.	Often I think my friends/relatives expect too much of me.....	0	1	2	3	4

Participant No:

Date:

		Not at all			Exactly right	
36.	There are people who stand by me even when I make mistakes.....	0	1	2	3	4
37.	With my interests and hobbies I am all on my own.....	0	1	2	3	4
38.	My friends/relatives don't take my feelings seriously .....	0	1	2	3	4
39.	There are people who always make me feel guilty .....	0	1	2	3	4
40.	I have a very good relationship with enough people.....	0	1	2	3	4
41.	There is nobody I can speak to about very intimate things .....	0	1	2	3	4
42.	I have a confidant who is readily accessible to me .....	0	1	2	3	4
43.	There is a group of people (circle of friends) I feel part of .....	0	1	2	3	4
44.	I have a close confidant on whose help I can always rely....	0	1	2	3	4
45.	I would like more help and practical support.....	0	1	2	3	4
46.	My friends/relatives can't understand that I also need time to myself .....	0	1	2	3	4
47.	There are people who are really happy in my company .....	0	1	2	3	4
48.	Through my circle of friend I get good advice and recommendation (e.g. a good GP, things going on).....	0	1	2	3	4
49.	There are people who turn to me with their personal problems.....	0	1	2	3	4
50.	I don't know enough people who I can ask for advice when I have problems.....	0	1	2	3	4
51.	There are people to whom I can express all my feelings without feeling embarrassed .....	0	1	2	3	4
52.	Often I wish to stay somewhere that nobody knows me.....	0	1	2	3	4
53.	I have a confidant with whom I feel very comfortable .....	0	1	2	3	4
54.	Important people try to control my thoughts and actions...	0	1	2	3	4

Participant No:

Date:

## AAIS

*The following questions ask about your use of alcohol. Each question has between 5 and 8 responses to choose from. Please underline the response that comes closest to your own experience.*

**1. How often do you drink?**

- a. Never
- b. once or twice a year
- c. once or twice a month
- d. every weekend
- e. several times a week
- f. every day

**2. When did you have your last drink?**

- a. never drank
- b. not for over a year
- c. between six months and one year ago
- d. several weeks ago
- e. last week
- f. yesterday
- g. today

**3. I usually start to drink because:**

- a. I like the taste
- b. To be like my friends
- c. To feel like an adult
- d. I feel nervous, tense, full of worries or problems
- e. I feel sad, lonely, sorry for myself

**4. What do you drink?**

- a. Wine
- b. Beer
- c. mixed drinks
- d. hard liquor
- e. a substitute for alcohol - paint thinner, sterno, cough medicine, mouthwash, hair tonic, etc.

**5. How do you get your drinks?**

- a. supervised by parents or relatives
- b. from brothers or sisters
- c. from home without parents' knowledge
- d. from friends
- e. buy it with false identification

**6. When did you take your first drink?**

- a. Never
- b. Recently
- c. after age 15
- d. at ages 14 or 15
- e. between ages 10-13
- f. before age 10

**7. What time of day do you usually drink?**

- a. with meals
- b. at night
- c. afternoons
- d. mostly in the morning or when I first awake
- e. I often get up during my sleep and drink

Participant Number:

Date:

## DAST-A

The following questions ask you for information about your drug use and can be answered either 'yes' or 'no'. Please draw a circle round your answer to each question.

- |  |     |    |
|--|-----|----|
| 1. Have you used drugs other than needed for medical reasons?  | Yes | No |
| 2. Have you abused prescription drugs?   | Yes | No |
| 3. Do you abuse more than one drug at a time?  | Yes | No |
| 4. Can you get through the week without using drugs (other than those required for medical reasons?) | Yes | No |
| 5. Can you get through the month without using drugs (other than those required for medical reasons) | Yes | No |
| 6. Are you always able to stop using drugs when you want to?   | Yes | No |
| 7. Do you abuse drugs more than once a week?   | Yes | No |
| 8. Have you had "blackouts" or "flashbacks" as a result of drug use?                                 | Yes | No |
| 9. Do you ever feel bad about your drug abuse?   | Yes | No |
| 10. Does your boyfriend/girlfriend (or parents) ever complain about you using drugs?                 | Yes | No |
| 11. Do your friends or family know or suspect you abuse drugs?                                       | Yes | No |
| 12. Has drug abuse ever created problems between you and your boyfriend/girlfriend?                  | Yes | No |
| 13. Has any family member ever gone for help for problems relating to your drug use?                 | Yes | No |
| 14. Have you ever lost friends because of your use of drugs?   | Yes | No |
| 15. Have you ever avoided your family or missed school or work because of drug abuse?                | Yes | No |
| 16. Have you ever been in trouble at school or work because of drug abuse?                           | Yes | No |
| 17. Have you ever been kicked out of school or lost a job because of drug abuse?                     | Yes | No |

## **Appendix 5**

### **Structured Interview Questions**

- (i) Drug Use
- (ii) Alcohol Use
- (iii) Visual Analogue Scales

## Structured Interview: Drug and Alcohol Use

The following questions should only be asked of those participants who have indicated that they do take drugs and / or drink alcohol.

