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Further evidence of differences in substance use and dependence between Australia and the United States

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Abstract

The current study compared the prevalence of substance use and DSM-IV dependence in the USA and Australia. Participants aged 18–54 were selected from two cross-sectional nationally representative Australian (National Survey on Mental Health and Well-Being – NSMHWB, 1997, $n = 7570$) and American (National Epidemiologic Survey on Alcohol and Related Conditions – NESARC, 2001–2002, $n = 29,673$) household surveys. The NSMHWB utilised the Composite International Diagnostic Interview, whereas the NESARC used the Alcohol Use Disorder and Associated Disabilities Interview Schedule. The 12-month prevalence of alcohol use was lower in the USA (56.5%) than in Australia (77.2%), although the rates of alcohol dependence were similar in both countries. The USA had higher rates of alcohol dependence conditional on use (9.0%) compared to Australia (6.8%). Australians had higher levels of drug use, dependence, and conditional dependence than Americans (except for sedatives and opioids). The absence of significant interactions between country of interview and the common correlates of substance use disorders indicated that the influence of these factors was similar in the USA and Australia. In conclusion, the current investigation revealed striking differences in the rates of conditional drug dependence between Australia and the USA. The cross-national generalizability of the relationships between the common correlates and prevalence of substance use and dependence indicates that a similar process of vulnerability to dependence may be operating in the USA and Australia. In the future, these cross-national differences could be used to help better understand the factors that influence drug use and the development of dependence.

Keywords

Alcohol and drug use; Cross-national comparison; Epidemiology; Substance dependence

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Contributors

Orla McBride contributed to the conception and design of the paper, conducted the statistical analysis, and drafted the manuscript. Maree Teesson and Tim Slade contributed to the conception and design of the paper, oversaw the statistical analysis, and provided critical revisions of the manuscript. Deborah Hasin, Louisa Degenhardt and Andrew Baillie provided critical revisions of the manuscript. All authors have contributed to and approved the final manuscript.

Conflicts of interest

None.

1. Introduction

Recent epidemiologic surveys have demonstrated that the use of, and dependence on, licit and illicit substances is widespread in Westernised societies (Andrews et al., 2001; Compton et al., 2007; Hasin et al., 2007), increasing in lower-income countries (Anderson, 2006; Hall and Degenhardt, 2007), and resulting in worldwide substantial economic and societal costs (Hasin et al., 2007). National epidemiologic surveys are essential in understanding the prevalence and correlates of psychiatric conditions, including drug and alcohol dependence (Caetano and Babor, 2006; Teesson et al., 2006). Over the last two decades, descriptive psychiatric epidemiology has undergone an unprecedented period of growth (Cottler et al., 1991; Kessler, 2007; Tsung and Tohen, 2002) yet there are still very few cross-national comparisons.

Studies indicate that approximately 48% of the global population are current consumers of alcohol, whereas 4.5% are current users of illicit drugs (Anderson, 2006). However, there is substantial variation in prevalence estimates of substance use and associated disorders both within countries (Compton et al., 2007; Grant et al., 2004), and between different countries of relatively similar socio-economic status (Maxwell, 2003; Teesson et al., 2006; Vega et al., 2002). For example, comparative data analysis of recent American epidemiologic surveys, namely the National Comorbidity Survey Replication (NCS-R; Kessler et al., 2004), the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant et al., 2003a), and the National Survey on Drug Use and Health (NSDUH; SAMHSA, 2003), has demonstrated numerous discrepancies in prevalence rates for drug use and associated disorders between the surveys, which could in part be attributed to differences in methodological design (Gruza et al., 2007; Grant et al., 2007). Indeed, non-comparable survey designs and protocols are not only problematic when conducting within-country comparisons, but these differences are often magnified and can greatly hinder between-country comparisons (Vega et al., 2002). Nevertheless, with proper interpretation of methodological differences, cross-cultural epidemiological comparisons are important to better understand the use of specific drugs in different countries, the associations of use with different socio-demographic variables, as well as providing possible clues regarding the etiology of substance use disorders (Canino et al., 1999; Kessler et al., 1997; Smart and Ogborne, 2000; Vicente et al., 2006). Reliable and valid cross-national psychiatric epidemiologic comparative studies however can be very time-consuming, requiring substantial financial costs and professional resources (Heeringa et al., 2004). Thus, it is not surprising that few cross-country comparisons are conducted (Teesson et al., 2006).

