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4 June 1993

Mr R S O'Regan QC
Chairman
Criminal Justice Commission
557 Coronation Drive
TOOWONG QLD 4066

Dear Mr O'Regan

The Advisory Committee on Illicit Drugs hereby furnishes you with its Discussion Paper ***Cannabis and the Law in Queensland.***

Yours faithfully

Professor John Western
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Dr Mary Sheehan

Dr Peter Nelson

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Mr Trevor Carlyon

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Mr Ivor Shaw

Mr Phil Dickie

ADVISORY COMMITTEE ON ILLICIT DRUGS

CANNABIS AND THE LAW IN QUEENSLAND

A DISCUSSION PAPER

JULY 1993

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This is a Discussion Paper, not a Report.

This Discussion Paper has been compiled by an Advisory Committee and reflects the views of that Committee and not necessarily those of the organisations to which Committee members belong.

The Advisory Committee has formed no conclusions on any matters raised.

The purpose of the Discussion Paper is to facilitate public submissions to the Advisory Committee on Illicit Drugs by:

(a) endeavouring to provide sufficient information so that a reader can form views on relevant issues; and

(b) identifying particular issues on which submissions are sought.

The matters raised in this Discussion Paper are not meant to restrict persons or organisations in any way in relation to relevant issues which they may wish to raise.

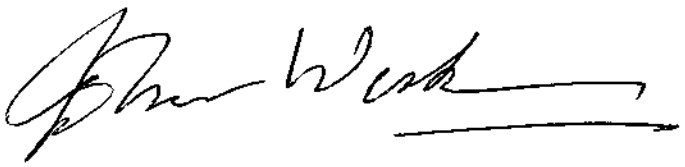
FOREWORD

As Chairman of the Advisory Committee on Illicit Drugs I would like to acknowledge the volunteer assistance and advice provided by the Committee Members. All were busy professional people largely from agencies external to the Criminal Justice Commission. That they were prepared to continue their involvement in the Committee's activities in what became quite trying circumstances is evidence of their seriousness of interest in trying to bring a little light to a contentious issue where emotional rather than rational thought frequently provides the rules of the game.

I would also like to acknowledge the hard work of the Commission staff who although frequently busy with other activities found time to assemble, process and analyse the data which forms the basis of this discussion paper.

Specifically I would like to thank Janelle Wright, Jane Hunter, Caroline Leighton-Hall and Glenda Waring.

It is sometimes customary in statements of this kind to absolve all but oneself from any blame that may arise from inadequacies contained in the document. However, I am pleased to note on this occasion that all members of the Committee believe this discussion paper will be a valuable contribution to informed public debate on this important but necessarily contentious social issue.



Professor John Western
Chairman
Advisory Committee on Illicit Drugs

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PART 1 - INTRODUCTION

The Requirement of the Fitzgerald Commission of Inquiry

The Fitzgerald Commission of Inquiry into Possible Illegal Activities and Associated Police Misconduct (hereinafter referred to as the 'Fitzgerald Commission of Inquiry') recommended that the Criminal Justice Commission (hereinafter referred to as the 'Commission') review Queensland's law and practice in areas shown by its investigations to be linked with, or likely to be linked with, such problems as organised crime and police corruption. Specifically, the recommendation was:

> B. ll Review Program
>
> This Commission recommends that the Criminal Justice Commission, as an essential part of its immediate functions, undertake investigations, review, reform, and consideration of criminal justice matters arising from this report, including:
>
> 2. general review of the criminal law, including laws relating to voluntary sexual or sex-related behaviour, s.p. bookmaking, illegal gambling, and illicit drugs, to determine:
>
> (a) the extent and nature of the involvement of organized crime in these activities
>
> (b) the type, availability and costs of law enforcement resources which would be necessary effectively to police criminal laws against such activities
>
> (c) the extent (if at all) to which any presently criminal activities should be legalized or decriminalized.[1]

With respect to the matter of illicit drugs, G.E. Fitzgerald QC, Chairman of the Fitzgerald Commission of Inquiry, said:

> ... it is important that the State Government press the Commonwealth Government and the Governments of other states to join in an urgent search for the most satisfactory solution to the issue.
>
> Such a search must be conducted objectively in the public interest and focus on social need in the use of resources, totally free from political considerations.[2]

Establishment of the Advisory Committee on Illicit Drugs

In fulfilling the brief bequeathed to it by the Fitzgerald Commission of Inquiry and mindful that the illicit drugs issue involves legal, enforcement, medical and social questions, the Commission established in August 1991 a working party with the necessary expertise, seeking assistance where necessary from outside the Commission. An Advisory Committee on Illicit Drugs (hereinafter referred to as the 'Committee') was consequently

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1 Commission of Inquiry into Possible Illegal Activities and Associated Police Misconduct 1989, *Report of a Commission of Inquiry Pursuant to Orders in Council* (Chairman, G.E. Fitzgerald QC), Qld Government Printer, Brisbane, p. 377.

2 *ibid.* p. 196.

formed under the chairmanship of Professor John Western, Professor of Sociology at the University of Queensland and one of the Commission's part-time Commissioners. The Committee includes officers and members of the Commission, officers of other relevant agencies such as Queensland Health, the Queensland Police Service, the Medical School of the University of Queensland, the Alcohol & Drug Foundation of Queensland and others with obvious expertise and interest in drug issues. Views expressed by members of the Committee are not necessarily those of the organisations to which they belong.

The Committee determined that the best way to proceed was to thoroughly research the issue, expose the results of this research to the scrutiny of the Committee and the representatives of community and professional groups who had expressed an interest in the topic, and issue a comprehensive discussion paper. This is that discussion paper and its release marks the opening of a three month period for the receipt of formal submissions from any interested party. Submissions will then be considered by the Committee.

There are, at the very least, four commonly distinguished groups of illicit drugs: cannabis and its derivatives; the opioids (i.e. heroin and methadone); cocaine and its derivatives; and the stimulants and hallucinogens (i.e. amphetamines and lysergic acid diethylamide [LSD]). The Committee decided against, in one exercise, attempting to study the whole spectrum of illicit drugs, for the following reasons:

- any document covering all illicit drugs would be extremely complex and unwieldy;

- the pharmacological, law enforcement and social issues arising from the use of different illicit drug groups are sufficiently distinct to justify individual consideration; and

- there are significant differences in the social perception of the issues surrounding the use of different illicit drug groups, i.e. the distinction drawn between so-called 'soft' and so-called 'hard' drugs, or the different health implications of drugs commonly taken intravenously as opposed to other methods of administration.

The Committee also determined that the first priority for study and the release of a discussion paper would be the cannabis illicit drug group, for the reasons that:

- as far as was known cannabis is the most widely used illicit drug;

- cannabis was the illicit drug making the greatest demands on the criminal justice system;

- cannabis is produced within the jurisdiction; and

- cannabis is the focus of the most controversy with respect to possible changes in the law.

The Discussion Paper

The purpose of this discussion paper is to:

- present information on the nature, supply and use of cannabis, current laws pertaining to its use or production, and the effectiveness, cost and nature of law enforcement; and

- seek submissions from interested community groups and individuals on preferred legislative, enforcement and social responses to the issues of cannabis use and production.

Every effort has been made in this discussion paper to reflect the views of Committee members and advice sought and received from persons and organisations with relevant experience and expertise. Some of the preliminary findings from the research were also the subject of a seminar held in March 1993 and this final document reflects relevant matters raised at and following this seminar.

The final portion of this discussion paper raises, in the format of questions, issues which the Committee hopes will be addressed in the submissions it receives.

To assist in the process of consultation submissions should be marked '**Submission**' and be addressed to:

The Secretary
Advisory Committee on Illicit Drugs
PO Box 137
BRISBANE ALBERT STREET QLD 4002

Submissions should be received by 20 September 1993.

PART 2 - THE BACKGROUND TO CANNABIS

What is Cannabis?

Cannabis sativa is the botanical name of a tall, easily grown annual plant known and cultivated since ancient times for its fibre, seeds and oil, and its medicinal and intoxicant properties.[3] Other names by which the plant and its preparations have been known by in official documents are *indian hemp* and *marijuana*. Colloquial references to the plant are many, varied and ever-changing with the best known and most enduring being *ganja, grass, pot* and *dope*. For the purpose of this discussion paper the word cannabis will be used to designate both the plant and its various preparations.

Botanically, *cannabaceae* is a distinct plant genus most closely related to the genus containing the hop plant. Botanists are in some disagreement as to whether there is only one species, *sativa*, or three, *sativa*, *indica* and the small northern European steppes weed *ruderalis*. *Sativa* is the principal concern of this discussion paper, although it should be noted that *cannabis indica* is cultivated in south-west Asia and used extensively in the production of hashish. The distinguishing feature of cannabis is the leaf, composed of an odd number of long, thin, serrated-edge leaflets varying in length, with the longest being at the centre of the hand-like array. The leaves have tiny hairs on their upper surface, some connected to glands within the leaf which produce the plant's resin. This amber-coloured resin contains compounds designated as cannabinoids. Some of these cannabinoids, the tetrahydrocannabinols (hereinafter referred to as THC), are responsible for the plant's psychotropic properties.

Except in rare instances the male and female plants are separate, with the male plant having less foliage and fewer flowers and being shorter lived than the female plant. As the highest concentration of cannabinoid glands is in the flowering tops, the resin (and drug) content of female plants is normally greater.

Viable cannabis seed germinates in three to seven days and in good conditions the plants grow rapidly to a height of one to nearly five metres at maturity which is usually complete

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3 In the general sense, much has been written about cannabis, frequently in connection with government sponsored inquiries. Unless otherwise noted, references for this portion of the discussion paper are as follows (International preceding Australian, in order of date): Indian Hemp Drugs Commission 1894, *Report on Indian Hemp*, Government Central Printing Office, Simla; Inglis, B. 1977, *The Forbidden Game: A Social History of Drugs* (2nd edn), Coronet Books, Philadelphia; Schultes, R.E., Hofmann, A. 1979, *Plants of the Gods: Origins of Hallucinogenic Use*, Hutchinson, London; Emboden, W. 1979, *Narcotic Plants: Hallucinogens, Stimulants, Inebriants and Hypnotics, their Origins and Uses*, McMillan, New York; Abel, E.L. 1980, *Marihuana: The First Twelve Thousand Years*, Plenum Press, London; Himmelstein, J.L. 1983, *The Strange Career of Marihuana: Politics and Ideology of Drug Control in America*, Greenwood Press, Westport; Tyler, A. 1986, *Street Drugs*, New English Library, London; Royal Commission into the Non-Medical Use of Drugs, South Australia 1978, *Cannabis: A Discussion Paper*, (Professor Sackville, Chairman), Gillingham Printers, Adelaide; Commonwealth Department of Health, Drugs of Dependence Section 1979, *Cannabis - A Review of Some Important National Inquiries and Significant Research Reports*, AGPS, Canberra; Royal Commission into Drug Trafficking 1979, *Report*, (P.M. Woodward, Chairman), AGPS, Sydney; Frank, M., Rosenthal, E. 1983, *Marijuana Grower's Guide*, Wild and Woolley, Sydney.

in four to nine months. This makes it possible to achieve two crops of cannabis a year on the same ground. However, cannabis is a frost-tender plant so this optimum level of production can be obtained only in glasshouse or sub-tropical and tropical areas, a point particularly relevant to Queensland. Cannabis can grow to maturity in the wild state and indeed did so in many areas of Australia as a result of the seed being included in bird seed mixes. This wild variety was known as *ditchweed*. However, both growth and THC content can be enhanced, on occasion spectacularly, through cultivation, irrigation, fertilisation and pruning.

There is general agreement that the cannabis plant originated and was first exploited for human use in central and east Asia. Archaeological evidence for the use of the fibre has been claimed to extend back to 10,000 B.C.; there is more general agreement that by 4,000–2,000 B.C. cannabis was widely known and used for a variety of purposes in the civilisations of China, India, Mesopotamia and Egypt.

The former common name *indian hemp* indicates the usefulness of cannabis as a source of fibre for the manufacture of coarse cloth, rope and paper. This is the oldest verifiable use of cannabis, with numerous fibre, hempen rope and cloth finds around 4,000–3,000 B.C. and some arguably earlier. The use of cannabis as a fibre source ceased to be commonplace only in very recent times, with it being an important commercial crop in the United States cotton belt from about 1750 to the time of the Civil War. Commercial and experimental cultivation for both fibre production and medical extracts persisted until about 1930.

Some sources claim that early man utilised the immature fruit as a food source; although direct human nutritional use of cannabis has generally ceased, cannabis seed was valued as a constituent of bird seed mixes until its prohibition in the late 1930s.

Cannabis was one of the earliest known medicines, used as an analgesic and sedative from very ancient times. However, widespread European use of cannabis for medical purposes is comparatively recent, a consequence most likely of French scientists taking part in a military expedition to Egypt during the Napoleonic Wars. Preparations of cannabis were still being marketed and promoted for the treatment of asthma, tension and pain until about 1930.

The use of cannabis as an intoxicant is believed to have begun in China, again in ancient times. Intoxicant use, often in connection with rituals, is known to have occurred in India, eastern Europe, the Middle East and North Africa in ancient times. In Rome, cannabis was widely cultivated for fibre but an absence of records would seem to indicate little intoxicant use of the plant. The next large geographical spread in cannabis use appears to have occurred as a result of European exploration and colonisation, with both commercial cannabis cultivation (for hemp) and intoxicant use being recorded extensively throughout the Americas. Indications are that while the plantation growers in the United States and the West Indies were unaware of, or, more likely, unconcerned about the plant's other qualities, slave labourers used cannabis extensively as an intoxicant. In the West Indies in particular, cannabis was used as a 'work' drug in much the same way as coca leaves were used elsewhere in South America. While Napoleon's scientists in Egypt were impressed with potential medical qualities of cannabis, it is believed that returned French troops were originally responsible for an increase in cannabis intoxicant use in western Europe in the 19th century. The first comprehensive modern western description of the intoxicating

effects of cannabis was published by Moreau in France in 1845.[4] In summary, minor use of cannabis in European cultures for its drug properties can be documented almost continually from the early 1800s and arguably somewhat earlier. If there was concern in Europe over the use of cannabis by Europeans, it was muted. The same was not true of the use of cannabis in European colonies.

In India, concern was expressed that cannabis consumption, some of which took place under the sanction of Hindu ritual, led to madness. Also, moves to limit consumption and trade in opium led some to question why other drugs should be excluded, there being at least some belief that hemp drugs were much more dangerous than opium. A limited inquiry in India in 1871 concluded that the reputation of hemp drugs was most likely exaggerated but habitual use could tend to cause insanity; however the prospects of successful prohibition were not good. A prohibition on 'hemp drugs' followed in Burma and led to agitation in the House of Commons for a similar course of action to be followed in India. A more comprehensive inquiry was commissioned in 1893. The seven volume report of the British East India Hemp Drugs Commission (hereinafter referred to as the 'Indian Commission') exhaustively examined the prevalent beliefs about cannabis, finding its use to be more extensive than believed by officials and its effects to be less than feared. In particular, cannabis use could not be linked causally to insanity or to crime. The Indian Commission view was that cannabis was less habit forming than either opium or alcohol and that a ban on hemp drugs would likely do more harm than good. The Indian Commission's inquiry is notable as the first of many government sponsored inquiries into cannabis, the majority of which have made comparable findings and similar recommendations. (Table 1.1 on p. 9 summarises the findings on cannabis and consequent recommendations of all such inquiries known to the Committee.)

Cannabis progressively became classified as an illegal substance and cannabis use a proscribed activity throughout the developed and colonial world during the period 1890–1940. The inquiries into cannabis and its use outlined above and in Table 1.1 generally had nothing to do with this process; the conferring of an illegal status upon cannabis was rather a secondary consequence of international efforts to control the production of opium. On one view, there was real intent to control drug trafficking on all sides but the negotiations were protracted and took many years. On another view, while the United States and China sought reductions in opium production, the colonial powers, with an eye on their opium monopolies and the revenue raised thereby, voiced the same sentiments but effectively obstructed the process. Cannabis was initially raised due to concerns about its social effects by delegates from British Egypt. However, most observers at the time and most commentators since maintain that cannabis, like coca, served as one of a number of diversions to the main topic of international dissension – opium and its derivatives morphine and heroin.

4 Moreau, J.J. *et.al.* 1845, *Du Hashish et De l'Alienation Mentale*, (orig. title) tr. by Barnett, G.J. 1973, *Hashish and Mental Illness*, Raven, New York.

The principal effect of the 1911 Hague Convention[5] was that the Chinese reduced opium production, at least partly to the benefit of smuggling interests in Hong Kong and the New Territories. In 1925, a second international conference,[6] this time under the auspices of the League of Nations, reaffirmed the desirability of reducing opium production. The Egyptian delegates raised the problem of hashish (cannabis resin) addiction in their colony with its supposed connection with insanity. Cannabis and coca were included in the list of drugs which member nations would 'undertake' to control within their territories while recognising whatever 'legitimate' uses they chose.

In 1931, agreement was finally reached on limiting opium production to that necessary to meet medical and scientific needs.[7] Some significance has been attached to the fact that the Egyptian delegate, then concerned about increasing heroin use in the Protectorate, broke ranks with the colonial power block on the all important opium question. Once again, what was judged appropriate for heroin, morphine and opium was also deemed appropriate for cannabis and coca. However international agreement, at long last achieved, proved ineffectual in operation. Production of opium and hemp, notably in India, did decrease; the cause is thought to be collapsing demand and prices as a consequence of the Depression rather than the unenforceable recommendations of an international convention.

Although there were some restrictions on medicinal cannabis use in Australia prior to 1920, the basic structure of the cannabis laws of the Australian states derives initially from the League of Nations sponsored conventions of 1925 and 1931. Although there is some evidence of minor cannabis use in Australia at that time there was no perceived problem with cannabis use until the 1960s.

By then, Australian law also reflected a further international convention which had its origins in the regulatory regime developed in the United States since the 1920s. There may (or may not) have been an actual increase in cannabis use, chiefly among minority groups, in the United States during the period of alcohol prohibition (1920–32). Along with claims of such increased use however, came some claims of an association between cannabis use, madness and violent crime. At least some of these claims after 1930 originated from the newly created United States Federal Bureau of Narcotics. Largely because of the Bureau's urging, the *Federal Marihuana Bill* was enacted in 1937, putting cannabis on the same legal basis as narcotics. Enforcement remained problematic and in the late 1950s a marked rise in cannabis use began. For the first time, cannabis (and other drug) use spread to the wider community rather than being principally confined to various ethnic and occupational minorities. This was very probably assisted by the enormous amount of symbolism invested in cannabis by what later became known as the counterculture. The United States was the principal instigator of the *Single Convention on Narcotic Drugs 1961* which in turn reflected the regulatory regime established under the *Harrison Narcotics Act 1915* and the *Federal Marihuana Bill 1937*.

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5 *International Opium Convention* 1911–12, The Hague.

6 *International Opium Convention: Agreement Concerning the Suppression of, the Manufacture of, Internal Trade in, and use of, Prepared Opium* 1925, Geneva.

7 *Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs* 1931, Geneva.

The evolution of the various international conventions[8] which are the basis of Australian law has some significance. One salient feature of the process was that cannabis was basically treated in identical fashion to and frequently described as a narcotic. Secondly, conventions and laws did not derive from research into cannabis or its effects and sometimes arose in spite of existing research.

8 *Shanghai Conference (on opium)* 1909; *International Opium Convention* 1911–12, The Hague; *International Opium Convention: Agreement Concerning the Suppression of the Manufacture of, Internal Trade In, and Use of, Prepared Opium* 1925, Geneva; *Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs* 1931, Geneva; *Agreement Concerning the Suppression of Opium Smoking* 1931, Bangkok; *New York Protocol* 1946 (amending 1925 and 1931 conventions and agreements), New York; *Protocol Bringing Under International Control Drugs Outside the Scope of the (1931 Convention)* 1948, Paris; *Protocol for Limiting and Regulating the Cultivation of the Poppy Plant, the Production of, International and Wholesale Trade in, and Use of Opium*, 1953, New York; *Convention on Psychotropic Substances* 1971, Vienna; *Single Convention on Narcotic Drugs*, 1961 (Amending Protocols 1972); *United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances* 1988, Vienna. A general reference is Bruun, K., Pan, L., and Rexed, I. 1975, *The Gentlemen's Club: International Control of Drugs and Alcohol*, University of Chicago Press, Chicago.

Table 1.1 – Summary of Inquiries

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
British East Indian Hemp Commission[9] *India 1893–94*	Cannabis use more extensive than believed, and effects less than feared. Use not linked causally to insanity or crime. Excessive use weakens constitution and increases susceptibility to disease. No injurious mental effects from moderate use. Less habit forming than either opium or alcohol.	Ban on hemp drugs would likely do more harm than good.
Marijuana Smoking in Panama – Report of Committee to Investigate the Effect of Smoking of Marihuana among Military Personnel[10] *Panama 1932*	No mental or physical deterioration demonstrated from young soldiers smoking cannabis. From medical standpoint, habitual use of all stimulants and intoxicants (including cannabis) should be considered detrimental to health.	Present military regulations prohibiting the introduction, sale, possession, or use of marijuana on military reservations should continue. No recommendations for further legislative action to prevent the sale or use of marijuana in the Canal.
Report of Mayor La Guardia's Committee on Marijuana[11] *New York 1944*	Cannabis, in all effective doses, impairs intellectual functioning. No direct relationship between the commission of crimes of violence and marijuana. No physical or mental deterioration can be attributed to cannabis. Marijuana is not a drug of addiction, comparable to morphine, and, if tolerance is acquired, this is of a very limited degree.	

9 Indian Hemp Drugs Commission 1893–94, *Report of the Indian Hemp Drugs Commission*, Government Central Printing Office, Simla.

10 Siler, J.F., Sheep, W.L., Bates, L.B., Clark, G.F., Cook, G.W. and Smith, W.A. November 1933, Marijuana Smoking in Panama, *The Military Surgeon: Journal of the Association of Military Surgeons of the United States*, vol. 53, pp. 269–280.

11 Mayor La Guardia's Committee on Marijuana 1944, *The Marijuana Problem in the City of New York*, The Jacques Cattell Press, Pennsylvania.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Wootton Report–UK, Advisory Committee on Drug Dependence[12] *United Kingdom 1968*	No evidence that cannabis smoking causes violent crime or aggressive anti-social behaviour, or produces conditions of dependence or psychosis requiring medical treatment in otherwise normal people. Cannabis a potent drug, with similar capacity to alcohol to alter mood, judgement and functional ability. Physically, cannabis very much less dangerous than opiates, amphetamines and barbiturates and less dangerous than alcohol. The mental effects are much less clear.	Restrictions on the availability and use of cannabis should be maintained. New legislation to deal specially and separately with cannabis and its synthetic derivatives should be introduced, as distinct from heroin and other opiates. Possession of small amount of cannabis should not normally be regarded as a serious crime punishable by imprisonment.
Report of Board of Health Committee on Drug Dependency and Drug Abuse in NZ[13] *New Zealand 1970*	Low THC content marijuana is less immediately harmful than certain narcotics or amphetamines and the barbiturates.	No relaxation of current control of cannabis and its preparations, considering the present state of knowledge of its properties.
Le Dain (Interim) Report – Canada, Commission of Inquiry into the Non–Medical Use of Drugs[14] *Canada 1970*	Existing evidence affords no clear guidance for predicting what would be the long–term effects of cannabis use at various levels of dose and frequency. Such evidence as there is affords the basis for a cautious rather than optimistic approach.	Simple possession to be punished by summary conviction to maximum fine of $100. Power to imprison in default of payment of a fine not exercisable in respect of simple possession.
Senate Select Committee on Drug Trafficking and Drug Abuse[15] *Australia 1971*	Concluded that many of the dangers and benefits claimed to result from cannabis are unsupported by scientific fact. Scientific evidence is not yet sufficiently conclusive to warrant, with safety to the public, removal of existing restrictions on use of any of cannabis derivatives.	Present restriction on use of cannabis to be retained in Australia. Stronger measures recommended to prevent entry of illegal drugs.

