



The Association between Recreational Drug use and Hypomania

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ABSTRACT

Previous research exploring the domains of hypomania has found that hypomanic personality traits have been shown to predict the onset of manic episodes along with substance abuse and potentially harmful reward related activities. Missing the diagnosis of past hypomania, and thus of bipolar disorder, is common such is the suggestion that substance misuse precedes the onset of either of these disorders beyond diagnostic criteria. This study therefore examined if the elevated risk of hypomania is associated with frequent recreational drug use patterns. Participants were recruited via random sampling from all MMU campuses (N=100). An amendment of the Hypomania Checklist (HCL-32) was used to take measure of the symptoms of hypomania in addition to questions regarding the frequency and types of illicit drugs used. Illicit drug use was reported by 75% of the respondents. A significant relationship was found between both the frequency of drug use and hypomania, and the diversity of drug use and hypomania. Both these revealed a moderate positive correlation. Only the frequency of the drug GHB proved to have an effect on higher scores on the HCL-32. High scoring participants of the HCL-32 are most likely to encounter hypomanic effects produced by the use of recreational drugs specifically those using drugs frequently and of a more diverse range.

KEY WORDS:	HYPOMANIA	ILLCIT DRUGS	MENTAL HEALTH	HCL-32	BIPOLAR
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Introduction

Illicit drug use in the UK

In today's society the availability of a variety of illegal drugs are on the increase and abused by many both recreationally and by dependant users. It is therefore necessary to increase public knowledge of the effects that drug abuse can have both to physical well being and mental health. Most recreational drugs typically defined as drugs used without a medical use and rather for enjoyment and pleasure purposes, appear in various forms or shapes. Along with each of these drugs having several street names, there now seems to be an increase in new types of drugs to what was being used even a decade ago, such is the recent non-medical use of ketamine (Dalgarno & Shewan, 1996; Dillon et al, 2003). Further to this, the emergence of a legal high known as mephedrone has become under investigation with the Home Office (HO) instructing the Advisory Council on the Misuse of Drugs (ACMD) to examine the legality of this drug as a priority (BBC News, 2010).

It is evident that people are using drugs for many different reasons might it be experimental, boredom, fitting in with peers or even a form of self-medication as a means of temporarily forgetting problems, in which case individuals often begin to abuse drugs (Khantzian, 1985). Though the prevalence of drug use throughout the United Kingdom varies between the general population, (Macleod et al, 2004) it is a growing concern that the number of individuals, particularly young adults, experimenting with a variety of illegal drugs is still as ever on the increase (Bachman et al, 1998; Melchior et al, 2008).

The interest focussed on drug use by the national press appears to make headlines for a number of reasons almost on a daily basis whether it be re-classifications or crime related. In the latest Home Office Statistical Bulletin, the British Crime Survey found that drug misuse in young adults aged 16-24 show that around two in five young people have ever used illicit drugs with nearly one in four that had used one or more illicit drugs in the last year (Hoare, 2009). This illustrates an increase within the last decade when compared to the survey of 1998 which found that 25 per cent of 16-29 year olds in England and Wales had tried prohibited drugs (Ramsey & Partridge, 1999).

Risk factors & prevention

In addition to the obvious risks that illegal drug use poses such as addictions and relationship with crime, there are rising figures of the inevitable signs of impact on the user's mental health. This impact is evident from latest statistics from the National Centre of Social Research which show one in six people in England suffers from a common mental health problem (NHS, 2009).

This rise in the incidence of drug misuse and its links with mental health has caused the government to rethink proposed treatment programmes and help available. As a result in 2008 a ten-year drug strategy was proposed aiming to restrict drug supply along with reducing the demand for them and focusing on protecting families and

strengthening the communities (Home Office, 2008). Illicit drugs are therefore arguably a concern not only for the society in terms of danger and crime but also the alarming amount of tax payer's money being invested into these types of drug tackling campaigns. Last year alone, an extra £11.8 million pounds was further invested from the Department of Health into drug treatment services across England (National Treatment Agency, 2009).

