An Analysis of the Potential Fiscal and Health Benefits of the Legalisation of the Sale of Marijuana in South Africa

Abstract

This paper explores the potential fiscal and health benefits South Africa could achieve if it were to legalise the sale of marijuana exploring outcomes from other countries' experiences. The fiscal benefits explored were the potential creation of a new stream of tax revenue and the decrease in government spending currently focused on anti-marijuana law enforcement. The fiscal concerns explored were issues around a decrease in tax revenue from a decline in demand as the price increases, the existence of the black market even after legalisation, and a decline in tax revenue from the decrease in alcohol consumption. The health benefits discussed are the decline in consumption of alcohol, the use of marijuana to aid in rehabilitation for alcoholics and drug addicts and the potential for a new field of research. The health concerns explored are abuse from adolescents, possibility of addiction in adults, and concerns regarding an increase in the consumption of junk foods. The marijuana market already exists in South Africa, in both rural and non-rural areas and as such, both poorer and more developed communities could gain from the legalisation of marijuana in South Africa. Data was collected through surveys to understand consumer preferences for marijuana, there is strong evidence that respondents are consuming marijuana already and as such there is evidence of the existence of a marijuana market within the sample population that is not being taxed, therefore, government could gain from legalising the sale of marijuana as they could earn a tax revenue from it.

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1. Introduction

Marijuana has been on the forefront of many debates in South Africa; including political, medical, and economic. The Western Cape High Court decriminalised the use of marijuana for use in one's private residence in 2017 (Prince v Minister of Justice and Constitutional Development and Others; Rubin v National Director of Public Prosecutions and Others; Acton and Others v National Director of Public Prosecutions and Others, [2017]). Thereafter, the Constitutional Court of South Africa (2018) ruled the use of marijuana in the privacy of one's home legal in September of 2018. Thus, it would be valuable to understand how South Africa could potentially benefit if it were to legalise the sale of marijuana, for both recreational and medical use.

Since the Constitutional Court ruled the use of marijuana in the privacy of one's home legal; the idea of marijuana being legal to some extent could spark some interest in the next step, which would be for South Africa to investigate the legalisation of the sale of marijuana for both recreational and medical purposes, and investigate the benefits of this. The purpose of this paper is to ascertain what potential taxation and health benefits South Africa could benefit from if it were to legalise the sale of marijuana.

Marijuana is a substance that is extracted from a plant called Cannabis Sativa (Hajizadeh, 2016). It is a psychoactive substance that grows naturally in many countries, it is used for both medicinal and recreational purposes throughout the world (Hajizadeh, 2016). South Africa has not fully legalised the use of marijuana yet, but several other countries, such as the Netherlands, have benefited from legalising the sale and use of marijuana (United Nations Officed on Drugs and Crime, 2018). Research has shown that marijuana has an abundance of benefits, not only as a drug, but also the impact that hemp[1] products have on the environment.

Global Commission on Drug Policy (2019) think that the United Nation's 1961 convention for drug scheduling has either not received any evaluation or the evaluation is decades out of date. Global Commission on Drug Policy (2019) believe that the scheduling of psychoactive substances is not based on pharmacological research, but rather that it is based on historical biases and political considerations. This means the scheduling of drugs is based on societies' perceptions of whether that drug is 'good' or 'bad'.

This means that South Africa could follow in the footsteps of other countries who have legalised the use and sale of marijuana, these countries have benefitted from unanticipated results, such as a decline in the price of marijuana, a decrease in the consumption of marijuana in the youth, etc (Humphreys, 2017).

[1] Hemp is a variety of cannabis that contains less than 0.3% of THC (i.e. dry weight) - this is usually the form of cannabis that physical materials would be made out from (Cadena, 2018).

The legalisation of the sale of marijuana in South Africa would open the opportunity for the South African government to benefit from the taxes added to the sales of marijuana. These benefits are discussed in section 2 of this paper. The South African government would need to consider the potential fiscal disadvantages as well; an example of this would be the potential decrease in the quantity sold due to the increase of prices due to taxes added. The disadvantages of the potential taxation of the sale of marijuana are expanded on in section 3 of this paper.

If South Africa were to legalise marijuana for sale, they would be able to reap many benefits; an example of these benefits is the whole new field of research for South African medical researchers. These medical benefits are discussed in full in section 2 below. It should be cautioned that legalising the sale of marijuana would come with disadvantages in respect of health for South Africa, these disadvantages are discussed in section 3.

A survey was undertaken to better understand the characteristics of the South African market, and how it could potentially be affected by the legalisation of the sale of marijuana. The survey collected data on people's consumption of marijuana, alcohol, and other recreational drugs within South Africa, their views on marijuana, and their views on alcohol and cigarettes. The survey was shared on personal social media platforms, such as Facebook, Instagram, and Twitter, and by word of mouth to recruit responses. The results from the survey found evidence of the existence of a marijuana market in South Africa and showed substantial demand for marijuana for medical purposes.

This paper is organised as follows. The second section of this paper covers the advantages of marijuana, sub-divided into the fiscal and health benefits. Followed by the third section which covers the disadvantages of marijuana, also sub-divided into the fiscal and health disadvantages. The fourth section gives some insight into what South Africa could gain from legalising the sale of marijuana. The sixth section of this paper discusses the method that was used, then the seventh section of this paper analyses the data that was collected and discusses these results. The eighth section concludes this paper.

2. The benefits of Legalising the sale of Marijuana

There are several arguments for the legalisation of the sale of marijuana; these are discussed in detail below and have been split into the fiscal and health benefits. The most appealing fiscal arguments are a new stream of tax revenue and the link between marijuana and crime related activities is lower than that of other drugs. These could lead to a decline in costs associated with marijuana-related crime for the South African Police Service (SAPS). The most appealing health benefits are the decline in alcohol consumption, assist in reducing damage done to the brain by excess consumption of alcohol, several addicts use marijuana to ease themselves off hard drugs, and that it is less dangerous in terms of overdose, risk of tragic intoxicated behaviour and risk of addiction. These would lower the costs for

public healthcare systems, improve the overall health level of the population, especially considering South Africa's high abuse of alcohol.

2.1 The Fiscal (Tax and Spending) Benefits

One of the most appealing arguments for the legalisation of marijuana is that it would provide a new stream of taxation revenue (Hajizadeh, 2016). Considering that South African has such high levels of government debt, and it is forecasting another budget deficit for the year 2020/2021 (National Treasury, 2020); an increased tax revenue would allow for an alleviation of the pressures from the budget deficit. National Treasury (2020) are forecasting the 2020/2021 budget deficit will be -14.6% of GDP. The high demand for the substance would yield a high tax revenue (Hajizadeh, 2016).

The legalisation of the sale marijuana in South Africa would create a new legal market – the marijuana market - one with an opportunity for high taxation as it could be taxed as a sin tax and as a general product (Hajizadeh, 2016). Riley *et al* (2019) found that the price elasticity of marijuana in South Africa was similar to that of cigarettes, it was suggested that if government were to legalise marijuana, they could use the model for taxing cigarettes as a benchmark. If this were done, marijuana would be subjected to three taxes - value added tax (VAT), sin taxes, and potentially export taxes if it were to be exported (Riley *et al,* 2019). Sin taxes and excise taxes are levied as a specific tax – a certain amount is charged per a product (van Walbeek, 2003). Therefore, the tax revenue would be consistent for the same quantity of marijuana sold regardless of the price[2]. As discussed below, there is evidence of a flourishing black market which could support the argument of a potentially large market for marijuana if it were to be legalised for retail purposes.

It is possible that the pre-tax price of marijuana will fall after legislation since prohibiting marijuana creates large expenses for the industries producing the drugs which are then passed on to consumers through high retail prices (Humphreys, 2017). Riley, Vellios and van Walbeek (2019) also agreed that the price of marijuana is likely to decrease due to the elimination of the risk associated to the drug, which would also increase the demand for the marijuana. The price of marijuana dropped in California, Washington, and Colorado (results shown in Table 1 below).

Table 1 includes certain case studies that look at the benefits certain states in the USA had from legalising the sale of marijuana. Colorado was one of the first states in the USA to legalise the sale of marijuana in 2014, for both recreational and medicinal purposes (O' Conner, 2016). Part of the tax revenue was used for public programs associated with substance abuse and marijuana use (Hajizadeh, 2016). Thus, part of the tax revenue was used to prevent abuse of the drug. All revenue generated from the sale of marijuana in California is geared towards youth anti-drug problems (60%), the environment (20%), and public safety grants (20%) (Downs, 2020). California taxes on three different levels, the

[2] The price of marijuana would affect the quantity, so the tax revenue is not completely independent of the price.

first is the nation-wide 7.25% sales tax, the second is an additional 15% excise tax on purchases, and the third is a range of taxes on cannabis flowers, leaves, and plants (Becker, 2019). This three-tier tax regime could contribute to the higher tax revenue generated in California compared to Colorado.

Table 1: Benefits from Legalising the Sale of Marijuana

State	Year it became legal	Sales	Tax Revenue	Price
Colorado	2014	Sales reached $1 billion in 2015	$130 million in 2015 Twice what was collected from alcohol sales > $302 million in 2019	Price decreased by 70% over the space of four years (Adams, 2018).
Washington	2014		$30 million in 2015 $47 million in 2016 $59 million in 2017 $65 million in 2018	Price of marijuana had dropped by 67% in July of 2017 (Humphreys, 2017).
California	2017		$635 million in 2019, an increase of 35% since 2018	The pre-tax price of marijuana dropped significantly (Humphreys, 2017).