In an attempt to overcome these obstacles, a small number of cross-cultural studies have been conducted in recent years. For example, Maxwell (2001, 2003) compared data from the 1995, 1998, and 2001 Australian National Drug Strategy Household Surveys and the United States National Household Surveys on Drug Abuse. After taking into account a variety of methodological differences between the two surveys (e.g., wording of questions, data collection method, and the age of participants), these studies revealed key differences in the prevalence and trends of substance use between the U.S. and Australia. Specifically, the results demonstrated that although rates of lifetime and past-year illicit drug use was highest among Australians in their twenties, rates of lifetime drug use in Americans was highest among individuals in their thirties and forties and the highest rates of past-year substance use was among American teenagers (Maxwell, 2003). Similarly, Teesson et al. (2006) assessed differences in the prevalence and correlates of substance use and dependence between Australia and the USA using age-matched samples from two well-known epidemiologic surveys, the 1997 Australian National Survey on Mental Health and Well-Being (NSMHWB; Australian Bureau of Statistics, 1998) and the 1990-1991 National Comorbidity Survey (NCS; Kessler et al., 1994). The results suggested that alcohol use was

higher in Australia than in the USA, but that rates of conditional alcohol dependence (i.e., dependence among users) were relatively similar in both countries. Although rates of other drug use were relatively similar in both countries, rates of substance dependence and conditional dependence were higher in Australia than in the USA. These findings were significant because they suggested that a variety of country-specific factors (e.g., availability of drugs, cultural influences, or social factors) could have impacted on the prevalence of substance dependence. However, one confounder of the study was that the U.S. data was collected in the early 1990s almost 7 years before the Australian data. It was unclear therefore whether the results represented true differences between the countries or simply reflected changes in the epidemiology of drug use across time.

More recent U.S. epidemiologic data has identified changes in patterns of substance use and associated disorders in surveys conducted in the decade following the NCS. Throughout the 1990s and into the early 21st century, the past-year prevalence in the USA of non-medical prescription drug use and use disorders increased by 50% and 67%, respectively (Blanco et al., 2007). Comparison of data from the 1991–1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES; Grant et al., 1994) and the 2001–2002 NESARC (Grant et al., 2003a) has produced some noteworthy findings. For example, during this time it appears that cannabis use in the USA did not significantly increase; however, cannabis dependence increased from 0.3% to 0.4% (Compton et al., 2004). Moreover, during the same time period, although the percentage of regular drinkers increased from 44.4% to 51.2% (Dawson et al., 2004), the prevalence of alcohol dependence significantly decreased (Grant et al., 2004).

Clearly, changes appear to have occurred in the prevalence and patterns of use of a range of drugs in the United States over the last number of years. The aim of the current study is to advance on the previous work of Teesson et al. (2006) and to examine whether analyzing more recent epidemiological data from the United States would reveal different contrasts in patterns of substance use and associated disorders between the USA and Australia. The present study used data on the 12-month DSM-IV prevalence of alcohol and drug use disorders in the USA population, as derived from the NESARC (2001/2002), and compared these findings to Australian data from the NSMHWB (1997). Not only are the surveys closer in time than previous comparisons but this time the U.S. data is more recent than the Australian data.

2. Method

2.1. Sample

The current study mainly focuses on two epidemiologic surveys: the 1997 NSMHWB (Australian Bureau of Statistics, 1998), and the more recent 2001–2002 NESARC (Grant et al., 2003a). For comparative purposes, prevalence estimates from the NCS (Kessler et al., 1994) that were derived from a recent cross-national investigation (Teesson et al., 2006) are also presented. Although the NSMHWB and the NESARC have been described in detail elsewhere (Andrews et al., 2001; Grant et al., 2004), they will be described briefly here to make comparisons between the two surveys more accessible.

2.1.1. NSMHWB—The NSMHWB employed a multi-stage sampling design and interviewed 10,641 people, aged 18 years or older, from across Australia. The overall response rate was 78.1%. The NSMHWB utilised the Composite International Diagnostic Interview version II (CIDI 2.1; World Health Organisation, 1997), which is a comprehensive, fully structured diagnostic interview schedule which provides current diagnoses, according to the accepted definitions of the DSM-IV (American Psychiatric Association, 1994) and the ICD-10 (World Health Organisation, 1993), for a variety of

psychiatric disorders, including alcohol, and substance, abuse and dependence. Interviews were conducted in person and the interviewer recorded the responses on a laptop computer. As reported elsewhere, the reliability and validity of the diagnostic criteria derived from the CIDI 2.1 are good, in light of certain methodological constraints (Andrews and Peters, 1998). The CIDI 2.1 assessed for abuse and dependence in all drinkers and did not use questions relating to substance abuse as a screener for substance dependence.