These figures mentioned and many more have urged the government to do more in an attempt to reduce figures and educate particularly young people of the potentially harmful consequences of illicit drug use. Consequently over the recent years the Home Office has implemented various campaigns such as the widely promoted 'talk to FRANK' media used nationwide to make young people more aware of risks and dangers along with help and advice information (FRANK, 2009). In addition to this, Blueprint, the biggest drug education research programme to ever run in the UK was also piloted between 2004-2005 in an attempt to educate school children in classes and maintain the government target of reducing the use of Class A drugs and the regular use of any illicit drugs among all people under the age of 25 (Home Office, 2009).

Concept of Hypomania

According to the official systems of the American Psychiatric Association's (1994) fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV, 1994) hypomania is defined as a "distinct period" of persistently "elevated, expansive, or irritable mood". This is said to be similar to the symptoms of mania but lacking in both intensity and duration. During this disturbance of mood, the DSM-IV (1994) lists seven symptoms from which at least three or more must have persisted and have been noticeable to a significant degree for approximately four days. A few of these symptoms include decreased need for sleep, pressurised speech, and excessive involvement in pleasurable activities such as buying sprees, or increased sexual energy.

Needless to say these actions can have harmful consequences and may result in further and more complex problems, often left untreated can lead to Bipolar disorders (Angst et al, 2005). The definition given by the DSM-IV (1994) is similar to that of the *International Classifications of Diseases* (ICD-10, 1976) which defines hypomania as a "lesser degree of mania" where concentration and attention levels may also be impaired in a person experiencing such abnormalities of mood. Though many patients enjoy their durations of speeded episodes claiming to flourish in creativity, it is likely that persons who experience such episodes without previous history of mental health often go undiagnosed hence untreated (Benazzi & Akiskal, 2003; Eckbald & Chapman, 1986).

In comorbid patients, it is quite often questioned if disorders such as hypomania potentially leading to bipolar, come first or whether they are the direct result of drug and alcohol abuse (Angst et al, 2006; Winokur et al, 1995). In such cases, it may prove complex to assess the onset of such affective or substance misuse disorders as symptoms of both often appear over time. An effective method of tackling the

issue of whether alcohol related or substance misuse precede the onset of mental health issues is to look at patterns of illicit drug use in individuals (Meyer & Wolkenstein, 2010).

Current research related to mental health and illicit drugs

The connection between drug use and mental disorders is a widely researched area, many finding a high correlation between substance misuse and psychosis. Much of the popular research in the field of mental health disorders and recreational drug use over approximately the last decade, has concentrated primarily on cannabis use and its association with Schizophrenia. It can be argued that this is due to the fact that cannabis was mostly the drug of interest or availability to the previous generation of young people or students and was therefore the 'hot topic' of research and debate. Though cannabis exposure remains to be very common among young people in the UK (Hickman et al, 2009), implications of other illegal substances are not always so widely researched in terms of psychosocial well being.

Current and more recent research however, has been examining psychoactive drugs in terms of classing them as pharmacological 'models' of psychotic symptoms and the association they seem to have with neurocognitive dysfunction (e.g. Morgan and Curran, 2006; Pomarol-Clotett et al, 2006). The symptoms and signs present in schizophrenia have been found to be imitated and also present in the effects of psychoactive drugs like cannabis and ketamine (Mason et al, 2008). This type of research investigating healthy volunteers of recreational drug use highlights the increase of risk in mental health problems during later life.

Existing research on hypomania however, focuses more on activities engaged in those with hypomanic personality traits and features with studies examining addictive tendencies or self reported happiness and appraisals (e.g. Forty et al, 2009; Jones & Day, 2008; Krumm-Merabet & Meyer, 2005; Meyer et al, 2007; Thalbourne & Houran, 2005). The validity and development of the hypomania scales and checklists are too a widely researched topic with many versions trialled and tested in different countries (e.g. Angst et al, 2005; Eckblad & Chapman, 1986; Holtmann et al, 2009). However, many of these scales such as Eckblad and Chapman's (1986) hypomanic personality scale (HPS) refer to hypomania as a personality style differentiating it from the condition expressed in the DSM IV-TR. Similarly, the hypomania interpretations questionnaire (HIQ) developed by Jones et al (2006) explores the interpretation of hypomania relevant appraisals based on the participants own interpretations of mood. The hypomania checklist (HCL-32) however, was developed as a self assessment screening instrument following Meyer and Keller's (2003) study which failed to identify latent classes of hypomania. The use of this tool combined with screening for patterns of recreational drug use will therefore aid in providing novel epidemiological research in finding direct associations between drug use and hypomania.