12 Advisory Committee on Drug Dependence 1968, *The Rehabilitation of Drug Addicts: Report by the Advisory Committee on Drug Dependence* 1968, Her Majesty's Stationery Office, London.

13 Committee on Drug Dependency & Drug Abuse in New Zealand 1970, *Drug Dependency & Drug Abuse in New Zealand: First Report*, Government Printer, Wellington, NZ.

14 Commission of Inquiry into the Non–Medical Use of Drugs 1971, *The Non–Medical Use of Drugs: Interim Report of the Canadian Government's Commission of Inquiry*, Queen's Printer, Ottawa, Canada.

15 Australian Parliament Senate Select Committee on Drug Trafficking and Drug Abuse 1971, *Drug Trafficking and Drug Abuse*, Report from the Senate Select Committee, *Drug Trafficking and Drug Abuse*, AGPS, Canberra.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Oregon State Legislature's Interim Committee on Alcohol and Drugs[16] *Oregon 1972*	No demonstrable causal link between use of marijuana and use of heroin and other drugs ... other drugs most often associated with marijuana use are nicotine and alcohol. Marijuana use, by itself, does not dictate whether other drugs will be used, or if other drugs are used, which drugs will be used.	Decriminalisation – on the basis that prohibition drives distribution underground where it is impossible to exercise any control over distribution and use.
Le Dain Report – Canada, Cannabis: A Report of the Commission of Inquiry into the Non–Medical Use of Drugs[17] *Canada 1972*	Four major grounds for social concern: . probable harmful effect of cannabis on the maturing process in adolescents; . implications for safe driving arising from impairment of cognitive functions and psychomotor abilities; . the possibility that long–term heavy use may result in a significant amount of mental deterioration and disorder; and . role played by cannabis in the development and spread of multi–drug use by stimulating a desire for drug experiences and lowering inhibitions.	Repeal of prohibition against the simple possession of cannabis.
Shafer Report – US, First Report by US National Commission on Drug Abuse[18] *United States 1972*	Little proven danger of physical or psychological harm from the experimental or intermittent use of the natural preparations of cannabis ... risk of harm lies instead in heavy, long–term use, particularly with the most potent preparations. Heavy user shows strong psychological dependence – behavioural changes detectable, organ injury possible.	Decriminalisation – Possession of marijuana for personal use no longer to be an offence. Marijuana possessed in public would remain contraband subject to summary seizure and forfeiture.

16 *Interim Oregon State Legislature Committee Report on Alcohol and Drugs* 1972, Oregon State Legislature, Portland.

17 Commission of Inquiry into the Non–Medical Use of Drugs 1972, *The Non–Medical Use of Drugs: Report of the Canadian Government's Commission of Inquiry*, Queen's Printer, Ottawa, Canada.

18 National Commission on Drug Abuse 1972, *Marijuana: A Signal of Misunderstanding: First Report of the National Commission on Marijuana and Drug Abuse*, US Government Printing Office, Washington.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Shafer Report – US, Second Report by US National Commission on Drug Abuse[19] *United States 1973*	Marijuana use is neither causative of, nor directly associated with crime, either violent or non-violent. Users tend to be under-represented among those convicted of assault, especially when compared with users of alcohol, amphetamines and barbiturates. Risk potential is low ... but availability of drug should not be institutionalised. Uncertainty about long-term effects of heavy use continues. Marijuana 'symbolism' is powerful and obstructs emergence of national policy.	Reaffirmed recommendations: possession for personal use not to be offence.
Drug Dependency and Drug Abuse in New Zealand Second Report[20] *New Zealand 1973*	Intermittent or even moderate cannabis use not obviously harmful. Long term toxicity or otherwise uncertain.	Cannabis plant, excluding resin or extracts, to be placed in schedule containing drugs with lesser potential for harm. Differing maximum penalties be provided for offences involving possession or use of different drugs as scheduled in terms of their relative potential for harm. Maximum penalty for the possession and use of drugs with the highest potential for harm should not be greater than the present maximum penalty for all cases of possession and use of controlled drugs.
Interdepartmental Committee on Drugs of Abuse in Australia[21] *Australia 1973*		Marijuana be scheduled separately from narcotics. Cannabis be transferred from the Single Convention on Narcotic Drugs to the Convention on Psychotropic Substances. Penalties for drug offences should be reviewed pending further research.

19 National Commission on Drug Abuse 1973, *Drug Use in America: Problem in Perspective, The Second Report of the National Commission on Marijuana and Drug Abuse*, US Government Printing Office, Washington.

20 Board of Health Committee on Drug Dependency and Drug Abuse in New Zealand 1973, *Second Report, Board of Health Report Series*, no. 18, New Zealand.

21 Interdepartmental Committee on Drugs of Abuse in Australia 1973, *Report to Ministers*, Canberra.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Eastland Report – US, Marijuana – Hashish Epidemic and its Impact on United States Security [22] *United States 1974*	Report of US Senate hearings to correct 'imbalance' of facts and 'myth of harmlessness' of cannabis. 'The other side' was that: . THC accumulates in brain, reproductive organs and fatty tissues; . cannabis causes massive damage to cellular processes; . chronic use causes brain damage – atrophy; . cannabis affects reproductive process – poses danger of genetic damage and mutation; . cannabis greater respiratory risk than tobacco; . chronic use causes 'amotivational syndrome'.	

22 United States Senate, 93rd Congress, Second Session, May 9,16,17,20,21 and June 13 1974, *Marijuana – Hashish Epidemic and its Impact on United States Security: Hearings before the Subcommittee to Investigate the Administration of the Internal Security Act and Other Internal Security Laws of the Committee on the Judiciary*, US Government Printing Office, Washington.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Senate Standing Committee on Social Welfare[23] *Australia 1977*	Evidence on physical effects inconclusive, but: . no apparent dangerous short-term effect from infrequent, low dose use apart from consequences of effect on psychomotor skills; . cannabis a likely driving and industrial work hazard.	That appropriate studies of health implications of cannabis use be conducted so that a database could be established within five years adequate for the introduction of a national policy. . As soon as possible, State and Territory legislation be amended to provide for introduction and use of appropriate methods of detecting THC in drivers and for imposition of appropriate penalties. . Information on cannabis effects on driving be included in existing education programs on road safety. . Cannabis be moved to an appropriate schedule in the UN Convention on Psychotropic Substances. . Commonwealth and States enact cannabis legislation which recognises the significant differences between opiate narcotics and cannabis in their health effects and in their criminal impact on users and the community. . Possession of marijuana for personal use, as already defined in most states: – offence not be defined in law as a crime; – the penalty be solely pecuniary and be enforceable by attachment of property, imprisonment, or such other means as may be determined; – that the penalty be a fixed amount; – no record of conviction to be kept; and – conviction should not, of itself, disqualify a person for employment.

23 Senate Standing Committee on Social Welfare 1977, *Drug Problems in Australia: An Intoxicated Society?*, AGPS, Canberra.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
New South Wales Joint Committee Upon Drugs[24] *New South Wales 1978*		Full scale research should be implemented by appropriate departments to determine effect of all drugs on driving performance. Further consideration be given to forfeitures of money and goods (being the proceeds of sale of drugs) being transferred to a Special Deposit Fund to be used to support programmes for rehabilitation, education and research in the field of drug addiction. Adhered to the view that scientific evidence is not yet sufficient to warrant the removal of the existing restriction on the use of any of the cannabis derivatives.
Royal Commission into the Non-Medical Use of Drugs (Final Report)[25] *South Australia 1979*	. Cannabis has very few acute side effects. . Cannabis use may adversely affect driving skills although no clear evidence in Australia that cannabis use had caused road accidents. . Possibility that cannabis smoke causes lung damage with regular use. . Some adverse long term effects shown in experimental research with animals; human applicability uncertain.	Advocated partial prohibition model under which possession and cultivation of drug for personal use would be permitted but commercial dealing would remain prohibited and no legal market would be established. This is not to be viewed as the first step in a series designed to 'legalise' the supply and use of cannabis. Initiatives to be taken through education programmes to minimise the likelihood of excessive or irresponsible use of the drug. Cannabis should be classified in legislation separately from opiate narcotics, whether the drug was subject to total prohibition or available for medical purposes.

24 New South Wales Joint Committee Upon Drugs 1978, *Report into Drug Abuse*, New South Wales Government Printer, Sydney.

25 Royal Commission into the Non-Medical Use of Drugs in South Australia 1979, *Final Report*, (Chairman, Professor Sackville), South Australian Government Printer, Adelaide.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Woodward Royal Commission – NSW, Royal Commission into Drug Trafficking in New South Wales[26] *New South Wales 1979*	. Medical evidence inconclusive. . Legal liberalisation likely to result in increased use and adverse effect on road and industrial safety.	Cultivation, possession, supply or use of cannabis should not be legalised. Legislation which would permit the possession of small quantities of cannabis grown for one's own use should not be introduced. That possession or use of cannabis should not be decriminalised. Government should support a substantial programme of research into the effects of cannabis, and drugs generally, on driving performance, with a view to developing suitable practical tests which will enable detection and prosecution of the drug intoxicated driver.
Advisory Council on the Misuse of Drugs[27] *United Kingdom 1979*		Deterrent to use of cannabis drugs still needed. Use of these drugs should not be legalised in the UK. Cannabis and cannabis resin be transferred from one class to another within Schedule 2 in order to attract lowest range of penalty. Offence for cultivation of cannabis to be treated in the same way as production, supply or possession of other controlled drugs. UK Government continue to pursue aims of the UN Single Convention on Narcotic Drugs with the utmost vigour.

26 *New South Wales Royal Commission into Drug Trafficking Report* 1979 (Chairman, Mr Justice Woodward), Sydney Government Press, Sydney.

27 Advisory Council on the Misuse of Drugs 1979, *Report on a Review of the Classification of Controlled Drugs and of Penalties under Schedules 2 and 4 of the Misuse of Drugs Act 1971*, Home Office, London.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
Australian Royal Commission of Inquiry into Drugs[28] *Australia 1980*	. Research had neglected hormonal/physiological effects of cannabis uses by females, on human foetus and persons with physical and mental disease. . Results of research on young, healthy intelligent adult males should not be extrapolated to whole community. . Cannabis is a drug with the capacity to cause harm. . Harmful effect on user and community may be greater or less than established by present research.	Elimination of drug abuse is an unattainable goal. Any rational community action to limit abuse of drugs must embrace all drugs, not only those classified as illegal. National strategy aimed at removing drug traffickers, making illegal drugs less available, preventing diversion of legal drugs to illicit use, controlling illegal drug use or reducing use of legal drugs, educating the community on drug abuse, treating abusers of drugs effectively, and removing ignorance that moulds community debate. No relaxation of the present Australian prohibition on cannabis be made for 10 years from commencement of operation of recommended National and State Drug Information Centres. At expiration of 10 years the legal prohibition against cannabis be reviewed by Commonwealth and State governments acting in concert.
Australian Foundation on Alcoholism and Drug Dependence[29] *Canberra 1981*		An Act similar to *Rehabilitation of Offenders Act* 1974 (UK) be legislated: . no criminal offence for the possession of cannabis for personal use; . feasibility study with view to creating a government monopoly on production, manufacture and distribution of cannabis; and . research gaps in data concerning cannabis use, with funds recouped by monopoly. Above proposals be introduced only after widespread community debate.

28 Australian Royal Commission of Inquiry into Drugs 1980, *Report*, AGPS, Canberra.

29 Australian Foundation on Alcoholism and Drug Dependence 1981, *Social Policy on Drugs : A Discussion Paper*, AGPS, Canberra.

INQUIRY *Date/Place*	FINDINGS	RECOMMENDATIONS
US National Research Council Committee on Substance Abuse and Habitual Behaviour[30] *United States 1982*	NRC began a study of marijuana policy in 1978. It is evident that full impact of marijuana use on health will not be clear until careful epidemiological studies over some decades have been completed. Research has not established a danger both large and grave enough to override all other factors affecting a policy decision.	Policy of partial prohibition is preferable on social, legal and economic grounds to complete prohibition of supply and use. Further research be conducted on the biological, behavioural, developmental, and social consequences of marijuana use, on the structure and operation of drug markets, and on the relations of various conditions of availability to patterns of use.
Advisory Council on the Misuse of Drugs[31] *United Kingdom 1982*	Much of the research undertaken so far had failed to demonstrate positive and significantly harmful effects in man attributable solely to the use of cannabis. There was insufficient evidence to enable reaching any incontestable conclusions as to the effects on the human body of the use of cannabis.	
Committee of the Institute of Medicine[32] *United States 1982*	Scientific evidence published to date indicates that marijuana has a broad range of psychological and biological effects, some of which, at least under certain conditions, are harmful to human health. No information to indicate how serious this risk may be.	There be a greatly intensified and more comprehensive program of research into the effects of marijuana on the health of American people.

30 National Research Council Committee on Substance Abuse and Habitual Behaviour 1982, *An Analysis of Marijuana Policy*, National Academy Press, Washington.

31 Advisory Council on the Misuse of Drugs 1982, *Report of the United Kingdom Advisory Council on the Misuse of Drugs*, London.

32 Division of Health Sciences Policy 1982, *Marijuana and Health Report of a Study by a Committee of the Institute of Medicine*, National Academy Press, Washington.

INQUIRY *Date Place*	FINDINGS	RECOMMENDATIONS
Select Committee on HIV, Illegal Drugs and Prostitution - Third Interim Report[33] *Australian Capital Territory 1991*	Current research inconclusive but does not indicate that cannabis is more harmful than alcohol and tobacco. Research into chronic and acute cannabis use indicates cannabis is less harmful than tobacco and alcohol. Possible and probable adverse effects of cannabis use are of limited duration. Cannabis may have therapeutic uses.	That the possession, cultivation and use of cannabis for personal purposes not be an offence at law, i.e. cultivate not more than 5 plants, offence to possess more than 25g in mass, but less than 100g carries penalty of a fine of $150, more than 100g carries full penalty of $5,000, imprisonment for two years or both. Provisions of the *Motor Traffic (Alcohol and Drugs) Ordinance 1977* that deal with driving a motor vehicle to include a prescribed concentration of THC in terms of impairment. The legislative reforms advocated be monitored by government. That after three years of operation of the legislative reforms advocated, the effectiveness of the amended legislation be reviewed and outcome of that review be tabled in the Legislative Assembly. That the assets of people convicted of serious drug related crimes be subject to forfeiture by the courts. That such assets ordered to be forfeited by the courts be used to promote, fund and further health and treatment programs for illicit drug dependent people. A drug assistance and treatment service to meet the specific needs of women and young people.

33 Legislative Assembly for the Australian Capital Territory Select Committee on HIV, Illegal Drugs and Prostitution 1991, *Third Interim Report Marijuana and Other Illegal Drugs*, AGPS, Canberra.

PART 3 - THE EFFECTS OF CANNABIS

Part 3 summarises, in lay language, the detailed and comprehensive critical review of the research literature on cannabis which forms Appendix A to this discussion paper.

Introduction

The majority of recent research into the various effects of cannabis was undertaken in the 1970s and early 1980s. Relatively little new research has been attempted in the late 1980s and 1990s with the exception of drug driving research. The inconclusive findings of most studies into health risks associated with cannabis use may be partly responsible for the decline in research interest on the question of cannabis effects.

Regardless of the inconclusive nature of the research evidence there are strong and divergent views in both the scientific and general community about the effects of cannabis use. Some would hold that cannabis is clearly a dangerous substance leading to a range of physical and psychiatric conditions that should be avoided. Others would claim that it is not a dangerous substance and that, used in moderation, it is physiologically less toxic than many regularly consumed legal substances such as alcohol and tobacco.

In spite of two decades of scientific inquiry negative effects of cannabis on human populations have not been unequivocally demonstrated. There may be many reasons for this, including:

- variable potency of the drug preparations;
- limitations of the research method;
- cultural and social variations where drug use is historic;
- multiple drug use;
- the illegal status of the drug in most countries; and/or
- the lack of measurable toxic effects of cannabis (tetrahydrocannabinols) in humans.

Cannabis remains a widely used drug in the 1990s. Cannabis consumption appears to decrease with age, with the peak period of use in a person's life being during transition from adolescence to adulthood. Despite the increasing proportion of the population who have tried cannabis, it is not exclusively used as the drug of choice by users. It is commonly used with other drugs such as alcohol and tobacco.

Cannabis is not a narcotic, although it is often legally classified as a narcotic here and in the United States for the purposes of control. Cannabis is inadequately described by any one drug category as it possesses properties of a sedative, euphoriant and hallucinogen. The principal psychoactive compounds in cannabis appear to be several tetrahydrocannabinols.

The potency in cannabis preparations varies with the growing conditions encountered by the plant, and marked variations in strength may characterise different geographic areas and the plant parts that are used. The most concentrated natural supply of cannabinol is found in the preparations called hash oil and hashish which consists largely of the processed resin from the flowers of cultivated female plants. Other preparations include flower heads, leaf or leaf and stem of both male and female plants.

Cannabis use may induce a dreamy euphoric state of consciousness with feelings of lightness and an air of detachment, jocularity and pre-occupation with simple and familiar things.

Some cognitive abilities remain keen unless drowsiness and sleep intervene. In social situations there is a tendency towards laughter and loquaciousness. Perceptual distortion of space and time is common; distances may be judged inaccurately and things may seem to be happening very slowly or very rapidly.

Dissociative phenomena such as partial amnesia or a feeling of being outside of one's self and looking on are frequent. There may be an unusually vivid remembrance of experiences or mood states of the past. The continuity of what is being attended to may be lost, to be replaced by an intense experiencing of short sequences of scenes. At the time of intoxication the appreciation of, or the desire for food is usually enhanced.

A panic reaction is sometimes induced particularly in once only users. When this occurs, the smoker may be keenly sensitive of others watching him or her and some stop cannabis use for this reason. Anti-social behaviour as a direct effect of cannabis is very rare; users ordinarily withdraw from company that they find unpleasant. Toxic-like reactions to ordinary preparations of cannabis are also very rare.

Pharmacological Effects

Cannabis is a unique psychoactive agent; its chemistry and pharmacology do not fit well within any class of mind-altering drugs. In low doses it has paradoxical effects, acting both as a stimulant and depressant on the central nervous system. In higher doses depressant effects predominate. Cannabis in high doses may have minor or short-lived effects on the immune system, reproductive system and cardiovascular system.

Although cannabis is widely used, its pharmacology is not well understood, and as noted earlier, it is difficult to draw firm conclusions from the research that has been conducted. Cannabis is not a single drug, but a complex mix; more than 60 cannabinoid compounds have been isolated from cannabis smoke. Measurement of the levels of cannabinoids in body tissues is difficult because of their high potency; low doses are sufficient to cause a 'high'. In addition, cannabis' effects vary widely across species and its long-term effects are difficult to predict from short-term human studies.

Studies are also complicated by the increased potency of cannabis over the past decades, with today's cannabis containing more THC by weight than that of the 1960s. Finally, many of the experimental studies involving humans have looked at short-term effects; practical considerations make long-term or longitudinal studies all but impossible to conduct.

These and other methodological problems partly explain why uncertain and often contradictory results have been obtained in cannabis research since the late 1960s.

Another factor in the pharmacology of cannabinoids is that they are highly soluble in fats showing only very slight solubility in water. This fact seems to play an important role in the way they are metabolized by the body and in their psychoactive effects. In addition, cannabinoids' fat solubility helps explain the extremely long time (up to 42 days) these compounds are retained within the body.

Tolerance and Dependence

Tolerance to cannabis occurs only to a minor degree. Physical dependence, manifested as very weak withdrawal symptoms, has been infrequently demonstrated with heavy usage. The symptoms are similar to those of alcohol or opiate withdrawal, namely nausea, agitation, irritability, tachycardia and sweating, but are extremely mild and do not result in a compulsive urge to take the drug. Repeated cannabis use may, however, lead to the development of a habitual pattern of drug taking behaviour.

Cannabis does not produce a state of serious drug-dependence and although a psychiatric diagnostic category of cannabis addiction now exists, its use has been limited.

Therapeutic Uses

Cannabis was at one time listed as a prescription drug but has not been used medically since the early 1900s. Recently, some interest has been shown in cannabis for therapeutic purposes. A finding of lowered intraocular pressure following oral THC administration has been repeatedly confirmed and it remains to be seen whether preparations of cannabis have any advantages over other forms of treatment for glaucoma. The use of THC in reducing the incidence of nausea and vomiting associated with cancer chemotherapy has also been studied and THC has been formulated and legally supplied in the United States for this purpose. It seems able to reduce nausea and vomiting at doses that are associated with only moderate mental effects. It remains to be seen, however, if any of these forms of THC have advantages over standard prescription drugs.

Health Risks

Cannabis has been suggested as a cause of medical problems including respiratory ailments, impaired immunity and reproductive disturbances. Often the symptoms of these disorders are subtle and non-specific, and the link with cannabis use is not readily apparent. The limited evidence from long-term studies suggests that most of the noticeable medical effects are reversible with cessation of cannabis use.

Numerous studies have shown that cannabis use during pregnancy has effects on the developing foetus. A link between cannabis use and low birth weight is well-established; similarly, cannabis has been shown to increase the risk of complications during pregnancy. Some research suggests that cannabis can cause malformation, foetal oxygen depletion resulting in impaired growth, prematurity and foetal brain damage. These effects may be

the result of smoking *per se* rather than an effect of THC and are not as marked as those associated with the use of alcohol at critical stages in pregnancy.

Respiratory Effects

Inhaled smoke from any source harms lung tissue, the cells lining the airways, as well as the immune cells found in the lungs. All of these effects can make the lungs prone to infection and can complicate or start respiratory disorders.

Cannabis and tobacco smoke are chemically similar (except that cannabis smoke contains cannabinoids and tobacco smoke contains nicotine) and the effect of cannabis smoke parallels that of tobacco smoke. Smoking habits of the two groups are not identical; cannabis users tend to smoke less, but they inhale deeply, do not use filters and smoke the cigarette down to the end. It may be that heavy cannabis smoking carries some similar risks to that of heavy cigarette smoking.

Cardiovascular Effects

Cannabis smoking produces an almost immediate increase in heart rate and blood pressure, which can aggravate existing cardiac conditions. In healthy young adults, smoking moderate amounts of cannabis increases the heart rate by as much as 90 beats per minute; the effect lasts about one hour after smoking

Although cardiac output may increase by as much as 30 per cent after smoking cannabis, blood pressure rises only modestly. Large doses of THC have resulted in opposite effects, causing a drop in blood pressure and heart rate. Some degree of tolerance to these effects occurs among chronic users of cannabis. The changes in cardiac function are not permanent and can be reversed by stopping smoking.