It is difficult to say if, or even which, of these states South Africa would take after if it were to legalise marijuana for retail purposes. South Africa is a middle-income country and it most likely would not be able to have a three-tier tax regime and still generate such high tax revenues. Ho, Hsieh, Lee, Schafferer, and Yeh (2017) found that a price increase of 7.38% on cigarettes would on average decrease consumption by 3.84% and increase tax revenue by 19.39% when studying the effect on 36 African countries. Mukong and Tingum (2019) found that a 10% increase in the price of cigarettes reduced the consumption by 4.3% for low-price brands and 6.9% for mid-price brands. Shanahan and Ritter (2013) concluded that there is inadequate data to determine the shape or movement of the demand curve for marijuana if the sale of such were to be legalised. Riley *et al* (2019) found that the price elasticity of marijuana in South Africa was similar to that of cigarettes, and we could use the above movement in cigarettes as a point of reference for the movement in marijuana.

The legalisation of the sale of marijuana would also decrease government spending that is devoted to law enforcement around the issue of marijuana, this would also decrease costs related to drug imprisonment and enforcement (Hajizadeh, 2016). It was estimated that R3.5 billion was spent on anti-marijuana law enforcement activity in the year 2014-2015 (van Kerken, 2016). These costs include the cost of arrests, investigations, court proceedings, convictions, imprisonment for possession or dealing, etc. (van Kerken, 2016). If the sale of marijuana were legalised, part of the tax revenue spent on anti-marijuana related activity could be allocated to another sector that could benefit from it more than where

it is currently being allocated. Law enforcement resources are devoted to other areas in need of improvement other than the chase of small possession offenders (Adams, 2018). The costs associated with anti-marijuana law enforcement could be expected to decrease if marijuana were legalised for sale purposes.

Notably, 585 arrests were made for possession of all drugs and only 16 arrests were made for dealing marijuana in July of 2015 (Government Communication and Information System, 2015). Thus, it appears the SAPS are not targeting the source of the problem if there were only 16 arrests made for dealing marijuana. Marijuana makes up 61% of the confiscations and all other drugs make up 39% of the confiscations from these arrests (Government Communication and Information System, 2015). Thus, legalising marijuana would reduce the number of arrests made for possession which would decrease the costs associated. Therefore, this decrease in the need for law enforcement would allow the SAPS to focus on other issues within in South Africa and decrease the number of criminal cases relating to marijuana possession.

This new industry could increase employment to grow and package marijuana (Hajizadeh, 2016). An increase in employment would decrease the need for state grants to alleviate the pressures of unemployment (which would decrease government spending). In the case of South Africa, it might allow existing producers in rural areas to continue to grow marijuana and possibly increase their revenue as the issue of law enforcement would be eradicated. Other jobs that could arise due to legalisation are jobs related to educational sessions and health promotional initiatives (Hajizadeh, 2016). Thus, illegal activity associated with the sale of marijuana would decrease due to the decline in activity in the black market for marijuana through the creation of jobs in a legal marijuana market.

2.2 The Health Benefits

If South Africa were to legalise the use and sale of marijuana; it would open more resources that could be used to focus on rehabilitation, therapeutic benefits, relief from suffering from certain ailments, decrease the reliance on prescription medication, decrease alcohol consumption, repair side effects of alcohol abuse, self-help programmes for addicts, and many more.

There are many therapeutic benefits of marijuana use in neuropathic pain, inflammatory bowel diseases, managing symptoms of chemotherapy and treatment-resistant epilepsy in children (Hajizadeh, 2016). If the sale of marijuana were legalised, it could open access to people who need relief from the suffering from anxiety, chronic pain, cancer treatments, and other conditions (Mafolo, 2019). As a result, this could decrease the reliance on prescription medication in the health industry. It would not only aid the formal health sector in certain countries, but it could open up the opportunity for the medicinal use of marijuana in low-income countries – especially in countries where villages or towns are far from hospitals (Global Commission on Drug Policy, 2019). South Africa is a middle-income country and

could take full advantage of the use of marijuana in the informal sectors, as well as the formal health sector.

The medical benefits of marijuana are not fully known nor studied properly which means that the contributions to the medical fields within South Africa would open a whole new field of research for South African medical researchers, as well as alternative medicinal routes for citizens suffering from certain diseases or illnesses.

Evidence from cases found that marijuana in small amounts had no harmful side effects, particularly when compared to the negative side effects of alcohol, which is legal (Nel, 2018). Liput *et al* (2013) found marijuana to be 114 times less deadly than alcohol. In addition, there was a lack of evidence that marijuana caused any aggressive or violent behavioural traits from its users or that it leads to the use of more harmful drugs (Nel, 2018).

The legalisation of marijuana has even decreased the consumption of the drugs by high-school students by 9% in Washington State, USA (Anderson, Hansen, Rees and Sabia, 2019). Dilley, Richardson, Kilmer, Pacula, Segawa, and Cerda (2019) also found a decrease in marijuana use amongst the youth in Washington State after legalisation and they argued that the reason for this was that drug dealers had now been replaced with dispensaries that required proof of age. The decrease in usage amongst the youth is vital if the negative health effects of abuse of marijuana at a young age are to be avoided (as discussed in the next section).

Baggio, Chong, and Kwon (2019) analysed the relationship between the consumption of alcohol and marijuana laws found after legalising marijuana across USA counties, the consumption of alcohol decreased by 12.4%. Thus, marijuana use and alcohol consumption are substitutes, and the substitution effect was larger than expected and it lasted two years after legalisation (Baggio, Chong, and Kwon, 2019). Therefore, the impact on the overall public health of legalising marijuana could be positive (Baggio, Chong, and Kwon, 2019). Alcohol is responsible for many negative health effects in South Africa (World Health Organisation, 2018), if the level of alcohol consumption decreased it would decrease these negative health effects which would in turn, decrease the burden on the hospitals, doctors, rehabs, etc. and decrease the taxes needed to finance these negative health effects within the health sector. This will be discussed in more detail in the next sections.

Liput, Hammell, Stinchcomd, and Nixon (2013) found that marijuana could help reduce damage done to the brain by excess consumption of alcohol. Liput *et al* (2013) found that a chemical in marijuana, called cannabidiol, could help treat alcohol-induced neurodegeneration. This is reminiscent of the idea that marijuana could be beneficial to research, trials, and treatments within various medical fields in aiding to treat the damage done to one's brain when alcohol has been abused. Peltzer and Ramlagan (2017) found a high burden of alcohol abuse in South Africa when considering the high consumption of alcohol is consumed by a small portion of the population seeing as the majority abstain from drinking.

The recorded alcohol production per capita was 8 litres but there are approximately 3-4 litres of unrecorded production of alcohol (Peltzer and Ramlagan, 2017). Therefore, marijuana could benefit the health sector within South Africa by assisting in reducing the damage done to the brain by excess consumption of alcohol.

Several addicts have been found to use marijuana to ease themselves off hard drugs, prescription medication addictions and/or alcohol dependence (van Kerken, 2016). This would also open a new method for rehabilitation centres to assist drug addicts and alcoholics in South Africa. So not only would it decrease the costs associated to alcohol abuse through the reduction in alcohol consumption, but there is a possibility that it could aid in repairing the damage done to the brain by high levels of alcohol consumption, and it could be used to ease addicts off multiple drugs.

3. The disadvantages of Legalising the Sale of Marijuana

There are many arguments against the legalisation of marijuana; these are discussed in detail below and have been split into the fiscal and health benefits. The notable fiscal concerns are a decline in tax revenue from a decrease in alcohol sales, a decline in demand due to an increase in prices from taxation, and that the black market for marijuana would not be eradicated entirely from legalisation. The most common health concerns are the usage of marijuana in the youth, and that marijuana is believed to be a gateway drug to other harmful substances. These concerns would put a greater burden on South Africa's healthcare system.

3.1 The Fiscal Disadvantages

As mentioned above, Baggio, Chong, and Kwon (2019) found that alcohol and marijuana are substitutes. Therefore, if the consumption of marijuana increases, the consumption of alcohol would be expected to decrease and as such, the tax revenue generated from the sale of alcohol would decrease with it. The tax revenue from marijuana was more than double the tax revenue from alcohol sales in Colorado in 2015 (Scarboro and Bishop-Henchman, 2016). Thus, the revenue generated from the sale of marijuana has the potential to exceed the loss the of revenue from the decline in alcohol sales – especially if we consider that Baggio, Chong, and Kwon (2019) only found a decrease in alcohol sales of 12.4%. Hence, one would not expect the tax income from alcohol sales to decrease by too much and that the potential tax revenue from marijuana would outweigh the loss.

VAT is taxed ad valorem – as a percentage of the price of the product (Ad Valorem Tax - Overview and Guide, Types of Value-Based Taxes, 2020). Thus, even if the price decreases and the quantity demanded increases, the result is not always an increase in tax revenue. Riley *et al* (2019) concluded the quantity of marijuana sold was sensitive to price changes but that the price elasticity sits within the inelastic range. Thus, it is difficult to conclude whether the tax revenue from legalising marijuana

would be greater than the estimated tax revenue that is calculated based on the price and demand of marijuana on the black market that currently exists in South Africa.