Context of present study

This research will aim at identifying any association between the use of recreational drugs and the onset of hypomania at a time when drug related issues have emerged at the centre of national debate. As previous research has highlighted, there are often people without previous history of mental disorders that go undiagnosed. The recognition of hypomania may require more delicate probing and inquiry than listed in the diagnostic criteria of the DSM-IV (1994) and ICD-10 (1976) which have also been found to possibly be less reliable than once thought (Angst et al, 2005). This study will therefore aim to establish within a non-clinical sample as to whether these episodes are not only common but due to the frequent or diverse use of drugs. In addition, there is increasing support to suggest that there is a need for a more dimensional view of affective disorders (Angst et al, 2003; Eckbald & Chapman, 1986; Forty et al, 2009) which this research will aim at accomplishing.

It can not be ignored however, that many mental disorders are organic and result from structural pathology in which case the diathesis-stress model explains that individuals can express certain traits or behaviours when activated by external stresses (Belsky & Pluess, 2009). It is therefore the interaction of genetic and external stimuli such as drugs which can trigger mental health disorders in some more than others. Many longitudinal studies in this field have also been conducted from which Moore et al, (2007) have conducted a meta-analysis and reported an odds ratio of 1:4 of psychotic disorders among those who had ever used cannabis (Moore et al, 2007).

Similarly, there has been numerous studies finding an association between alcohol dependence and bipolar, however the abuse of drugs including cocaine, amphetamines and cannabis in patients has been "less extensively investigated" (Brown et al, 2001). However, systematic evaluations of hypomania have been found to increase the estimated occurrence of bipolar disorder by double (Allilaire et al, 2001) suggesting that bipolar disorder is as prevalent as unipolar major depression (Angst & Cassano, 2005). At present, the evidence regarding the direct causal relationships between recreational drugs and many mental health disorders is lacking. This consequently raises the question if whether we can afford to delay intervention and see if this increase of early illicit drug use does directly lead to the prevalence of mental health issues (Jorm & Lubman, 2007). This area of research will consequently prove to be of novel interest in terms of locating those perceived as healthy individuals within society with hypomania.

One-tailed hypotheses

- 1) There will be a significant difference between the frequencies of recreational drug users and scores on the HCL-32.
- 2) There will be a significant difference between the diversity of recreational drugs used and scores on the HCL-32.
- 3) There will be a significant difference between the high and low frequency users of each recreational drug and scores on the HCL-32.

Method

Design

Three main factors taken into consideration during this present study consisted of, the diversity of drugs used, the frequency of drug use and symptoms characterising hypomania. An amendment of the self rating thirty-two itemed Hypomania Checklist (HCL-32) (Angst et al, 2005) was utilised as a means of measuring hypomania, in addition to supplementary questions referring to types and frequencies of illicit drug use. Participants were subsequently required to complete a questionnaire formulated to incorporate questions referring to all three factors. This investigation adopted a correlational design assigning participants a numerical score on each of these three features for the purpose of identifying associations.

Participants

The sample comprised of 100 undergraduate students selected from Manchester Metropolitan University via random sampling. Of these participants, 45% (n=45) were female and 53% (n=53) male of which the ages ranged from 18-47 years (M= 22.18 yrs, SD= 4.37). Being a current student at the university was the only stipulation of the requirement criteria for this investigation.

Materials

The *HCL-32*, a self rating questionnaire (appendix 5), formed the basis of the questionnaire used in this investigation as a measure of self-assessment of lifetime experiences of hypomanic symptoms.

The use of *paper envelopes* enabled the participants to conceal the completed questionnaire before returning to the researcher.

Measures

Hypomania screening

The HCL-32 (Angst et al, 2005) was developed as measure into the self-assessment of lifetime experiences of hypomanic symptoms on the continuum from normal to pathological. It is also utilised in screening patients for bipolar-II, minor bipolar and subthreshold hypomania, however, it does not provide a diagnosis of these disorders but can aid in identifying potential bipolar cases in psychiatric, psychological and general practice. The HCL-32 was developed due to the fact that hypomanic symptoms are not frequently recognised because the individual may not necessarily experience their behaviour as abnormal. This often therefore results in unrecognised hypomanic symptoms which in adolescence is strongly predictive of later bipolar disorder thus emphasising the need of identifying these symptoms to ensure effective treatment (Angst et al, 2005).