2.1.2. NESARC—Conducted by the U.S. Census Bureau for the National Institute on Alcohol Abuse and Alcoholism (NIAAA), the 2001–2002 NESARC (Grant et al., 2003a) was a nationally representative face-to-face survey of 43,093 civilian non-institutionalised adults residing in the United States, including all 50 states and the District of Columbia. The NESARC included persons living in households, military personnel living off-base, and residents of boarding or rooming houses, non-transient hotels and motels, shelters, college quarters and group homes.

The NESARC sample was recruited from the 2000–2001 U.S. Census Supplementary Survey sample (C2SS), in combination with the Census 2000 Group Quarters Inventory. Comprehensive details on the construction of the NESARC sampling frame are available elsewhere (Stetser et al., 2002; Degenhardt et al., 2007a,b) but brief details will be provided here. For the NESARC, the NIAAA required that African-Americans and Hispanics would be oversampled to ensure that each major race or ethnic group was adequately represented and that accurate estimates of major survey variables were obtained (Grant et al., 2003a,b). Thus, race and ethnicity information collected from the C2SS was used to target African-American and Hispanic households. Recruitment for NESARC took place between August 2001 and April 2002, between 5 and 18 months after the prior C2SS (Stetser et al., 2002; Degenhardt et al., 2007a,b). The NESARC sampling frame was restricted to vacant and occupied non-seasonal housing units where there had been a prior response to the C2SS survey. Dwelling units that generated a refusal for participation in the C2SS, as well as seasonally occupied houses, were excluded from the NESARC sampling frame. Neither the C2SS nor the NESARC sample included institutionalised, homeless, or incarcerated individuals. A single sample of adults aged 18 years or older was randomly selected for interview from each sample household, and young adults (aged 18–24 years) were oversampled at a rate of 2.25 times greater than that of other members in the household (Grant et al., 2007). The sampling frame response rate was 99%, the household response rate was 89%, and the person response rate was 93%, yielding an overall response rate of 81%. The data was weighted to adjust for probabilities of selection of a housing unit or equivalent, household- and person-level non-response, the selection of one person per household and over-sampling of young adults (Grant et al., 2003a). The weighted data were adjusted to represent the U.S. population on a variety of socio-demographic variables including region, age, sex, race and ethnicity based on the 2000 Decennial Census.

The NESARC used the Alcohol Use Disorders and Associated Disabilities Interview Schedule version IV (AUDADIS-IV; Grant and Dawson, 2000), which is a fully structured diagnostic interview schedule. Like the CIDI 2.1, the AUDADIS-IV enquires about the occurrence of a variety of DSM-IV disorders, including alcohol and drug abuse and dependence. The reliability and validity of the AUDADIS-IV alcohol consumption module and alcohol dependence diagnoses, and to a less extent alcohol abuse diagnoses, has been extensively documented in the United States and abroad (Chatterji et al., 1997; Grant et al., 2003b). Similar findings have been reported for the AUDADIS-IV drug use module and drug use disorder diagnoses (Canino et al., 1999).

2.1.3. Concordance of AUDADIS-IV and CIDI DSM-IV substance use disorders—Cottler et al. (1997) reported on the concordance of DSM-IV substance dependence

diagnoses between the CIDI and an international version of the AUDADIS, the AUDADIS Alcohol and Drug Revised (AUDADIS-ADR; World Health Organisation, 1992). Using kappa as a measure of agreement between the two instruments, the results for alcohol, cannabis, opiate, and sedative dependence were good ($\kappa = 0.44\text{--}0.67$); however, the result for amphetamine dependence was somewhat weaker ($\kappa = 0.38$).

2.1.4. Differences between the NSMHWB and the NESARC—There were some important differences in the two surveys. These differences are outlined below, along with the adjustments conducted to allow comparisons between the NSMHWB and the NESARC.