There has been a decrease in the price of marijuana in states in the USA that have fully legalised the drug – which has been of concern in recent years, the price has dropped so drastically it has begun to affect the revenue generated and the tax revenue received (Adams, 2018). This affects the tax revenue because sin taxes are taxed as a percentage of the price of the product sold in the USA (Adams, 2018). Although, Colorado, Washington, and California have still been generating high tax revenues over the past few years. South African sin taxes are taxed as a price per the quantity of the product, for example cigarettes are taxed at R16.66 per 20 cigarettes (National Treasury, 2020). Given that the pre-tax price of marijuana is expected to decrease after the legalisation, revenue could be greater than expected or it could be smaller than based on current prices as demand would increase which could drive tax revenue up, but the price would decrease which could decrease tax revenue. This expected decrease in the pre-tax price of marijuana leaves room for marijuana to be taxed and still meet the expected tax revenue at current expectations.

The legalisation of marijuana would not totally eradicate the black market (Hajizadeh, 2016). An evident example of this is how prominent the illicit tobacco market is in South Africa even though the sale of tobacco products is legal (Rossouw, 2018). Thus, the black market has the potential to undercut the legal sales of marijuana, this would jeopardize the amount of expected revenue generated as well as the tax revenue expected. The comparison is made to tobacco when discussing the possible outcomes for marijuana because the two products are similar in nature (Riley *et al*, 2019).

The legalisation would not eradicate the black market entirely, but it would reduce it. Riley *et al* (2019) concluded that the price elasticity of marijuana was similar to that of cigarettes, therefore, the marijuana market and the cigarette market function in a similar manner. The market for illicit cigarettes in SA is large and has been growing with the increase in tax rates on cigarettes, therefore, government has seen a considerable decrease in related tax revenue (Rossouw, 2018). Thus, the black market for marijuana is not going to disappear altogether if marijuana was legalised.

3.2 The Health Disadvantages

Although the legalisation of marijuana would allow for access to all its benefits, the drug does still have some detrimental effects to it – especially if consumed in high quantities or if used from an early age. The arguments against the legalisation of marijuana are associated with the concerns regarding the high usage and/or possible abuse if adolescents manage to purchase and use the drug (Hajizadeh, 2016). Granted Anderson *et al* (2019) found that the legalisation of marijuana decreased the consumption of the drug by high-school students by 9% in Washington State, USA. The regular use of marijuana has some adverse effects such as problems with healthy brain development amongst the youth, depression or anxiety, symptoms of chronic bronchitis, schizophrenia, and addiction (Hajizadeh, 2016).

Some of the side effects that are of notable concern to adolescents are addiction (which increases from 9% to 17% if the use of marijuana starts at an early age), altered brain development (the brain is only fully developed at approximately 21 years of age), poor educational outcomes which increases the likelihood of dropping out of school, cognitive impairment, diminished life satisfaction and achievement, symptoms of chronic bronchitis, and an increased risk of chronic psychosis disorders (including schizophrenia) in persons with a predisposition to such disorders (Volkow, Baler, Compton and Weiss 2014).

Marijuana is believed to be a gateway to the usage of harmful and harder drugs. It has been found that while most people who have used harder drugs (such as hereon and crack) have used cannabis as well – this is just a correlation, not causation (De V van Niekerk, 2014). It has been found that heroin and crack addicts gateway drugs were tobacco and alcohol – both of which are legal substances in South Africa (De V van Niekerk, 2014). Van Gundy and Rebellon (2010) and Kirby and Barry (2012) agreed that alcohol should be classified as the gateway drug, and not marijuana. It has also been found that whether people start using so called 'harder drugs' is dependent more on social factors, e.g. stress, emotional trauma, unemployment, rather than whether they have consumed marijuana in their lifetime (Kirby and Barry, 2012). Riley *et al* (2019) also found that there was discontinuity between the market for marijuana and the market for other drugs as drug dealers tend to sell marijuana or sell other drugs. This could be suggestive of the fact that dealers do not see a strong enough link between the consumption of marijuana and other drugs to sell them altogether. Therefore, it is difficult to conclude whether this is an apparent disadvantage of marijuana.

Consuming marijuana has been known to cause cravings for certain foods – usually high-calorie foods. This phenomenon is referred to as 'munchies' but there is no concrete evidence to support an actual behavioural change, most evidence is correlational and indirect (Baggio and Chong, 2019). Baggio and Chong (2019) compared the sale of junk food for 18 months after the legalisation of marijuana in certain states and they found that the sale of marijuana increased the sales of ice cream, biscuits, and crisps by 3.1%, 4.1%, and 5.3%, respectively, in Colorado, Oregon, and Washington (Baggio and Chong, 2019). Thus, marijuana and high-calories foods are complements (Baggio and Chong, 2019). The increase in the consumption of junk food could result in possible negative health effect, as this would increase the sugar intake in those consuming these junk foods whilst consuming marijuana.

4. What does South Africa have to gain from legalising the sale of Marijuana?

As mentioned above, South Africa has legalised the home or personal use of marijuana, becoming the third country on the African continent to have done this (Constitutional Court of South Africa, 2018).

This means that citizens of South Africa are allowed to grow and use marijuana within the confines of their own, or their friend's, homes and not in spaces that are open to groups of people, while the sale of marijuana is still prohibited (Nel, 2018). This means that you are only allowed to grow as much as is necessary for your own personal use, and the buying and selling of marijuana is still illegal (Constitutional Court of South Africa, 2018).

Although the sale of Marijuana is still prohibited in South Africa, it is believed that the plant is widely cultivated across rural areas of SA, for both domestic use and exports (de Villiers, 2018). Marijuana is an important cash crop for many rural areas in SA – especially in Kwa-Zulu Natal and the Eastern Cape (de Villiers, 2018). The farming of marijuana sustains whole rural communities within South Africa, even though it is illegal, it is an important crop to these communities as they are extremely poor subsistent economies (de Greef, 2016). Police have failed to stop the farming of marijuana in these communities as most of these farmers lack an alternative income stream and there is a consistently high demand for marijuana (de Greef, 2016). While the villagers have admitted to being aware of the illegality of their actions, most of them confessed that it was the only way they could make money (de Greef, 2016). Alternatively, the legalisation could allow for these villagers to earn a living from farming marijuana whereby they would not have any concerns with regards to legal issues. These villages have had issues in the past where the SAPS have confiscated their crops or have used aerial eradication programs – of which a poisonous spray is used to kill the crops which kills all their other food crops as well as poisons their animals (de Greef, 2016).

The United Nations Office on Drugs and Crime (2018) found that South Africa is the third largest producer of marijuana on the African continent, producing 2300 tons of the plant annually. South Africa is also believed to be a leading supplier of marijuana for the United Kingdom and Europe (de Villiers, 2018). In addition, it was also found that South Africa, Nigeria, Ghana, and Zambia were exporting marijuana to European countries, namely the United Kingdom and the Netherlands (United Nations Officed on Drugs and Crime, 2018). The bulk of marijuana that is sold in Amsterdam (where the sale of marijuana is legal) is allegedly from South Africa (Powell, 2014). This means that the black market for marijuana in South Africa generates all this revenue, therefore criminals reap many rewards for taking advantage of the thriving market for marijuana in and outside of South Africa. In addition, this market is not taxed and as such, the government is losing out on tax revenue that this market could generate, as well as it does not contribute toward South Africa's GDP.

Approximately R3.5 billion was spent on marijuana related criminal activity in the 2014-2015 financial year (van Kerken, 2016). The SAPS crime statistics showed that 65% of all drug related arrests were related to the possession of marijuana in the 2015-2016 financial year (Hopkins, 2017). In the same year, 61% of all drug possession confiscations were for marijuana and 39% were for all other drugs (van Kerken, 2016). It has also been noted that on average for every dealer that is arrested, 36 users

were arrested as well (van Kerken, 2016), which is suggestive that the SAPS are not targeting the source of the issue. This means that if South Africa were to legalise marijuana for sale purposes, it could reallocate part of this R3.5 billion elsewhere.

Riley *et al* (2019) found that the market for marijuana was promising in their sample population. They found significant evidence that provincial markets existed within South Africa for marijuana. Although, it is cautioned that the population sample was not a good representation of the national level (Riley *et al,* 2019). The evidence in this paper suggests that South Africa has the potential to use these markets to create a new stream of tax revenue. These markets were also only limited to people who consumed marijuana, legalising it would open the market up to new consumers who previously would not consume due to the illegality of the product. The most significant finding of the paper is that the consumption of marijuana is sensitive to the price of marijuana but that the price elasticity of marijuana sits within the inelastic range (Riley *et al,* 2019). It was noted that the responsiveness of the consumption of marijuana to the price of marijuana is comparable to that of cigarettes (Riley *et al,* 2019). This information is beneficial to government, as it would help them when attempting to legalise marijuana – as they could tax marijuana in a similar manner as cigarettes.