The main aim of this instrument is to assess the characteristics of the 'high' periods that the subjects have recently encountered. Of this, question 3 comprises of a

checklist of possible symptoms characterising hypomania in terms of energy, activity and mood. Participants are required to rate these symptoms either yes (present or typical of me) or no (not present or typical) whereby a score can be accumulated upon completion of the HCL-32. In order to fulfil the research aims of this investigation, only question 3 referring to this checklist was employed in a format identical to the original version.

A 'yes' response to any of the items is equivalent to a score of one and any 'no' response equates to a score of zero making the possible maximum score thirty two with the minimum of zero. The scoring manual of the HCL-32 (appendix 6) received via email correspondence from the author, details a total score of 14 or more attributed by the number of positive answers to the thirty two items is an indicator of potential bipolar and should be further investigated.

Drug frequency and types used

In addition to the HCL-32, two questions relating to illicit drug use endeavoured to measure the diversity and frequency of drugs used by the respondents. The first question addressed whether the participant had used any form of illicit substance followed by the nine illicit drugs grouped in terms of drug classification (*Class A*: ecstasy, LSD, cocaine, *Class B*: magic mushrooms, cannabis, amphetamines, *Class C*: ketamine, tranquillisers, GHB). The design of the question allowed the respondent the opportunity to select from five options corresponding to when each drug was used last consisting of; 'never', 'over a year ago', 'the last year', 'the last month' and 'the last week'.

The five options measured the severity of drug use, of which each option generated a numerical value based upon the frequency. The scores in descending order are as follows: 'last week'= 4, 'last month'=3, 'last year' = 2, 'over a year' = 1 and 'never'= 0. Therefore the possible score obtainable on the 'total frequency of drugs' used was thirty six and a minimum score of zero.

A 'total diversity of drugs' score was achieved by the summation of each illicit drug taken by each participant equating to a maximum of nine and a minimum of zero. The 'total drug behaviour' score was derived through a summation of both 'total frequency of drugs' and 'total diversity of drugs' making the maximum score for this third variable forty five and a minimum of zero.

To establish low or high frequency users of each drug, a secondary score was allocated on the basis of when each drug was used last. In the event of drugs used either in the 'last week' or 'last month', respondents were classified as a high frequency user subsequently scoring a numerical value of two. A score of one attributed to the options 'last year' and 'over a year ago' classifying participants as low frequency users and lastly those who responded 'never' were given a score of zero.

Statistical analyses

Analyses to examine the associations between frequency and drug type were completed using SPSS version 16. The approach of correlational analyses and independent t-tests enabled to measure recreational drug behaviour and hypomania through the means of Pearson's correlations and Levenes test for equality of variance. Regression analyses to test between each frequency and drug type was rejected as per Field's (2005) formula indicating a specific sample size criteria.

Procedure

The present investigation recruited participants from a student population by approaching individuals from all five of the Manchester based campuses. This was to eliminate confounding variables, and substantiate validity of the sample in terms of gathering data from more than just one set of students from the same faculty or course (Creswell, 2005).

Providing willing participants with a questionnaire contained within a self-sealing paper envelope, allowed for respondents to conceal the completed questionnaire. Adopting this method granted participants both confidentiality and anonymity due to the sensitivity of the subject area being researched. Furthermore, this method aimed to encourage a greater rate of participation by decreasing the involvement of both the researcher and peers (Jahoda et al, 1962).

The implementation of a questionnaire information sheet advised participants of the research aims in addition to the request of a signature and date (appendix 1). This method successfully ensured informed consent and participant's awareness of the study and issues relating to confidentiality and anonymity (Wiles et al, 2005). On receipt of the completed questionnaire, a supplementary debrief sheet provided participants with useful information regarding the research and contact details of the researcher (appendix 2).

Research Proposal

Prior to commencing this investigation, the submission of a research proposal assisted in determining possible flaws in the research design, method or aims. This consequently highlighted the need to condense the original objectives to achieve the focal aim, concentrating primarily on the association between hypomania and the diversity/frequency of recreational drug use.