1. The NSMHWB assessed diagnoses in the last 12 months only, whereas the NESARC inquired about both lifetime and 12-month prevalence. Comparisons were thus restricted to 12-month diagnoses.
2. The age of respondents in both surveys was aged 18 years and older. However, the analysis in the current paper was restricted to individuals aged 54 years or younger to permit easier comparisons between the current findings and those from a recent cross-national comparative study (Teesson et al., 2006). This restricted age range also contained the majority of individuals with DSM-IV diagnoses.
3. The categories of substances for which information was acquired differed in each survey. Specifically, NESARC inquired about the use and occurrence of DSM-IV abuse and dependence for ten substances: cannabis, cocaine, hallucinogens, inhalants/solvents, heroin, opioids, amphetamines, sedatives, tranquilizers, and any other substance. The NSMHWB only assessed four specific drugs, namely, cannabis, stimulants, sedatives (including tranquilizers), and opioids (including heroin); thus, to ensure similarity between the two surveys, analyses were restricted to these four drug categories.
4. In the NSMHWB, a standard drink consisted of 10 g (0.35 oz) of alcohol (Teesson et al., 2000). On the other hand, the NESARC defined a standard drink as having 17 g (0.6 oz) of alcohol (Dawson et al., 2005). Alcohol use in the NSMHWB was defined as having consumed at least 12 alcoholic beverages in the year prior to the interview. In the NESARC, current drinkers were individuals who consumed one or more alcoholic beverages in the last 12 months; however, respondents were also asked if they had drunk at least 12 alcoholic drinks in the last year. In the current analysis, alcohol use was defined as consuming at least 12 alcoholic beverages in the last 12 months.
5. In the NSMHWB, drug use disorder data is presented on respondents who had used drugs more than five times in the past 12 months. In the NESARC, any individual who reported using a specific drug in the last 12 months only, or during and prior to the last 12 months, were asked a set of symptom questions which operationalized the DSM-IV abuse and dependence criteria for that particular substance, during the last 12 months. Additionally, these respondents were also asked questions relating to their frequency of use for each specific substance on a 10-point Likert scale, ranging from every day to once a year. This scale did not include an option that compared exactly to the CIDI; however, the closest comparison in the NESARC was using drugs between 7 and 11 times in the last year. Thus, for the purposes of this analysis, last year substance use was defined as at least six times for respondents of the NSMHWB and at least seven times for respondents of the NESARC.
6. As previously outlined, participants in the NESARC sample were identified and recruited using information from Census interviews conducted by the US Census

Bureau during the C2SS. In contrast, the NSMHWB interviewed a representative sample of adults residing in private dwellings in urban and rural locations throughout Australia. All cases were identified and interviewed by lay-interviewers (Andrews et al., 2001).

7. The NSMHWB and the NESARC adopted different methodological approaches to account for the complex design of the surveys. Specifically, whereas the NSMHWB used balanced repeated replicate weights (Andrews et al., 2001), the NESARC used clustering and stratification variables (Grant et al., 2003a,b).

2.1.5. Analysis—The analysis for the current study was conducted in stages using different statistical software. Firstly, prevalence estimates for substance use and dependence as well as the standard errors and 95% confidence intervals, were generated separately for the two surveys using SUDAAN (Research Triangle Institute, 2004). SUDAAN is a software programme that uses appropriate statistical techniques to account for the stratified multi-stage sampling designs. Secondly, bivariate logistic regression analyses were conducted to compare the prevalence rates between the Australian and American surveys. Odds ratios derived from these logistic regression analyses represent the odds of having the outcome (e.g. alcohol dependence, etc.) for those in Australia compared to those in America. Finally, a series of multiple logistic regression analyses were used to assess the strength of associations between alcohol and drug dependence and a number of specific socio-demographic variables (i.e., age, sex, education, marital status, employment, urbanicity, and country of origin). These variables were chosen because they have been identified within the literature to be related to the use of, and dependence on, alcohol and drugs (Teesson et al., 2006). The second and third stages of the analysis involved amalgamating data from the NESARC and the NSMHWB. This point is noteworthy because, as outlined above, the surveys employed different methodological designs. Although separately both survey designs are appropriate and acceptable, it is not possible to account for the effects of two different methodological designs simultaneously. These analyses were therefore conducted using SAS software (SAS Institute Inc., 2002), taking into account the weighting variable in both surveys and allowing for generalizability to the general population. In order to achieve meaningful error around the parameter estimates the weighting variable represented the contribution of each respondent to the total sample, not to the total population.

3. Results

3.1. Prevalence of substance use in the past 12 months

The demographic characteristics of the sub-samples used from the NSMHWB and the NESARC are displayed in Table 1. The 12-month prevalence rates for substance use, dependence, and conditional prevalence in Australia and the USA are presented in Table 2. For comparative purposes, data from the NCS that was derived from a previous investigation (Teesson et al., 2006) is also displayed. An initial noteworthy finding is that the prevalence of substance use (except sedative use) differed significantly across the NESARC and the NSMHWB. Specifically, in the year prior to the interviews (NSMHWB – 1997; NESARC – 2001/2002), last year alcohol consumption was higher for Australians aged 18–54 years (77.2%) compared to their American counterparts (56.5%). Although the prevalence of drug use was considerably lower than alcohol use, a similar pattern emerged. Only 5.2% of Americans, compared to 10.8% of Australians, used at least one drug from the four categories (cannabis, sedatives, opioids, and stimulants), in the past year. In both countries, cannabis was the most commonly used drug, with 9.8% of Australians and 3.8% of Americans reporting use at least six times (seven for Americans) in the past year. The prevalence of sedative use was similar albeit slightly higher for Australians (1.0–1.1%). Australians were more likely to report using stimulants, whereas Americans were more

likely to report using opioids. A comparison of rates between the NSMHWB and the NCS revealed significant differences in substance use except for any drug use.