The annual street value of marijuana for the year 2014-2016 was estimated to be R1.5 billion (van Kerken, 2016). The VAT on the marijuana industry for the 2016 year would have been approximately R160 million (van Kerken, 2016). As mentioned earlier, the price of marijuana could decrease which would decrease this VAT amount. The black market is not expected to disappear altogether, as discussed above. Therefore, the VAT calculated above is higher than what the legal marijuana market could expect if prices remained the same. Nonetheless, South Africa would be earning some form of tax revenue. This VAT amount obviously does not include other taxes that would-be set-in place if marijuana were to be legalised for sale, such as sin taxes, export taxes, etc. Lesotho's cannabis industry received an estimate of 10 million Canadian Dollars (approximately R123 million)[3] in the year 2018 (Ramphele, 2019). Lesotho is more like South Africa than the many other first-world countries discussed in this paper. Lesotho is a developing country and is an African country, much like South Africa. Whereas, South Africa is a much larger country, with lots more resources and thus, South Africa has the opportunity to generate a higher revenue from the sale of marijuana. Lesotho's high tax revenue gives hope to the idea that South Africa could generate high tax revenues from the sale of marijuana.

The unemployment rate in 2019 was 29.1% in South Africa (National Treasury, 2020). If South Africa were to legalise the sale of marijuana it would create more jobs which could assist in addressing this issue (Mafolo, 2019). The emergence of a new market – the marijuana market – would have the potential to create both low-skilled and high-skilled demand for labour (Mafolo, 2019). In the USA, 321 744 jobs

[3] This conversion was estimated on July 20, 2020.

have been created so far from the legalisation of marijuana – such as jobs relating to retail operations, administration, manufacturing operations, management, and agriculture operations (Mofolo, 2019).

4.1 The Alcohol, Cigarettes and Marijuana Debate

South Africa has no recorded marijuana-related deaths so far (van Kerken, 2016). (Parry, Probst, and Rehm, 2018) found that 62 300 people died from alcohol-related causes in South Africa in 2015, this was approximately one in ten deaths. This approximation is higher than the estimate in 2010, which was 7% (Parry *et al*, 2018). South Africa also has one the highest alcohol related road death rates in the world, 58% of deaths can be attributed to alcohol (World Health Organisation, 2018).

The South African population consumed 28.9 litres of pure alcohol per capita of the population in 2016, the fifth highest in the world (World Health Organisation, 2018). A notable concern is 59% of South Africa's drinking population are considered binge drinkers – defined as consuming more than 60 grams of pure alcohol at least once over a 30-day period (World Health Organisation, 2018). Vellios and van Walbeek (2018) found that 43% of the drinking population were binge drinkers in South Africa in the year 2014 to 2015. Alcohol is one of the most highly addictive substances and is linked to more harm than other drugs, yet it is still legal (van Kerken, 2016). Liput *et al* (2013) found that marijuana is 114 times less deadly than alcohol.

It is also common knowledge that cigarettes are highly addictive and are linked to lung cancer (van Kerken, 2016). Although smoking prevalence in South Africa has decreased over the years, from 31% to 18.2% between 1994 and 2012 (Vellios and van Walbeek, 2016). Boachie, Rossouw, and Ross (2019) calculated that approximately 20 249 deaths among persons aged 34-74 were attributed to smoking in 2016 – approximately 7.94% of deaths in this age group. The economic cost of smoking was R33 billion (approximately 0.77% of GDP) in 2016, while the healthcare cost related to smoking was R11.4 billion (approximately 3.24% of healthcare expenditure) (Boachie, Rossouw, and Ross, 2019).

Nutt, King, Saulsbury, and Blakemore (2007) found that marijuana was the second least addictive drug according to its physical dependence whereas cigarettes and alcohol are both more addictive than cocaine with regards to its physical dependence – shown in table 2 below. Marijuana has the second lowest psychological dependence whereas tobacco was the third most addictive based on psychological dependence (behind heroin and cocaine) (Nutt *et al*, 2016).

Barbiturates (e.g. anti-anxiety medication), Benzodiazepines (e.g. tranquilisers), and Amphetamine (e.g. Ritalin) are all prescription medications – all of which have a higher physical and psychological dependence than marijuana (as seem in table 2). There is fairly new research showing that marijuana can be used to treat some of the disorders that these pharmaceuticals are treating, if they are considered less harmful than these pharmaceuticals then one might want to consider replacing pharmaceuticals with marijuana.

Table 2: Psychological and Physical Dependence of Drugs[4]

Drug	Psychological Dependence	Physical Dependence
Heroin	3.0	3.0
Cocaine	2.8	1.3
Tobacco	2.6	1.8
Barbiturates	2.2	1.8
Alcohol	1.9	1.6
Benzodiazepines	2.1	1.8
Amphetamine	1.9	1.1
Marijuana	1.7	0.8
Ecstasy	1.2	0.7

(Source: Nutt *et al*, 2016).

It has also been found that after ingesting alcohol people are more likely to do things they would not normally do (Kirby and Barry, 2012). Alcohol, cigarettes, and cocaine increase dopamine levels in the brain and as such, when one is intoxicated, alcohol, cigarettes, and cocaine become somewhat irresistible (Kirby and Barry, 2012). Fiellin, Tetrault, Becker, Fiellin, and Hoff (2013) found that the abuse of alcohol or tobacco products are far more likely than the abuse of marijuana. Fiellin *et al* (2013) found that the prevalence of previous substance use for prescription opioid addicts was 57%, 56%, and 34% for alcohol, cigarettes, and marijuana, respectively.

The underage consumption of alcohol and tobacco is likely to precede the consumption of marijuana (Kirby and Barry, 2012). It has also been shown that alcohol is one of the most difficult substances to get off your mind, as alcoholics face many triggers in everyday life (Kirby and Barry, 2012).

5. Data Analysis

This paper has compared literature from other countries that have legalised marijuana and looked at South Africa's comparable characteristics that could allow for South Africa to benefit from the legalisation of the sale of marijuana, or characteristics that would make it difficult for South Africa to follow in the footsteps of other countries. A survey was undertaken to better understand the characteristics of the SA market and how it could potentially be affected by legalisation. The survey collected data on people's consumption of marijuana, alcohol, and other recreational drugs within South Africa, their views on marijuana, and their views on alcohol and cigarettes. This section analyses the data from these surveys to determine if the consumption of marijuana in South Africa is sufficient to legalise marijuana such that government would benefit through taxing the product.

[4] A four-point scale was used to measure the risk associated to each drug, 0 = no harm, 1 = some, 2 = moderate, and 3 = extreme risk. The values shown are the mean independent group scores in the two categories of dependence.

5.1 Survey Design

Primary data was collected for this research paper through surveys[5], the questions asked were relating to the consumption of marijuana, the reasons for the consumption, the relation to alcohol, cigarettes, and other drugs, etc. The dataset used was a non-random sample population of South African citizens who had access to the internet. The focus of this paper is the benefits of the consumption of marijuana, the survey questions were designed to elicit information regarding peoples' consumptions, and reasons for said consumption, of marijuana, and how this consumption is related to alcohol, other drugs, and illnesses. The survey contained 30 questions, most of which were relating to the consumption of marijuana, alcohol, and other drugs, and the effect these have had on people, while other questions were related to the demographics of respondents.

The illegal nature of the use of marijuana and other drugs presented a limitation in obtaining a large number of responses, as well as accurate responses as consumers can be apprehensive when it comes to answering questions honestly if they're related to illegal activities. The survey was designed to ensure that the respondents remained anonymous. The survey website used ensured that only one response was possible per a device, which minimised the possibility of duplicate responses.[6] The survey contained a brief introduction of the research, an explanation of the purpose of the surveys, and an insurance of the anonymity of the surveys.

5.2 Collection

The survey was shared on personal social media platforms, examples of such are Facebook, Instagram, and Twitter, and by word of mouth to recruit responses. Respondents were asked to share the link to the survey with friends and family in order to grow the number of responses, and in an attempt to diversify the demographics of respondents. The data was collected over a period of 21 days, during this time the survey was posted on social media accounts several times, each time prompting respondents to pass it on. In that time, 1 271 people responded to the survey and all these observations were used in the analysis. It was possible for respondents to skip questions if they were not comfortable answering them, which created issues with selection bias as not every question had 1 271 responses.

The use of social media to recruit respondents is very limiting, the sample is relatively small and is limited to respondents who use social media actively, which underrepresents people who use other forms of social media or do not use social media at all. The nature of the surveys have also likely overrepresented the portion of the population that are pro-legalisation of marijuana, as we would assume, they are more likely to participate in the research relating to a topic that could be considered quite sensitive. The older generations are also likely to be underrepresented as they are less likely to be using social media platforms.

[5] Ethics approval was granted by the University of Cape Town's School of Economics.
[6] The website used was AllCounted.com.

The use of social media was more beneficial when attempting to generate responses related to the debate on whether alcohol or marijuana is a gateway drug, if people would consume marijuana with a 10% tax added to it, if they would replace marijuana with pharmaceuticals, etc. as people who are interested in the topic would be more likely to respond to the survey.