Ethical Considerations

In conducting this investigation "principles of courtesy and professional responsibility" towards the participants were accomplished as per the guidelines of the British Psychological Society's (BPS), *Code of Conduct* (2000). This outlines several key issues that should be of compliance when conducting research with human participants which this present study fulfilled by gaining approval by the means of

submitting two MMU ethics forms. Both these signed forms, the *Application for Ethics Approval Form* (AEAF) and the *Ethics Form* (ECF) can be found in appendix 7 and 8 respectively.

Additional ethical considerations included informed consent of participant involvement, obtained through a signature ensuring individuals had read the research aims. In addition, the questionnaire information sheet detailed participants' right to withdraw from the research and anonymity of their details. Lastly the implementation of personal identification number ensured each respondent could be easily identified should a participant wish to withdraw from the study.

The investigation did not involve deception nor did it present any danger to the participants involved. As a means of offering help to those participants that may be affected by either drug use problems or mental health problems, contact details of organisations that provide help and advice were provided. Researcher contact details also provided participants with direct contact should they have any questions regarding the investigation made available to participants by the means of a debrief information sheet. All responses were stored securely with only the researcher holding access to this ensuring confidentiality in the collection and storage of data as per the BPS ethical guidelines (2000).

Results

Descriptive Statistics

The study was completed by 100 participants (N=100), of which 47% (47) were female and 53% (53) male. The mean age of the participants was 22.18 with a range of 29 (18-47) and a standard deviation of 4.37. From the sample 75% (75) of the participants had taken recreational drugs leaving 25% (25) of participants who had never taken any form of illicit drug.

Drug Use

Participants reported recreational drugs they had used as a means of identifying patterns of both poly-drug use behaviour and to find which drugs were most commonly used; the descriptive statistics of drug use by this sample is shown in table 1 (appendix 3). Cannabis use was the most commonly reported recreational drug used by 70 of the participants of this study with ecstasy and cocaine as the second and third most common reported at 61 and 59 respectively.

For each of the participants a calculation of the number of illicit drugs used was made as a means of quantifying the diversity of drugs used within the sample. This summation involved simply calculating the frequency of drugs used by each participant together with the diversity of drugs used allowing to group the total number of participants who had used the range of the nine drugs listed on the questionnaire. From the results of this summation, 9% of participants had used only one form of illicit drug with 3% having used all nine of the drugs (table 2, appendix 3).

Frequency of recreational drug use

Participants of this study were asked to respond to the last time they had used each of the given nine illicit drugs in an attempt to identify the frequency levels of illicit drug intake. The results of this indicate that 29% of participants had used cannabis most recently within the last week and again 29% had also used cocaine in the last week. Ecstasy had been used by 19% of the participants in the last week with ketamine closely following at 17% of the sample having used in the last week (table 3, appendix 3).

Hypomania and its association with drug use

The data obtained from the responses of the questionnaires was parametric and of normal distribution and therefore to establish whether the use of illicit drugs had any effect on participants HCL-32 scores, a Pearson's correlation coefficient [Pearson's (r)] analysis was adopted. The participant's scores on the HCL-32 were correlated with both the diversity of drug use then again with the frequency of drug use and lastly a combined total of diversity and frequency giving a total of drug behaviour to achieve any associations.

Firstly the participants HCL-32 scores were correlated with the diversity of drugs used and produced a statistically significant positive correlation coefficient between total hypomania score and total diversity of drugs [$r(100) = .96, p < .01$]. This therefore indicates within this sample, the diversity of drugs used has a significant effect on the scores achieved on the HCL-32 (figure 1, appendix 3).

The association between the total HCL-32 scores and the frequency of drugs used also achieved a significant positive correlation coefficient between total hypomania score and total frequency of drugs [$r(100) = .53, p < .01$]. Again this therefore suggests that within this sample, the frequency of drugs used has a significant effect on the scores achieved on the HCL-32 (figure 2, appendix 3).

Lastly in an attempt to gain a combined total for the diversity of drug and frequency, a summation of the two variables were made to produce a number for each participant, this was labelled 'total drug behaviour'. This too was correlated with the HCL-32 scores and generated a significant positive correlation coefficient between total hypomania score and total drug behaviour [$r(100) = .56, p < .01$]. Consequently the results suggest that within this sample, the combined total of both diversity and frequency of drugs characterised as 'total drug behaviour', has a significant effect on the scores achieved on the HCL-32 (figure 3, appendix 3).