3.2. Twelve-month prevalence of substance dependence

Past year prevalence rates for DSM-IV alcohol dependence did not differ significantly between the NESARC and the NSMHWB. For all other substances however, the prevalence estimates for dependence were higher in Australia than in the USA. For instance, the prevalence rate for any DSM-IV drug dependence in Australia (2.7%) was almost quadruple that of the USA (0.7%). Apart from alcohol, cannabis accounted for the highest levels of drug dependence in both countries. For stimulants and sedatives the prevalence rates for DSM-IV dependence were slightly yet significantly higher (at the $p < 0.01$ level) for Australians compared to Americans. In contrast, the comparison odds ratios between the NSMHWB and the NCS revealed that only rates of alcohol, any drug, and cannabis dependence were greater in Australia than in the USA.

Comparison of conditional prevalence rates (i.e., dependence among users) across the NESARC and the NSMHWB revealed significant difference for all substances except stimulants. In particular, conditional prevalence rates for alcohol dependence were higher in the USA (9.0%) than in Australia (6.8%). The conditional prevalence rates of any drug or cannabis dependence in Australia were at least double those in the USA. Both nations were relatively similar in terms of conditional stimulant dependence. Australian sedative users were almost four times, and opioid users over six times, more likely to experience dependence compared to American sedative and opioid users respectively. A secondary finding was that in a comparison of the NCS and the NSMHWB, Australia had significantly higher conditional prevalence estimates than the USA for all substances except alcohol.

Across the NESARC and the NSMHWB, the overall prevalence of DSM-IV alcohol and drug dependence was higher among males than among females. In terms of alcohol, 7.5% of males and 3.0% of females in Australia, and 7.0% of males and 3.2% of females in the USA, met the DSM-IV diagnostic criteria for dependence. In addition, 3.7% of males, and 1.6% of females, in Australia satisfied the DSM-IV drug dependence criteria. In the USA, the prevalence of drug dependence in males and females were markedly lower, with rates of 0.9% and 0.5% respectively. Males were more likely than females to use all substances except stimulants, in which case both males and females were equally like to use this type of substance.

3.3. Correlates of substance dependence in Australia and the USA

In order to explore the relationship between substance dependence and a range of socio-demographic characteristics, two multiple logistic regression analyses were conducted, one for alcohol and one for drug dependence (Table 3). Specifically, the variables pertaining to drug and alcohol dependence served as the dependent variables and nation (USA versus Australia) and the other socio-demographic variables acted as independent variables. Table 3 shows the results of these analyses for alcohol and drug use separately. Interaction effects between country and other correlates were tested but are not reported because they were not significant and did not add to the explanatory power of the model.

The final model for alcohol dependence ($-2 \log$ likelihood 14524.70; likelihood ratio ² statistic = 1020.32, d.f. = 9, $p < 0.001$) is presented in Table 3. The odds ratios presented are adjusted for the effect of all other variables in the model. Compared to females, males were more than twice as likely to be dependent on alcohol. Younger individuals (i.e., less than 45 years of age), and in particular respondents aged 18–24 years, were more likely than older adults to have experienced alcohol dependence in the past year. Respondents who were

never married and were unemployed had an increased risk for having experienced alcohol dependence in the year preceding the interview. Most importantly, the results revealed that nationality did not prove to be a significant correlate of alcohol dependence.

The final model for drug dependence ($-2 \log$ likelihood 4065.88; likelihood ratio χ^2 statistic = 553.53, d.f. = 9, $p < 0.001$) is presented in Table 3. Similar to alcohol dependence, males were more likely than females to meet the criteria for drug dependence. Compared to older individuals, individuals under 35 years of age were more likely to drug dependent. Respondents in the 35–44 years of age group were slightly less likely (OR = 0.96) to experience drug dependence when compared to older individuals. Respondents who were never married, had less than a high school education, and were unemployed had an increased odds of having experienced drug dependence in the year preceding the interview. In contrast to the findings for alcohol dependence, Australians were around three and a half times more likely to meet the criteria for drug dependence than Americans.

4. Discussion

Previous research suggested that Australians interviewed in 1997 reported higher levels of drug use and dependence, particularly in relation to cannabis, compared to their American counterparts in 1990–1991 (Teesson et al., 2006). This research was informative but it was unclear whether true differences existed, or whether they also reflected changes in patterns of drug use and dependence during the 1990s. Thus, in an attempt to advance the literature, the current investigation explored whether similar findings would emerge using more recent epidemiologic data from the USA.