5.3 Results and Discussion of Results

Table 2 below provides the summary statistics of the sample created from the 1 271 people who responded to the online survey. Of those sampled, 60.7% were female and 39.3% were male. The majority of the respondents were White (61.1%), followed by Black Africans (16.3%), then Coloureds (12%), then Indian/Asians (8.8%), and 1.8% preferred not to say. Riley *et al* (2019)[7], a paper of a similar nature, also found the majority of their sample to be predominantly white. The majority of the respondents in this sample were between the ages 18 – 24 (62.6%) and 25-34 (22.2%), with the number of respondents decreasing as each age group increased. The predominant age group in Riley *et al's* (2019) sample was between 20-29. The monthly income of the respondents was mostly between 0 – R10 000 (56.1%) and R10 000 – R20 000 (19.5%), with the remainder earning above R20 000 a month. Riley *et al* (2019) found that most of their sample earned between R1000 and R10 000. Thus, the sample is not a fully accurate depiction of the national population statistics, but other studies have used similar samples. More than three quarters of the respondents said they do or have consumed marijuana (77%), with the most common reason being for recreational purposes. Most of the sample population consumes alcohol (78.8%), while only 37% of the sample population said they do or have consumed other drugs for recreational reasons.[8]

Table 3: Sample Characteristics

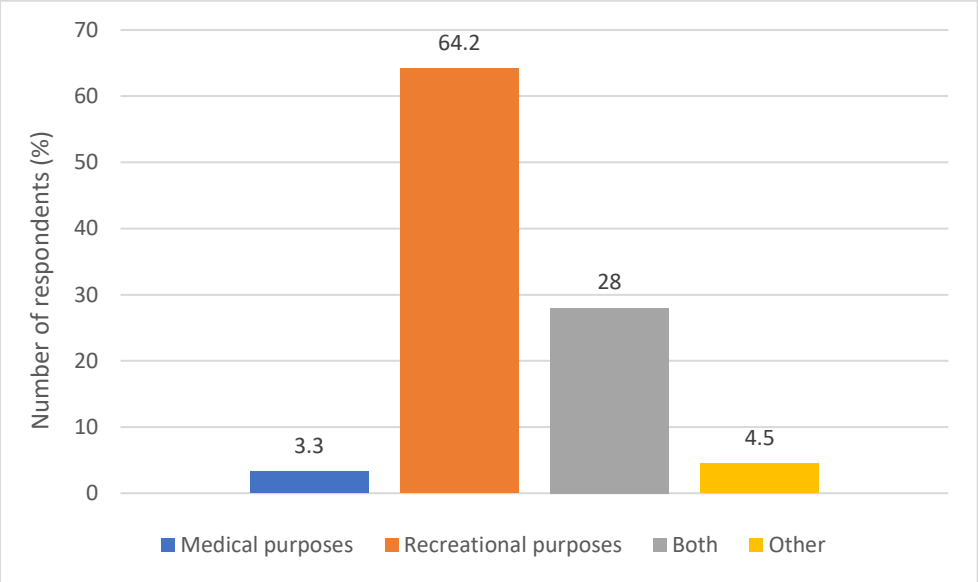
Variable	Proportion (%)	Sample size
Gender		
Female	60.7	770
Male	39.3	499
Population Group		
Black African	16.3	207
White	61.1	776
Coloured	12.0	153
Indian/Asian	8.8	112
Prefer not to say	1.8	23

[7] Riley *et al* (2019) was a paper on the market demand of marijuana, done by a student at the University of Cape Town, by collecting survey data and as such, comparisons are made to this paper throughout because it is of a similar nature.
[8] Any reference to other recreational drugs is referring to drugs that are not alcohol or marijuana.

Age Group		
18-24	62.6	794
25-34	22.2	282
35-44	7.2	91
45-54	4.7	60
55-64	2.4	31
65+	0.9	11
Monthly Income		
<R10 000	56.1	706
R10 000 – R20 000	19.5	245
R20 000 – R30 000	11.0	138
R30 000 – R40 000	4.9	62
R40 000 – R50 000	3.0	38
R50 000 +	5.5	70
Consume Marijuana		
Yes	77.0	978
No	23.0	292
Consume Alcohol		
Yes	78.8	1001
No	21.2	269
Consume Other Drugs		
Yes	37.0	470
No	63.0	800

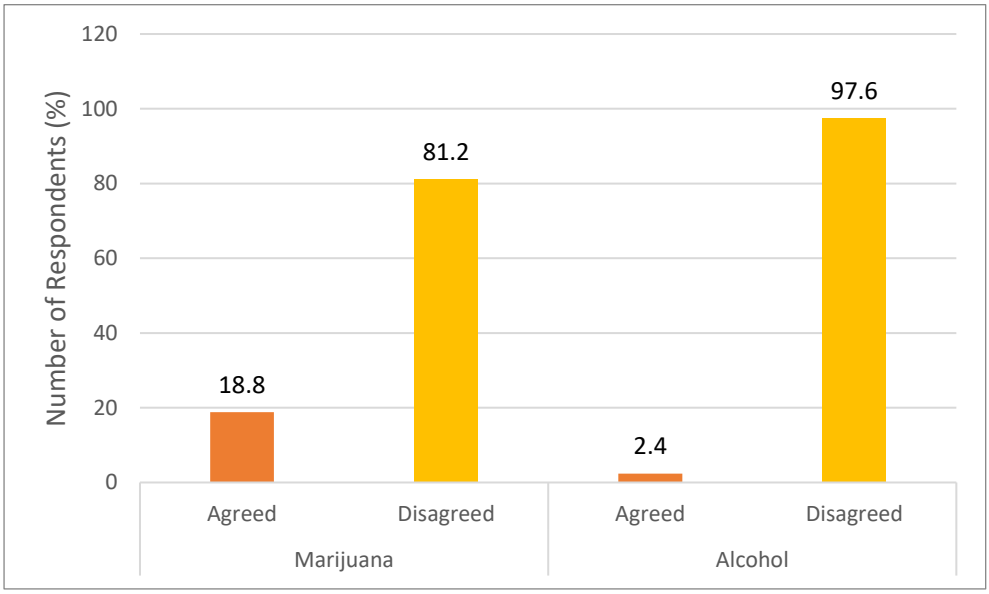
When analysing the data above, I found that 77% of the sample consume marijuana, 78.8% consume alcohol, and 37% consume other drugs. This is suggestive of a thriving marijuana market within this sample. It is also consistent with Riley *et al* (2019)'s sample and other research papers which have suggested that the market for marijuana is evident in South Africa, although they do not find that such a large percentage of the population consumes marijuana. In this sample, the percentage that consumes marijuana is almost the same as the percentage who consume alcohol.

Figure 1: Reasons for Marijuana Consumption



As mentioned above, 77% of respondents said they have in the past or actively consume marijuana. Of the respondents who consumed marijuana, the majority (64.2%) consumed marijuana for recreational purposes, while 3.3% consumed it for medical purposes and 28% said they consumed it for both recreational and medicinal purposes. The respondent's reasons for consuming marijuana are shown in figure 2 above. The high percentage of respondents who consumed marijuana is indicative of the existence of a market for marijuana. Although most consume it for recreational purposes, 31.3% consumed it for medical purposes, and thus, this is an indication of the existence of the demand for marijuana for medical purposes, even if respondents were consuming it recreationally as well. Legalising the sale of marijuana would help ensure that the marijuana consumed for medical purposes would be of a high quality and would be safer for consumption than marijuana bought off the street. This is relevant to the sample as 56.1% of respondents who consume marijuana said they bought it from a dealer. Buying marijuana on the black market means there is no regulatory structure ensuring the quality of the marijuana consumed.

Figure 2: Consume Marijuana or Alcohol Everyday

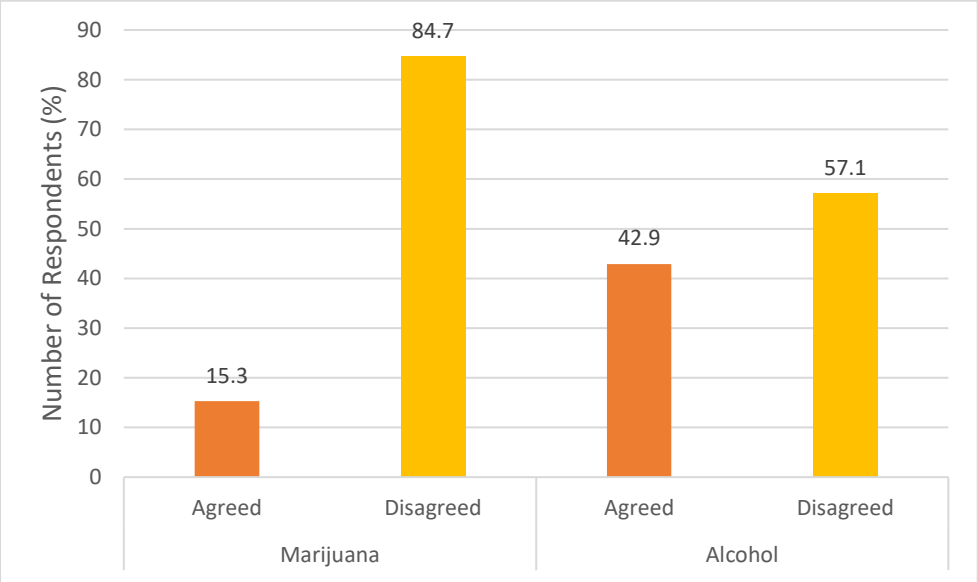


Of the respondents who consume marijuana, 18.8% found they needed to consume marijuana every day. Whereas only 2.4% of the respondents that consumed alcohol found they needed to consume it every day. The percentage of marijuana consumers who consume marijuana every day is much higher than the percentage of alcohol consumers that consume alcohol every day. These results are shown in figure 3 above.

