

Evaluating cannabis policies: Willingness-to-pay to avoid stigma

Work in progress

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Introduction

Cannabis is the most commonly used illicit drug in Australia, with one in three (33.5%) Australians aged 14 and older having used it in their lifetime, and almost one in ten having used recently (at least once in the past year)^[1]. Among recent users 14.9% reported using daily and 19.8% use at least weekly^[1]. In Australia the possession and/ or use of cannabis remains illegal, although various Australian jurisdictions have laws providing for some police discretion for dealing with individuals found in possession of a small amount of cannabis. In 2006, in the state of New South Wales, there were a total of 14,082 separate cannabis offences, of these, 12,528 were possession /use offences (2006 Police COPS data). This translates to an annual risk of arrest of 2.9% to 3.2% per user, or adjusting for frequency of use the rate drops to less than 0.05% of arrest per occasion of use. Under the current laws in NSW police may formally caution, rather than charge adults¹ for minor cannabis offences^[2], so the actual number arrested for possess /use offences is less. However, police retain the right to lay criminal charges on any adult found in possession of any amount of cannabis.

Cannabis is an illegal substance in most countries, however, some jurisdictions have depenalised possession /use or of a small amount of cannabis while maintaining the illegal status of supply and cultivation. Although countries differ in how they enact depenalisation, one of the key arguments for changing the laws pertains to the perceived negative consequences or personal costs to the individual relative to the offence of possession or use of a small amount of cannabis^[3-7]. Others argue that drug use is a human right and it should be treated as a cultural asset not as murder and rape^[8]. An alternative viewpoint is that the personal costs of a criminal record are a justifiable consequence of being found in possession of cannabis^[9, 10] and is a deterrent for the use of an illegal substance. Still others debate drug use itself, some making the point that unlike stigma attached to mental illness there is a value to having negative stigma related to drug use, and that in fact those drugs with higher stigma (heroin) have lower use than those with low stigma (cannabis)^[11]. Further, they argue that probability of criminal sanction for use is so low, and most health outcomes are widely debated, particularly with cannabis, that stigma may be the only major deterrent of illicit drug use^[11].

¹ There are similar but separate laws for juveniles (those less than 18) but this study will only pertain to adults.

This study, conducted as part of a larger cost benefit analyses evaluating the legalisation of cannabis versus the current cannabis policies, uses contingent valuation (CV) methods to attempt to quantify the stigma from a criminal record for the ‘possession or use’ of a small amount of cannabis. Respondents are asked what ‘fine’ they would pay to avoid a criminal record.

Identification of some of the consequences of stigma from cannabis offences were identified by Lenton et al. (2000) among two samples of cannabis users who had been apprehended for cannabis; one group was from the state of South Australia (SA) where a civil penalty (fine) system was in place and the other was from Western Australia (WA), where at the time of the interviews, cannabis was totally prohibited. Of those from WA found guilty, most had neighbours and friends who had found out about their conviction and they reported that they were now thought of as a ‘criminal’; many reported being subsequently asked about a criminal record on a job application, with some denying it and others reported deciding not to apply for such jobs in the future.

The consequences of a conviction can include the social stigma (embarrassment and disapproval of family)^[12] and friends^[7, 13]; or economic stigma (loss or otherwise negative impact on employment, lower future wages, loss of professional registration, denial of some types of business licences, negative impact on ability to hold public office, cost of fines, payments for legal representation and lost wages if imprisoned^[7, 9, 12-16], failure to seek necessary treatment^[10, 17] and potential restrictions on foreign travel^[7]. Even after adjusting for a number of potentially confounding factors, associations with poorer mental health and physical health have been demonstrated amongst those who perceive that they are being discriminated against or feel stigmatised because of their illicit drug use^[10]. Additionally, those in treatment for their drug use, who feel discrimination, are more likely to drop out of treatment^[10].

When assessing drugs policies many of these intangible consequences, such as stigma, go unvalued. Stigma as a result of the use of illicit drugs or as a result of a criminal record as a result of a conviction related to possession, use, or supply of an illicit drug are separate but related issues.