Individual recreational drugs and association with hypomania

As a means of further analysis to determine the hypothesis of whether any particular drug has an effect on the participant's total score on the HCL-32 an independent t-test was performed on each of the individual nine drugs and the low and high frequency users of that particular drug. In this case the two groups; high frequency

drug users and low frequency drug users act as the independent variable (IV) and the mean hypomania scores on the HCL-32 act as the dependant variable (DV).

In order to split the users of each drug into either a low or high frequency user, those participants who had answered yes to having taken each drug in either the 'last week' or the 'last month' were considered as high frequency users. Similarly, those who had answered to taking each drug in the 'last year' or 'over a year ago' option were categorised as low frequency drug users of each particular drug. Those participants who had answered 'never' to each drug were therefore disregarded when the t-tests were performed as the aim of the t-test was to find any significance of the individual illicit drugs and hypomania score. Including the 'never' users in the 'low frequency group' for instance would have meant that participants that had never used the drugs would also be used as a means of comparison.

An independent t-test was performed to compare the mean hypomania scores on the HCL-32 between high frequency ecstasy users and low frequency ecstasy users. The participants of the high frequency ecstasy users scored higher (table 4, appendix 3) on the HCL-32 ($M=18.24$, $SD= 6.33$) than low frequency ecstasy users ($M=17.30$, $SD= 6.98$). There was no significant difference however between the two groups: $t(59) = 0.55$, $p > .05$

Again an independent t-test was used to compare the mean scores obtained from the HCL-32 between high frequency LSD users and low frequency LSD users. Those participants of the high frequency LSD group again scored higher (table 5, appendix 3) on the HCL-32 ($M= 22.00$, $SD= 1.00$) than the low frequency LSD users ($M=19.00$, $SD= 6.98$). This had no significant difference between the high frequency and low frequency LSD groups: $t(17) = 0.94$, $p > .05$

To compare the mean scores obtained from the HCL-32 between high frequency cocaine users and low frequency cocaine users a further independent t-test was performed. Again the high frequency users of cocaine scored higher (table 6, appendix 3) on the HCL-32 ($M= 18.78$, $SD=6.02$) than the low frequency cocaine users ($M=17.08$, $SD= 7.29$). This test also found that there was no significant difference between the two groups: $t(58) = 0.98$, $p > .05$

A fourth independent test was completed this time to evaluate both the mean scores gained from the HCL-32 of the high frequency magic mushroom users and low frequency magic mushroom users. The low frequency magic mushroom users scored higher (table 7, appendix 3) on the mean scores of the HCL32 ($M= 19.48$, $SD= 5.83$) than the high frequency magic mushroom users ($M= 14.00$, $SD= 9.90$). This test also proved there was not a significant difference between the two groups: $t(29) = 1.25$, $p > .05$

A further independent t-test was used to compare the mean scores observed from the HCL-32 of the high frequency cannabis users and the low frequency cannabis users. The low frequency cannabis users scored higher (table 8, appendix 3) on the measure of hypomania ($M=18.06$, $SD= 5.90$) than the high frequency cannabis users

($M= 17.18$, $SD= 7.24$). There was therefore no significant difference between the high and low frequency groups of cannabis: $t(69) = 0.56$, $p > .05$

An independent t-test was performed to compare the mean hypomania scores on the HCL-32 between high frequency amphetamine users and low frequency amphetamine users. Those participants of the high frequency amphetamine group again scored higher (table 9, appendix 3) on the HCL-32 ($M= 20.00$, $SD= 2.73$) than the low frequency amphetamine group ($M= 19.29$, $SD= 7.14$). There was no significant difference observed between these two groups: $t(23) = 0.36$, $p > .05$

The seventh independent t-test carried out compared the mean hypomania scores from the HCL-32 this time between the high frequency ketamine users and the low frequency ketamine drug users. The high frequency ketamine group scored higher (table 10, appendix 3) on the HCL-32 ($M= 19.36$, $SD= 5.48$) than that of the low frequency ketamine users ($M= 18.21$, $SD= 6.86$). This holds no significant difference between the high frequency user group and the low frequency ketamine group: $t(47) = 0.65$, $p > .05$