Nutt *et al* (2007) found a different result, as their studies indicated evidence that alcohol was more addictive than marijuana, and that alcohol had a higher physical and psychological dependence than marijuana. Fiellin *et* al (2013) found that the abuse of alcohol and tobacco products were far more likely than the abuse of marijuana. Kirby and Barry (2012) also found alcohol to be one of the more addictive substances. In addition, Kirby and Barry (2012) found research that suggested that addiction to 'harder drugs' is linked to social factors.

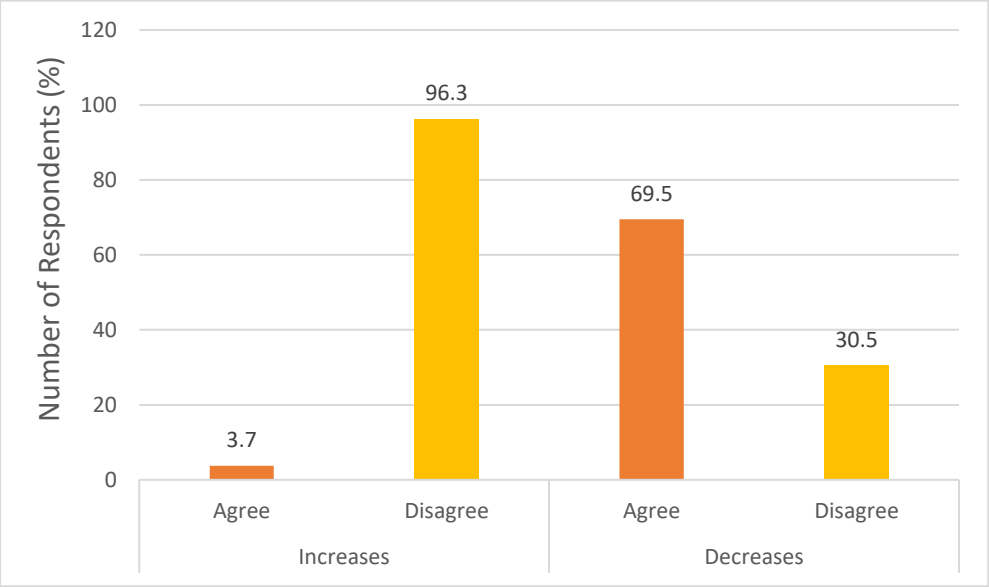
This means the number of addicts in this population would be small in comparison to the general population as most of the respondents in this study were university students or graduates. The survey did not allow for differentiation between everyday marijuana consumers who consume marijuana for medical purposes or who consume recreational purposes, which makes it difficult to decipher whether the trait is addictive or whether it is reliant due to a medical condition. This means that the statistics used to measure reliance is not a good indication of whether respondents were addicted as there was no telling if they consumed marijuana every day for treatments purposes or to feed an addiction.

Figure 3: Marijuana or Alcohol as a Gateway Drug



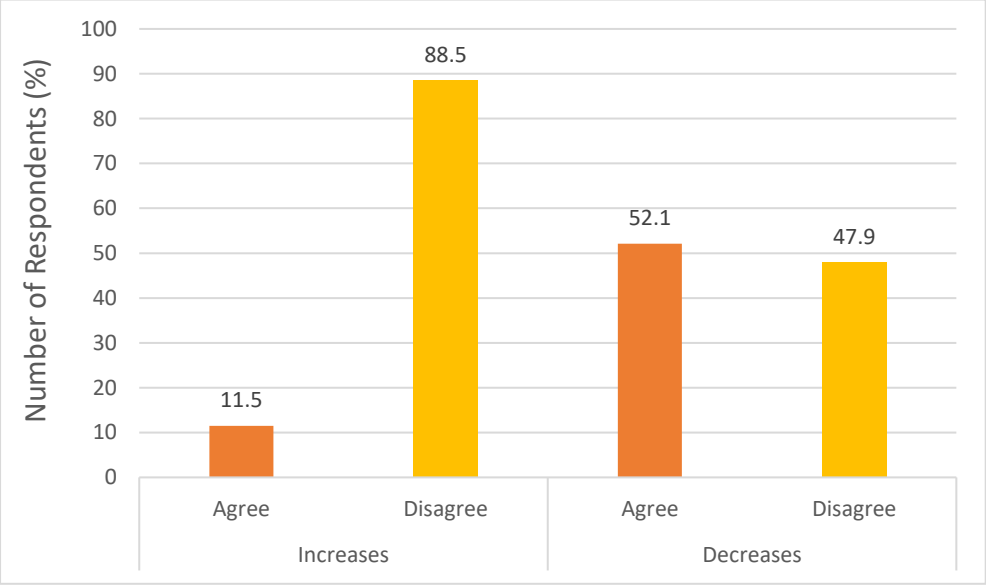
Marijuana is believed to be a gateway drug to the usage of harmful drugs. Of the respondents who consumed marijuana and other recreational drugs, 15.3% believed that marijuana was the gateway drug. Whereas, of the respondents who consumed alcohol and other recreational drugs, 42.9% believed that alcohol was the gateway drug. This is in line with more recent literature, as De V van Niekerk (2014) found evidence that alcohol and tobacco were the gateway drugs for heroin and crack addicts. De V van Niekerk (2014) criticised the evidence found of marijuana being a gateway drug for only illustrating a correlation that exists rather than evidence of an actual causal effect between the two drugs. Kirby and Barry (2012) and Van Gundy and Rebellion (2010) agreed that alcohol was the gateway drug. Kirby and Barry (2012) found evidence that the impaired judgement that develops from the consumption of alcohol is the reason alcohol is a gateway drug. Fiellin *et al* (2013) also found that previous substance use for prescription opioid addicts was 57%, 56%, and 34% for alcohol, cigarettes, and marijuana, respectively. Nel (2018) also found no evidence that marijuana led to the use of more dangerous drugs. This evidence from this sample is suggestive of alcohol being a gateway drug.

Figure 4: Marijuana Decreasing or Increasing Alcohol Consumption



69.5% of the respondents that consumed marijuana and alcohol said that consuming marijuana decreased the amount of alcohol they consumed, where only 3.1% said that consuming marijuana increased the amount of alcohol they consumed. This is consistent with Baggio, Chong, and Kwon (2019) who found that alcohol consumption decreased after the legalisation of marijuana.

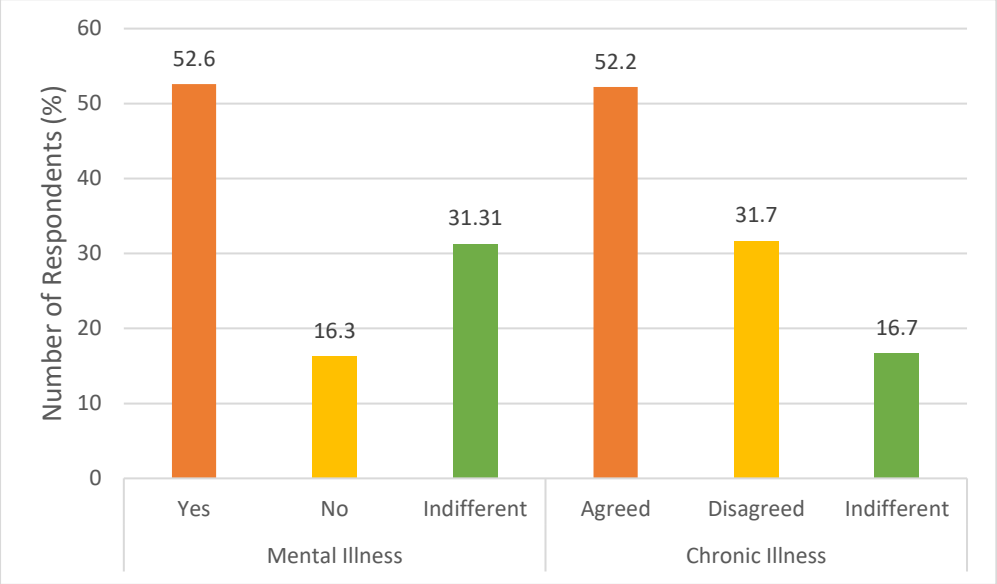
Figure 5: Marijuana Decreasing/Increasing Consumption of Recreational Drugs



52.1% of respondents who consumed marijuana and other recreational drugs said that marijuana decreased their consumption of other recreational drugs while only 11.5% said that marijuana consumption increased their consumption of other recreational drugs. This is consistent with Van Kerken (2016)'s literature which suggests that addicts use marijuana to ease themselves off hard drugs.