A number of important findings warrant discussion. Firstly, the results demonstrated that in general, there was a large degree of consistency across countries in terms of the patterns and correlates of 12-month alcohol and drug dependence. Specifically, both surveys revealed a higher prevalence of substance dependence in males compared to females, in younger adults and in the unemployed. Of particular importance is the lack of any significant interaction between these common correlates of substance dependence and country, which indicates the effects of these correlates were similar in both the USA and Australia.

One noteworthy finding was that although there were significant differences between the NSMHWB and the NESARC surveys in terms of alcohol use (i.e., higher prevalence in Australia) both countries had similar rates of alcohol dependence, which meant that rates of conditional alcohol dependence were *higher* in the USA. It is possible that some U.S. abstainers from alcohol might have been at low risk for alcohol dependence if they had used it. In Australia, the higher rate of alcohol use may be due to the fact that similar low-risk individuals do not abstain from alcohol but do not experience alcohol-related problems; thus, the rates for alcohol dependence in both countries are similar (Teesson et al., 2006).

Striking differences were found between the two countries in the conditional prevalence rates for drug dependence. Higher drug dependence prevalence rates in Australia had been attributed in part to the notion that a new cohort of cannabis users had emerged in the USA in more recent years (Compton et al., 2004). However, the current study found that the rates of use and conditional prevalence of drugs, and in particular cannabis, continued to remain higher in Australia than in the USA even when more recent US data were used. Taking into consideration the fact that the Australian data presented herein was collected a decade ago and it is very likely that drug use patterns have changed during this time period, it may be that social or cultural factors unique to Australia contributed to higher levels of drug use and dependence, particularly for cannabis, in this sample. Recently, cross-cultural comparisons of substance use behaviours among adolescents and young adults in the USA and Australia

have revealed important cultural differences between the two nations. For example, American youths are more likely report engaging in religious activities and to feel that they have better social skills than their Australian counterparts (Beyers et al., 2004). Moreover, Australian youths were more likely to report more favourable parental and community attitudes towards substance use compared to American youths (Toumbourou et al., 2005). Furthermore at a national level, the USA and Australia have policies to deal with substance use. Possibly reflecting its societal and religious norms, the USA has a relatively conservative “zero-tolerance” or abstinence approach to drug use (The White House, 2002) whereas Australia has developed a comprehensive harm minimisation approach (Ministerial Council on Drug Strategy, 1998). It is possible that differences in policies and societal norms play an important role in influencing patterns of substance use in both countries. The influence of such cultural norms on rates of dependence is less clear.

Despite such stark differences in societal attitudes to alcohol across the two countries, the correlates and rates of alcohol dependence in the two countries remain very similar suggesting a strong influence of common vulnerabilities. However, the findings of the present study clearly indicate that the influence of societal norms warrants further study.

4.1. Strengths and limitations

A major strength of the current cross-cultural comparison study is that age-matched samples from two well-known and reputable epidemiologic surveys were utilised. The survey instruments were robust and directly comparable. Robust cross-national comparisons rely on sound replication of methods and findings. The fact that the present paper was able to replicate previous findings using a more recently collected dataset is important, and suggests that the differences in rates of dependence may not reflect methodological differences between the original two surveys.

The findings of this study should be considered in light of several methodological limitations. As previously mentioned, the regression analysis was conducted without accounting for the complex design of the NESARC or the NSMHWB. The confidence intervals for the analysis therefore are narrower in range than would have been expected if all aspects of the complex survey designs had been taken into account. However, studies that have analyzed the NESARC data taking into account the clustered nature of the data through the use of sampling design variables have also found relatively narrow confidence intervals (e.g., Compton et al., 2007; Grant et al., 2005). Furthermore, confidence intervals of a magnitude similar to those in the current study were reported in a recent comparison study of the NESARC and the NSDUH (Gruca et al., 2007).

Salient differences between the AUDADIS-IV and the CIDI 2.1 (e.g., wording of questions) may have contributed to some of the differences in prevalence rates. For example, the AUDADIS-IV generally takes longer to administer than the CIDI because it has a stronger focus on substance use, which leads to a greater number of questionnaire items being asked for the abuse and dependence criteria (Cottler et al., 1997). Both instruments however used a binary (yes/no) response format for the items that operationalize the substance abuse and dependence criteria. Thus, it is not clear to what extent the differences between the instruments could have resulted in different substance use prevalences, but such effects cannot be ruled out. The surveys also differed somewhat in terms of response rates: 78.1% for the 1997 NSMHWB and 81.2% for the NESARC. Although it might be reasonable to suggest that the higher response rate in NESARC might increase prevalence estimates of substance use (Gruca et al., 2007), in general, this did not appear to be the case. Moreover, differences in government policies, societal factors and cultural influences could have had an impact on respondents' willingness to report drug use during the surveys, contributing to differences between the two countries; however, the current study could not investigate for