Contingent valuation studies have been used to assess the value of a wide range of treatments, policies, and interventions including the processes of care^[18]; the alleviation of flu symptoms by flu sufferers and their families^[19]; the value of intangible effects of crime^[20]; improved

street lighting ^[21] and in a host of other treatment and illnesses such as IVF treatment, depression, and arthritis ^[22]; the value of drug treatment program in the community^[23]; and the value of a gun control program ^[24]. This paper attempts to add to this literature by quantifying WTP to avoid stigma. The remainder of this paper provides the economic theory, the methods, descriptive analysis, estimates of the societal value of the stigma, and regression analysis examining the characteristics that impact on the amount respondents are willing to pay (WTP).

Methods

CV is a survey technique that can be used to value the benefits of commodities that are not available in the market ^[22]. The theoretical underpinnings lie in utility maximisation with an income constraint. Given the budgetary constraint of the individual, the utility function may take the form of

$$U^1 = f(X, S^{wf}, Y) > U^0 = f(X, S^{nf}, Y)$$

where X is the bundle of goods consumed, S^{nf} is Stigma with no fines (i.e. a person found guilty of a cannabis offence has a criminal record; S^{wf} is stigma (or the lack of stigma) with a fine system, and Y is household income. The compensating variation C , the measure of the utility change is

$$U^1 = f(X, S^{wf}, Y-C) \Rightarrow U^0 = f(X, S^{nf}, Y)$$

where C is the amount of money paid in the form of a fine, to reduce stigma from S^{nf} to S^{wf} but will leave the person just as well off as before.

Survey construction

A CV study requires the development of a hypothetical scenario describing a particular good or service. Respondents are then asked what they would be willing-to-pay for that good or service described, or alternatively, what is the minimum amount they would need to accept in order to be deprived of the good? CV studies are often used in hypothetical scenarios where the respondents may be totally unfamiliar with the context. Experience with a good or service may actually result in different valuations, as those with previous experience may be valuing their own experience not that described in the scenario ^[25]. As such the scenario must be clear, succinct, and provide all necessary information in order for a decision to be made while at the same time not overburdening the respondent with too much extra information ^[26]; it must also be realistic enough that the respondent takes it seriously and believes that it could

happen ^[21, 26] but not likely to elicit strong preferences ^[26]. This requires writing the survey and the question in neutral language and piloting the survey to ensure readability. This survey was piloted among 60 colleagues, and subsequently modified to improve the ease of readability. Pilot respondents did not report any difficulty in either understanding the question or in making a choice of an amount they were WTP, neither did they report that the survey was unrealistic.

This WTP study was a pragmatic addition to a larger survey that was obtaining data on community preferences for different types of cannabis policies. The larger survey consisted of nine complex discrete choice tasks; the CV question was the tenth task for the respondents. Additional information was collected on demographics (i.e. age, gender, education and employment, number of children, household income) and attitudes (believe whether cannabis is addictive, whether there are health benefits from cannabis and political leanings) and use of cannabis in order to explore heterogeneity in choice of WTP.

The scenario in the CV study describes a situation where the respondent (or in alternate versions of the questionnaire, someone close to them) was detected by police with a small amount of cannabis. A small amount of cannabis was described as no more than sufficient quantity to make approximately 24 joints. The respondents were told the person detected with the cannabis had no previous criminal record, and had committed no other offences at the time.

The scenario briefly described the process of being arrested, having to attend court, and some of the consequences of a potential criminal record. Consequences included a potential negative impact on employment opportunities, a decreased ability to travel to some countries, as well as the stigma of having a criminal record. Respondents were also informed in the survey that approximately 3 in every 100 people who use cannabis in any one year are detected by police.

Part of getting respondents to take the survey seriously, is ensuring the payment vehicle was reasonable and suits the context of the study ^[26]. Inappropriate payment vehicles may result in biased responses, this may occur when respondents are asked to consider a payment for a good or service for which they do not normally pay for directly e.g. health care in a public system. Payment options used in CV studies include direct out-of-pocket payments, changes in taxation, insurance or voluntary payments. In this survey, the question was framed in terms of the maximum fine that would need to be paid to avoid a criminal record. The range presented

to the respondents in this survey was the actual fine structure for cannabis possession /use in Australia.

The sample and mode of administration

The sample for the final study was recruited from a panel of 90,000 Australians through a commercial survey company (SSI). The survey was done on-line. Recruitment was stratified by “ever used cannabis” with an attempt to approximate the population rate of ever used cannabis which is 33%, and then to match the population age and gender distribution over the age of 18.