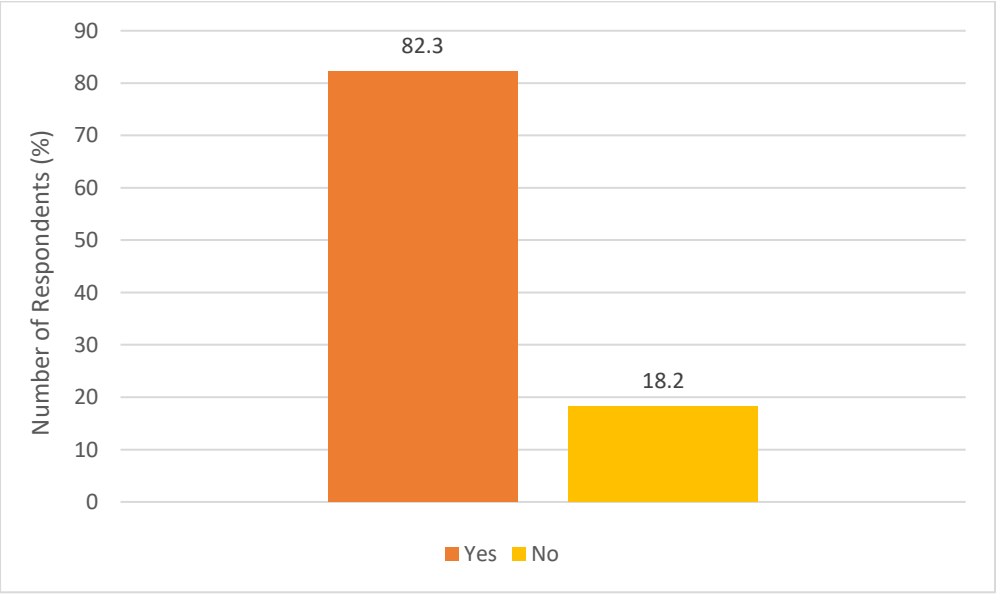
It is also consistent with De V van Niekerk (2014) who found that the relationship between marijuana and other recreational drugs is not causal but rather just a correlation.

Figure 6: Marijuana Helped with Mental or Chronic Illness



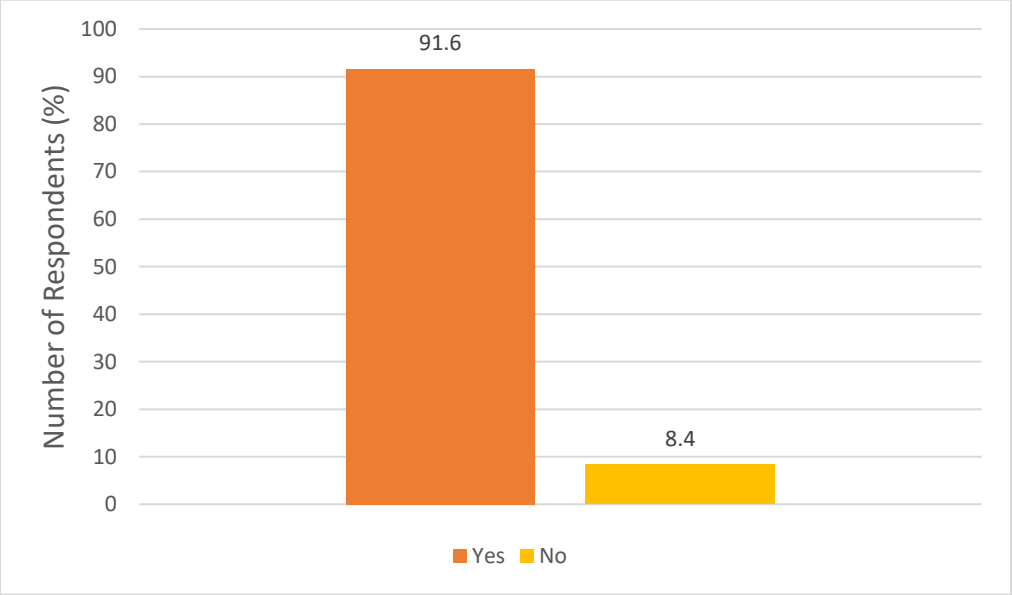
Of those respondents with mental illnesses and chronic illnesses, 52.6% of those with mental illnesses and 52.2% of those with chronic illness said that consuming marijuana has helped them deal with or manage their illness. This is in line with literature discussed above, as Hajizadeh (2016) and Mafolo (2019) have suggested that marijuana has therapeutic benefits, can be used for relief from suffering from an illness, could be used to replace some pharmaceuticals, etc. It should be noted, however, that this is an individual's opinion and not the opinion of a qualified medical professional.

Figure 7: Replace Pharmaceuticals with Marijuana



Respondents were asked if they would replace pharmaceuticals with marijuana if they had found a conclusive study in which marijuana had been used to manage or cure their disease or mental illness, 82.3% said they would. This is suggestive of the existence of demand for a medical marijuana market in South Africa. The high percentage of people in awe of an alternate source of medication is suggestive of a demand for an alternate source of medication, and/or a new source of medication, such as marijuana.

Figure 8: Purchase Marijuana with 10% Tax Added



91.6% of respondents said they would choose to buy marijuana in a legal market, even if it meant a 10% tax added would increase the price of marijuana. This is suggestive that the demand could be unaffected by the legalisation of marijuana. The high demand for marijuana is also suggestive of the potential for high levels of tax on marijuana if were to be legalised fully in South Africa. A limitation of this question is that the quantity respondents would buy was not covered and as such, we cannot fully understand the elasticity of marijuana. However, Riley *et al* (2019) found that the quantity of marijuana sits within the inelastic range.

5.4 Data Limitations

The data collected regarding the consumption of marijuana and other recreational drugs in South Africa is limited because we would assume the data is inaccurate as consumers have a tendency to answer question dishonestly when the questions are related to illegal or socially undesirable activities, such as consuming drugs for recreational use. Even though marijuana has been legalised for personal use, the sale of marijuana is still illegal, and people tend to be hesitant to answer surveys relating to illegal activity honestly. Thus, the data collected was limited as the data is, also, then skewed towards people who are pro the legalisation of marijuana as the topic, and thus surveys, are of more interest to them than those people who are against the legalisation of marijuana.

The sample is skewed in many ways. Firstly, the sample is heavily skewed towards white respondents (76.2%) which is concerning as they are the minority race, making up 7.9% of the population (StatsSA, 2019). This may be because 50% of South Africans who have access to the internet are white (Shezi, 2017), and thus, using social media platforms to collect data limited the diversity of the population sample. Black respondents are heavily underrepresented in this sample (11%), this is concerning seeing as they make up 80.7% of the population (StatsSA, 2019). This limitation may be because only 33% of South Africans who have access to the internet are black (Shezi, 2017). As such, the overrepresentation of white respondents and underrepresentation of black respondents could be attributed to the high levels of racial inequality in South Africa. Another limiting factor of this sample is that the survey was only offered in English, which would limit the amount of people able to answer the survey, which could be another reason for the underrepresentation of the black population (Riley *et al*, 2019). The Indian/Asian ethnic group was also overrepresented slightly in this sample, making up (5%) of the sample but only 2.6% of South Africa's population (StatsSA, 2019).

The sample collected was small, and thus could be a reason the sample population was not an accurate depiction of the actual population. The number of respondents was low due to time and resource constraints, a further application of this study could be applied with a lengthy and more thorough data collection process. The provinces of the respondents were not collected, which could help provide some insightful information on which areas have a higher concentration of people who consume marijuana. It was not a focus of this study and as such, it was left out of the survey intentionally.

The data collected is also of a sensitive nature and as such, the survey might deter some people from answering it honestly or answering it at all. One of the questions asked people if they do or have ever consumed marijuana in any form, and another question asks respondents if they do or have consumed other drugs recreationally. Both topics are of an illegal nature and could deter people away from answering the survey, and as such the survey has possibly been skewed towards people who are pro the legalisation of marijuana and/or are pro other drugs as well. This is seen as 75.5% of respondents said they do or have consumed marijuana, and 42.7% said they do or have consumed other drugs recreationally. This is much higher than the 3.5% of the South African population that consumes marijuana (United Nations Office on Drugs and Crime, 2018). This might also be due to the sample being heavily skewed to people below the age of 34, 36.9% of the sample were between the ages of 18 and 24, and 36.2% were between the ages of 25-34. This overestimation of the population is concerning, as only 18.7% of the population lies between the ages of 20 and 34 (StatsSA, 2019). Thus, the data collected is skewed towards much younger respondents.

Kirby and Barry (2012) and Fiellin *et al* (2013) found that the addiction rates for marijuana are much lower than other legal and illegal drugs. The population in this study shows that a much higher

percentage of the population is reliant on marijuana (18.8%) than those that are reliant on alcohol (2.4%).

Vellios and van Walbeek (2018) found that 33.1% of South African (above the age of 15) consumed alcohol, where 47.7% were male and 20.2% were female. The population in study showed that 78.8% of the population consumed alcohol – which is a lot higher than Vellios and van Walbeek (2018) found. This could be attributed to the fact that the population in this study is heavily skewed to an age group below 34.

Respondents could skip questions which resulted in inconsistencies in the number of responses to each question.[9] A more thorough survey could be created and conducted, one with more options when answering questions which ensures that all questions can be answered. This would ensure consistency in the number of respondents to each question.