Because the two drugs are often compared, it should be noted that the cardiovascular effects of tobacco are related to the nicotine content. Although cannabinoids are known to cause the short-term cardiovascular changes noted above, these effects are very different from those caused by nicotine. The long-term consequences of cannabis on the cardiovascular system are essentially unknown and cannot be suggested from evidence related to cigarette smoking.

Reproductive Effects

Conflicting evidence has been reported on the effects of chronic high doses of cannabis on human sexual function. In males, THC may diminish testosterone production and inhibit reproductive function. In women, THC may be responsible for lack of ovulation during the menstrual cycle. The research in this area is very inconclusive and the results even more equivocal than that produced about other health risks.

Psychological Effects

The reported psychological effects of cannabinoids – which include excitement and dissociation of ideas, enhancement of the senses, distortions of time and space, delusional thinking, impulsiveness, illusions and hallucinations – are accompanied by behavioural changes, including a deterioration of psychomotor performance, lowered attention span and memory, and reduced physical strength.

Psychomotor Functioning

The psychomotor effects of cannabis use have been the subject of increased research interest in recent years, both in Australia and internationally.

Cannabis clearly causes a deterioration of motor skills. For example, 94 per cent of those whose blood levels contain moderate amounts failed a standard roadside sobriety test administered ninety minutes after smoking. Some 60 per cent of them failed the test 150 minutes after smoking.

The effect on motor skills has particular relevance to the role of cannabis in traffic accidents and other types of accidents. Although epidemiological studies are hampered by methodological difficulties – in particular, the poor association between blood levels of cannabinoids and their effects – experimental studies show that cannabis impairs many of the fundamental skills needed for safe driving, including co-ordination, tracking, perception and vigilance. Similarly, performance in driving simulators is poorer after cannabis use.

Studies further demonstrate that the impairment of cannabis and alcohol on driving skills are additive when the cannabis dose is moderate or high. When the cannabis dose is low there is an effect (antagonism) that seems to reduce the alcohol impairment when the drugs are taken together.

These effects on motor skills have significant implications regarding the consequences of cannabis use. The subjective effects of alcohol and cannabis are quite different with cannabis only users reporting that they drove more carefully and slowly when intoxicated. The two drugs have very different mechanisms of action in the body and also produce different changes in mood and performance.

Many studies have shown that THC is infrequently detected in the blood of dead drivers as the only drug present. In the majority of cases, THC is found in combination with alcohol.

Either drug will impair driving performance and when taken in combination will generally increase impairment.

Cognitive Functioning

The effect of cannabis on attention has been studied using a variety of tests. These studies show that people consistently do poorly after receiving even moderate amounts of cannabis. Some of the specific impairments found have included confusion, loss of directedness, and the ability to simultaneously remember information and incorporate it to complete a task.

A study of long term heavy cannabis users showed no significant differences in IQ scores (as measured by three different tests) between users and non-users. However, the researchers did find short term impairment of the ability to perform psychomotor tasks.

Other studies show that cannabis' effects on attention are marked but complex. Short-term memory appears to be affected more strongly than does retrieval of information that is already present in memory. In word-recognition tests, where people are asked to identify words that were previously read aloud to them, those people receiving cannabis tended to accept more incorrect words from a list that was supplied to them, and when asked to write as many words as they could recall, were able to remember fewer words than subjects receiving a placebo.

In tests of free recall - in which people are given a book to read and later asked to recall the contents - those receiving cannabis recalled less and included fewer content words. All of these effects appear to disappear after intoxication ceases.

Motivation

An often-cited, but anecdotal, consequence of cannabis use is amotivational syndrome - a loosely defined concept involving disinterest, apathy and antisocial behaviour. Some of these effects are characteristic of central nervous system depressants in general. Whether a distinct amotivational syndrome can be ascribed to cannabis use is open to question. The term is imprecise, though it is clear from clinical observation that some adolescents who use cannabis appear flat in effect and devoid of the drive and energy normally seen in adolescents.

Controversy exists over the issue of whether chronic cannabis use causes this amotivational syndrome. Some investigators have identified or postulated such a syndrome, with symptoms including lethargy, diminished scholastic and/or job performance, and introversion. The common thread in these descriptions seems to be a generalised dysfunction of cognitive, social and interpersonal skills to a greater or lesser degree.

From a scientific viewpoint, the existence or non-existence of such a syndrome is difficult to establish. Much of the evidence is anecdotal, with many obvious confounding factors such as the widely varying developmental changes in adolescence and early adulthood.

Psychiatric Disorders

A linkage between cannabis use and psychiatric disorders has a very long anecdotal history and has been the subject of the majority of government sponsored inquiries into cannabis.

Some psychiatric symptoms may appear with cannabis intoxication. The majority of these have a rapid onset after ingestion but are limited in their duration. Experience of time distortion, illusion, mild hallucinations and delusions are examples of these short-lived symptoms.

Panic attacks and extreme anxiety are infrequent reactions which disappear in a relatively short time.

The relationship between cannabis use and the incidence of schizophrenia has been the subject of research and debate for almost 20 years. The results are still equivocal. Researchers have not been able to conduct studies that have been able to test a person's predisposition to schizophrenia prior to cannabis use. Therefore it is not possible to establish a direct relationship between cannabis use and the onset of schizophrenia.

It may be that cannabis use is a predisposing or independent risk factor in the development of schizophrenia but the scientific evidence to date is equivocal on this point.

PART 4 - THE LAW RELATING TO CANNABIS

Introduction

Every Australian jurisdiction has legislation which outlaws the cultivation, supply and possession of the plant *cannabis sativa*. The history behind such legislative prohibition dates back to earlier this century when the international community passed a number of conventions to control 'narcotic' substances, a category including cannabis. Such conventions included the *1911 Hague Convention*, the *1925 Geneva Convention on Opium and Other Narcotic Drugs* and the *1931 Geneva Convention*.

More recently Australia became a signatory to the United Nations *Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances* 1988 which, amongst other things, requires participating nations to prevent the illicit cultivation of plants containing narcotic or psychotropic substances. The cannabis plant is specifically included.

Queensland Law

The first State controls on cannabis were in Victoria in 1928, with Queensland following in 1937 with the enactment of the *Health Act*. Section 130 of that Act made it an offence to possess or supply a 'dangerous drug' and was punishable by a maximum penalty of 200 pounds and/or six months imprisonment for a first offence and 500 pounds and/or two years imprisonment for any subsequent conviction.

In 1971 the Act was amended to distinguish between a 'dangerous drug' and a 'prohibited plant'. *Cannabis sativa* was listed as a 'prohibited plant'. The applicable penalty for possession was the same for both the drug and the plant, $2,000 and/or two years imprisonment. In the case of supplying or cultivating a 'prohibited plant', the maximum penalty was $10,000 and/or 10 years imprisonment if prosecuted on indictment. This penalty was increased in 1976 to $100,000 and/or life imprisonment.

In 1986 the *Drugs Misuse Act* was enacted and the *Health Act 1937* provisions in relation to 'dangerous drugs' and 'prohibited plants' were repealed.

The *Drugs Misuse Act 1986*, controls the supply and possession of some 146 defined drugs. The penalties provided under the Act vary according to the type and quantity of the drug in question. Four drugs - heroin, cocaine, phencyclidine and lysergide - are classified as schedule one drugs and attract more severe penalties. All other drugs, including cannabis, are listed in a second schedule under the Act, and carry lesser penalties.

The second factor which governs the penalty applicable is the quantity of the drug involved. Under the third schedule of the Act an amount of 500 grams or a quantity of 100 plants or more of cannabis will increase the maximum penalty.

The applicable provisions are:

- Section 5 – 'Trafficking in Dangerous Drugs'

'A person who carries on the business of unlawfully trafficking in a dangerous drug is guilty of a crime.'

Penalty for cannabis: 20 years.

- Section 6 – 'Supplying Dangerous Drugs'

'A person who unlawfully supplies a dangerous drug to another ... is guilty of a crime.'

Penalty for cannabis: 15 years, or 20 years if an adult supplies to a child; an intellectually handicapped citizen; a person within an educational or correctional institution; or to a person who does not know that he is being supplied with the drug.

- Section 8 – 'Producing Dangerous Drugs'

'A person who unlawfully produces a dangerous drug is guilty of a crime.'

Penalty for cannabis: 15 years, or 20 years if quantity equals or exceeds 500 grams or 100 plants (as per third schedule).

- Section 9 – 'Possessing Dangerous Drugs'

'A person who unlawfully has possession of a dangerous drug is guilty of a crime.'

Penalty for cannabis: 15 years, or 20 years if quantity equals or exceeds 500 grams or 100 plants (as per third schedule).

The penalties listed above apply only when an offender is convicted before a superior court. Summary prosecution, that is in the Magistrates Court, is made possible by section 13 of the Act. This provision permits those charged with supplying, producing or possessing cannabis and liable to a maximum penalty of 15 years imprisonment, to be dealt with in summary proceedings before a magistrate. When proceedings are taken in this jurisdiction, a maximum penalty of two years imprisonment is applicable.

The provisions of section 13 permit all minor offences in relation to cannabis to be dealt with summarily. It is only the major dealers or growers who become liable for the larger penalty when prosecuted upon indictment before a superior court.

In addition to the plant form of the drug, the Act also recognises tetrahydrocannabinol (THC) as a separate form of the dangerous drug. To sell, produce or possess this extract from the cannabis plant will result in a higher penalty being applicable when two grams or more are involved, as opposed to the 500 grams required for the plant form.

- Section 10(2) – 'Possessing Things'

'A person who unlawfully has in his possession any thing ...

(a) for use in connexion with the administration, consumption or smoking of a dangerous drug; or

(b) that he had used in connexion with such a purpose,
commits an offence against this Act.'

Penalty: Imprisonment for two years.

This is a simple offence only and is dealt with in a Magistrates Court.

Commonwealth Law

Under section 233B(1) of the *Customs Act 1901* (Cwlth) it is unlawful to import, export or possess prohibited imports which are narcotic goods. Cannabis is listed as a 'prohibited import' under the *Customs (Prohibited Imports) Regulations 1956 No. 90* and as a 'narcotic good' under Schedule VI of the *Customs Act 1901*.

The penalty applicable upon conviction for these offences is set out in section 235 of the Act. Life imprisonment is the maximum sentence for conviction upon indictment where a 'commercial quantity' (more than 100 kilograms) or the drug involved is of a 'trafficable quantity' (more than 100 grams) and the offender has been previously convicted of another such offence. Where there is no such previous conviction in the case of a 'trafficable quantity', the penalty is a fine of $4,000 and/or imprisonment for 10 years.

If there is no evidence relating to the 'sale of, or other commercial dealing in' the drug by the person charged, or the quantity of the drug is less than the 'trafficable quantity', the maximum penalty is $2,000 and/or imprisonment for two years.

In addition to the *Customs Act 1901*, the Commonwealth enacted the *Crimes (Traffic in Narcotic Drugs and Psychotropic Substances) Act 1990* to give effect to the 1988 United Nations Convention referred to in the introduction to this Part. The Act prohibits dealing in drugs on board Australian aircraft and ships and the dealing in drugs outside of Australia by a person within Australia.

Cannabis is included in schedule two as a 'narcotic drug' and penalties range from two years imprisonment for possessing or supplying small amounts or for cultivating not more than five plants, to life imprisonment where commercial quantities are supplied or possessed or more than 1,000 plants are cultivated.

Other Jurisdictions

Generally, the legislation throughout the other Australian jurisdictions is very similar to that of Queensland, particularly where cultivation or supply of the plant is undertaken on a large scale.

In relation to possession of small quantities, South Australia and the Australian Capital Territory have introduced amendments to their law permitting 'on the spot fines' to be issued to an offender.

South Australia[34]

The penalties are:

- $50 for possessing less than 25 grams;
- $150 for possessing less than 100 grams;
- $50 for smoking in own home;
- $50 for possessing a utensil, or $10 if also fined for possessing the drug;
- $150 for cultivating less than 10 plants.

In addition to these fines, a $5 'Victims of Crime Levy' is added to every on the spot fine issued in the State.

Should an offender be found smoking cannabis in a public place, or in possession of an amount greater than 100 grams, he/she is liable to arrest and prosecution in the normal manner.

Australian Capital Territory[35]

The penalties are:

- $100 for possessing 25 grams or less;
- $100 for possessing five plants or less.

Police have a discretion in determining whether or not such an offence notice is appropriate in the circumstances.

Offenders issued with these on the spot offence notices have no criminal conviction recorded against them if the nominated fine is paid. If the fine is not paid, a criminal prosecution would commence and the matter is determined by the Courts in the normal manner.

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34 Drug & Alcohol Services Council 1991, *Cannabis Laws*, The Laws relating to Possession and Supply of Cannabis.

35 *Drugs of Dependence Amendment Act 1992 (ACT).*

PART 5 - CANNABIS USE AND ATTITUDES TO CANNABIS USE

The Significance

Although some authors have suggested that a consideration of the question of social control is important in the development of policies relating to drug use, this discussion paper proceeds upon the assumption that the aim of drug policy is properly to either restrict drug use, regulate inappropriate drug use or minimise individual and social drug related harm. This being the case an evaluation of drug use and the social context in which it takes place, including social attitudes to drug use, is of primary importance. Such an evaluation is important not only in the determination of policy alternatives but also in the later evaluation of the policy options selected for implementation.

Estimating the Extent of Cannabis Use

Estimating accurately the precise prevalence of illegal activities must rate among the most difficult of challenges to the social statistician.

The basic tool, the survey of general or particular populations, provides the best indication despite some inherent limitations. Problems potentially arise from the truth or otherwise of respondents' replies on sensitive topics, and the reliability of estimates given the small numbers of some drug using populations in relation to the overall population. Careful survey design can mitigate the influence both of lying and small sample size.

In looking at trends in use there is an additional problem, in that not all surveys are directly comparable. Fortunately however, since the inception of the National Campaign Against Drug Abuse (hereinafter referred to as 'NCADA') a number of comprehensive surveys designed to evaluate the campaign have been conducted at three year intervals.

The Committee has obtained, by permission of Australian Market Research Pty. Ltd. and through the Social Science Data Archives of the Australian National University, a copy of the computer file database for the 1991 National Campaign Against Drug Abuse Social Issues Survey. Unless otherwise noted, this evaluation survey forms the basis of the following estimates of cannabis use and attitudes to that use.

From the survey database, it is possible to obtain weighted, representative values for cannabis use in Australia, including the States, among age and occupational groupings and for other demographic variables. However, as reliability is proportional to sample size, results for small regions and multiple breakdowns of variables need to be viewed more sceptically than, for instance, national results.

The Extent of Cannabis Use

Based on the 1991 NCADA survey, cannabis has been tried by 31.7 per cent of the Australian population aged 14 and over and by 30.6 per cent of Queenslanders aged 14 and over.[36] Some 13.3 per cent of Australians aged 14 and over had used cannabis in the past 12 months, as had some 10.3 per cent of Queenslanders aged 14 and over. Among Australian respondents to the survey, 5.4 per cent had last used cannabis within the previous week; among Queensland respondents, the equivalent figure was 5 per cent. On these and other measures from the survey, it can be concluded that the extent and pattern of cannabis use within Queensland is broadly consistent with national averages.

Cannabis is, without doubt, the illicit drug in widest use. Table 5.1 summarises the use of some legal and illegal drugs.

By convention, the term 'cannabis user' is restricted to those who have used cannabis within the past 12 months. The best measure of this group is that it forms about 10 per cent of Queenslanders aged 14 and over, or about 238,900 Queenslanders.[37] On the basis of the NCADA evaluation survey, about one in 10 of this group were daily users and one in three were using cannabis once a week or more.[38] Sample size is such that the accuracy of the precise percentages is questionable but, once again, this is broadly consistent with the patterns of cannabis use for Australia as a whole. This type of finding, that about 10 per cent of users use the drug daily and 30–40 per cent use cannabis once a week or more, is consistent with other surveys into drug using behaviour.[39]

On a conservative estimate therefore,[40] about 23,900 Queenslanders are using cannabis daily and 83,600 Queenslanders are consuming cannabis at least once a week. These are the groups who could be considered more frequent, regular users of the drug and there are another 155,200 less frequent or occasional users.

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36 Department of Health, Housing and Community Services 1991, *National Campaign Against Drug Abuse Social Issues Survey* 1991, (Computer file), Social Science Data Archives, The Australian National University, Canberra.

37 *NCADA Social Issues Survey 1991*, (Computer file); also Australian Bureau of Statistics, *Preliminary Census Returns 1991*; 2,978,617 (Qld population, preliminary estimate 1991 census) x 77.86 per cent (proportion aged 14 and over 1986 census) x 10.3 per cent (proportion Queensland cannabis 'users') = 238,872.

38 *NCADA Social Issues Survey 1991*, (Computer file); the precise findings are 11.2 per cent of users using daily and 37.8 per cent of users using once a week or more.

39 For example, Plant, A., Macaskill, P., Lo, S.K., and Pierce, J. 1988, *Report of the Evaluation of the Anti-Heroin Campaign*, NCADA, AGPS, Canberra, found 29 per cent of 'users' using more than once a week, 12 per cent once a week, 10 per cent once a fortnight, 25 per cent once in three months, 12 per cent once in six months and 12 per cent once in nine months or more. The *NCADA Social Issues Survey 1991* for Australia (Qld) found 11.8 (11.2) per cent of cannabis 'users' using daily, 5.4 (2.7) per cent using 4–6 times per week, 12.2 (14.9) per cent using 2–3 times per week, 8.9 (9.0) per cent using once per week and 7.3 (13.3) per cent using 2–3 times per month.

40 This calculation is based on the premise that about 10 per cent of 'users' are daily consumers and that 35 per cent use cannabis once or more a week.

Table 5.1 – Recent Drug Use and Whether Ever Tried Drugs 1991

DRUG	USED RECENTLY		EVER TRIED	
	QLD %	AUST %	QLD %	AUST %
MAINLY AVAILABLE LICITLY				
Tobacco/Cigarettes[1]	24	21	79	76
Alcohol[2]	47	48	94	93
Pain killers/Analgesics like aspirin or panadol[2]	45	37	90	85
Tranquillisers[3]	6	6	37	33
MAINLY AVAILABLE ILLICITLY				
Cannabis[3]	8	9	30	32
Hard Drugs (Any)[4]	NA	NA	15	15
Amphetamines Group[4]	1	2	8	8
Cocaine[4]	#	#	4	3
Hallucinogens[4]	1	1	8	7
Inhalants[4]	–	1	3	3
Barbiturates[4]	#	1	5	5
Heroin[4]	–	#	1	2
Ecstasy/Designer Drugs[4]	1	1	2	2

[1] Recent use refers to daily use (6+)
[2] Recent use refers to past week
[3] Recent use refers to past month
[4] Recent use refers to past three months
Response less than 0.5 per cent
– No response
Base numbers: Australia 2,483
Queensland 401

Source: Australia Social Issues Research 1991, *Report on the National Campaign Against Drug Abuse Social Issues Household Survey 1985–91,* Australia Market Research, North Sydney.

Table 5.2 – Demographic Features of Users, Ever Used Cannabis 1991

DEMOGRAPHIC FEATURE	AUSTRALIA (%)			QUEENSLAND (%)		
	Sample (n=2485)	Ever Used (n=792)	User* (n=327)	Ever Used (n=127)	User* (n=43)	Sample (n=417)
GENDER						
Male	50	60	65	57	64	50
Female	50	40	35	43	36	50
AGE						
14–24	22	34	49	35	48	23
25–34	21	37	37	37	38	20
35–44	19	22	10	24	14	19
45–59	19	7	3	3	–	18
60+	20	1	1	1	–	19
MARITAL STATUS						
Defacto	5	12	16	18	19	7
Divorced/Separated	8	9	9	9	11	8
Never Married	25	38	56	35	56	27
Now Married	57	41	19	38	15	56
Widowed	5	1	1	–	–	4
OCCUPATION						
Upper White Collar	16	19	15	16	12	13
Lower White Collar	19	21	21	29	35	23
Blue Collar	15	23	24	18	26	13
Unskilled	5	6	5	8	5	7
Pensioner	16	2	1	2	–	14
Unemployed	5	9	14	8	6	4
Home Duties	17	11	6	13	10	18
Student	8	9	15	6	6	8

* Used cannabis in the past 12 months

– No response

Note: (%) refers to the per cent of the population aged 14 years and over.

: Sample size declines and there is a decreasing degree of confidence in results from Australia ever used to Queensland user.

Source: NCADA Social Issues Survey 1991, (Computer file).

User Characteristics

It is critical to get some understanding of who these users are. Unfortunately, breakdowns into age, occupation, marital status and other demographic characteristics reduce the size of the State sample in the NCADA survey to levels where there is a lesser degree of confidence in the findings. However, because cannabis use in Queensland does not seem to be appreciably different to Australian use on other measures, the findings for the sub-groups can be checked against those for larger samples. Table 5.2 sets out these demographic profiles from the survey findings for both the national and Queensland samples.

These results once again underline the similarity between cannabis use in Queensland and nationwide. Also noteworthy are the relatively small, but consistent differences between those who have ever used cannabis and those who have used it in the last 12 months ('users'), with the latter being more likely to be male, young and never married.

Of cannabis users in Queensland, approximately 65 per cent are male and nearly 50 per cent are less than 25 years of age with a further 40 per cent in the 25–34 year age range. In both Queensland and Australia users are disproportionately not married, very probably a reflection of their youth. The occupational distribution of users is less consistent between Australia and Queensland presumably because of the small samples in a number of the occupational categories. Nevertheless it would appear that users are disproportionately lower white collar and blue collar workers, or unemployed (see Table 5.3). More generally Table 5.3, as far as is possible given the survey limitations, sets out the occupational profile of cannabis users in Queensland compared with the general population sample for Queensland.

Table 5.3 – Occupation of Cannabis Users in Queensland Compared with a Population Based Occupational Sample 1991 (%)

Occupation	Sample	Cannabis User*
Upper White Collar	13	10–15
Lower White Collar	23	about 30
Blue Collar	13	about 25
Unskilled	7	about 5
Pensioner	14	–
Unemployed	4	5–15
Home Duties	18	5–10
Student	8	5–15

* Ranges of use are provided in this column because of the limitations of small sample size.

Source: NCADA Social Issues Survey 1991, (Computer file).

The prevalence of use by certain occupational groups among users does appear to become more accentuated when frequency of use is considered. Table 5.4 provides data from the Australia-wide sample on three categories of use: Ever Used; Used in the Past 12 Months; and Used in the Past Four Weeks. The data reinforces the view that regular and frequent users tend disproportionately to be blue collar workers and unemployed.

Table 5.4 - Cannabis Use by Occupation and Frequency of Use 1991 - Australia

Occupation	Sample (%)	Ever Used (%)	User* (%)	Used Past 4 Weeks (%)
Upper White Collar	16	19	15	10
Lower White Collar	19	21	21	17
Blue Collar	15	23	24	27
Unskilled	5	6	5	6
Pensioner	16	2	1	2
Unemployed	5	9	14	17
Home Duties	17	11	6	7
Student	8	9	15	16

* Have used cannabis in the past 12 months
Note: Percentages have been rounded off to nearest whole number.
Caution:Sample size and reliability declines from left to right.

Source: NCADA Social Issues Survey 1991, (Computer file).