Again an independent t-test was used to compare the mean scores obtained from the HCL-32 between high frequency tranquilliser users and low frequency tranquilliser users. Those participants of the high frequency tranquilliser group scored higher (table 11, appendix 3) on the HCL-32 ($M= 23.00$, $SD= 5.29$) than the low frequency tranquilliser users ($M= 21.00$, $SD= 6.52$). This is not of any significant difference between the high frequency and low frequency tranquilliser groups: $t(6) = 0.45$, $p > .05$

The ninth and final independent t-test was performed to compare the mean scores obtained from the HCL-32 between high frequency GHB users and low frequency GHB. The high frequency GHB users scored higher (table 12, appendix 3) on the HCL-32 ($M= 25.00$, $SD= 5.66$) than the low frequency GHB users ($M= 19.11$, $SD= 3.05$). This test did find a significant difference between the two groups: $t(18) = 2.43$, $p < .05$

Discussion

Summary of findings

Based on previous descriptions of hypomanic characteristics (Akiskal, 1996; Angst et al, 2005; Eckblad & Chapman 1986), the researcher focused on recreational drug use reported by individuals for an association with hypomania within a non-clinical sample. It was expected that individuals with high scores on the HCL-32 were users of recreational drugs seeking to spend their time pursuing pleasurable and rewarding activities through the onset of manic episodes related to substance abuse. In an attempt to enhance current literature relating to this field, the study addressed the aim through three, one tailed hypotheses set out in section 1.5.1.

Consistent with hypothesis one, it was observed that frequent users of recreational drugs scored higher on the HCL-32 indicating self reported hypomanic temperament.

On the basis of the analysis used to examine this hypothesis, a moderate positive correlation was found ($r=0.536$, $p< 0.01$) evidently supporting hypothesis one. This consequently indicates that within this sample, the frequency of recreational drug use has a significant effect on scores on the HCL-32.

Furthermore, it was anticipated that an association would be found between the diversity of drugs used by the participants and scores on the HCL-32. Hypothesis two was also one tailed and attempted to establish whether those using a more diverse range of drugs would score higher on the measure of hypomania than those using a less diverse range of recreational drugs. This hypothesis was also supported on the basis of the descriptive statistics finding a positive moderate correlation of ($r= 0.96$, $p<0.01$) indicating that within this sample, the diversity of drugs used has a significant effect on the scores of the HCL-32.

Hypothesis three attempted to establish whether an association could be found within the high and low frequency users of each drug and scores on the HCL-32. From the results observed the only significant difference found between the mean HCL-32 scores and the high and low frequency drug users of all nine individual illicit drugs listed, was within the two groups of the GHB drug. The descriptive statistics of high and low frequency users of this drug found a significant difference between the two groups $t(18) =2.43$ $p<.05$

Implications of findings in relation to previous literature

The literature reviewed in the introduction (section 1) illustrates that hypomania-prone individuals are more likely to pursue pleasurable or substance related activities with enthusiasm (Meyer et al, 2007). The present study found a significant correlation between recreational drug use and hypomania sub-divided by the frequency and diversity of use, and scores on the HCL-32.

A plausible justification for the findings of this study in relation to the participants used may have been due to the sample selection being entirely from an undergraduate student population. Similarly to the findings of this present investigation, Carvalho et al (2008) found that cannabis was the most used illicit substance at 94%, reported as a means of alleviating stress caused by the pressures of education (Madu & Matla, 2003). The approach in which the participants were recruited would therefore maybe imply that the environment, in which the recruits were surrounded by the burdens of university anxieties, may have been a predominant motive for illicit drug use.

The evidence of this present study is congruent with previous findings from a systematic review conducted by Moore et al (2007), which found that the risk of psychotic symptoms is greater in those frequently using recreational drugs, in particular those using cannabis. It could therefore be suggested, that 40% of the respondents of this investigation, in the high frequency group having used cannabis in the last week or month, have an increased risk of inducing such symptoms.

Furthermore, it is assumed that persons with a hypomanic temperament are considered at risk for bipolar disorder and engage in pleasurable and rewarding activities. The HCL-32 measure of hypomania characterises such activities and has

been validated internationally as an instrument for the spectrum of bipolar manifestations (Angst et al, 2005). This subsequently identifies the possibility of developing a cycle of reward associated moods, and energy created by substance use. Consistent with Holtmann et al, (2009), the present study has captured the risk of bipolarity in those adolescents at risk of hypomania who may be less likely to identify their symptoms as pathological.