Research elsewhere suggests that face-to-face administration of CV surveys may provide the ‘best’ results. As this survey was included alongside a complex discrete choice survey, and involved questions about illicit drug use it was felt that anonymous administration might avoid answers that were approval seeking ^[26]. Additionally, face-to-face survey required resources that were beyond this study. Telephone surveys are also often used in this field but were not felt to be suitable due to the complexity of the other parts of the survey.

The administration of the survey involved panel members being notified of the study and their participation requested. They then logged onto a website to complete the survey. As various strata (cannabis use, age, and gender) were completed access to the survey was denied to those strata. In addition, a predefined time algorithm was used to exclude those who completed the whole survey too rapidly.

Ethics was granted by the University of New South Wales HREC. Respondents received no payment but a donation was made to a charity for every survey completed.

Format of the question

The actual question can be asked in a number of different ways from an open-ended question, payment card method, bidding game, single bounded dichotomous choice / referendum methods, double bounded dichotomous choice formats or one and a half bound distribution ^[27, 28]. Each has limitations, for example, open ended questions often result in a large number of non-responses^[29, 30], zeros, outliers and unreliable responses^[28] particularly if the subject has not thought about the issue. Additionally, in a normal market we are not used to stating the price of a desired purchase.

In a bidding game format, the respondent is presented with an amount, and asked if they would pay this amount, if they answer yes, the amount is increased until the maximum the

respondent is willing to pay is reached, similarly if the first response is no, they are presented with decreasing amounts until they reach a maximum WTP. This method is susceptible to starting point bias ^[27, 28, 31].

Bounded dichotomous choice requires the respondent to say only yes or no to one amount, however, this has been demonstrated to be an inefficient method of obtaining estimates ^[28]. Double bounded and one and half bound distribution are variations of this method that permit additional information to be collected thus improving the efficiency of the methods, but they do not all correspond to the same WTP distribution ^[28]. These binary choice methods impose assumptions onto the shape of the demand curve ^[31] but it is often argued that they function more like a market where one chooses or accepts based on the offered price ^[31].

Another commonly used method is the payment card where a number of plausible monetary values for the good are placed in front of the respondent and they asked to chose the maximum amount they are willing to pay^[27]. Respondents willing-to-pay more than the highest stated amount can be asked to state their maximum WTP ^[32]. This method while minimising outliers is susceptible to biases due to the starting/ ending points, and the frequency of numbers in the range ^[27, 28, 31]. Others argue that the payment card, is the most realistic as it mimics the ‘shopping around’ experience ^[33].

In this study, a decision was made to use a payment card format. Of the various methods, the trade-off between providing reasonable responses and the simplicity appealed given the question followed nine complex discrete choice profiles. It was felt that to use the more complex bidding /trade-off questions might aggravate the respondents and result in a high rate of non-response.

Smith explores whether offering the values in a random order, moving from hi to lo values, or lo to hi values make a difference in the WTP ^[34]. He found there was no statistical difference in results between Hi-lo and random presentation, or between Lo-Hi and Hi-Lo, but there were statistically different results between Lo-Hi and random values on the payment card. Although not statistically greater, the Hi-lo version consistently gave higher results than the others. The random presentation did however increase the complexity and cost of administration. This survey used high-low and low-high presentation of the values to explore whether there was starting point bias. Example of scenario and payment card available from author on request.

As some respondents may know with some certainty that they would never use or be found with cannabis and thus find the question unreasonable, half of the respondents were asked

what they would be WTP if the person detected with cannabis was a loved one. There are mixed findings in the literature on , with some detecting that WTP for one's self is more important ^[35] while others find no difference ^[19].

In summary, WTP was elicited using four versions of a payment card. In two versions, the respondents were asked to consider what they might pay in terms of a fine if they were found by police with a small amount of cannabis in their possession; one of these started with zero and went to \$2,500 and the other started at \$2,500 and went to zero. In the other two versions, the respondent was asked what fine they would pay if "someone who was close to them" (i.e. a child, partner or sibling) was found in possession of a small amount of cannabis; again there were two versions of the card – one low to high and the other high to low. The values for the fines were based on the actual fine structure in Australia for the possession/use of a small amount of cannabis and were \$0, \$50, \$150, \$250, \$500, \$750, \$1000, \$1250, \$1500, \$2000 and \$2500.