### Section A: Drug Use

1. What types of drug do you usually take (list all)?
2. How often do you take drugs?  
1 = every day  
2 = several times a week  
3 = every weekend  
4 = once or twice a month  
5 = once or twice a year
3. To what degree do you think your drug use is related to the effects of your traumatic experience/experiences? Rate the degree on a scale of 0-10 where 0 = they are not related in any way and 10 = they are very much related (Present participant with a visual analogue scale to aid them in answering this question).
4. Refer back to the symptoms endorsed on the Impact of Events Scale (IES) when asking the following questions. Where there is a \* insert examples of the participants OWN symptoms (i.e. those endorsed on the IES).

If your intrusions\* get worse, what happens to your drug use?

Does it:           Increase  
                      Decrease  
                      Stay the same

If your avoidance\* get worse, what happens to your drug use?

Does it:           Increase  
                      Decrease  
                      Stay the same

If your arousal symptoms get worse, what happens to your drug use?

Does it:           Increase  
                      Decrease  
                      Stay the same

### Onset of drug use

5. When did you start taking drugs?
6. Was this before or after your trauma/the onset of your traumatic experiences?
7. Do you take drugs:       More often than before the trauma  
                                  As often as before the trauma  
                                  Less often than before the trauma



**Onset of alcohol use**

5. When did you start drinking alcohol?
6. Was this before or after your trauma/the onset of your traumatic experiences?
7. Do you drink alcohol:   More often than before the trauma  
                                  As often as before the trauma  
                                  Less often than before the trauma
8. Has the amount you drink:   Increased since the trauma  
                                      Decreased since the trauma  
                                      Stayed the same
9. Thinking about the different types of drink, which you take.  
Do you:           Use a greater number of different **types** of alcoholic drink compared  
                          with before the trauma  
                          Use the same number of different **types** of alcoholic drinks as you  
                          did before  
                          Use fewer different **types** of alcoholic drink than before

**Drug Use**

- 3. To what degree do you think your drug use is related to the effects of your traumatic experience/experiences? Place a cross on the line below to indicate to what extent you think your drug use is related to the effects of your traumatic experience/experiences.

---

Not at all Related Very much Related

## Alcohol Use

3. To what degree do you think your alcohol use is related to the effects of your traumatic experience/experiences? Place a cross on the line below to indicate to what extent you think your alcohol use is related to the effects of your traumatic experience/experiences.

---

Not at all  
Related

Very much  
Related

## **Appendix 6**

**Correlation Matrix (Pearson's product-moment)**

**Main Variables**

APPENDIX 10: CORRELATION MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Alcohol Score																	
2. (Log of) Drug Score	.58**																
3. Gender	-.04	-.42															
4. Age	.49*	.38	-.26														
5. Intrusions	.19	.14	-.06	.02													
6. Avoidance	.17	.21	-.12	-.01	.71**												
7. Arousal	.02	.11	.07	-.18	.43	.23											
8. IES (total)	.20	.19	-.09	.01	.95**	.90**	.37										
9. Emotional Support	.05	.06	-.02	.19	.11	.13	-.39	.13									
10. Practical Support	-.18	.02	.06	.24	.22	.12	-.18	.19	.83**								
11. Social Integration	.04	.33	-.21	.29	-.08	.05	-.40	-.02	.81**	.72**							
12. Social Strain	-.02	-.03	-.04	-.17	.43	.19	.50*	.35	-.54*	-.42	-.64**						
13. Total Social Support	-.03	.16	-.07	.26	.09	.11	-.35	.10	.95**	.91**	.92**	-.58**					
14. IES x Emotional	-.05	.29	-.32	.26	-.18	-.09	.24	-.15	-.29	-.16	.01	.01	-.15				
15. IES x Practical	-.12	.16	-.19	.21	-.14	-.04	.29	-.10	-.15	.01	.13	-.08	.00	.92**			
16. IES x Social Integration	-.10	.22	-.28	.36	-.10	.04	.18	-.04	.01	.14	.18	-.15	.12	.84**	.86**		
17. IES x Social Strain	.07	-.04	.09	-.38	-.01	-.07	-.07	-.04	.01	-.10	-.16	.25	-.09	-.64**	-.63**	-.78**	
18. IES x Total Social Support	-.10	.23	-.27	.29	-.14	-.03	.25	-.10	-.15	.00	.11	-.08	-.01	.96**	.97**	.94**	-.71**

\* p < .05

\*\*p < .01

## **Appendix 7**

**Correlation Matrix (Kendall's Tau)**

**Coping Strategies**

APPENDIX 7: CORRELATION MATRIX (KENDALL'S TAU):

COPING STRATEGIES

Coping Strategy	Alcohol Score	Drug Score	Gender
1. Distraction	-.11	.10	-.11
2. Social Withdrawal	.13	.31	-.36
3. Self-criticism	.23	.00	.10
4. Blaming Others	.07	-.23	-.11
5. Wishful Thinking	.15	.01	.01
6. Resignation	.04	.16	-.11
7. Cognitive Re-structuring	-.31	-.34*	-.10
8. Problem Solving	-.15	-.07	.02
9. Emotional Regulation	.03	.12	-.25
10. Social Support	-.10	-.16	-.15

Nos. 1-6 = negative coping strategies

Nos. 7-10 = positive coping strategies

\*  $p < .05$