In interpreting these results, some allowance probably needs to be made for the greater preponderance of cannabis use, unemployment and student status among the young. This prevalence of heavier cannabis use among the young can be readily more directly shown from other figures: 13.5 per cent of the sample population aged 14-24 were weekly users of cannabis as compared with only 2.9 per cent of those aged 25 and over.[41] Table 5.5 provides a breakdown of the Queensland sample by age and occupational category. Those between 14 and 24 are more likely to be students, unemployed and unskilled while those over 25 are more likely to be pensioners or engaged in home duties. The relative heavier use of cannabis among students, the unemployed and the unskilled is in part very probably associated with their young age.

41 *NCADA Social Issues Survey 1991,* (Computer file).

Table 5.5 – Occupational Distribution of the Sample by Age 1991 – Queensland

Occupation	Sample (%)	14–24 (%)	25+ (%)
Upper White Collar	13	9	14
Lower White Collar	23	22	23
Blue Collar	13	11	14
Unskilled	7	10	6
Pensioner	14	3	17
Unemployed	4	9	3
Home Duties	18	3	22
Student	8	32	1

Note: Care should be taken when interpreting these figures due to the small numbers involved.

: All figures are rounded off to the nearest whole number.

Source: NCADA Social Issues Survey 1991, (Computer file).

Trends in Cannabis Use

Most evaluations of trends in cannabis use, both in Australia and overseas, have in recent years described the level of cannabis use as stable or moderately declining. For instance, in the United States comparisons of regular surveys of drug use would suggest that cannabis use rates are now about half what they were in the late 1970s and early 1980s.[42] A recent Australian prediction was that lifetime prevalence (those who have ever used cannabis) would, on present trends, increase to a maximum 40 per cent or less of the population.[43] However, more recent surveys in Australia would seem to question such assumptions – particularly on more current use estimates. Figure 5.1 presents results from two survey series on both lifetime prevalence of cannabis use and use within the past year.

Further analysis of the data suggest some increases in use among adolescents; Figures 5.2 and 5.3 show lifetime prevalence (in adolescents also a measure of relatively recent use) by age and gender. Figure 5.1 has been compiled from information provided by Roy Morgan Research Services (hereinafter referred to as 'RMR') and, since 1985, from the successive NCADA evaluation surveys. Figures 5.2 and 5.3 are based on material from the NCADA surveys.

42 Kandel, D.B. 1991, 'The Social Demography of Drug Use', *The Milbank Quarterly*, vol. 69 no. 3.

43 McAllister, I., Moore, R. and Makkai, T. 1991, *Drugs in Australian Society: Patterns, Attitudes and Policies*, Longman Chesire, Melbourne, p. 109.

Figure 5.1

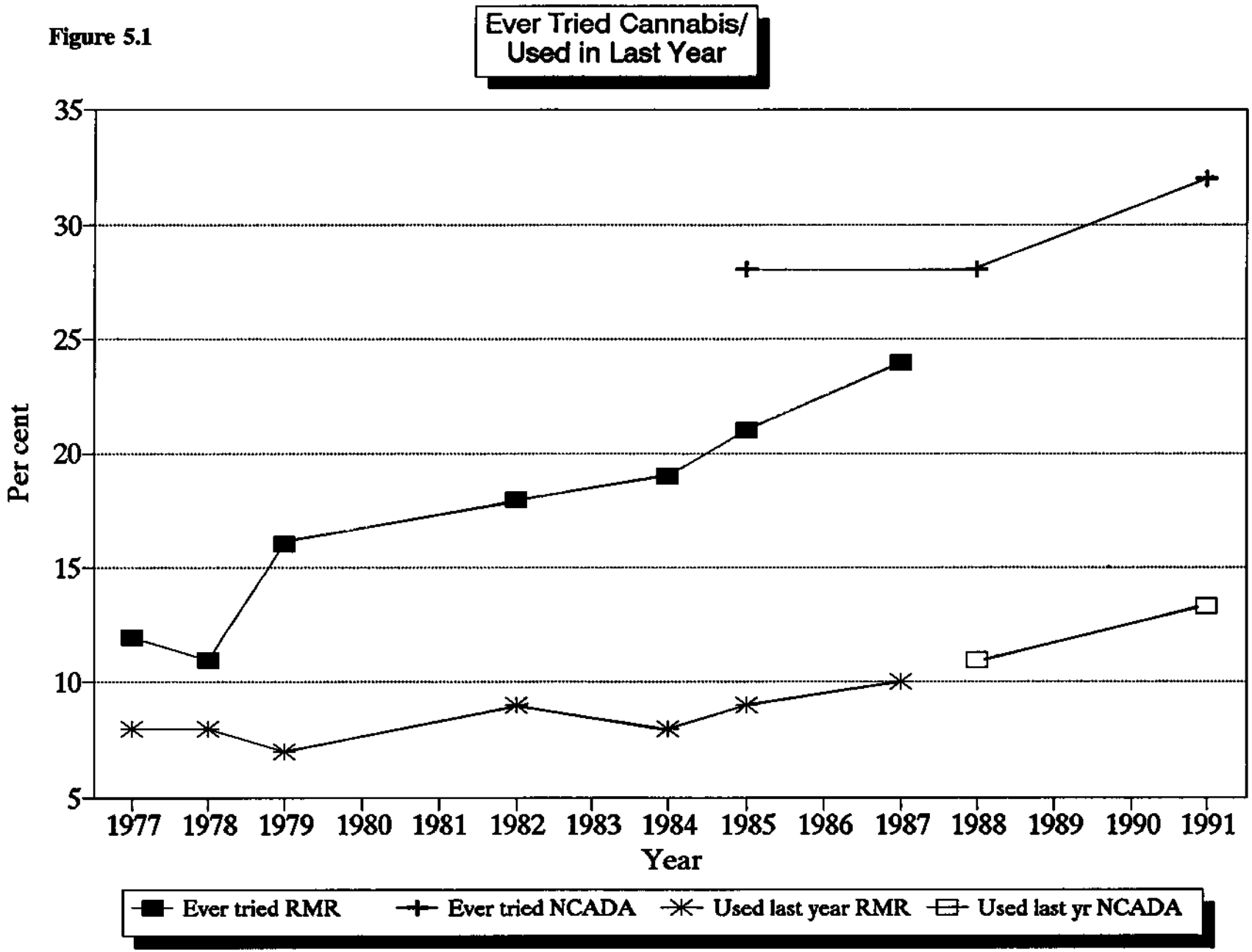

Ever Tried Cannabis/
Used in Last Year
35
30
25
20
15
10
5
Per cent
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991
Year
Ever tried RMR
Ever tried NCADA
Used last year RMR
Used last yr NCADA

Figure 5.2

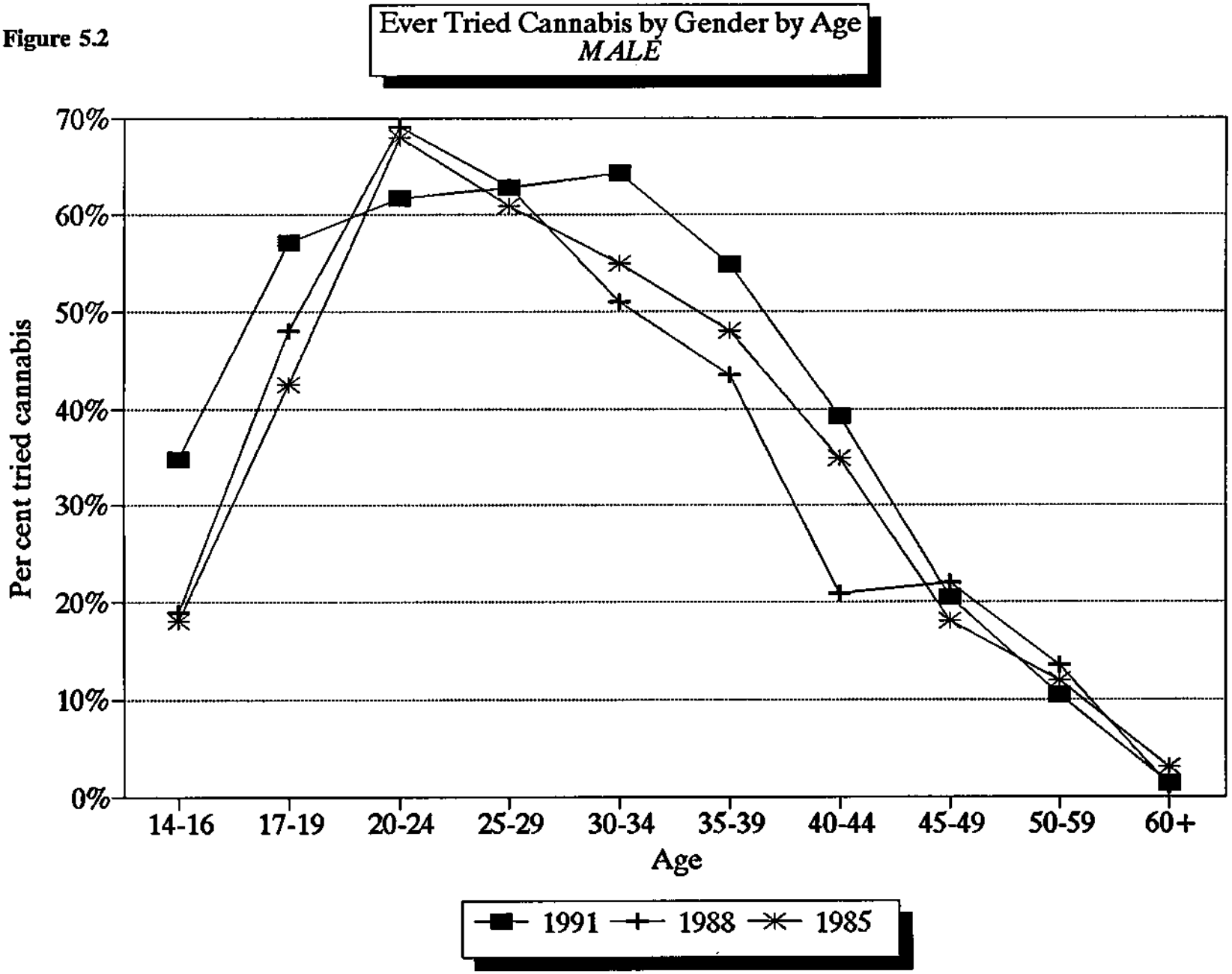
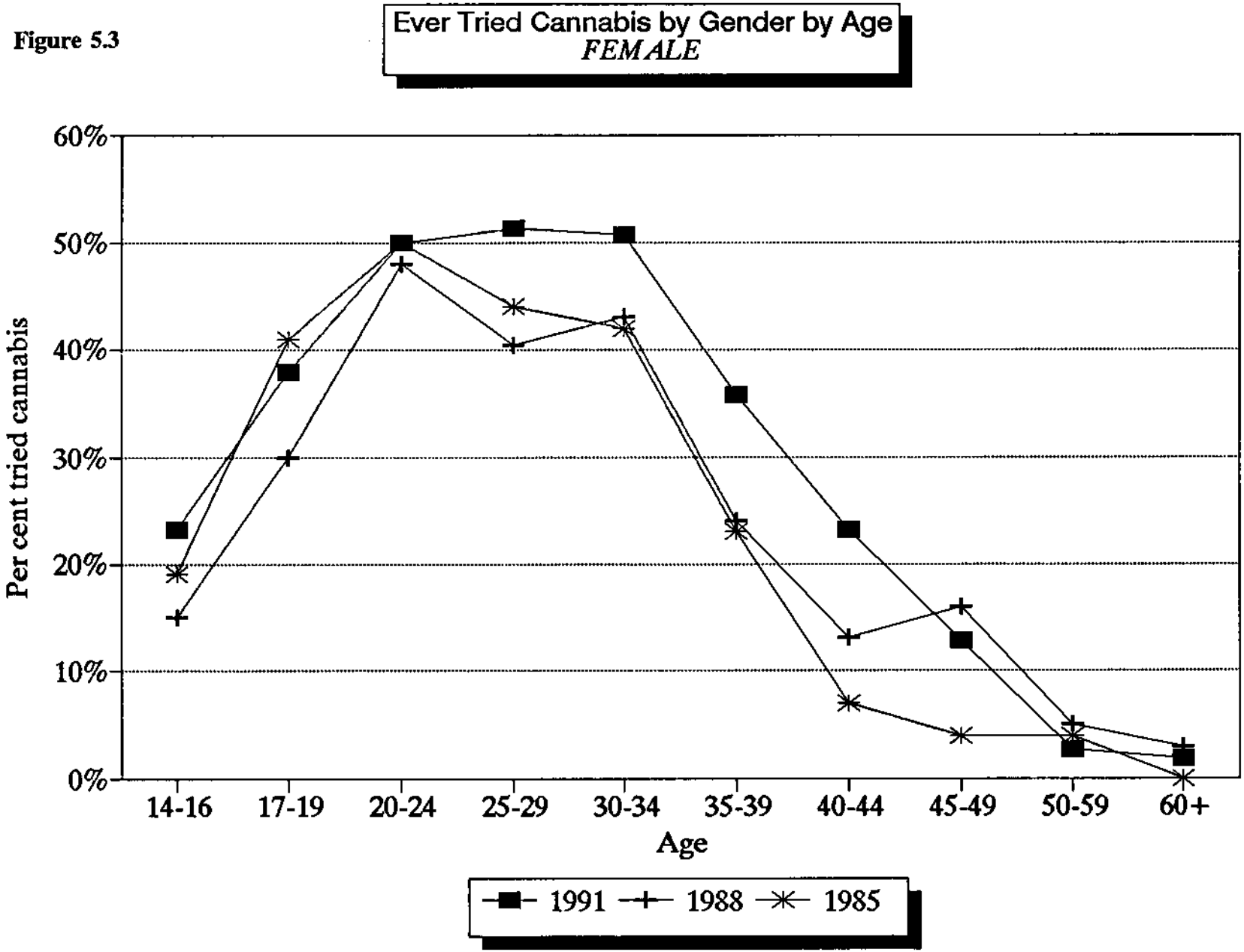

Ever Tried Cannabis by Gender by Age
MALE
70%
60%
50%
40%
30%
20%
10%
0%
Per cent tried cannabis
14-16
17-19
20-24
25-29
30-34
35-39
40-44
45-49
50-59
60+
Age
1991
1988
1985

Figure 5.3


Ever Tried Cannabis by Gender by Age
FEMALE
60%
50%
40%
30%
20%
10%
0%
Per cent tried cannabis
14-16
17-19
20-24
25-29
30-34
35-39
40-44
45-49
50-59
60+
Age
1991
1988
1985

Use of Cannabis and Other Illicit Drugs

Historically and currently, there has been much discussion about the links between cannabis use and the use of other illegal drugs. In general, there are two strands to these arguments, one strand being that cannabis use leads to the use of other drugs and the other being that regular cannabis users establish contact with an illegal sub-culture where other more hazardous illicit substances are used. Table 5.6 below shows some of the various associations between cannabis use and the use of other illicit drugs. Of those who have ever used cannabis 26 per cent had also used amphetamines, 22 per cent had used hallucinogens, 10 per cent had used barbiturates and 10 per cent had used cocaine and six per cent had used heroin.

Table 5.6 - Cannabis Use and Use of Other Illicit Drugs 1991 - Australia

Drug	% Ever Used Cannabis and Ever Used ...	% Ever Used Cannabis and Never Used ...
Amphetamines#	26	74
Hallucinogens	22	78
Barbiturates	10	90
Cocaine	10	90
Heroin	6	94

Note: All figures have been rounded off to the nearest whole number.
Includes ecstasy, designer drugs.

Source: NCADA Social Issues Survey 1991, (Computer file).

Other data from the NCADA survey also reveals that among those using other drugs, the proportions using cannabis are very high; in decreasing order, of those who have ever used hallucinogens 95.5 per cent have also used cannabis, for cocaine the proportion is 94.7 per cent, for heroin 93.3 per cent, for amphetamines 91.9 per cent and for barbiturates 62.1 per cent. That there is a positive association between cannabis use and the use of other illicit drugs cannot be in doubt; of those who have never used cannabis, only very small proportions have used any of the other illicit drugs.[44] However, although two variables may be connected it does not follow that one is necessarily the cause of the other. While the users of other illicit drugs have, except in the case of barbiturates, almost invariably also used cannabis, it is also true that the majority of those who have tried cannabis have not tried other illicit drugs.

44 Specifically, of those who have never used cannabis, 1.3 per cent have used amphetamines, 0.5 per cent hallucinogens, 3.0 per cent barbiturates, 0.3 per cent cocaine and 0.2 per cent heroin, *NCADA Social Issues Survey 1991, (Computer file).*

Decriminalisation and Cannabis Use

Lastly, there is the important question of what factors determine the level of cannabis use in society. The fundamental question – *Why do people use drugs or any particular drug?* – is a tremendously complex issue on which there are many conflicting viewpoints but very little data. However, one subsidiary issue which is relevant to the Committee's deliberations is the degree to which legal sanctions and law enforcement influence the use of drugs.

Changes in use after legislative changes at least potentially shed some light on this question. In evaluating this material, however, it is important to bear in mind that the effect of the legislative changes *able to be evaluated* has been in one direction only – toward greater liberalisation.[45] Changes in the vigour of enforcement are more difficult to evaluate, at least in part because the effective timing of such changes is more difficult to pinpoint than is legislative change. In addition, where there are changes in use these may have other causes than legislative change; accordingly most research in this area seeks to compare changes in use before and after changes or between jurisdictions where there has been legislative or enforcement liberalisation with other comparable jurisdictions where there has been no change.

In April 1987, South Australia introduced what is known as an expiation notice system which substantially reduced penalties and meant that no criminal conviction was recorded for certain small scale cannabis possession, production and use offences. Penalties were simultaneously increased on other production, dealing and trafficking offences. This package of measures has, in over-simplistic and erroneous terms, been labelled as decriminalisation. Table 5.7 shows various measures for cannabis use in South Australia and for other Australian States from the 1985, 1988 and 1991 surveys conducted for NCADA.

In interpreting these findings it must be emphasised that the size of the South Australian samples in the surveys is small;[46] there may be little statistical significance in variations of few percentage points from the average of other States. This is true for comparisons of data from the one survey or across a number of surveys.

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45 In 1986 drug offence penalties in Queensland were substantially increased; however, the effects of such changes on use, if any, are not able to be evaluated because of the lack of suitable survey data collated prior to the change.

46 For 1991 South Australian random sample (all age groups) n=402.

Table 5.7 – Percentages of Respondents who Reported that they had Tried Cannabis 1985–91

		Age Group (years)		
		14–19	20–39	40+
SA	1985	27.8	46.7	7.1
	1988	25.5	46.3	6.2
	1991	40.0	56.5	9.0
Other States	1985	31.4	49.9	8.1
	1988	28.5	49.2	9.2
	1991	35.8	52.5	10.9

Note: Caution needed when interpreting these figures due to small size of South Australian samples.

Source: Christie, P. 1991, *The Effects of Cannabis Legislation in South Australia on Levels of Cannabis Use*, Monitoring Evaluation and Research Unit Drug and Alcohol Services Council, Adelaide; *NCADA Social Issues Survey 1991, (Computer file).*

The Committee sought the assistance of the South Australian Drug and Alcohol Services Council in the interpretation of this material; in general terms the Council in both its previous publications and its comments to the Committee holds that the extent of cannabis use in South Australia is equivalent to use nationally as are the trends in cannabis use.[47]

Surveys of high school seniors in a number of States, have also not detected significant differences in cannabis use between South Australia and other States; the most recent such survey was in 1989. It remains possible that there has been some additional increase in cannabis use in South Australia between 1988 and 1991; however the available data is not adequate to determine whether this is so. Further research is obviously required to determine the validity of such trends.

Evidence from around the world on the impact of decriminalisation has tended to support a view of negligible or modest consumption increases following decriminalisation, although there are complications with widely varying means of 'decriminalisation', disputes over what is meant by 'modest' and many difficulties in finding comparable research material from both before and after legislative changes.

47 Sarre, R., Sutton, A., Pulsford, T. 1989, *Cannabis – The Expiation Notice Approach*, Report Series C, No. 4, June, South Australian Attorney General's Department, Adelaide; Christie, P. 1991, *The Effects of Cannabis Legislation in South Australia on Levels of Cannabis Use*, Monitoring, Evaluation & Research Unit Drug & Alcohol Services Council, Adelaide.

In the Netherlands, a discretionary power available to the prosecuting authorities has underpinned central and regional policies of relaxed enforcement, more usually known as 'normalisation'. Cannabis is available in some commercial venues such as coffee shops. The Committee sought what information it could in relation to the Netherlands; a comparative table and a number of representative evaluations follow:

> The results of analysis [of more than 20 Dutch prevalence studies since 1970 and equivalent material from other jurisdictions] show that the prevalence of [Dutch] cannabis use since 1970 decreased, whereas the policy became more tolerant. Since 1979 a slight increase in the use of cannabis can be observed. A comparison with data from countries with a more restrictive policy reveals that the use of cannabis in the Netherlands is on the same level as in Sweden and Norway, but far lower than in the U.S. However, the downward trend in these three countries since 1984 did not occur in the Netherlands.[48]

> De facto decriminalisation of drug use does not appear to produce more cannabis use.[49]

> National household surveys [into the use of hashish and cannabis] have shown a rather stable pattern for almost two decades.[50]

Prevalence of Cannabis Use in the Mid-1980s Among Adolescents and Young Adults

Country	Per cent
The Netherlands (18 year olds)	17
The Netherlands (15 year olds)	9
Sweden (15 year olds)	7
Norway (15–21 year olds)	18
United States (18 year olds)	57

Source: Leuw, E. 1991, 'Drugs and Drug Policy in the Netherlands', in *Crime and Justice: A Review of Research*, M. Tonry (ed.), University of Chicago Press, Chicago, p.237.

48 Leuw, E. 1991, 'Drugs and Drug Policy in the Netherlands', *Crime and Justice: A Review of Research*, vol. 14, M. Tonry (ed.), The University of Chicago Press, Chicago, p. 237; citing Driesen, F.M.H.M., van Dam, G., and Olsen, B. 1989, 'De Ontwikkeling van het Cannabisgebruik in Nederland, Enkele Europese Landen en de VS Sinds 1969', *Tijdschrift voor Alcohol, Drugs en Andere Psychotrope Stoffen*, vol. 15, pp. 2–15 & p. 11.

49 Van de Wijngaart, G. 1990, 'The Dutch Approach: Normalisation of Drug Problems', *The Journal of Drug Issues*, vol. 20, no. 4, pp. 667–678.

50 Korf, D.J. 1990, 'Cannabis Retail Markets in Amsterdam', *The International Journal on Drug Policy*, vol. 2, no.1, pp. 23–27; Van de Wijngaart, G.F., *op.cit.*

In the United States, 11 States enacted various forms of decriminalisation measures during the 1970s.[51] State based research found what were said to be negligible or modest increases in consumption subsequent to the changes although there has been some dispute over exactly what 'modest' means.[52] A more recent study in California claimed stable cannabis use but much increased use of other illicit drugs a decade after decriminalisation.[53] In Alaska, where use in private homes is not an offence due to a Supreme Court ruling, the picture is confusing because of the lack of information available prior to the change, the non-inclusion of the State in some national surveys, and apparently higher levels of drug use than is general.[54]

A clearer overall picture might emerge from national surveys conducted by the National Institute for Drug Abuse (hereinafter referred to as 'NIDA'). The researchers who conducted one of the series of surveys of high school seniors during the so-called 'decade of decriminalisation' concluded that:

> [O]verall, the preponderance of the evidence that we have gathered and examined points to the conclusion that decriminalisation has had virtually no effect either on the cannabis use or on related attitudes and beliefs about cannabis use among American young people in this age group.[55]

Another study of the series of NIDA surveys[56] over the period of the so-called 'decade of decriminalisation' makes the observation that the decriminalising States were those with higher than average usage rates to begin with. However, in terms of percentage increases, there is little to distinguish States with severe, moderate and decriminalised legislative regimes - the decriminalisation effect, if any, appears small.[57] These national survey results are summarised for adolescents in Figure 5.4 and for adults in Figure 5.5.