Analysis

Two sets of analysis were conducted. First, descriptive analyses of the WTP including the mean and estimates of the total estimates of the societal valuation of stigma are presented. Secondly, regression analyses were done to examining the impact that various characteristics have on the WTP.

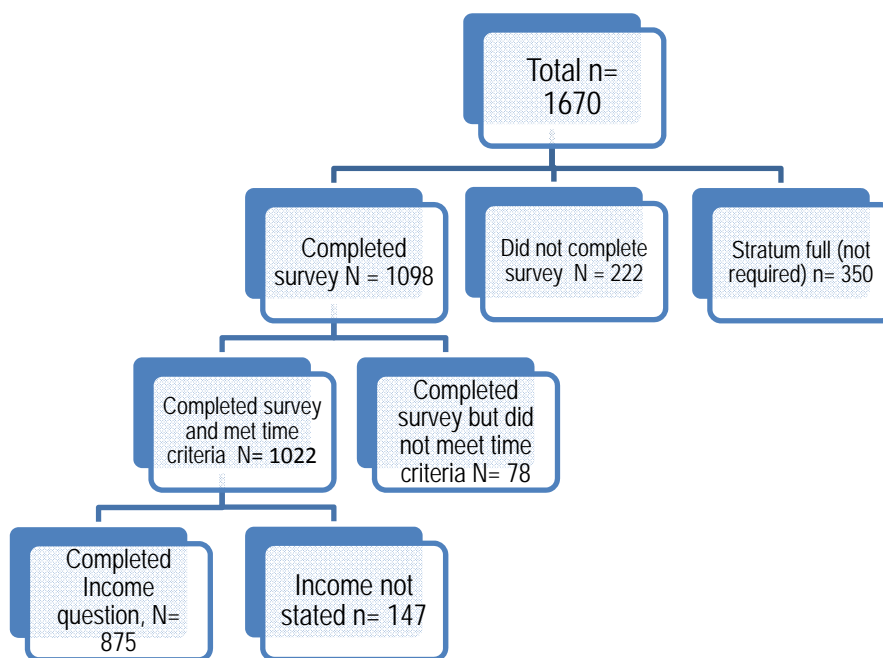
The mean WTP is preferred over the median when using the results in a policy context ^[27, 28], however, if the data are skewed or there are some large outliers they may put excessive weight on certain preferences, and in which case the median is a better predictor of what the public are willing to pay. Both are reported. As the WTP responses are expected to be positively skewed non-parametric tests were used. A Kruskal-Wallis test was done to test for the null hypothesis that there were no differences across all groups, while the Wilcoxon Rank Sum test was used to test the null hypothesis that that there would be no difference between the high-low and low-high formats and between whether paying for self versus others.

An initial OLS regression analysis (log linear) was estimated. Tests for misspecification (Ramsey RESET) and Breusch-Pagan test for heteroskedasticity were performed and the model subsequently modified. Two quadratics, one each for age and income, were added. The final analysis used weighted least squares.

Results

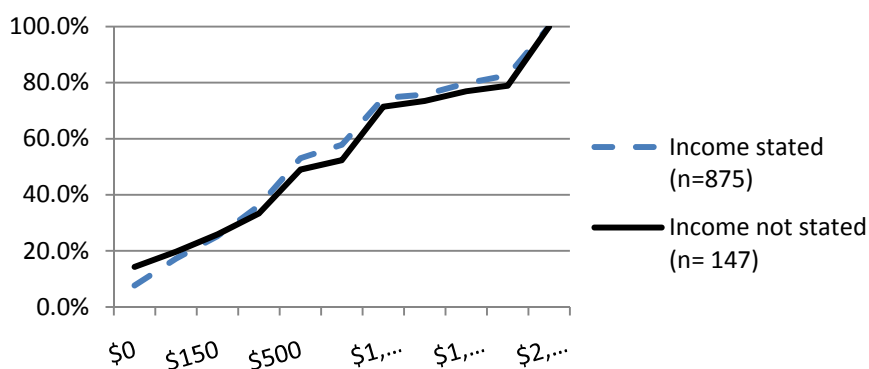
A total of 1670 persons logged on to undertake the survey over a period of one week (see Figure 1). Of those, 350 belonged to stratum already full and did not complete survey beyond cannabis use, age and gender questions (screening questions). A total of 222 people who started the survey did not complete it; they either logged off before completion or the internet became inactive. Of the 1022 valid survey responses, 147 did not complete the household income question, and as it was expected that the household income would be an important explanatory variable, the WTP analysis was undertaken on the 875 complete surveys.