such effects. In addition, it has been suggested that because the NESARC was conducted by a government agency, and that information from the C2SS was used to target individuals for participation, respondents in the NESARC may have had concerns regarding anonymity and confidentiality, leading to underestimates of substance use and dependence (Degenhardt et al., 2007b, 2008; Grucza et al., 2007). This is important because previous research has demonstrated that concerns about anonymity and confidentiality could be associated with lower levels of disclosure regarding actual drug use (Aquilino and LoSciuto, 1990). Moreover, it is also reasonable to suggest that rates of substance use and dependence in both the NESARC and NSMHWB could be underestimated. As previously outlined, although both surveys used computer-assisted personal interviews (CAPI), recent research has suggested that the use of computerized self-administration methods (ACASI) to collect sensitive data on substance use may generate more accurate estimates of use and dependence (Grucza et al., 2007).

An additional limitation in this study is that unlike the NESARC, the NSMHWB did not collect any information on the prevalence of cocaine use in Australia because the 1995 National Drug Strategy Household Survey revealed that cocaine use was not prevalent (<1%) among Australian adults (Teesson et al., 2000; Teesson et al., 2006). In the U.S. however, cocaine is the second most commonly used illicit drug (Degenhardt et al., 2008). Thus, it is likely that the omission of this information from the current comparative analyses could potentially have affected some of the analyses and interpretation of the data. Finally, this study is limited by the lack of comparable data between the NSMHWB and the NESARC surveys in relation to frequency and quantity of substance use. It is possible that there are differences in substance consumption patterns, particularly in relation to cannabis, between the Australia and the USA. It is possible that Australian cannabis users may use cannabis in different ways from those in the United States (such as more frequently or more often through a water pipe or “bong”), but such behaviours were not assessed in these surveys. Future work might examine in more detail the context and patterns of drug use across these two countries to investigate these possibilities.

4.2. Conclusions

As the field of drug epidemiology becomes more established and there is increasing attention being given to drug use comparisons across countries and contexts, cross-national comparisons of data derived from well conducted population based surveys of drug use and dependence will play an important role in advancing the strength of evidence. This second comparison of US and Australian data suggests that differences do exist between these two countries. A clear discussion and examination of the possible methodological differences between surveys must form part of any such comparison, but the replication of previous findings about differences in the extent of alcohol and drug dependence across these two countries suggests that these differences may not be merely artefactual. As the number of studies conducted worldwide increases, further comparisons across countries will increase our understanding of both similarities and differences in the nature and extent of risk for drug use problems, and potentially shed light on contextual and cultural factors that play a part.

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Table 1Demographic characteristics of the Australian ($n = 7570$) and American ($n = 29,673$) samples.

	<u>Australia</u>		<u>USA</u>	
	<u>1997 NSMHWB</u>		<u>2001–2002 NESARC</u>	
	<i>N</i>	%	<i>N</i>	%
<i>Demographic variables</i>				
Gender				
Male	3347	50.0	13,153	50.8
Female	4223	50.0	16,520	49.2
Age group (years)				
18–24	1069	18.5	5,199	18.2
25–34	2189	28.8	7,759	25.9
35–44	2480	28.7	9,090	29.6
45–54	1832	24.0	7,625	26.3
Marital status				
Never married	1879	27.3	9,097	27.5
Other	5691	72.7	20,576	72.5
Urbanicity				
Urban	5181	73.8	24,766	81.5
Rural	2389	26.2	4,907	18.5
Education				
Less than 12 years	2199	27.8	4,170	12.7
12 years or more	5371	72.2	25,503	87.3
Employment				
Employed	5783	78.0	23,020	78.0
Unemployed	1787	22.0	6,653	22.0

Note: *N*= unweighted; %=weighted. NESARC =National Epidemiologic Survey on Alcohol and Related Conditions; NSMHWB =National Survey on Mental Health and Well Being.

Table 2

Twelve-months prevalence (% , 95% CI) of substance use and DSM-IV dependence in the United States of America and Australia.