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51 This is best seen in the light of gradual swings in the degree of criminalisation rather than, as is often portrayed, 11 States pursuing their own path. In broad terms the period 1915-31 saw cannabis subjected to local and regional prohibitions; the period 1932-37 was when such prohibitions became national in nature; penalties were increased in the period 1951-65; all states reduced penalties on consumption related offences in the period 1969-72; following publication of the report of the National Commission on Marijuana and Drug Abuse in 1972, some states followed up the recommendation of decriminalising consumption-related offences. (In Alaska, offences in private homes are not recognised because of a Supreme Court ruling.) See Bonnie, R.J. 1980, *Marijuana Use and Criminal Sanctions: Essays on the Theory and Practice of Decriminalisation*, Michie Company, Virginia.

52 See for example Mandel, J. 1987, 'Are Lower Penalties a Green Light for Drug Users?', *Journal of Psychoactive Drugs*, vol. 19, no. 4, pp. 383-385; Johnston, L.D., O'Malley, P.M., & Bachman, J.G. 1981, *Marijuana Decriminalization: The Impact on Youth, 1975-1980*, Monitoring the Future Occasional Paper 13, Institute for Social Research, The University of Michigan, Ann Arbor, Michigan; Single, E.W. 1991, *The Impact of Marijuana Decriminalization*, Paper presented to Window of Opportunity Congress, Adelaide.

53 Mandel, *ibid.*

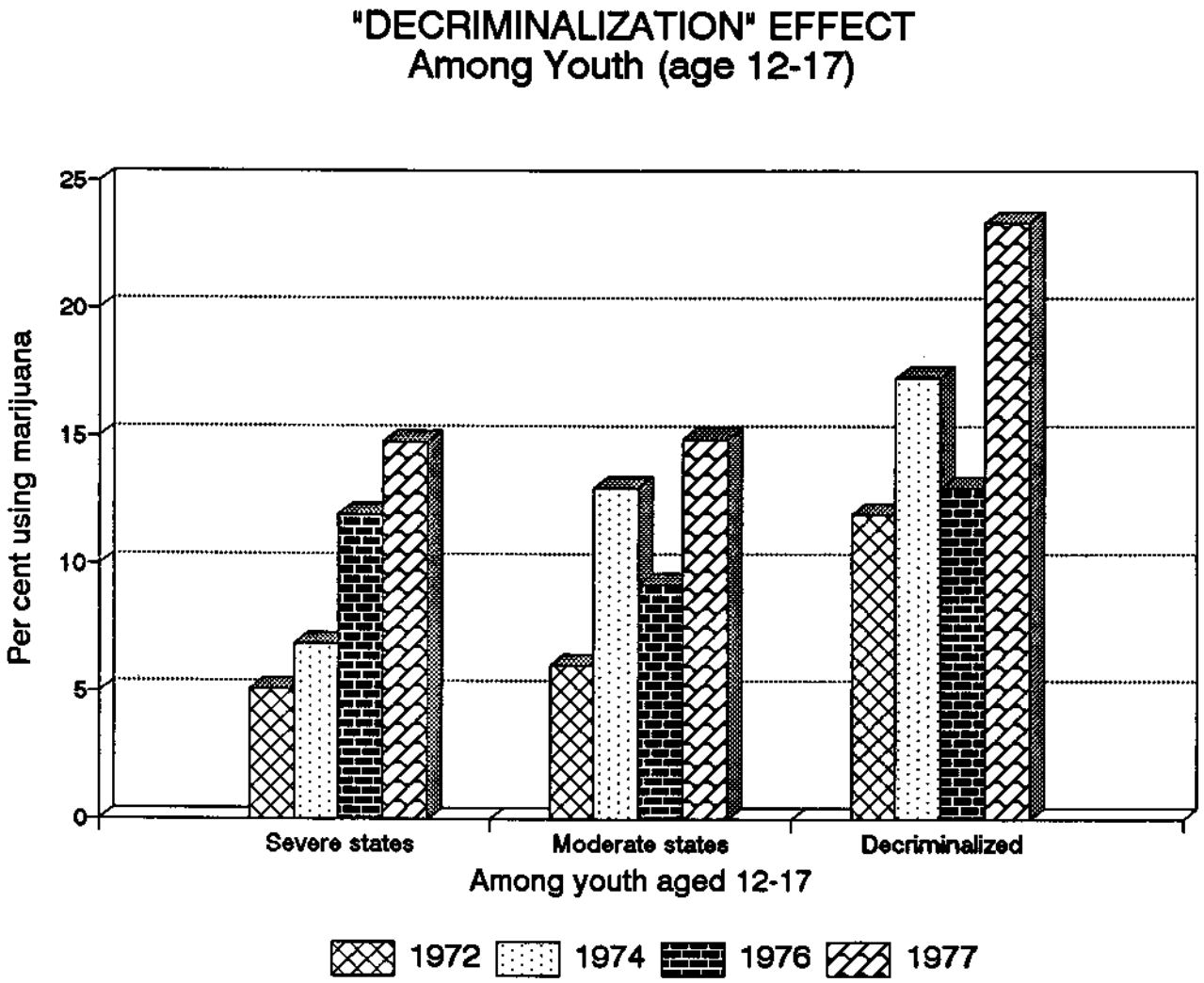
54 The Committee has been given access to as yet unpublished research in relation to Alaska.

55 Johnston, O'Malley and Bachman, *op.cit.*, p. 27.

56 Single, *op.cit.*

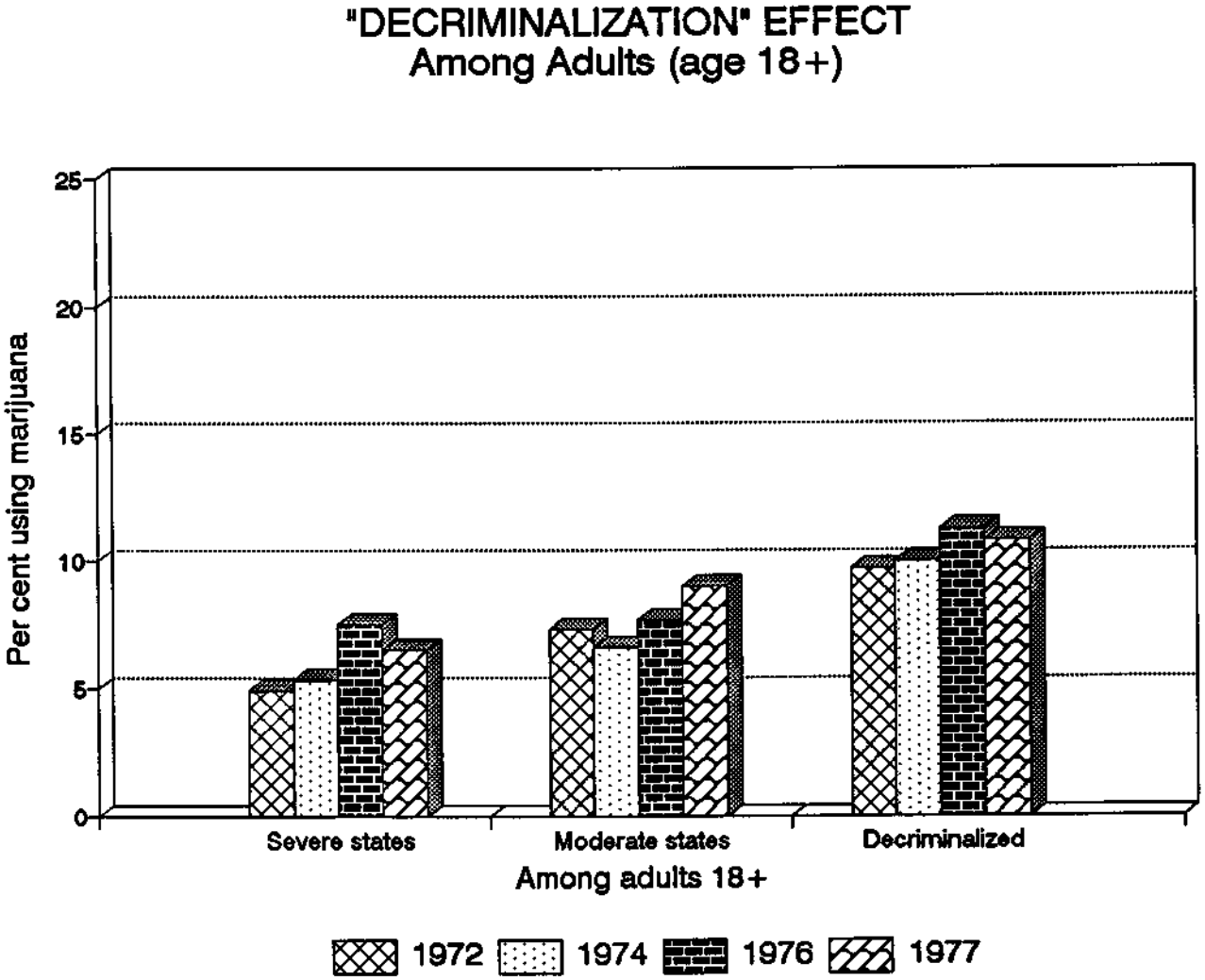
57 For example, for youth aged 12-17, there was a 180 per cent increase in cannabis use in 'severe' states over the period 1972-77 as compared to a 92 per cent increase in 'decriminalised' States.

Figure 5.4 – Adolescent Cannabis Use by Legal Regime: United States 1972–77



Source: Single, E.W. 1991, *The Impact of Marijuana Decriminalization*, paper presented to Window of Opportunity Congress, Adelaide.

Figure 5.5 – Adult Cannabis Use by Legal Regime: United States 1972–77



Source: Single, E.W. 1991, *The Impact of Marijuana Decriminalization*, paper presented to Window of Opportunity Congress, Adelaide.

The United States does, however, provide the best known example of increased enforcement effort against illicit drugs. From the early 1980s, expenditures and Federal enforcement activity against illicit drugs increased significantly (although this was not necessarily reflected in enforcement activity by the agencies of individual States). It is known that consumption of many illicit (and some licit) drugs peaked in the late 1970s or early 1980s and has since declined.[58] Research to date however does not provide any basis for either attributing the decreased drug consumption to the increased Federal enforcement effort or for the contention that increased enforcement has had little or no influence on consumption levels.

In aggregate, the material to hand would seem to support a tentative view that legislative or enforcement regimes are not ***primary*** determinants of overall levels of cannabis use. However, any such judgement is limited to a context where cannabis is, and remains, a proscribed substance. There simply is no relevant example of a similar jurisdiction where there are ***no*** restrictions on cannabis use and in the absence of such data it is impossible to say what would happen to levels of use were all restrictions to be removed. Some writers have raised the possibility that the relationship between law and social norms governing illicit drug use is mutually supportive; outright legalisation could conceivably open the way for a considerable increase in cannabis use. Legalisation which permitted producers to create demand (e.g. through advertising) would almost certainly result in increased consumption.

Attitudes to Cannabis Use

Social attitudes impact on both the level of drug use and on policies directed at drug use. As such, attitudes themselves are a significant element in the overall social issues posed by the use of a drug such as cannabis. Many authors suggest that it is social norms that are the primary determinant of levels of drug use; campaigns to decrease (or increase in the case of advertising) drug use work to the extent that social norms are affected. More arguably the legal status of a drug may impact on consumption through its influence on its social acceptability.

With attitudes, as with use, the primary research tool is the representative sample survey. Not surprisingly, cannabis, the most widely used illicit drug is also the most 'acceptable' illicit drug, although it remains much less 'acceptable' than any of the licit drugs. The most recent comprehensive evaluation of attitudes to various drugs within Australia was the 1991 NCADA evaluation survey which asked respondents whether the use of various substances regularly (at least once a month) was 'okay'. The findings, in terms of the percentage of the sample aged 14 and above who thought the 'regular' use of various drugs 'okay', are shown in Table 5.8.[59]

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58 In relation to youth, aged 12–17, peak cannabis use (24 per cent) was in 1979 and it had declined to 11 per cent by 1990. Consumption of cocaine, alcohol and other illicit drugs also peaked in the same year and tobacco in 1985. In the 18–25 year age group, cannabis, cocaine and other illicit drug use peaked in 1979, tobacco in 1982 and alcohol in 1985. NIDA surveys 1974–1990, quoted in Mandel, *op.cit.*

59 Australia Social Issues Research 1991, *op.cit.*, p. 111.

Table 5.8 - Regular Drug Use 'Okay'

Australia

Alcohol 70%; Analgesics (Pain killers) 60.7%; Tobacco 51.7%; ***Cannabis 28.4%***; Tranquillisers 18.4%; Amphetamines 5.2%; Hallucinogens 3.7%; Barbiturates 3.5%; Ecstasy/Designer drugs 2.9%; Cocaine/Crack 2.7%; Heroin 2.5%; Inhalants 2.2%.

Queensland

Alcohol 69.5%; Analgesics 60.8%; Tobacco 49.7%; ***Cannabis 28.4%***; Tranquillisers 17.6%; Amphetamines 5.1%; Hallucinogens 4.1%; Barbiturates 3.6%; Ecstasy/Designer drugs 2.6%; Cocaine/Crack 2.4%; Inhalants 2.1%; Heroin 1.5%.

Source: NCADA Social Issues Survey 1991, (Computer file).

For most drugs, there would appear to be some association between legal (or illegal) status and acceptability - particularly for the illicit drugs. However, cannabis is the notable exception, with just under one third of both Queensland and Australian samples approving of regular use (Table 5.8). Attitudes to cannabis in this respect have been described as 'ambiguous'.[60]

This ambiguity is shown in attitudes to the legal regime governing cannabis - a sizeable proportion of the population believe that the use or possession of small amounts of cannabis should be either legal or at the least not a criminal offence. Figures 5.6 and 5.7 overleaf detail public opinion survey responses to these questions.[61]

While Figure 5.6 reveals that in 1990 60 percent of the sample surveyed believed that the smoking of cannabis should remain illegal this proportion had declined from around 84 per cent holding this view in 1970. At the same time the proportion believing the smoking of cannabis should be made legal had increased from around nine per cent in 1970 to nearly 40 per cent in 1991.

Figure 5.7 shows little change in views about possession of cannabis. In 1979 around 47 per cent believed the possession of small amounts of cannabis should be a criminal offence, a proportion almost identical to that reporting similarly in 1987.

60 The survey's conclusion is that '[T]here is evidence for broad attitude dimensions of acceptance/rejection of "licit" drug use and of "illicit" drug use. These are correlated, and the alignment of attitudes to marijuana use is ambiguous'; *ibid*, p. 112.

61 Source for graphs: *NCADA Social Issues Survey 1991*, (Computer file); Roy Morgan Research.

Figure 5.6

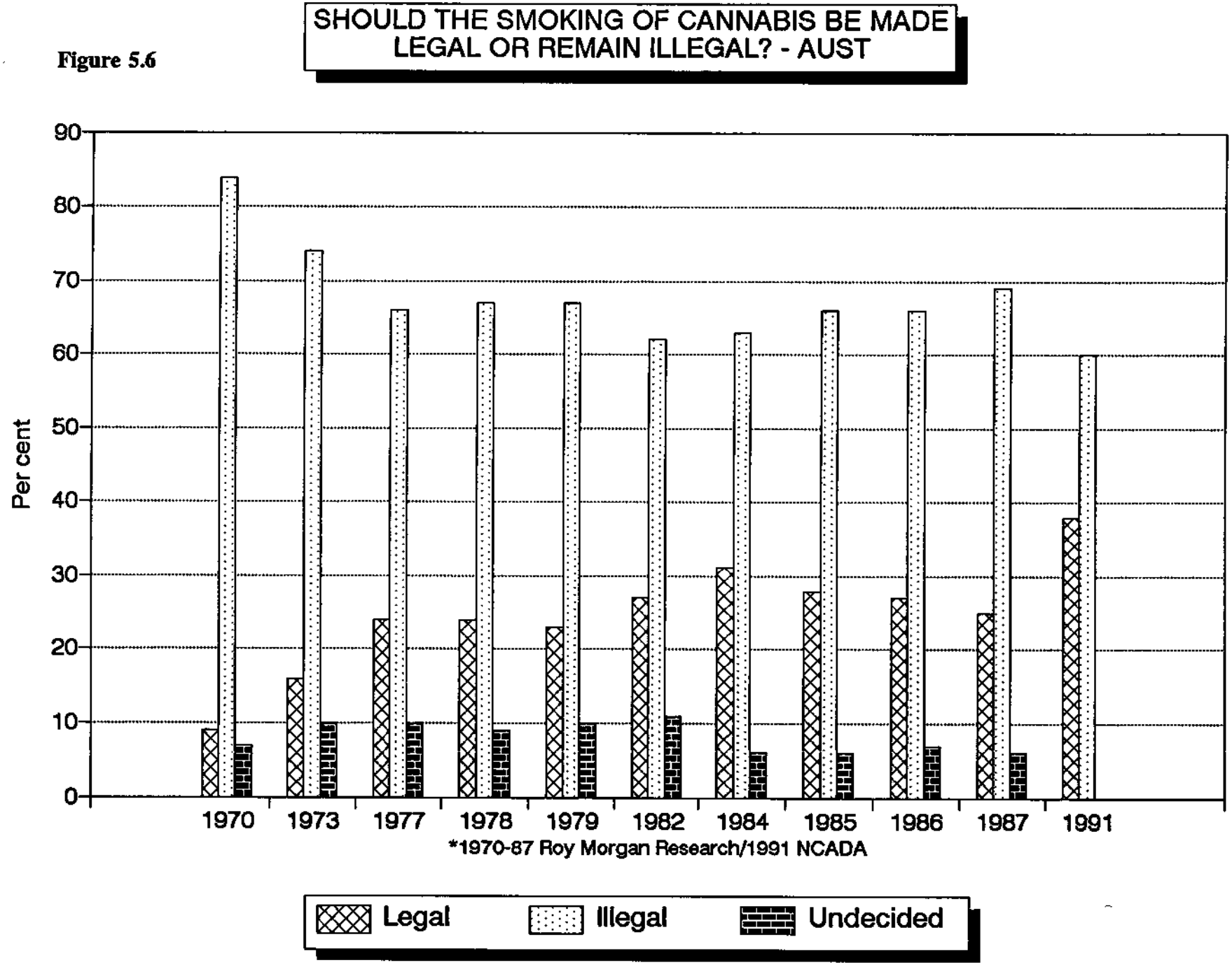
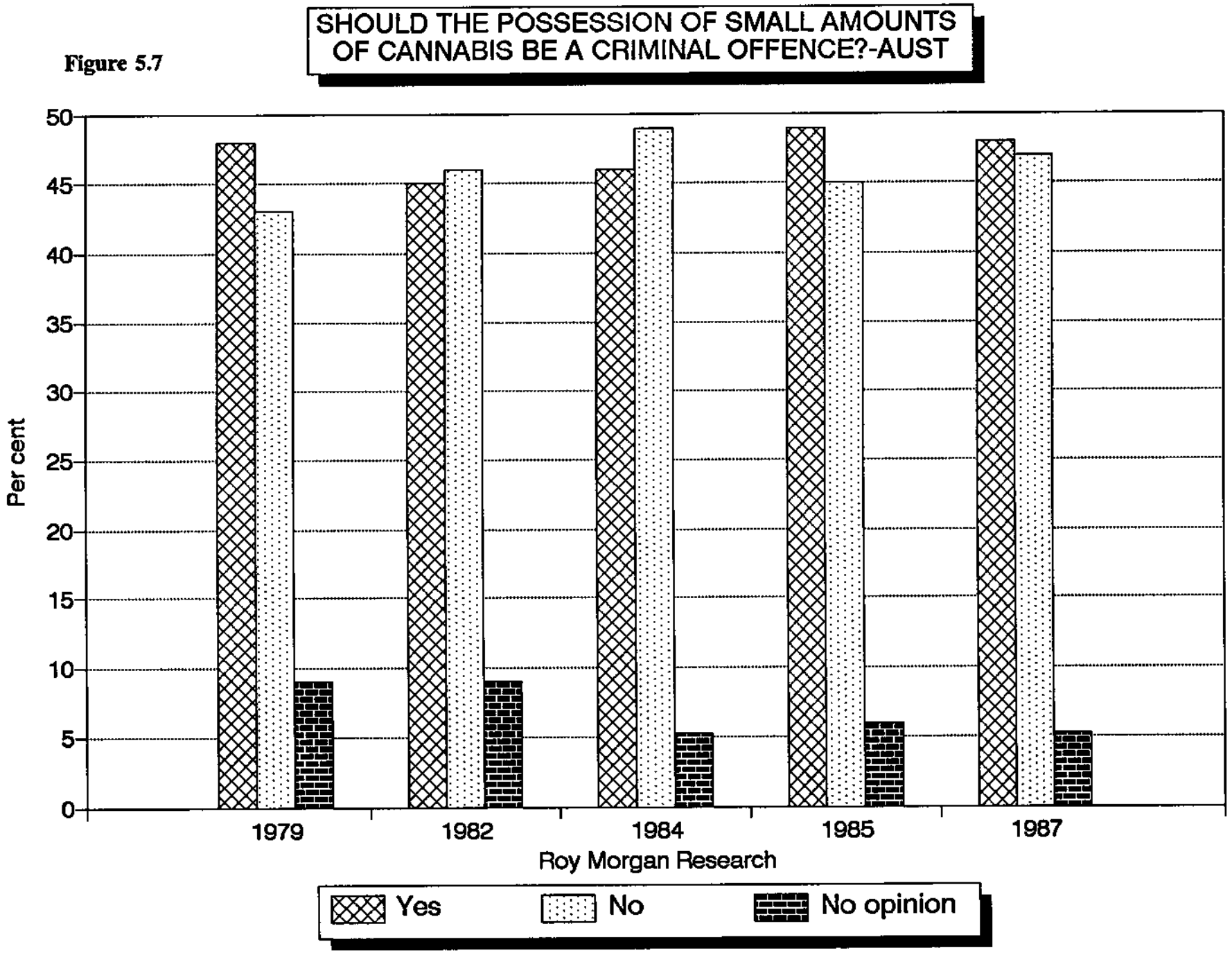

SHOULD THE SMOKING OF CANNABIS BE MADE LEGAL OR REMAIN ILLEGAL? - AUST
Per cent
90
80
70
60
50
40
30
20
10
0
1970
1973
1977
1978
1979
1982
1984
1985
1986
1987
1991
*1970-87 Roy Morgan Research/1991 NCADA
Legal
Illegal
Undecided

Figure 5.7


SHOULD THE POSSESSION OF SMALL AMOUNTS OF CANNABIS BE A CRIMINAL OFFENCE?-AUST
Per cent
50
45
40
35
30
25
20
15
10
5
0
1979
1982
1984
1985
1987
Roy Morgan Research
Yes
No
No opinion

The 1991 NCADA Social Issues Household Survey also reveals that the proportion of the Queensland sample agreeing with the proposition that the 'smoking of cannabis should be legalised' was identical to the national proportion. Nationally, the proportion who 'agree strongly' has doubled since 1988, rising from eight to 16 per cent. However, the proportion who 'disagree strongly' is more than double this, at 37 per cent. In national terms 38 per cent agree in some form with the proposition and 60 per cent disagree.[62]

Yet another measure of attitudes relates to perceptions of social drug 'problems'. To put these in context, the 1991 NCADA survey found the following profile of unprompted concerns among respondents.