Figure 1: Survey respondents



Before examining the WTP data in more detail it is worth examining the cumulative frequencies on WTP for those who stated their income (n=875) and those who did not (n=147). As can be seen in Figure 2 the cumulative frequencies of WTP are similar for those who stated their income and those who did not suggesting that their exclusion should not negatively impacted the results.

Figure 2: Cumulative frequencies of WTP



Demographics, characteristics and attitudes

There are no apparent differences in demographics across the four versions of the survey. The average household income was \$59,000 (AUD) with an average household size of 2.25 (SD 1.21) persons. The sample was 48% percent female and the average age was 46.3. Within the sample 24.3% had a tertiary education, 20.7% had completed less than Year 12, 12.4% had completed Year 12 and the remainder had a diploma or quantifications from a technical college. 65.6% of the sample was married or in a de facto relationship.

About cannabis

Over the whole sample, 41.7% had ever used cannabis, 11.4% reported using within the past year, with the average frequency of consumption on 7.7 occasions in the past year. 86.3% indicated that they believed cannabis is always or usually addictive, and 26.4% believed there were some health benefits from the use of cannabis

Table 1: Characteristics and Demographics (n=875)

<i>Characteristic</i>	About self		About loved one		Total <i>ALL</i>
	<i>Lo-Hi</i>	<i>Hi-Lo</i>	<i>Lo-Hi</i>	<i>Hi-lo</i>	
	n=217	n=230	n=218	N= 210	
Age – mean (SD)	47.35 (15.10)	46.8 (15.1)	47.05 (15.48)	45.5 (15.15)	46.3 (15.19)
Males %	56	54	50	48	52.3
Believe cannabis has health benefits %	28.1	25.2	27.0	25.2	26.4
Believe cannabis addictive %	87.6	84.5	83.9	89.5	86.3
Used cannabis in past year	11.1	11.7	11.0	11.9	11.4
Used cannabis ever	43.3	42.6	37.8	43.3	41.7

No. of occasions used past year - Mean (SD)	7.7 (44.4)	7.98 (43.64)	8.75 (45.01)	5.96 (37.46)	7.63 (42.74)
<i>Political views</i> ◇					
Left %	18.3	14.8	10.6	10.5	14.9
Right %	20.48	19.1	19.7	21.4	20.1
Missing Response %	12.9	20.0	20.0	19.5	16.6
<i>Employment status</i> #					
FT/PT employed	51.1	53.4	51.3	53.3	52.6
PT employed	16.6	20.0	18.4	16.7	17.9
Looking for employment	5.17	6.5	6.4	7.1	6.3
Retired/ Pension	23.0	26.5	28.0	21.9	31.2
<i>Education</i> ^					
Full time student	5.53	2.61	3.67	3.33	3.8
Education less than Year 12	24.8	20.4	18.0	20.0	20.7
Education equal Year 12	19.4	18.3	21.6	12.4	19.7
University education	23.5	25.6	22.9	25.2	24.3
Ever attended court	18.4	23.0	17.4	17.6	19.2
Married/ defacto	69.1	64.5	64.2	64.8	65.6
Number of children	0.68 (1.09)	0.63 (1.05)	0.65 (1.0)	0.67 (.96)	.65 (1.03)
With children living in household	35.9	33.5	32.1	40.0	35.31
Household income Mean (SD)	58,162 (40,179)	58,710 (46,513)	59,543 (46,746)	59,951 (42,260)	59,079. (43,999)

◇Excluded category is middle (ie. neither left or right, #Excluded category is homemaker; ^Excluded category is TAFE/.technical college, diploma

WTP

The overall mean WTP to avoid the stigma of a criminal record was \$898.50 per respondent. The mean WTP in the four versions of the survey ranged from \$805.70 in those who were asked about WTP for a loved one and had the low-high payment card (PC) to \$1006 in the group asked about ‘themselves’ and presented with a high to low PC (Table 2). Although the skewness statistic is not large, the difference between mean and median WTP indicates skewed responses.