	USA NCS 1990–1991	USA NESARC 2001–2002	Australia NSMHWB 1997	NSMHWB vs NESARC COR (95% CI)	NSMHWB vs NCS COR (95% CI)
<i>Use in the past 12 months</i>					
Alcohol	46.3 (44.1–48.5)	56.5 (56.1–56.9)	77.2 (75.0–79.4)	2.6 (2.5–2.8) **	3.9 (3.7–4.2) **
Any drug	11.9 (10.6–13.3)	5.2 (5.1–5.3)	10.8 (9.8–11.8)	2.2 (2.0–2.4) **	0.9 (0.8–1.0)
Cannabis	8.1 (7.1–9.1)	3.8 (3.7–3.9)	9.8 (8.8–10.8)	2.7 (2.5–3.0) **	1.2 (1.1–1.4) **
Stimulants	2.5 (1.9–3.1)	0.4 (0.38–0.47)	1.3 (0.9–1.7)	3.0 (2.3–3.9) **	0.5 (0.4–0.6) **
Sedatives	2.4 (1.8–3.0)	1.0 (0.99–1.15)	1.1 (0.9–1.3)	1.1 (0.8–1.4)	0.5 (0.4–0.6) **
Opioids	2.5 (1.9–3.1)	1.2 (1.1–1.3)	0.3 (0.1–0.5)	0.2 (0.1–0.4) **	0.1 (0.1–0.2) **
<i>DSM-IV dependence in the past 12 months</i>					
Alcohol	3.1 (2.3–3.9)	5.1 (4.9–5.3)	5.3 (4.3–6.3)	1.0 (0.9–1.2)	1.7 (1.5–2.1) **
Any drug	1.1 (0.7–1.5)	0.7 (0.6–0.8)	2.7 (2.1–3.3)	3.8 (3.1–4.6) **	2.5 (1.9–3.2) **
Cannabis	0.5 (0.3–0.7)	0.5 (0.45–0.55)	2.0 (1.6–2.4)	4.6 (3.6–5.8) **	3.9 (2.8–5.6) **
Stimulants	0.2 (0.0–0.4)	0.09 (0.08–0.12)	0.3 (0.1–0.5)	2.9 (1.7–5.0) **	1.5 (0.8–2.9)
Sedatives	0.2 (0.0–0.4)	0.11 (0.09–0.13)	0.5 (0.3–0.7)	4.5 (2.8–7.2) **	2.2 (1.2–3.9) *
Opioids	0.3 (0.1–0.5)	0.2 (0.18–0.22)	0.3 (0.1–0.5)	1.8 (1.1–2.9)	1.1 (0.6–2.0)
<i>DSM-IV conditional dependence in the last 12 months</i>					
Alcohol	6.5 (4.9–8.1)	9.0 (8.7–9.3)	6.8 (5.6–8.0)	0.7 (0.6–0.8) **	1.1 (0.9–1.3)
Any drug	9.0 (5.7–12.3)	13.3 (12.4–14.2)	22.7 (17.6–27.8)	1.9 (1.5–2.4) **	3.0 (2.2–4.0) **
Cannabis	6.5 (3.6–9.4)	11.8 (10.9–12.8)	20.9 (16.6–25.2)	2.0 (1.5–2.5) **	3.8 (2.6–5.5) **
Stimulants	7.8 (2.5–13.1)	20.1 (17.9–22.2)	22.4 (12.6–32.2)	1.2 (0.6–2.2)	3.4 (1.7–7.1) *
Sedatives	8.4 (1.0–15.9)	9.1 (7.9–10.4)	25.9 (16.3–36.5)	3.5 (1.9–6.4) **	3.8 (1.9–7.8) *
Opioids	9.1 (3.4–14.8)	10.8 (9.7–11.8)	43.1 (11.9–74.3)	6.3 (2.5–15.5) **	7.5 (2.8–20.0) *

Note: COR=comparison odds ratio; CI = confidence interval.

*
 $p < 0.01$

**
 $p < 0.0001$.

Table 3

Adjusted odds ratios (AOR) for alcohol and drug dependence, Australia vs USA, full model.

Variable	Alcohol dependence		Drug dependence	
	AOR	95% CI	AOR	95% CI
<i>Gender</i>				
Male	2.30 **	2.08–2.54	2.23 **	1.80–2.76
Female (R)				
<i>Age (years)</i>				
18–24	3.20 **	2.71–3.79	4.61 **	3.11–6.83
25–34	1.78 **	1.52–2.08	2.48 **	1.71–3.61
35–44	1.38 **	1.18–1.62	1.53	1.02–2.27
45–54 (R)				
<i>Marital status</i>				
Never married	1.67 **	1.49–1.87	1.68 **	1.31–2.16
Other (R)				
<i>Urbanicity</i>				
Urban	0.87	0.78–0.97	1.00	0.79–1.26
Rural (R)				
<i>Education</i>				
Less than high school	1.09	0.96–1.23	2.02 **	1.63–2.50
High school or higher (R)				
<i>Employment</i>				
Unemployed	1.18 *	1.06–1.32	1.92 **	1.55–2.37
Employed (R)				
<i>Nation</i>				
Australia	0.99	0.88–1.11	3.52 **	2.89–4.30
USA (R)				

Note: R = referent category.

*
 $p < 0.01$ **
 $p < 0.0001$.