Table 5.9 – Most Important Problems Affecting People of Your Own Age (Unprompted) 1991 – Australia (%)

Unemployment	27
Lack of Money	19
Economic situation	16
Drug Issues (excl. alcohol, tobacco)	***13***
Personal/Family health	11
Family relationships	9
Alcohol issues	9
Housing costs	8
Health Service Availability	7
Pollution	6
Crime/Violence	6
.	
.	
Smoking	2
.	
.	
No real problems	4

Source: NCADA Social Issues Survey, 1991 (Computer file).

There is little doubt that drug related issues are perceived as relatively major problems. However, Queenslanders are somewhat *less* concerned with drug issues than Australians generally. Table 5.10 sets out drug related concerns more specifically for both the national and Queensland samples.

62 Australia Social Issues Research 1991. *op.cit.*, p. 142.

Table 5.10 – Drug Related Concerns 1991 – Australia and Queensland (%)

Problem/Issue	Australia	Queensland
Getting involved with	2	1
Availability/use	11	6
Alcohol/drink driving	9	7
Smoking	2	2
Drug/Alcohol Issues	*16*	*11*

Source: NCADA Social Issues Survey 1991, (Computer file).

When respondents were asked, unprompted, to nominate the drugs they associated with a 'drug problem', heroin headed the list (39 per cent), followed by cannabis (21 per cent), cocaine (15 per cent), alcohol (11 per cent), tobacco (3 per cent) and amphetamines and tranquillisers (2 per cent). Interestingly, Queenslanders are somewhat more likely to nominate cocaine (17 per cent) and cannabis (25 per cent) as linked with the drug problem and less likely to nominate heroin (32 per cent) and alcohol (9 per cent). The perception of cannabis in association with a drug problem declined from 29 per cent in 1985 to 21 per cent in 1991.[63]

Those who nominated any drug as a concern, for either the community or personally, were asked the reasons for their concern. Of those who felt cannabis to be a concern to the community the main reasons were its prevalence or accessibility (nominated by 40 per cent), a potential to cause dependency (24 per cent), its effect on the young (19 per cent). Only a minority nominated harmful health effects (10 per cent), harmful mental effects (6 per cent) or harmful effects on road safety (1 per cent).[64]

Those nominating cannabis as a concern in their everyday life once again nominated the prevalence or accessibility of cannabis as their major concern (38 per cent), followed by its effect on the young (25 per cent) and perceived dependency effects (13 per cent). Only three per cent were concerned about harmful health effects and none were concerned about harmful effects on road safety.

Of the sample generally, most believed the responsibility for dealing with drug problems generally rested with the government, which, in the opinion of the majority, was not doing enough.

Some 62 per cent of the Queensland sample believed government did not do enough in educating people about drugs, in treating and rehabilitating people with drug problems (52 per cent), did not do enough in enforcing laws concerning drug taking (61 per cent) and

63 Unprompted first mentions to the question 'When people talk about "a drug problem", which drugs do you think of?'; Australia Social Issues Research 1991, *op.cit.*, pp. 49–50.

64 *ibid.*, p. 74.

not enough enforcing laws against drug dealing (80 per cent). Queenslanders were marginally more satisfied with government efforts and marginally believed the government was doing enough or too much, as compared to the national sample.

Respondents were asked to allocate a notional $100 between four illicit drug control activities. In relation to cannabis abuse, Queensland respondents allocated $50.50 to education, $24.50 to gaoling and penalising dealers, pushers and traffickers, $17.60 to treatment and rehabilitation and only $6.80 to gaoling and penalising users. Queenslanders had marginally greater preference for education and for penalising dealers than the national average. Also, considerably more money was allocated to education and considerably less to penalising dealers than in a similar exercise for cocaine and heroin.[65]

Volunteered responses from the Queensland sample to the question – *What else do you think Government should do about drugs?* – included the following:

Harsher penalties for dealing	26.5%
Programs in school	17.4%
Increase enforcement	15.9%
More information on effects	15.0%
Restrict supply	8.6%
Target big people	8.1%
Harsher penalties for using	7.1%
Legalise soft drugs	5.6%
Concentrate on hard drugs	3.7%
Strip assets from dealers	2.9%

Nobody suggested the legalisation of all drugs as a desirable option.

65 *ibid.*, p. 148.

PART 6 - THE SUPPLY OF CANNABIS IN QUEENSLAND

Introduction

In his report Mr G.E. Fitzgerald Q.C. recommended that in reviewing the criminal law in the area of illicit drugs, specific attention be paid to the extent and nature of the involvement of organised crime in these activities.[66]

There is no agreement on what precisely is meant by 'organised crime' and there are many competing definitions. However, it is sufficient for the purposes of this discussion paper to note that if 'organised crime' is involved to any degree in cannabis then it would be logical to expect that involvement to be in the areas of production and distribution. Production and distribution are facets of the more general topic of supply. This section of the discussion paper will accordingly focus on the supply of cannabis and consider the degree of organised criminality in this context.

Cannabis supply and its organisation must also be examined in the context of the demand for cannabis.

Estimating the Size of the Cannabis Market

Various estimates regarding the size of the cannabis market in Australia and elsewhere have been made, most commonly by extrapolating from the quantity of cannabis discovered or seized by law enforcement agencies. In the view of the Committee, very little reliance should be placed on such seizure-based estimates; the proportion of seizures is unknown and seizures fluctuate considerably from year to year.[67]

In 1988, the National Crime Authority Parliamentary Committee estimated an Australian market of $1,905 million for cannabis in 1989, giving Queensland a notional share of $337 million. The basis of these estimates were survey results suggesting that nearly 30 per cent of cannabis users used the drug more than once a week, at a street price of $450/oz.[68]

This methodology - estimating the value and quantity of cannabis consumed by heavy, regular users - is much more satisfactory than extrapolation from the unknowns involved in law enforcement seizures. Accordingly, this is the method adopted in this paper. ***It must be emphasised however, that all figures derived in this area are estimates.***

The Committee's estimates are based on the survey results relating to use and frequency of use in the NCADA evaluation surveys dealt with in Part 5 of this paper; and on interviews conducted with self-identified frequent or regular cannabis users and cannabis producers

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66 Fitzgerald Commission of Inquiry 1989, *op. cit.*, p. 377.

67 In Queensland claimed seizures ranged from 500 to 287,000 plants.

68 Report by the Parliamentary Joint Committee on the National Crime Authority 1989, *Drugs, Crime and Society*, Commonwealth Government Printer, Canberra, pp. 34-40.

(most of whom were in custody or correctional institutions at the time of interview).

The calculations involved in estimating market size in broad terms involve assumptions based on these surveys, interviews and other material. The assumptions and their sources are identified. It should be stressed that the assumptions used in calculations are based on a conservative consideration of the material before the Committee.

The Size and Economic Significance of the Cannabis Market

Cannabis, as the consideration of the extent of its use has shown, is an illegal commodity in significant demand. It would seem likely that the quantity of cannabis consumed by frequent or regular users would be more than that consumed by many more less frequent or irregular users. Frequent, regular use can also be quantified far more readily than infrequent, irregular use. Accordingly, the following estimates proceed only from the basis of quantities required for frequent, regular cannabis use.

What constitutes 'frequent, regular use' is to some extent an arbitrary judgement. For the purpose of this calculation of market size the group of frequent, regular users will be taken to mean those consuming cannabis with a minimum frequency of once a week. According to the 1991 NCADA evaluation survey, 10.3 per cent of the Queensland population over the age of 14 or some 238,900 Queenslanders had used cannabis in the last 12 months. Of this 'user' group, 37.8 per cent were using once a week or more and 11.2 per cent were using daily. This finding is consistent with other surveys on patterns of use.[69] From this, for the purpose of calculation and taking into account the limitations of the NCADA sample, it is assumed that 35 per cent of 'cannabis users' are frequent, regular users – so about 83,600 Queenslanders consume cannabis once a week or more.[70]

During the course of this research project as many frequent cannabis users and producers as possible were interviewed, with a significant focus of the interviews being patterns of use and production. Most, but not all, of these users (or usual users) were in prison, some for drug related offences and the great majority fitted into the category of weekly or more frequent users of cannabis. However, patterns of use were relatively consistent whether the user or former user was incarcerated or not. Of necessity, the size of this sample was small; the methodology was one of face to face qualitative interviews although some group discussions were also conducted. Particularly in the prison sample, a general tendency to exaggeration was noted. With all interviewees, claimed consumption was checked against claimed expenditure. Of those who used once a week or more the most common credible range of consumption was an ounce of cannabis consumed in one to four weeks, with a concentration of responses in the two to three weeks range. The next assumption for the purpose of calculation is based on these interviews (see footnote 71); that a conservative estimate of an average level of consumption for this group is approximately an ounce bag of cannabis over a period of about three weeks, or about 10

69 Analysis of surveys conducted prior to NCADA surveys contained in *ibid.*, pp. 33–55; *NCADA Social Issues Survey 1985, 1988, (Computer file).*

70 The specific calculation is 238,900 cannabis 'users' x 35 per cent = 83,615.

grams of cannabis per week.[71]

Cannabis valuation is extremely problematic. Usually estimates of value are given in 'street value' terms, often in cases where this is not appropriate (for instance when comparing with the usually wholesale or production values of other commodities). The value of cannabis greatly depends on where along the marketing chain the measurement is taken – there is, in fact more than one 'street' quantity and hence more than one street value. An added difficulty is that street weights often do not correspond with actual weights. Table 6.1, showing an actual marketing chain, illustrates some of the complexities of cannabis pricing.

Table 6.1 – Cannabis Valuation – One Example[72]

	Grower	Dealer 1	Hotel Dealers
Price/Quantity	$2,800/lb	$300/oz	$20/'stick'(g)
Progressive Total			
(correct weights)	$2,800	$4,800	$ 8,960
(actual weights used)	$2,800	$6,000	$12,000

Finally, cannabis prices are extremely variable, with the main influences being source, quality and season.

For the purpose of calculation, the Committee has assumed that an ounce is the street unit, and that the weights are correct. From the offender interviews and from police and other information the price of an ounce of cannabis fluctuates in the range $100–$600. At the lower end of the scale much of what is on offer is categorised as 'rubbish' and at the upper end of the scale there is a large proportion of imported and some specialist or 'gourmet' cannabis. The interviews indicated that the frequent, regular user group expected to pay in the range of $250–$450/oz for cannabis of acceptable quality, with the most common

71 The consistency of this information from interviews was checked with the estimated amount spent on cannabis by interviewees. This most commonly lay in the range of $3,000–$6,000 annually. This excludes any value for homegrown or shared cannabis or cannabis obtained as payment or part-payment for dealing. For comparison, the model 'frequent' consumer described in this estimate would spend $4,325 in the purchase of 17.3 ounces of cannabis at $250/oz.

72 The information is taken from an actual example of the progression of a deal on the Gold Coast, ignoring cannabis retained for personal use. The example is worked through twice, once with 'honest' weights (1lb = 16oz; 1oz = 28g) and then with the actual weights used; in this example, 20 'ounces' to the pound and 30 'grams' to the 'ounce'. (As with many illicit drugs, a combination of metric and imperial weights is used.) A 'stick', sometimes known as a 'foil', once equated with, and is usually presumed to contain about, one gram of cannabis, often in ready to consume form. (Not to be confused with a 'Buddha stick' or 'Thai stick' which is an imported cannabis product, and much more expensive.)

prices paid being in the range of $250–$300/oz. Once again, the lower end of the most commonly paid range – $250/oz – is used in deriving estimates.

On the basis of these values, the estimated 83,600 frequent regular users of cannabis in Queensland consume about 40,500 kilograms of cannabis annually, with a street value of about $361.6 million.[73]

Before going further, the basis of this estimate should be re–emphasised. First, the most conservative reasonable variables in terms of use, quantity and price have been chosen. Second, the consumption of infrequent, irregular or occasional users is disregarded. Third, it includes the unknown value of cannabis grown or otherwise acquired for personal consumption by users for which no or very little money actually changes hands.

From a number of indications, the Committee believes that a great deal more cannabis is produced than consumed in Queensland. Police members of the Committee pointed out that the largest crops detected in Queensland were intended for southern State consumption and were often grown and organised by southern State–based interests. The Committee's offender interviews yielded a similar picture – most of those involved in growing 'commercial' crops maintained that most medium to large crops were not grown for consumption within Queensland.

It is difficult to quantify the additional production in Queensland. Using a conservative estimate of the average yield of half–a–kilogram of cannabis per plant it follows that the Queensland consumption requirement estimated above could be satisfied by about 81,000 plants being brought to maturity each year. Queensland Police Service reports on 'commercial' plant seizures were obtained;[74] despite serious inadequacies in such data, it would seem that police can on average seize 40–50,000 plants annually *without any discernible market effect*. This would imply a much larger crop, even if growers do plant more than required in order to offset losses.

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73 The specific calculations are:
83,600 heavy regular users x 17.3 oz/year x .028g/kg = 40,496kg
83,600 heavy regular users x 17.3 oz/year x $250 = $361,570,000

74 Most such reports were in reports to Federal agencies and figures were obtained for the period 1984 to 1990; claimed plant seizures ranged from 500 to 287,000. Excluding two very large reports and one very low report, the average range is 40–50,000. As a rule of thumb police use the equation one (mature) plant = $2,000.

There are a number of reasons that can be advanced as to why Queensland might have a significant role in national cannabis supply, including:

- the degree of investigative or law enforcement action in southern States;[75]
- more favourable growing conditions, particularly in north Queensland;[76]
- perceptions of the relative quality of cannabis grown by various methods or in various areas; and/or
- the presence of established criminal networks with southern market connections.

No precise estimate of the value of this additional cannabis production is possible, but proceeding from the production required to meet the major component of Queensland demand and the lack of effect of the usual extent of recorded plant seizures it seemed to the Committee that an assumption that 'export' production was three quarters of 'domestic' production would be both reasonable and conservative. Using this 75 per cent assumption,[77] the Queensland cannabis industry, in street value terms, can be conservatively estimated at $632.8 million annually. In wholesale terms, valued at the current average price of $4,000-a-kilogram, the monetary valuation of the estimated 70,900 kilogram (70.9 tonne) cannabis crop is $283.6 million. ***(Note: This is an estimate only of the combined commercial and non-commercial value of an illegal crop; it is a calculation which is of necessity based on a number of assumptions which have been spelt out. Police members of the Committee believe, on their experience, that the assumption of the amount of personal regular, frequent consumption may be higher than is actually the case, in which case this estimate may be in excess of the crop. However, the estimate disregards irregular and infrequent consumption and in performing the calculation, assumptions have been set at the most conservative, reasonable level indicated by the data available to the Committee; these factors may mean the estimate undervalues the crop.)***

If this estimate is *in any way* appropriate, it is extraordinary; by way of comparison in the equivalent period, 23 million tonnes of sugar cane valued at $727 million was grown in Queensland with the next most valuable commodity being 2 million tonnes of wheat valued at $272 million.[78] However, such comparisons seem mild beside a similar

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75 A shift of major growers towards Queensland and one other state was noticeable following the murder of anti-drugs campaigner Donald Mackay in Griffith, NSW, in 1977 and the subsequent investigative focus on the Riverina area; in recent years the NSW Drug Enforcement Agency's Cannabis Eradication Program has made that state increasingly inhospitable for large scale cannabis growing.

76 Cannabis is a frost-sensitive plant; in north Queensland it can be cropped twice a year as opposed to once a year in outdoor locations in cooler areas.

77 Giving an overall 'export' proportion of 43 per cent, as follows: 0.75 (proportion of domestic consumption requirement additionally produced for interstate markets)/ 1.75 (domestic consumption requirement + additional 'export' production = 42.8 (per cent).

78 Australian Bureau of Statistics 1991, *Value of Agricultural Commodities Produced*, (Cat. No. 7503.3), ABS, Canberra.

estimate for the United States, where the value of domestically produced cannabis is estimated at $32–$64 billion in 1988–89, compared with $15 billion for the largest legitimate crop (corn), $7 billion for wheat, and $4 billion for cotton.[79] The extraordinary factor is the value bestowed on cannabis (also once known and scarcely valued as *ditchweed*) by its illegal status. The most comparable commercial crop grown in Queensland, tobacco, is many times more demanding to grow than cannabis; by weight, however, wholesale cannabis is nearly 800 times as valuable as wholesale tobacco:

Table 6.2 – Estimated Cannabis and Known Tobacco Production 1990–91 – Queensland

Crop	1990–91 Production	Wholesale Value
Cannabis	70.9 tonnes (est.)	$284 million
Tobacco	7,000 tonnes	$44 million

Source: *Tobacco*: Australian Bureau of Statistics 1991, *Crops and Pastures*, Cat. No. 7321.3, ABS, Canberra. *Cannabis* (commercial and non–commercial, including Queensland grown cannabis marketed interstate): Estimated at 1.75 times consumption requirement of Queensland frequent, regular users.

It does not follow from such comparisons that cannabis production is a particularly significant agricultural pursuit – this point is readily illustrated by consideration of the personnel and other resources required to produce 71 tonnes of cannabis, as opposed to 23 million tonnes of sugar cane, 2 million tonnes of wheat or 7,000 tonnes of tobacco. A more valid comparison, comparing like with like, would require answers to questions such as the following:

- *If cannabis were legal, what quantity would be produced and at what price?* or
- *If sugar cane or tobacco were illegal, what quantities would be produced and at what prices?*

The proportion of 'homegrown' to 'commercial' cannabis within the overall total is not known; however, there is reason to believe it to be relatively minor. First, the bulk of consumers are located in urban contexts where the potential for home production is much reduced (and where, although there is *some* successful production, many attempts founder on purely horticultural grounds). Second, although there may be many very small

79 Weisheit, Ralph A. 1992, *Domestic Marijuana: A Neglected Industry*, Greenwood Press, Connecticut, p. 35. These estimates are based on extrapolated value of seizures, not value of estimated consumption. It is not clear whether the comparison is between similar price levels, i.e. a retail price compared to a wholesale price.

growers, their contribution to the overall crop is likely to be minor. Some indication of this comes from the Committee's analysis of 1991 cultivation prosecutions for 116 offences covering 5,425 plants.[80] If it is assumed that cultivations of five plants or less are intended for private consumption, this accounted for 47.7 per cent of the offences but only 2.3 per cent of the plants. If the assumption is made that cultivations of 10 or fewer plants relate to personal use then 72.5 per cent of offences are accounted for, but only 6.2 per cent of the plants. If one assumes that police find a representative sample of the crop and that those growing up to 10 plants are growing substantially for personal consumption it would appear that the majority of cannabis is grown for commercial rather than personal uses. Even if police do not find a representative sample of growers and this precision can not be justified, the general observation still stands; mathematically the medium to larger crops must contribute the largest proportion of production.[81] Additionally, at the smaller end of the scale many growing attempts are unsuccessful – only a proportion of urban seedlings in pots on windowsills are brought to any sort of useful maturity regardless of law enforcement activity.

The amount of data currently collected in Queensland is inadequate for any more precise estimation of the market size. However, any valuations of this magnitude raise the issue of economic impact. Although cannabis production and commerce occurs around Queensland, there are areas where it is concentrated and it is here that economic impact, if any, would be most significant. The caveats related to this are that income from crops grown for interstate consumption is believed to be often mainly earned and retained interstate, that production for personal consumption is an imputed value only, and that while it may involve high values commercial cannabis production would necessary involve relatively small numbers of very well-remunerated participants.

This question of economic impact has been considered in the United States but much of what has been written to date has not been based on particularly rigorous research. According to a standard reference work:

> Marijuana cultivation activity in some rural areas is so intense that it distorts entire local economies through the influence of the drug monies it generates. These are often areas in which some of the local inhabitants consider marijuana cultivation to be neither immoral nor undesirable, and in which these residents welcome part-time work in cultivation as a supplemental source of income. In some rural areas marijuana has even become the primary cash crop, developing an underground economy with fixed prices to benefit everyone involved in the drug's cultivation and distribution.[82]

In truth, it may not be possible to be so definitive; rural economies are little understood and much of the research, media and law enforcement portrayal of issues is permeated with a particularly urban perspective:

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80 *Court Briefs Survey 1991*, (unpubl.). (The Committee conducted a detailed evaluation of more than 2,000 drug offence Magistrate's Court briefs for the periods 1987-88, and 1991.)

81 This can be illustrated from the analysis of court brief production offences: the bottom 72.5 per cent of producers were responsible for 6.2 per cent of production and the top 4.6 percent of producers were responsible for 81 per cent of production.

82 Miller, Gary J. 1992, *Drugs and the Law: Detection, Recognition and Investigation*, Gould Publications, Florida, p. 15.

> Aside from geography, studies of drugs in rural areas must contend with rural culture. In particular rural communities are often closed to outsiders and rural citizens may be reluctant to tell outsiders about local deviants. ... many rural areas of the United States operate on cash economies, even for relatively large purchases. Long-time residents who purchase cars and household appliances with cash are not likely to arouse much suspicion (unless their spending becomes excessive by local standards). Similarly, the nature of farming makes the masking of supplemental cash income much simpler than is true for those whose income is derived from fixed salaries or hourly wages.[83]

An admittedly limited degree of research in Queensland suggests several levels of specialisation in the overall cannabis market.[84] Figure 6.1 is a schematic representation of the Committee's general understanding of the organisation of the cannabis market. At the bottom are those whose only role is as consumers. However, among heavy users, the cost of cannabis becomes a significant burden. According to the offender interviews, the minority response to this burden, more accentuated among the young, was to steal or commit crime in order to raise funds; most, however, bought cannabis surplus to their needs and on-sold some, or sought to grow some proportion of their own needs.

The next level of the market therefore consists of the small scale user-dealers or grower-dealers, whose primary motivation is the satisfaction of their own demand. Some of these, however, graduate to the next level; growing or dealing where the primary motivation is to produce income and the supply of personal cannabis needs being a secondary motivation. At this level of the market, growers and dealers mix with persons whose interest in cannabis is wholly financial or 'criminal'; outsiders who enter the market because of its income producing potential.

At the higher levels of production, such 'criminal' growers and wholesalers are dominant, with those who have graduated from a user ('lifestyle') interest in cannabis often working for them as employees or contract growers. In Queensland, where growing areas are relatively remote from major markets,[85] 'criminal' growers have the advantage of superior transport and marketing contacts.

The market appears to operate both at a local and at a national level, with the characteristic form of organisation being partnerships within a wider network. Although there is some connection between the two, in most of Queensland the local network and the 'national' network appear to function relatively independently; local cannabis needs are satisfied locally or regionally by a network of relatively small-scale growers and local user-dealers and grower-dealers.