The Kruskal Wallis test rejected the null hypothesis of no difference in WTP across the four groups ($\chi^2 = 8.92$, $p=0.03$). A Wilcoxon Rank Order test (results presented Table 3) suggests that there is a significant difference between the WTP for those who were presented with a

payment card low - high relative to those who were presented with the high-low PC. The high-low PC presentation produced significantly higher results. It does not appear that there is a significant difference, at the 5% level, between the amounts an individual is WTP for themselves versus a loved one.

Table 2: WTP a fine to avoid a criminal record for possession or use of a small amount of cannabis by various scenarios

	All	Scenario about self		Scenario about loved one	
		<i>Lo-Hi</i>	<i>Hi-Lo</i>	<i>Lo-Hi</i>	<i>Hi-lo</i>
<i>N</i>	875	217	230	218	210
Mean	898.5	877.2	1006.3	805.7	898.8
Std. Deviation	865.0	877.4	874.2	856.2	843.9
Median	500	500	875	500	750
Skewness	.083	.967	.668	1.102	.881

Given evidence of starting bias elsewhere, it is not surprising that the mean for those shown the high-low PC is larger than those who were presented with a low-high PC suggesting presentation bias may be present.

Table 3: Wilcoxon Rank Order (WTP)

Comparison	z	p
Payment card: comparing self versus loved ones (pooled all high and all low)	-1.78	0.08
Payment card low to high (pooled 'all self' and 'all loved ones')	-2.42	0.02

Valuation for the cost benefit analysis

In order to arrive at a *total value of stigma avoided*, when criminal sanctions are not imposed for possess/use offences, an estimate of the WTP must be multiplied by some population. But which population — there are a number to consider and they range from the total adult population (or households) of NSW, the population of cannabis users, all cannabis users who were detected by police for a possession/ use offence, just those who went to court, or finally just those who were detected for only a cannabis offence and did not have a prior criminal (non-drug) offence. As is illustrated, in Table 4, the total value of the WTP is very different depending on which population is chosen, and also whether the mean across the whole sample or the median is used.

Those who may actually bear the stigma of being convicted of cannabis possession /use offences in NSW, in one year, are those who are found guilty of an offence and do not have a prior or concurrent non-cannabis offence. In NSW, in 2006, this was 1,076 persons (Unpublished data). However, this is with a cannabis-cautioning program in operation, where many who are detected with cannabis by police are not charged with a criminal offence. In order to be comparable with the WTP question asked, the number detected by police with a small amount of cannabis, may be the most relevant number (n= 12,254²). This results in a total of \$11 million, using the mean WTP. If the median is used this reduces to \$6.1 million.

Table 4: Total Willingness to pay

<i>Population description (one year)</i>	<i>N</i>	Mean \$898 \$	Median \$500 \$
NSW population 18+	5,244,644	4,714,934,956	2,622,322,000
Cannabis using population	438,501	393,773,898	219,250,500
Possess/use offence	12,254	11,016,346	6,127,000
Cannabis offence who go to court	6,026	5,417,374	3,013,000
Cannabis offences minus prior non-cannabis offences	1,743	1,566,957	871,500
Cannabis offences minus those with prior & concurrent	1,076	967,324	538,000

Regression analysis

The results of the regression analysis are provided in Table 5. The dependent variable (LnWTP) was the log transformed (WTP +1) as is often done with skewed data^[36]. One was added to all WTP as 7% of the respondents indicated they would pay zero dollars, a rational decision for those who believe that deterrence of a criminal record is important in modifying behaviour.

The Ramsay RESET test on the initial OLS suggested misspecification, however, after introducing quadratics for age and income this was resolved (p = 0.132). The Breusch-Pagan test suggested heteroskedasticity (p<0.0001). A weighted least squares model with weights proportional to income and income squared was subsequently used^[36].

² This is the number offences, not offenders. Other data suggests that the about 4% of offenders have multiple cannabis offences each year.

Before examining individual coefficients, it is worth noting that in re-specifying the model and making corrections for heteroskedasticity there were no sign changes. The main economic variable, the household income adjusted for family size (OECD Modified scale) remained highly significant across all models. In the final model, the coefficient indicates a 0.0035% increase in WTP for every additional dollar of income, up to a turning point of approximately \$100,000 at which time the rate per additional dollar of income WTP begins to decrease ^[36].