6. Conclusion

It is now legal for South Africans to grow and consume marijuana within the privacy of their own homes, and South Africa could significantly benefit from the legalisation of the sale of marijuana. The sale of marijuana would create a whole new stream of tax revenue for government, which is arguably the most appealing benefit. The high demand for the substance in other countries has yielded high tax revenues, especially considering the pre-tax price could decrease due to the elimination of risk and demand could stay the same as Riley *et al* (2019) found the price was inelastic in South Africa. It would also decrease the current government spending on law enforcement targeted at anti-marijuana enforcement. These would benefit government in easing the high government debt and spending within South Africa. This new industry could decrease unemployment through the creation of new jobs, both in rural and non-rural areas. It would also allow existing producers in rural areas to continue to grow marijuana and possibly increase their revenue as the issue of law enforcement would be eradicated.

The most appealing health benefit for South Africa is the expected decline in alcohol consumption as marijuana and alcohol are substitutes. Considering South Africa's issues with alcohol consumption, like binge drinking, highest alcohol related road death rates in the world, and one in ten deaths is alcohol related, this would decrease the burden on the healthcare system created through the abuse of alcohol consumption. Marijuana has also been used to help reduce damage done to the brain by excess consumption of alcohol, and it has been used to ease addicts off hard drugs, prescription medication addictions and/or alcohol dependence. There is evidence that marijuana in small amounts has no harmful side effects, in fact Liput *et al* (2013) found marijuana to be 114 times less deadly than alcohol. Marijuana also has both a low psychological and physical dependence. Marijuana can also be used for the treatment or relief from suffering for some illnesses, and if it were legalised it would allow access

[9] See appendix for explanation on skipped questions.

for many people in South Africa – both in the rural and non-rural areas. This would help small villages or towns that are far from hospitals. It would also create the opportunity for the replacement of pharmaceuticals with marijuana.

There are also some concerns with the legalisation of marijuana. Alcohol and marijuana are substitutes, if the consumption of marijuana increases, the consumption of alcohol would be expected to decrease which would decrease the tax revenue from the sale of alcohol. The tax revenue from the sale of marijuana in several countries exceeded the tax revenue from alcohol in most cases discussed in this paper, therefore we would not expect the decline in tax revenue from alcohol sales to outweigh the increase in tax revenue from marijuana sales. The legalisation of marijuana would not totally eradicate the black market, the existence of the current black market for tobacco is a good example. Thus, the black market has the potential to undercut the legal sales of marijuana which could jeopardize the amount of expected revenue generated and the expected decline in spending on anti-marijuana law enforcement. There have been concerns regarding a decrease in demand if the price of marijuana had to increase from taxation, but Riley *et al* (2019) found the price was inelastic in South Africa so the demand will not be affected by much. Therefore, we could still expect to see high tax revenues.

The most popular argument against marijuana is that it is believed to be a gateway to the usage of harmful or harder drugs by most societies. Most research has shown that although there is the existence of a relationship between the use of marijuana and harder drugs, it is just a correlation, not causation. Some research has shown that alcohol and tobacco are more likely the gateway drug. Another health concern is the potential for abuse, especially if adolescents manage to purchase it. The regular use of marijuana has some adverse effects such as problems with healthy brain development amongst the youth, depression or anxiety, symptoms of chronic bronchitis, schizophrenia, and addiction. Marijuana and high-calories foods are complements, the increase in consumption of unhealthy foods could result in a negative effect on the healthcare system.

There is substantial evidence of the existence of a market for marijuana in South Africa. In this paper, 77% of the sample consumed marijuana – this is suggestive of a thriving marijuana market. Riley *et al* (2019)'s sample and other research papers have also suggested the existence of a marijuana market in South Africa. Although, they do not find that such a large percentage of the population consumes marijuana. While most respondents consumed marijuana for recreational purposes in this paper's sample, 31.3% consumed it for medicinal purposes which is an indication of the existence of the demand for marijuana for medical purposes as well. If it were legalised for sale purposes, government could regulate marijuana to ensure that the marijuana consumed for medical purposes is of a high quality and would be safer for consumption than marijuana bought off the street.

Of the sample in this paper, 15.3% believed that marijuana was the gateway drug, while 42.9% found that alcohol was the gateway drug. As such, there could be less concern for legalising marijuana leading

to an increase in the use of more harmful substances. 69.5% of the respondents that consumed marijuana and alcohol said that consuming marijuana decreased the amount of alcohol they consumed and 52.1% of respondents who consumed marijuana and other recreational drugs said that marijuana decreased their consumption of other recreational drugs. This means that the sale of marijuana could lead to a decrease in both the consumption of alcohol and more harmful substances – which would have a positive effect on the healthcare system.

Of those respondents with mental illnesses and chronic illnesses, 52.6% of those with mental illnesses and 52.2% of those with chronic illness said that consuming marijuana has helped them deal with or manage their illness. This means that marijuana could be used to replace some pharmaceuticals as well as aid with relief from symptoms. This is important as 82.3% of respondents said they would replace pharmaceuticals with marijuana if they had found a conclusive study in which marijuana had been used to manage or cure their disease or mental illness.

The benefits of legalising the sale of marijuana have outweighed the concerns in other countries – South Africa could benefit from the existence of a legal marijuana market in several ways.

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8. Appendix

List of Questions Included in Online Survey

1. What is your Gender?
    a. Female
    b. Male
2. What is your ethnicity?
    a. Black African
    b. White
    c. Coloured
    d. Indian/Asian
    e. Prefer not to say
3. How old are you?
    a. 18-24
    b. 25-34
    c. 35-44
    d. 45-54
    e. 55-64
    f. 65+
4. How much do you earn? (Monthly)
    a. 0-R10 000
    b. R10 000 – R20 000
    c. R20 000 – R30 000
    d. R30 000 – R40 000
    e. R40 000 – R50 000
    f. R50 000 +
5. Do you consume marijuana in any form?
    a. Yes
    b. No
6. What are the reasons you consume marijuana?
    a. Medical purposes
    b. Recreational purposes
    c. Both
    d. Other
7. You find the need to consume marijuana every single day.
    a. Agree
    b. Disagree

8. Do you consume alcohol?
    a. Yes
    b. No
9. You find the need to consume alcohol every day.
    a. Agree
    b. Disagree
10. You take other drugs recreationally.
    a. Agree
    b. Disagree
11. Consuming marijuana decreases the amount of alcohol you consume.
    a. Agree
    b. Disagree
12. Consuming marijuana increases the amount of alcohol you consume.
    a. Agree
    b. Disagree
13. Consuming marijuana decreases the quantity of recreational drugs you consume.
    a. Agree
    b. Disagree
14. Consuming marijuana increases the quantity of recreational drugs you consume.
    a. Agree
    b. Disagree
15. Marijuana was a gateway drug for you consuming other drugs recreationally.
    a. Agree
    b. Disagree
16. Alcohol was a gateway drug for you consuming other drugs recreationally.
    a. Agree
    b. Disagree
17. How do you get hold of marijuana?
    a. Grow your own
    b. Buy it from a dealer
    c. A friend grows it
    d. Other
18. If marijuana cost R10 a gram, and government added a tax to it so that it would R11, but you could now buy it in a much safer manner, you would still consume as much as you do now.
    a. Agree
    b. Disagree
19. If you had to estimate how much you spent on a gram of marijuana, how much would it be?

a. R10 – R20
b. R20 – R30
c. R30 – R40
d. R40 – R50
e. R50+

20. Marijuana has positively impacted your life.
    a. Agree
    b. Disagree
21. Marijuana has negatively impacted your life.
    a. Agree
    b. Disagree
22. Do you suffer from a mental illness?
    a. Bipolar
    b. Depression
    c. Anxiety
    d. Mood disorder
    e. Other
23. If you said yes to the previous question, would you say marijuana has helped you cope with your mental illness?
    a. Yes
    b. No
    c. Indifferent
24. Do you suffer from any chronic illness?
    a. Yes
    b. No
25. If you said yes to the previous question, would you say marijuana has helped you cope or cured your illness in any way?
    a. Yes
    b. No
    c. Indifferent
26. If you found a conclusive study in which marijuana had been used to manage or cure your disease or mental illness, you would replace your pharmaceuticals with marijuana.
    a. Agree
    b. Disagree
27. The sale of marijuana is currently illegal in South Africa, while the use of marijuana is legal if it is home grown. You believe that the sale marijuana should be made legal.
    a. Agree

b. Disagree

28. Of the three substances; alcohol, cigarettes, and marijuana; which would you say is the most harmful to your health?
    a. Marijuana
    b. Cigarettes
    c. Alcohol
29. Of the three substances; alcohol, cigarettes, and marijuana; which would you say is the most addictive?
    a. Marijuana
    b. Cigarettes
    c. Alcohol
30. In 2016, it was recorded that the consumption of alcohol was responsible for 120 000 deaths, while marijuana has had none. It is having been reported that alcohol is more addictive than cocaine, whereas marijuana is one of the least addictive substances. You believe alcohol should be made illegal in South Africa.
    a. Agree
    b. Disagree

Respondents were allowed to skip questions they were uncomfortable answering, this was done due to the sensitive nature of the topic of marijuana, alcohol, cigarettes, and other recreational drugs – all of which were mentioned in the above questions.