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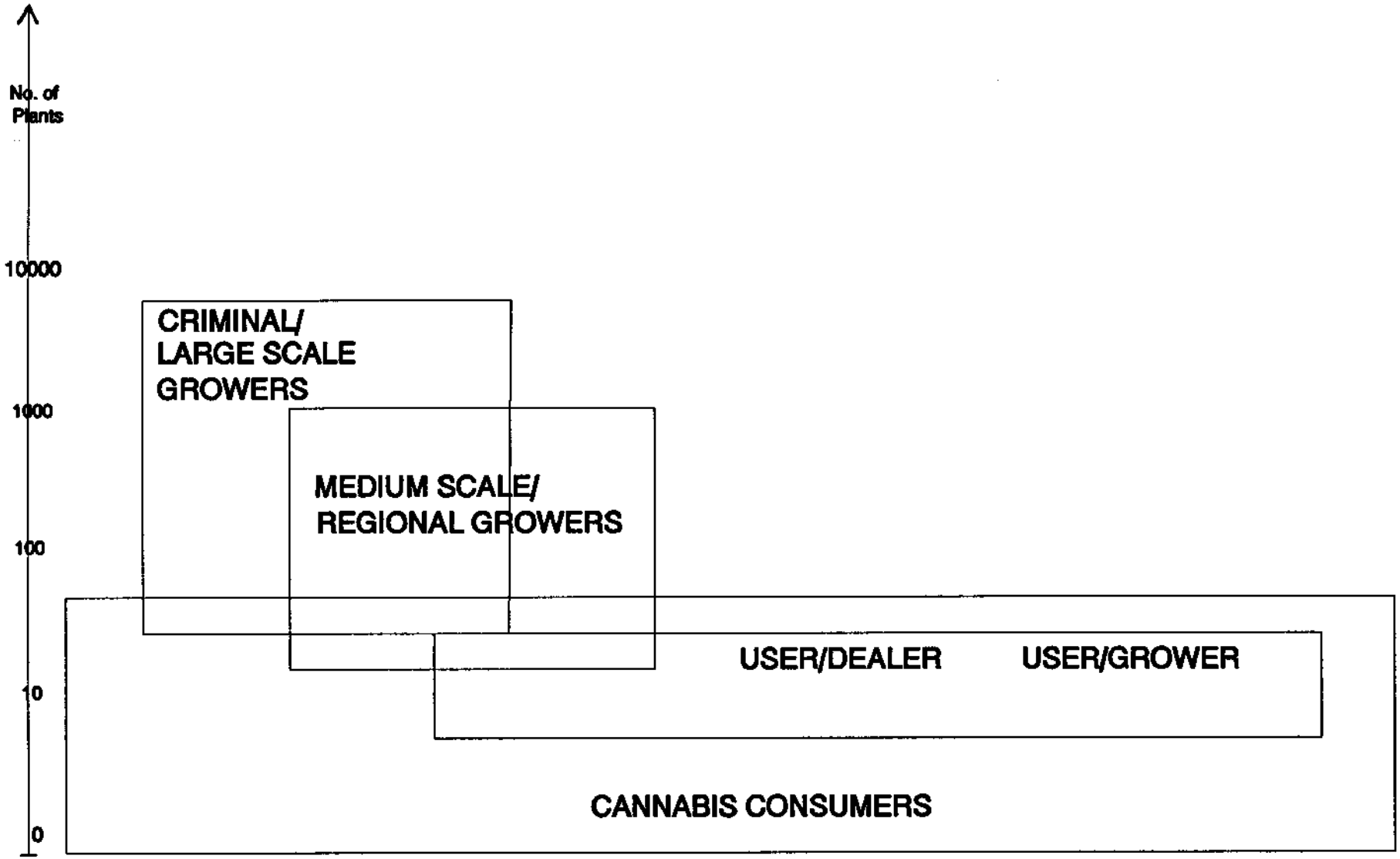
83 Weisheit, R.A., *op. cit.*, pp. 4-5.

84 Research into the functioning of and participation in specific drug markets is relatively new; a pioneer study of cannabis markets (in the USA) is Weisheit, *op. cit.* Weisheit delineates growers as being *hustlers, communal growers* and *pragmatists* (pp. 41-47). The Committee has, in a more modest way, emulated Weisheit's research through interviews with direct participants in the market as part of this study.

85 From the perspective of north Queensland, where two of the three major cannabis production areas in Queensland are located, major markets for commercial size crops appear to be Newcastle, Sydney, Wollongong, Brisbane, Gold Coast, and Melbourne.

Figure 6.1 – Schematic Representation – Organisation of Cannabis Supply in Queensland



There is evidence of significant 'organisation' within the national supply network. Law enforcement agencies have long been concerned with the activities of an alleged southern Italian criminal fraternity which may hold a significant or dominant position within the 'national' supply network and in some regions.[86] Persons identified as members of this fraternity have been responsible for murder and corruption on a significant scale, are extensively linked with other organised criminal interests, and have been heavily involved in other criminal activities including large-scale money laundering, taxation and insurance fraud. Some analysts believe the fraternity itself is the major participant in large-scale cannabis supply; others believe that the fraternity provides a framework for, and facilitates involvement by extended family groups, partnerships and enterprises.[87] ***It is stressed that no inference is intended that any more than a tiny minority of Italian-born and descended-citizens are or have been involved in any criminal activity.***

Members of a number of 'outlaw' motorcycle gangs have also been convicted with large-scale cannabis production offences. In this case the evidence is clearer that the criminal entity or actor is more likely to be the gang or fraternity rather than the individual gang members. There would also appear to be some cannabis-based criminal enterprises with contract labour or marketing connections with outlaw motorcycle gangs. ***It is stressed that no inference is intended of any criminal activities or involvement by the great majority of motorcyclists or motorcycle clubs or associations.***

Generally, organised criminal interests appear to be heavily involved in the large-scale production and distribution of cannabis.

Although the bulk of Australia's cannabis requirement would seem to be satisfied by domestic production, more cannabis is imported than any other category of illicit drugs. Cannabis imports appear to:

- fulfil the majority of demand for processed cannabis products (hashish and cannabis oil);
- fulfil niche market requirements for particular prized varieties of cannabis (e.g. 'New Guinea Gold'); and
- even out fluctuations in supply, whether from the normal seasonal variations in availability of cannabis, or regional shortages arising from law enforcement activities.

Imports are the responsibility of the Australian Customs Service and the Australian Federal Police. There are two schools of thought on the significance of Queensland as a point of entry for illicit drugs – it is possible that drug movements would be in proportion to person and cargo movements into Australia making the major markets for all

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86 New South Wales Royal Commission into Drug Trafficking Report, *op. cit.*

87 Criminal fraternity is defined here as a pattern of organisation stressing membership; Partnership is defined as persons not related, engaged in short or long term criminal activity; enterprise as criminal activity which includes persons in an 'employee' role; Dickie, P. and Wilson, P. 1993, 'Defining Organised Crime: An Operational Perspective', *Current Issues in Criminal Justice*, vol. 4, no. 3, pp. 215-224.

commodities also the main points of entry; however, the long, relatively unsupervised coastline and airspace of northern Queensland and its proximity to major illicit drug producing areas in south-east Asia may mean that Queensland is a more significant point of entry. Seizure statistics can be found to produce both schools of thought, but it should be noted that the resources devoted to detecting illicit imports are relatively concentrated at the major ports of entry into Australia. The following figures relating to seizures are the most recent indication of illicit drug imports into Queensland, although it should be noted that the number of cannabis seizures is probably accentuated by improvements in mail detection facilities and procedures.

Table 6.3 - Detected Drug Importations 1991-92 - Queensland and the Northern Territory

Drug	No. of Seizures	Amount seized (g)
Amphetamines	29	11095.6
Cannabis	626	218396.1
Cannabis Resin (incl. oil)	115	2610.8
Cocaine	13	407.6
Heroin	40	3669.2
LSD	4	100.0 (approx)
Other *	4	209.0
Total	**831**	**236.5 (kg)**

* Cannabis Seed

Source: Australian Federal Police Northern Region.

The openness of the north Queensland coastline to illicit drug imports has, however, long been a matter of concern. A more recent development has been the increasing level of importation of cannabis grown in Papua New Guinea through north Queensland. In view of the very low prices paid for cannabis in Papua New Guinea, such trafficking is particularly profitable, and it is likely that there may be substantial professional criminal involvement in such trafficking.

There is ample historical evidence of organised criminal involvement in cannabis importation, particularly in relation to bulk imports.[88] The principal source of cannabis has been south-east Asia, particularly Thailand. The major source of processed cannabis products, hashish and oil, has been south-west Asia. Both of these regions are also the principal source regions for heroin entering Australia and there is some evidence to

88 McCoy, A.W. 1980, *Drug Traffic: Narcotics and Organized Crime in Australia*, Harper & Row, Sydney.

suggest connections between the two commodities at various stages in the trafficking and marketing chain.

The precise interactions between organised criminal interests, illegal markets and law enforcement are far from clear. Some law enforcement interventions undoubtedly harm criminal organisations through the incarceration of their members or the seizure of their working capital (drugs or money) and assets. Other interventions may, however, assist organised criminal interests – through the maintenance of high rates of return, the removal of competitors and through creating conditions where those more prepared to resort to corruption and violence are placed at a competitive advantage.

Which effects predominate is not an issue that can be resolved without a great deal of further research, although some of the possible theoretical models for considering such questions are considered in Part 8 of this discussion paper.

PART 7 - CANNABIS LAW ENFORCEMENT

Introduction

There have been a large number of reports published, both in Australia and overseas, on drug law reform issues. It is perhaps surprising that despite this, there has been little analysis of the costs, impact or effect of drug law enforcement.

In undertaking this study, the Committee was conscious of the recommendation of the Fitzgerald Commission of Inquiry to determine 'the type, availability and costs of law enforcement resources which would be necessary to effectively police criminal laws against such activities' (i.e. vice, illegal gambling and illicit drugs).[89]

Accordingly, the Committee undertook preliminary inquiries with both the Queensland Police Service and the Corrective Services Commission.[90] It quickly became apparent that there was no information of any precision on the current level of resources allocated or consumed in drug law enforcement.

Additionally, during the Committee's consultation process with community and professional associations, a significant number of members of the legal profession raised concerns over both the equity of drug law enforcement and its effect on the criminal justice system. Once again, there was no way of knowing whether some of the individual cases or experience raised in support of such concerns were valid generalisations about the operation of drug law enforcement. Accordingly, the Committee gave research on law enforcement and its effects considerable priority.

As far as possible, the Committee sought to quantify the operations of law enforcement with respect to illicit drugs. This endeavour was hampered by serious shortcomings in the quantity and quality of information collected by relevant agencies over many years. The following description of drug law enforcement can therefore represent only a beginning, not the final word on the subject.

A major portion of the Committee's research in this area was the detailed analysis of more than 2,000 court briefs prepared by police in relation to drug offences generally. It should be noted that the quality and consistency of information recorded on individual court briefs is often open to question.[91] For this reason, and also to explore trends in practice, two distinct periods were surveyed. The Committee also had access to unpublished statistical material from the Queensland Police Service and the Australian Bureau of Statistics. Comparative material on levels and extent of drug use was also obtained from

89 Fitzgerald Commission of Inquiry, *op. cit.*, p. 377.

90 The Queensland Police Service, which through the Drug Squad and others has representation on the Illicit Drugs Advisory Committee, provided as much information as it was technically able to provide on the current commitment of resources and what might be a desirable level of resourcing. The Corrective Services Commission was unable to provide any information.

91 The collection and standardised recording of information on drug offences has since been addressed by the Queensland Police Service.

the computer database of the 1991 evaluation survey into the National Campaign Against Drug Abuse, already referred to in Part 5 of this report.

Drug Offences and Law Enforcement

Cannabis law enforcement must be seen in the context of drug law enforcement and law enforcement generally. In comparing drug offences to most other offences, it must be emphasised that drug offences tend to be detected by police, rather than reported to them. This, of necessity, complicates comparisons between the drug related activities of law enforcement agencies and their other activities. Table 7.1 contains reported and 'cleared' totals for a variety of offences.

Table 7.1 – Comparison of Drug Offences and Other Offences

Offence	No. reported	No. cleared
Drug Offences	18,404	18,241
All Offences against person	*19,011*	*12,851*
All Property Offences	*213,713*	*47,247*
Break and Enter	64,587	8,692
Stealing	88,087	19,791
Motor Vehicle Theft	16,473	3,502

Note: Drug offences are largely detected by police and hence a high proportion of offences are cleared; other offences are reported to police.

Source: Queensland Police Service Statistics 1991–92.

In overall terms, drug offences form 15.5 per cent[92] of all matters 'cleared' by police and 19.2 per cent[93] of all 'cleared' matters excluding traffic offences.

Drug offences form 5.4 per cent[94] of all charges heard before the lower (magistrates) courts, however, when traffic offences which amount to more than half of all charges are excluded some 11.2 per cent[95] of charges are drug matters. In terms of appearances

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92 18,241 (cleared drug offences)/ 117,518 (total cleared offences); Queensland Police Service 1992, *Statistical Review 1991–1992*, Goprint, Brisbane; Figures provided by the Queensland Police Service statistical division.

93 18,241 (cleared drug offences)/ 94,885 [117,518 (total cleared offences) – 22,633 (cleared traffic offences)].

94 14,119 (drug charges)/ 263,938 (total charges). Australian Bureau of Statistics 1990–91 (unpubl. data), *Table 2 – Magistrates Court Charges Heard: Offence by Outcome and Punishment, Queensland.*

95 14,119 (drug charges)/ 125,742 [263,938 (total charges) – 138,196 (traffic charges)].

before the lower courts 3.8 per cent[96] of the most serious offences resulting in the appearances related to drugs; when traffic offences are excluded, the proportion rises to 9.5 per cent.[97]

In the higher courts, drug offences are the basis of 7.3 per cent[98] of criminal charges heard; in terms of appearances, in 8.1 per cent[99] of cases drug offences are the most serious reason for the appearance.

Finally, persons convicted of drug offences represented 8.0 per cent[100] of the prison admissions throughout the year and some 6.7 per cent[101] of the prison population on 30 June 1991.

Cannabis and Drug Law Enforcement

On any measure, cannabis is the basis of the majority of drug law enforcement. Table 7.2 attributes, where possible, all cleared drug offences to the drug category involved; cannabis related offences are some 93.6 per cent of offences that could be attributed to a drug type.[102] Additionally, some accounting can be made for the 33 per cent of offences recorded as 'other drug offences'; of these 93.3 per cent are offences of possession of some item in connection with drug use.[103] The Committee's analysis of 1991 court briefs showed that 97.4 per cent of offences of possession of an item were for possession of an item known or believed to be connected with the use of cannabis.[104] Using these proportions,[105] the majority of offences can be attributed to a drug type.[106] Of such

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96 7,380 (drug appearances)/ 195,108 (total appearances). Australian Bureau of Statistics unpublished data, *Table 1 – Magistrates Courts Appearances: Offence with most Serious Outcome by Outcome and Punishment, Queensland, 1990–91.*

97 7,380 (drug appearances)/ 77,688 [195,108 (total appearances) – 117,420 (traffic appearances)].

98 1,086 (drug charges)/ 14,915 (total charges). Australian Bureau of Statistics 1990–91 (unpubl. data), *Table 6 – Higher Courts Charges Heard: Offence by Outcome, Queensland.*

99 334 (drug appearances)/ 4,138 (total appearances). Australian Bureau of Statistics unpublished data, *Table 4 – Higher Courts Appearances: Offence With Most Serious Outcome by Outcome, Queensland, 1990–91.*

100 421 (drug admissions)/ 5,266 (total admissions). Australian Bureau of Statistics 1990–91 (unpubl. data), *Table 2 – Convicted Prisoners (a) Under Sentence by Offence, Queensland.*

101 134 (drug offenders)/ 1,989 (total in prison).

102 11,035 (cannabis and hashish offences)/ 11,786 (offences attributed to specific drug category – excludes unidentified 'soft' and 'hard' drugs, 'unknown' and 'other offences').

103 5,736 cases of possessing a thing for drug use out of a total of 6,144 'other drug offences'.

104 *Court Briefs Survey 1987–88; 1991* (unpubl.).

105 5,587 offences of possess thing for cannabis use + 149 offences of possess thing for use of other drug = 5,736 total offences of possess thing for drug use.

attributable offences, the proportion attributable to cannabis was 94.9 per cent in 1991–92.[107]

Table 7.2 – Cleared Drug Offence by Offence and Drug Type 1991–92

	Possess Drug	Produce Drug	Sell/Supply Drug	Traffic in Drugs	Other Drug Offences
Cannabis	7,845	1,735	1,213	10	–
Hashish	182	1	48	1	–
Other Soft Drugs*	15	–	13	–	–
Opium	–	–	–	–	–
Morphine	16	9	3	1	–
Heroin	91	6	160	9	–
Amphetamine	205	6	128	4	–
Cocaine	20	–	14	1	–
Barbiturate	–	–	–	–	–
Mushroom	13	–	–	–	–
L.S.D.	28	–	36	1	–
Other Hard Drugs*	45	–	9	–	–
Unknown*	169	65	153	5	–
TOTAL	**8,629**	**1,822**	**1,777**	**32**	**6,144#**

* Statistics recorded prior to analyst's determination of drug type.

\# This figure comprises 134 cases of permitting/suffering premises to be used; 5,736 cases of possessing a thing for drug use; 119 cases of receiving or possessing property from a drug sale; and 155 other drug offences.

Source: Queensland Police Service 1991–92 (unpubl. statistics).

Similar results were obtained from the drug offence court brief surveys – during a three month period in 1991, cannabis accounted for 81.4 per cent of all offences and in 1987–88 for 87.6 per cent.[108] Drug offences can be categorised as those of using, supplying,

106 Excluding unanalysed 'soft' and 'hard' drugs and 'unknown' drugs and including 5,736 offences of possess thing for drug use, 17,522 offences can be attributed to a drug category.

107 11,035 (cannabis and hashish offences) + 5,587 (estimated possess thing for cannabis use offences)/ 17,522 (total offences attributable to drug category).

108 *Court Briefs Survey 1987–88, 1991* (unpubl.).

trafficking and producing.[109] Cannabis use (possession and possession of a thing) is by far the predominant drug offence, accounting for 65–75 per cent of all drug offences.[110] Table 7.3 examines the proportions of the various cannabis offences, showing again the prevalence of use offences.[111]

Table 7.3 – Cannabis Offences – Offence Type (%)

	Use	Supply	Traffic	Produce
1991–92	81.9	7.6	0.1	10.4
1991	81.3	6.7	0.0	12.1
1987–88	89.0	7.3	0.1	3.5

Note: The Queensland Police Service established a cannabis plantation unit within the Drug Investigation Squad in late 1988.

Source: Queensland Police Service 1991–92 (unpubl. statistics); Court Brief Survey 1987–88, 1991 (unpubl.).

It should be noted that in this discussion paper the words possession and use are used with what might at first appear to be a certain degree of interchangeability. *Use* is used in the context of all offences related to drug use; in this instance the specific offences are possession of a drug and the category of 'other offences', which is for the most part possession of some item in connection with the use of a drug. When for some reason the specific offences must be referred to, the designations *possession* and *other offences* are used. It is, of course, true that 'possession' charges can be levied in respect of significant drug quantities and in contexts where insufficient evidence could be gained for supply or trafficking charges. Proportionately however, these situations are an insignificant proportion of the overall total of possession offences and the generalisation that possession is equivalent to a personal rather than a commercial scale offence is valid.

Although cannabis possession (use) is regarded as the least serious of the cannabis offences, supplying and production offences include, respectively, any sale and any growing of cannabis. These can also include offences involving cannabis in quantities that would be considered more appropriate to personal rather than commercial purposes. To the extent that a highly inconsistent system of recording drug quantities allowed, this question was explored using data from the court brief surveys.

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109 Derived from provisions of *Drugs Misuse Act 1986*; possession and possession of item for drug use categorised as 'use'.

110 **1991–92** – 74 per cent (13,614 'cannabis use' offences/ 18,404 total offences); **1991** – 66.2 per cent *(Court Briefs Survey 1991)*; **1987–88** – 78 per cent *(Court Briefs Survey 1987–1988)*.

111 Queensland Police Service Statistics 1991–92.

Table 7.4 – Cannabis Production Offences 1991 – Scale of Production

1–5 Plants	6–10	11–20	21–100	101–1000	1000+
47.7%	24.8%	11.0%	11.9%	3.7%	0.9%

Source: Court Brief Survey 1991, (unpubl.).

As mentioned under the heading of supply (see page 60), the 47.7 per cent of growers cultivating five plants or less were responsible for only 2.3 per cent of production; the 72.5 per cent growing 10 plants or less were responsible for only 6.2 per cent of production.

The Detection of Cannabis Offences

It is generally police detection of an offence that is the point of entry into the criminal justice system of a drug offence. This detection can occur in a number of ways which can be broadly categorised as:

- the result of undercover or other specific operations, usually by the Task Force Drug Investigation Squad or regionally based detective units;
- the result of search warrants taken out under the *Drugs Misuse Act 1986*, often proceeding on the basis of information received; and/or
- chance discovery of illicit drugs or implements associated with illicit drug use while police are responding to complaints, engaged in routine patrols, making unrelated inquiries or engaged in other tasks.

The results of the surveys of court briefs in relation to how cannabis related offences came to the attention of police are as shown in Tables 7.5 and 7.6.

Table 7.5 – Mode of Discovery – Cannabis Offences (%)

	Drug Search Warrant	Operation	Chance Discovery
1987–88	48.6	6.1	45.3
1991	51.4	7.1	41.5

Source: Court Brief Survey 1987–88, 1991 (unpubl.).

The proportion of offences detected in any particular manner varied considerably with the category of drug offence, as set out in Table 7.6.

Table 7.6 - Drug Offences - How Detected 1991 (%)

	Possession or Use	Manufacture and Grow	Supply/Traffic	Other Drug Offences
Drug Warrant	50.0	75.0	33.3	59.4
Operation	3.0	7.8	49.2	5.0
Chance Discovery	47.0	17.2	17.5	35.6

Source: Court Brief Survey 1991 (unpubl.).

Police representatives on the Committee believe that these results underestimate the extent of police operations, most likely due to the incorrect recording of information on court briefs. The point may be valid, as the quality of information recorded on court briefs is extremely variable.

It is possible to partly check these findings, by comparing the number of charges resulting from Drug Investigation Squad operations to the overall number of drug charges. In 1991-92 the proportion of Drug Investigation Squad operational charges to cleared drug offences overall was 7.2 per cent;[112] in 1990-91, the proportion was 21.9 per cent.[113] From this, it is not possible to say any more than that the overall contribution of operations is perhaps more variable than the court brief survey shows; in all probability, the extent of the Drug Investigation Squad contribution is closely tied to its level of resourcing.

The significant finding overall from this analysis is that a large proportion of drug charges can be viewed as arising while police are on general duties or going about other, unrelated business.

Who is Apprehended for Cannabis Offences?

Using material from the two court brief surveys, the Committee has been able (to a greater extent than has previously been possible) to profile those apprehended for drug offences. This demographic material from what could be called the 'apprehended' group could then be compared with the demographic material on 'user' groups obtained through the 1991 *NCADA Social Issues Survey* and detailed in Part 5 of this discussion paper. Table 7.7 details the basic comparison.

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112 Arrest Return for Drug Investigation Squad Operations, 1991-92; Queensland Police Service 1992, *Statistical Review 1991-92*, Goprint, Brisbane; 1,385 (Drug Squad operational charges) - 68 (non-drug charges)/ 18,241 (cleared drug offences).