The LnWTP is also significantly and positively related to the following independent variables: the more children in the household the more the respondent was WTP; marital status, those who are currently married are WTP more than those who are not as are those who are retired (homemaker as the base). The high low version was also significantly and positively related to the WTP. Age is negatively related to WTP. Evaluating at the mean age of the sample which was 46 years; those who are older would be willing to pay approximately 1.9% less for each year of age over 46, with the percentage rate decreasing until the age of 69 at which point the WTP would begin to increase.

Relative to those who classify themselves as homemakers (both males and females) the only employment category where there was any significant difference was with those who are retired. Two other independent variables that were expected to be significant were whether the respondent thought cannabis as always /usually addictive (base never addictive) and whether there any health benefits from the use of cannabis. ³

Although there were no significant differences in WTP between those who had recently used cannabis and those who had not, there are differences the rates of cannabis use between males and females at the population level. An interaction term was constructed to examine whether these differences extended to differences in WTP. The highly significant coefficient on this interaction term would suggest that there are gender differences. Relative to males who have not used cannabis in the past 12 months, females who have not used are WTP 15.8% more, and females who have used cannabis are WTP $(15.8 + 72.9 - 46) = 42.7\%$ more, while males who have used cannabis in the past 12 months would be willing to pay 46% less.

³ In an earlier model, educational classifications and political views (left, right etc.) were included but never approached significance and for the sake of parsimony were not included in the final models.

Table 5: Regression analysis

	OLS			OLS			WLS		
	Coeff	Sig	Std error	Coeff	Sig	Std Erro	Coeff	Sig	Std Error
Inc_Household	0.000011	***	0.000002	0.00004	***	0.000006	0.000035	***	0.00001
Iin_HH ²				-2.000E-10	***	3.8600E-11	-1.740E-10	***	4.470E-11
Sex_Female	0.214	*	0.145	0.167		0.152	0.158		0.136
Married	0.311	**	0.151	0.261	**	0.150	0.222	**	0.138
Used recently	-0.177		0.221	-0.522		0.282	-0.460		0.240
Health benefits	-0.380		0.155	-0.345		0.154	-0.276		0.140
Addictive	0.510		0.196	0.478	*	0.193	0.509		0.172
Hi_Lo	0.229	**	0.133	0.232	**	0.131	0.276	**	0.118
Emp FT/PT	0.603		0.233	0.440	**	0.235	0.631		0.237
Retired	0.278		0.286	0.240		0.283	0.556	**	0.287
FT Student	0.574		0.418	0.449		0.414	0.662		0.394
Looking for work	0.340		0.343	0.367		0.340	0.577		0.354
No. Kids	0.121	**	0.076	0.158	***	0.076	0.122	***	0.074
Age	-0.007	*	0.006	-0.054		0.029	-0.019	*	0.027
Age ²				0.000	***	0.000	0.000	***	0.000
Female*Use				0.724	*	0.418	0.729	***	0.369
Constant	4.514		0.428	5.012		0.679	4.156		0.637
R2	0.0904			0.1237			0.1163		
F	6.58			7.37			7.06		
p	<.0001			<.0001			<.0001		
Breusch-Pagan, <i>p</i>				<.0001					
Ramsey RESET, <i>p</i>	0.002			0.1324					

Discussion

The results in this paper suggest that individuals are able to place a value on the stigma associated with a charge related to cannabis possession/use and indicate they are willing to pay a mean value of \$898 to avoid that stigma. This payment would be to avoid the stigma of a criminal record for either themselves or a loved one where this stigma may potentially impact on the individual's ability to obtain or maintain employment, on future earnings; on the likelihood of seeking treatment for dependence and on ability to travel overseas, as well as

restricting professional and business activities ^[7, 9, 13-16]. Social stigmatisation by family, friends and neighbours may also have been a consideration in choosing a response but was not explicitly stated in the description.

Respondents, who were married, had children and were female selected higher WTP values as did those who have higher household incomes even when adjusted for family size. This was not an unexpected finding. Surprisingly, recent use of cannabis was not significant on its own. One reason for this may be that those who use cannabis routinely are relatively confident they would not be detected. There were notable differences between males and females when recent use was interacted with gender. Females who have used are WTP considerably more than their counterparts who have not; whereas males who have used recently would be WTP considerably less.