The research aims of this study expected to find differences in scores in relation to high and low frequency drug users but no differences were found other than in those users of GHB. As discussed later in the limitations (section 4.3) the possible explanation of this is due to the imbalance of sample size. A further motive of why this was the only drug in which a difference was associated maybe due to the chemical properties that consist in GHB. In a study by Molnar et al (2009), the cellular actions of this drug were associated with the brain reward area; nucleus accumbens. This may explain why GHB is diverse to other drugs due to the natural rewards associated with it and the addictive properties which may reinforce further use of the drug, in turn emphasising hypomanic characteristics.

Limitations of study

It is imperative to consider limitations of this study when interpreting the findings within the chosen sample. This in turn facilitates our knowledge on how to contextualise the findings and improvements for further research within this field. One of the primary limitations of this investigation is the use of a student sample as subjects, and that students are a select group rather than a representation of the population. Conceivably, the student sample in this study can be generalised to other university students as they appear to be a unique group of the population.

A further limitation of using this sample within the university environment is the cooperation of the students in which a familiar rapport is present; for example the researcher being a fellow student/peer. As a result it cannot be known for certain if the student's participation in the research may have some outcome toward skewing the responses given and hence the findings by participants producing demand characteristics.

In relation to the high and low frequency groups of each of the nine recreational drugs, an imbalance within the sample sizes of these two groups, may have caused invalid assumptions from the results. In particular, the drug GHB (in which there was a significant difference) consisted of two high frequency users and eighteen low frequency users. For future research, obtaining an equal number or more evenly balanced number of participants in each of the high and low groups would be beneficial in observing the effects of each drug listed.

Future research

Since the majority of the studies discussed in section 1 (Jones and Day, 2008; Macleod et al, 2004; Thalbourne and Houran, 2005) examined youths and adolescents, there is a lack of evidence related to follow up investigations. Many

mental health disorders have been shown to manifest in individuals in later life even after periods where illicit drugs have not been used therefore the long-term effects of recreational drug use on mental health remains weakly understood. This therefore highlights the need for future in-depth longitudinal investigations studying the intricate relationships between the extent of illicit drug use and mental health conditions (Botvin et al, 2000; Han et al 2010).

Further research is required to determine whether the observations found in this study may be generalised to different populations such as non student samples, or different drug types to establish the possibility of developing additional functions to the HCL-32 measure of hypomania. In addition, future studies could also examine the present items on the HCL-32 by categorising them by primary and secondary motivations of use to determine how these correspond to changes in patterns or frequency of illicit drug use. This in turn would expose the characteristics of hypomania fulfilled by substance use which would be beneficial in informing further education, treatment and prevention interventions making them specific to this target population (Boys et al, 2001).

Conclusion

To summarise the findings from this study, it can be concluded that recreational drug use is associated with higher scores on the HCL-32 measure of hypomania however; this does not establish a cause and effect relationship. This study succeeds in contributing support to previous findings into associated reward related yet potentially harmful activities pursued by those with hypomanic temperaments. Furthermore, the findings suggest that recreational drug users scoring highly on the HCL-32 have an increased risk of developing bipolar disorder. This therefore suggests that recreational drug use may expose psychotic or mental disorders in individuals who are vulnerable.

It is evident that there is insufficient information regarding the effective treatments for social and recreational drug use, though much of the research present in this field focuses on the neurobiology and toxicities of such drugs. The current study indicates the need of developing research aimed at effective prevention of the increase in recreational drug use by adolescents and young adults warranting a focus on several issues. These include addressing comorbidity within polysubstance users, furthermore a need of raising awareness to facilitate detection of early signs and symptoms within schools and institutes in the hope of providing better quality care.

The current study highlights prolific substance misuse within just one small sample and therefore supports the assertions of previous recommendations into the need of future research determining specific cause and effect relations. Factors that may help in establishing the reasons behind increasing figures of illicit drug use, are those such as social and cultural issues that surround and support adolescents and young people within society. These components must therefore be thoroughly considered in the design of future intervention and treatment approaches. More specifically the need of researching which treatments are effective in which populations, and which

treatment providers have an understanding of the role that recreational drugs play in social networks, is vital to reducing mental health risks.

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