There were limitations to this study. The decision to conduct the survey on-line and to use a payment card was a pragmatic one given the resources available. The results appear to indicate that people understood the question and responded appropriately, although in a question not presented here, those who selected \$2500 (the highest value) were allowed to state the maximum they would pay. These data, while yet to be fully analysed appear to have some improbable responses with a few individuals with low annual incomes stating they would be willing to pay amounts that were up to ten times their annual incomes. These outliers affect the mean WTP for one group in particular (those who are in the high-low and 'self' group). It may be that personally administered surveys result in fewer protest bids ^[29]. Future work will include analysis of this additional question.

As in the use of any survey technique there are a number of potential biases ^[28]. The results of this survey indicated there was likely starting bias (high-low). It is also feasible that the hypothetical nature of this study may have resulted in unconsidered responses; however, the scenario described is similar to programs currently operating in several jurisdictions in Australia. Additionally, it is possible that individuals may have undertaken 'yea saying' and selected a larger value without considering the implications as they knew they were unlikely to have to pay it. However, as discussed above, several respondents when provided the opportunity to give an open bid revised their bid to a much larger number, some selected up to \$50,000.

Not surprisingly, the mean WTP is somewhat higher for the ‘self’ versus ‘other’ group but the amount is not significantly different. It is not possible to comment on whether this is altruism for other in society^[30] or whether it may simply be care for family and other loved ones.

The theoretical validity of contingent valuation results can sometimes be tested by examining whether the results conform to the predictions and assessing whether expected relationships hold between the demographic and attitudinal information collected ^[28]. Dealing with the issue of demographics and attitudinal behaviours first, this study did find an expected relationship between WTP and income, and between WTP and number of children in a household. It was expected that those with dependent children may place a higher value on avoiding the potential harms of stigma. Expected relationships between thinking cannabis has health benefits and being WTP more did not eventuate, nor did any significant relationships between political views and WTP. It was hypothesised, *ceteris paribus*, that those who were older may have felt that a criminal record was warranted, however, life experience, having children or grandchildren may lead to alternate views.

It is not possible to test for convergent validity as there is no evidence of such a study having been conducted previously. Nonetheless, these results can to be placed in the context of what actually happens in three jurisdictions in Australia where fines are currently issued for the detection of a small amount of cannabis. In WA, it was reported that after 4 years of the program 66.3% of the Cannabis Infringement Notices (CIN) were complied with either by paying a fine or attending a treatment facility. Failure to pay the CIN results in the loss of drivers licence. In SA, early in the program, approximately 55% of offences were expiated but more recently “*around half of all CENs issued between 1998 and 2000 were forwarded to court for enforcement (50.7% in 1998, 52.7% in 1999 and 46.4% in 2000)*”^[37]. In SA when matters are forwarded to court as a result in lack of payment this may result in a criminal record. A similar pattern exists in the Australian Capital Territory (ACT) where the highest rate of expiation was 67.8% in between 1994 and 1996, and more recently the rate dropped to 48.6%^[38].

What is not clear is whether differences between the stated WTP and results from these programs arise because of overstating of WTP, or differences between respondents and participants in the civil infringement programs. The participants of these schemes are not the same as the respondents of the survey. Cannabis users are younger. In WA, 81.1% of those issued with a CIN were aged between 18 and 34 ^[38] whereas the contingent valuation survey attempted to be representative of the population. There were higher rates of non-payment

among females, indigenous, those issued with multiple CINs, and those who live in some of the rural and remote areas of WA. This final point is important as an alternative to paying the fines was to attend a treatment centre, but a lack of access to treatment facilities for those who were unable to afford to pay the fines was an additional impediment^[38]. Moreover, many of those in WA who failed to expiate had a previous criminal record; were already disqualified drivers; or already had a number of unpaid fines meaning they may have had little to gain by paying the fine. Is there a dissonance between only 40 to 60% actually paying a fine of between 100 and \$200 and an average societal WTP of approximately \$900? It may be hypothetical bias or it may simply be the fact that those detected with cannabis tend to be younger, less well off, and otherwise disadvantaged. These data are not sufficient to be able to address these issues.

There are issues, as to what population could be used to estimate the societal WTP for stigma avoided. The actual stigma avoided would appear to be for the cannabis using population who currently have police encounters but the question as to whether the total societal WTP (population times their mean WTP) is valid remains open for debate.

Finally, this novel use of CV may prove useful in attempting to quantify stigma in diverse areas such as mental health and HIV/AIDS

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