113 Arrest return for Drug Investigation Squad Operations, 1990-91; Queensland Police Service, *ibid.*; 3,317 (Drug Squad operational charges) - 319 (non-drug charges)/ 13,669 (cleared drug offences).

Table 7.7 – Demographic Features: Cannabis Users and Apprehended Cannabis Offenders 1991 – Queensland (%)

GENDER	USERS	APPREHENDED OFFENDERS
Male	64.4	87.4
Female	35.6	12.6
AGE		
14–24	47.8	49.5
25–34	38.1	38.5
35–44	14.0	9.5
45+	n.a.	2.4
MARITAL STATUS		
Single/Defacto/Never Married	74.4	74.9
Divorced/Separated	11.0	10.6
Now Married	14.6	14.4
Widowed	n.a.	0.1
OCCUPATION		
Upper White Collar	10–15	1.8
Lower White Collar	about 30	3.5
Blue Collar	about 25	14.7
Unskilled	about 5	19.3
Unemployed	5–15	46.1
Home Duties	5–10	2.0
Student	5–15	7.1

Note: Occupational categories between the two surveys are a close but not identical match. Due to small sample size, occupational categories on cannabis use are presented as ranges or approximations only.

Source: NCADA Social Issues Survey 1991, (Computer file); Court Brief Survey 1991, (unpubl.).

In terms of the age and marital profiles those apprehended are similar to the user group. In other respects the apprehended group is quite different to the user group; they are much more likely to be male, or to be unemployed or unskilled workers.

This table must be interpreted with caution, bearing in mind that cannabis 'users' are defined as those who have used cannabis in the past year. It includes those who have tried cannabis for their first and only time (proportion not known), those who are daily users (11 per cent), those using once or more a week (38 per cent) and those using several times a month or more (51 per cent).[114] Presumably, those who use with greater frequency stand a greater chance of being apprehended.

114 *NCADA Social Issues Survey* 1991, (Computer file).

The analysis of the occupational status of extremely frequent users in Part 5 does show some increase in the representation of some groups; for instance the unemployed category was five per cent of the overall Australian NCADA Social Issues Survey sample, nine per cent of those who had ever used cannabis, 14 per cent of 'users' and 17 per cent of those consuming once a month or more. A similar increase in representation was exhibited among students and there was a smaller increase in the blue collar category. Some of this variation in occupational categories could be expected, as the young are proportionately over-represented among cannabis users generally and more so among frequent users; some occupational categories are also more prevalent among the young (for example, the unemployed category is nine per cent of the sample group aged under 25 and only three per cent of the sample group aged over 25).[115]

However, even when all these factors are taken into account, it would still seem that those apprehended for cannabis use are not representative of cannabis users generally. This is an extremely significant point; it seems inescapable that the laws pertaining to cannabis are not equitably enforced in the sense that the chances of being apprehended are closely related to the incidence of the offence. Also, those who are more commonly apprehended tend to come from the less privileged social groups - the unemployed and unskilled. Their rate of apprehension may in part be due to their increased frequency of use, but it may also be due in part to their relatively disadvantaged social position. Conversely, the rate of apprehension for other, more privileged groups is lower; for instance, the 'user' rate for both managerial/administrative and professional groups is in the order of 5-10 per cent while the apprehension rates for these groups are 0.6 per cent and 1.2 per cent respectively.[116] Again, relative rates of use may be a factor.

In summary, apprehended offenders are overwhelmingly young, single, unemployed or unskilled males. It should be noted that a similar apprehended offender profile appears for most other offences.[117]

None of this is to say that police are deliberately victimising certain groups. A discriminatory pattern of apprehensions could conceivably arise through the operation of factors not including intended discrimination. Two such factors in particular were suggested by police members of the Committee:

- some groups are more likely to come to police notice than others over matters unrelated to drugs; and/or

- some groups may habitually use or have no option but to use cannabis in more public surroundings or generally less discrete circumstances.

Three American sociologists postulated three potential explanations for the differential impact of enforcement on lower socio-economic groupings in three American jurisdictions where they compared use and arrest rates - different offending rates, differential enforcement which includes but is not confined to 'police harassment' of certain groups,

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115 See Tables 5.3, 5.4 and 5.5 in Part 5 of this discussion paper.

116 *NCADA Social Issues Survey* 1991, (Computer file).

117 Criminal Justice Commission 1991, *Crime and Justice in Queensland*, Brisbane, pp. 27-38.

and differential visibility of offences. Their findings, and their hypothesis for such findings, are very similar to those of this study:

> The data shows that the most frequently arrested groups also have generally higher estimated user rates. At the same time, the differences in the violation rates are insufficient to account for the arrest rate differences (which are typically much greater in magnitude) . . . In this regard, the general over-representation of young, blue collar males may reflect either a greater visibility of these persons and their marijuana use to the police or a police predisposition to search persons with these characteristics. Matza's (1969) discussion of the role of categorical resemblance within the 'method of suspicion' indicates that not all social categories of persons and activities are equally 'suspect'. Organisational pressures for effective policing inevitably encourage police reliance on resemblance to 'known' categories of suspected persons. Suspicion is neither randomly directed nor incidental, but rather methodical and involves the application of existing category systems of suspects. Certain characteristics of actors and action may signify such categories and, therefore, serve as cues that affect police perception, focus police attention, and direct police investigation. Although we are without direct observational data concerning these dimensions of police activity, the available data do suggest certain patterns of police suspicion. As we have indicated, the most frequently arrested groups – young males, often black – more often involve general patrol officers and a police–citizen encounter where the marijuana violation was not initially or directly seen. Instead, arrests of these groups often result from police stops for other purposes, often 'suspicious circumstances' after which a search produced marijuana evidence. Many of these arrests imply a methodical application of suspicion to persons with reputations for 'making trouble'.
>
> Finally, we note that although the police harassment hypothesis is often associated with drug law enforcement, it is also apparent that the context of much marijuana use is one where such activity is visible. In these circumstances, the probability of police–offender contact is greatly increased, a condition that is largely determined by marijuana users. The data presented here are compatible with both interpretations – differential enforcement or differential visibility – and, therefore, with either inappropriate or appropriate selectivity. We wish to emphasise, however, that an empirically based choice among them requires observational data concerning the arrest event, including the detection process by which citizens are linked to a violation.[118]

The Committee accepts the view of its police members that discriminatory enforcement outcomes are the product of factors such as the differential visibility of offences and offenders and not the product of any deliberate intent in either law or enforcement practice. However, it must be faced that, for whatever reasons, cannabis law enforcement does have inequitable outcomes. This raises the possibility that the enforcement of the law is widely perceived as being discriminatory, and that this has an adverse influence on respect for the law in general, as well as legislators, the judiciary and the police service.

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118 W.T Johnson, R.E. Petersen, L.E. Wells 1977, 'Arrest Probabilities for Marijuana Users as Indicators of Selective Law Enforcement', *American Journal of Sociology*, vol. 83, no. 3, pp. 681–699, at 696–697.

The Role of the Drug Investigation Squad

Most specific drug operations are the responsibility of the Drug Investigation Squad, a section of the Queensland Police Service Task Force. The Drug Investigation Squad's specific objectives are:

- to identify and prosecute any person/organisation carrying on the business of unlawfully trafficking in dangerous drugs;

- to liaise with other drug enforcement agencies on a State and national basis in relation to intelligence gathering/analysis and drug supply reduction techniques;

- to locate, dismantle and destroy drug laboratories and cannabis plantations and prosecute any person/organisation involved.[119]

Where cannabis related offences come to the notice of the squad, charges are laid where possible. Frequently this is dependent on the availability of resources and the existence of other, higher priority, matters.

The serving inspector in charge of the Drug Investigation Squad is part of the police representation on the Committee, and the Committee accordingly had access to detailed information on Drug Investigation Squad activities for 1990–91 and 1991–92.

In 1990–91 squad operations resulted in some 697 persons being charged with 3,317 offences as a result of 32 drug operations closed during the period; additionally, there were 198 'non–operational' arrests of persons who were charged with 384 offences.[120]

In 1991–92 the squad had an average personnel level of 36 operational police; some 331 persons were charged with 1,385 offences as a result of the closure of 22 drug operations; additionally there were 325 'non–operational' arrests of persons charged with 879 offences.[121]

In 1991–92 the squad was responsible for 3.8 per cent of possession offences, 39 per cent of dealing offences, 3.6 per cent of producing offences, 59.3 per cent of trafficking offences and 3.4 per cent of other offences. It would seem fair to say that the Drug Investigation Squad is responsible for a large proportion of apprehensions for the more serious drug offences.

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119 Queensland Police Service, Drug Investigation Squad, Strategic Plan.

120 Arrest Returns for Drug Investigation Squad operations 1990–92; Queensland Police Service 1992, *Statistical Review*, Goprint, Brisbane.

121 Arrest Returns for Drug Investigation Squad operations 1991–92; The reduced level of charges in 1991–92 is in part attributable to changes in operational practice in emphasising 'quality' rather than 'quantity' briefs. In addition six operations resulting in 221 persons being charged with 735 offences were terminated in the first three months of 1992–93.

Another way of looking at the Drug Investigation Squad is to compare the profile of offences resulting from its operations with the overall Queensland Police Service profile of drug offences (Table 7.8).

More than half the charges laid by the Drug Investigation Squad are for the more serious supply and trafficking offences, as compared to about 1 in 10 offences for police generally.

Table 7.8 – Profile of Offences: Queensland Police Service and Drug Investigation Squad 1991–92

	Use (%)	Supply (%)	Produce (%)	Traffic (%)	Other (%)
QPS n=18,404	46.9	9.9	9.7	0.2	33.4
Drug Investigation Squad n=1,108	25.1	52.6	5.0	1.4	15.9

Source: Figures provided by the Queensland Police Drug Investigation Squad, 1991–92; Queensland Police Service 1991–92 (unpubl. statistics).

However, even with the Drug Investigation Squad's emphasis on 'powder' drugs, a large proportion of their operational charges are in relation to cannabis offences – some 80.6 per cent of all the offences readily attributable to a drug category (Table 7.9 sets out this comparison).[122] It should be noted that this is less than the 93.3 per cent attributed to cannabis in a similar exercise[123] on overall drug offences by the Queensland Police Service.

122 Arrest Returns for Drug Investigation Squad Operations, 1991–92. Note: No attempt has been made to attribute other offences (chiefly possession of an item in relation to drug use) to a drug category as this information is not available in relation to Drug Squad offences. In relation to QPS overall offences, 93.3 percent of other offences relate to possession of item and of these, 97.4 percent relate to possession of item known or believed to be connected with cannabis use.

123 Excluding consideration of 'other' offences.

Table 7.9 – Queensland Police Service and Drug Investigation Squad: Drug Offences Attributable to a Drug Type 1991–92 (%)

	Queensland Police Service	Drug Investigation Squad
Cannabis	93.6	80.6
Opiods	2.5	4.1
Amphetamines	2.9	8.9
LSD	0.6	3.5
Cocaine	0.3	2.7
Mushrooms	0.1	0.0
Multiple types	0.0	0.2

Source: Figures provided by Queensland Police Service Drug Investigation Squad, 1991–92; Queensland Police Service 1991–92 (unpubl. statistics).

For the Queensland Police Service generally, the most predominant drug offences attributable to a drug type are possession or use of cannabis (66.6 per cent of all drug offences attributable to a drug type)[124] followed by cannabis production (14.7 per cent).[125] For the Drug Investigation Squad, the most predominant offence is supplying cannabis (42.9 per cent),[126] followed by cannabis possession (26.4 per cent).[127]

One caution previously mentioned may well have particular relevance to these measures of Drug Investigation Squad impact – in this discussion paper possession and use are used almost interchangeably with the implication that such offences are less serious than other drug offences. In general this assumption is valid – the proportion of 'significant' possession offences is a tiny proportion of the overall total. However, a higher proportion of Drug Investigation Squad cannabis possession offences could be expected to be of significant amounts. Police members of the Committee also advised that difficulties in gaining evidence against traffickers often meant they were charged with supply or possession offences.

Drug Offences and the Criminal Justice System

In analysing how the courts and prisons deal with drug offences there are significant deficiencies in the information collected. The ideal would have been to assemble a sample of individual cases. However, each agency concerned collects its own statistics

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124 Queensland Police Service, *op. cit.*, (see Table 7.2) 7,845 cannabis possess/ 11,786 total offences attributable to drug type (excluding 'other offences').

125 *ibid*; 1,735 cannabis produce offences/ 11,786 drug attributable offences.

126 Queensland Drug Investigation Squad Returns 1991–92; 475 cannabis supply offences/ 1,108 offences attributable to drug type.

127 *ibid*; 292 cannabis possession offences/ 1,108 drug attributable offences.

and there is no available or cost effective way to follow offences from the time of apprehension, through the treatment of offenders by the courts and the correctional system. Although statistics from each component of the criminal justice system are provided to and collated by the Australian Bureau of Statistics, there are significant difficulties in building up any precise overall picture. One difficulty concerns the collection of statistics over financial year periods; a number of charges generated by police will not be heard by the courts until the next statistical period and may overlap into an even later statistical period as far as the correctional system is concerned. Also, agencies have historically collected their own statistics for internal reasons, without any thought of compatibility to other related databases. For example, the police service can generally relate offences to a drug and offence type, but no information on drug type is contained in court statistics; court statistics can relate to either the number of charges heard or the number of appearances, but a complete set of statistics on outcomes is not available on either basis.

Nevertheless, the various statistical collections, with all their drawbacks, comprise the best available information, now and in the foreseeable future. Fortunately, from the point of view of analysis of how the criminal justice system deals with drug offences, precise figures are less significant than the proportions of offences dealt with in particular ways. Accordingly, the Committee has, as far as possible, examined the flow of drug offences through the system. The primary source of material for this analysis was published and (predominantly) unpublished data held by the Australia Bureau of Statistics; it was supplemented where possible with other information such as the court brief surveys 1987–88; 1991 and other material compiled for this paper.

This information is best presented diagrammatically, with the starting point being the 100 per cent of offenders for each class of offence being brought before the courts by police. In this way, it became possible to evaluate the relative seriousness with which the criminal justice system as a whole views particular offences. In relation to possession and use offences the closest 'fit' was with the minor assault offence category which includes common assault, aggravated assault, resisting arrest and other obstructions, other resisting and obstructing and other minor assaults. A conclusion may be that, as an offence, cannabis use is viewed as marginally more serious than minor assault.

These flow diagrams are arranged in the following manner:

- Possession or use (93 per cent cannabis related)
- Other drug offences (91 per cent cannabis use related)
- *Minor assault*
- Manufacture and grow offences (95 per cent cannabis related)
- Importing/Exporting (cannabis proportion of offences unknown – 87 per cent of imports)
- Dealing/Trafficking (70 per cent cannabis related)

It should be noted that some samples are of relatively small size; in general, less reliance can be placed on the 'flow' for the higher courts than for the lower courts. Also, a relatively small number of persons were charged with the more serious offences, particularly importing and exporting.

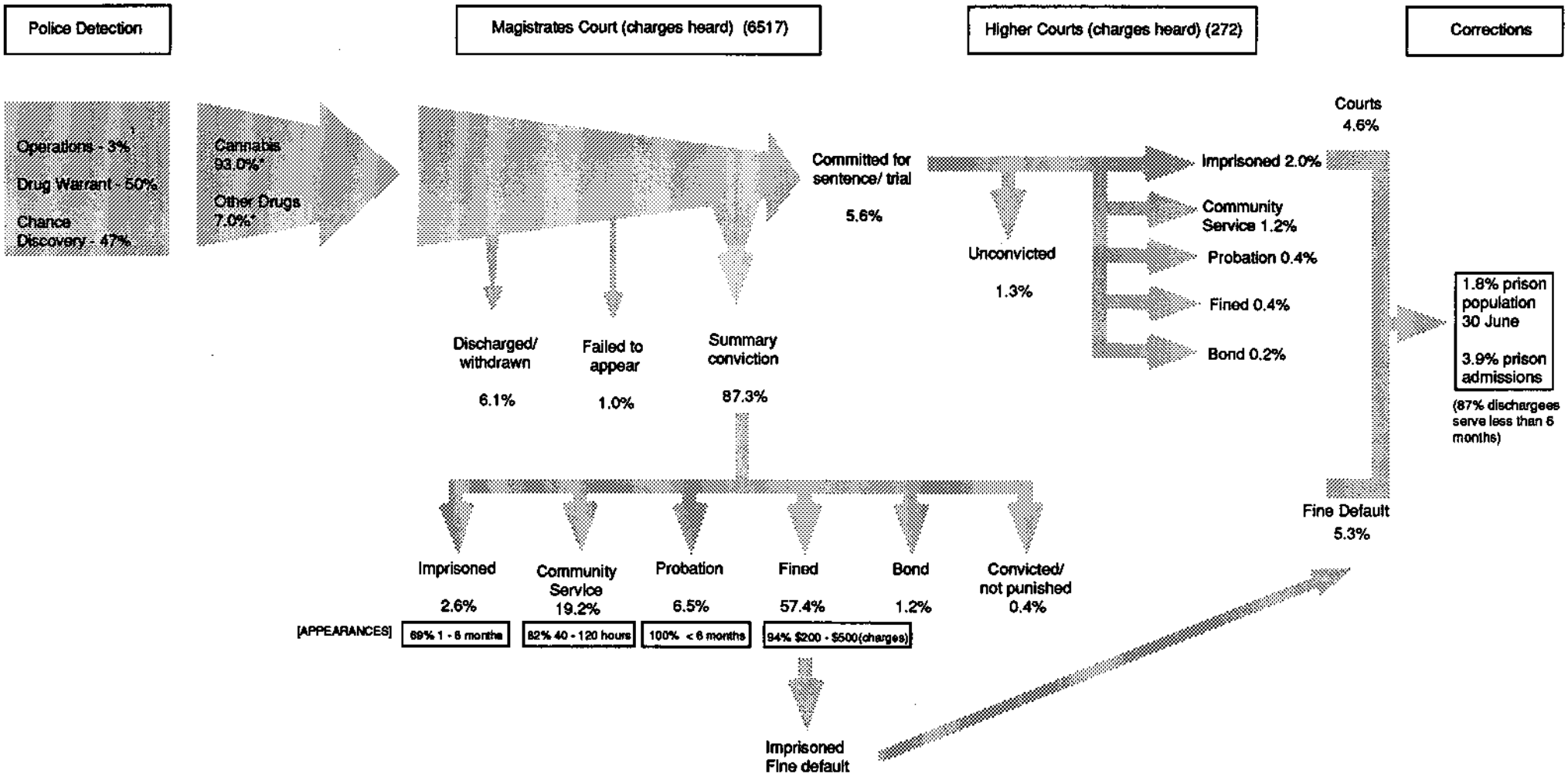
The Committee also considered it unfortunate that the statistical base amalgamates supplying, dealing and trafficking offences.

However, even given such caveats, the Committee believes it a significant advance to be able to evaluate offences in the context of their overall disposition by the criminal justice system.

Figure 7.1

DRUG LAW ENFORCEMENT - POSSESSION OR USE 1990-91

(44.7% of 1990-91 Drug Offences)



Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane (unpublished data); Court Briefs Survey 1991, (unpublished);
*Queensland Police Service statistics 1991-1992.

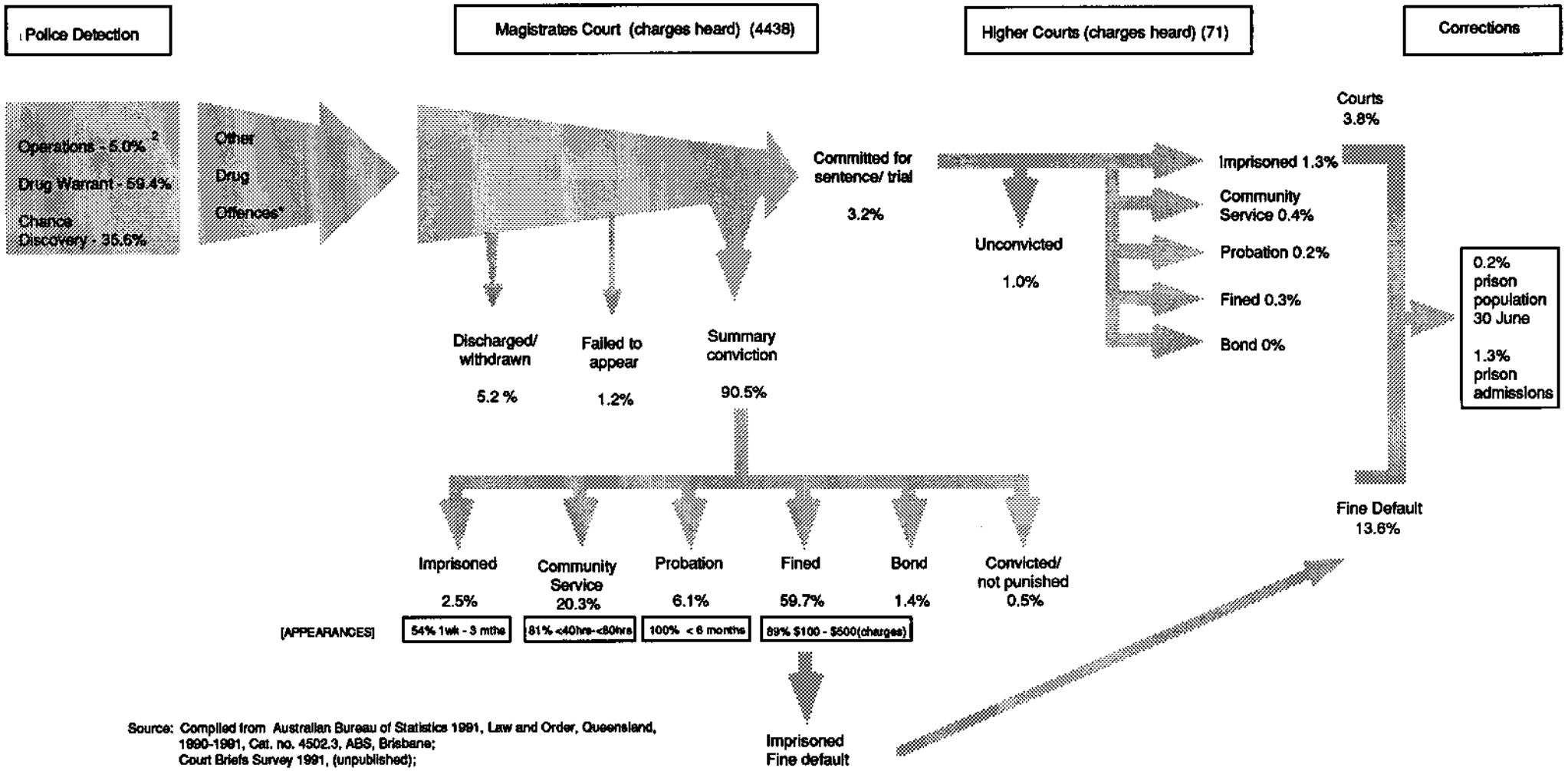
Operational detections may not always be noted on court briefs which may affect the accuracy of this percentage.

Note: The number of fine defaulters converting to community serivce is not accounted for.

Figure 7.2

DRUG LAW ENFORCEMENT - OTHER DRUG OFFENCES 1990-91 [1]

(32.5% of 1990-91 Drug Offences)



Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane;
Court Briefs Survey 1991, (unpublished);

* Queensland Police Service statistics 1991-1992; 90.9% relate to use of cannabis related instruments

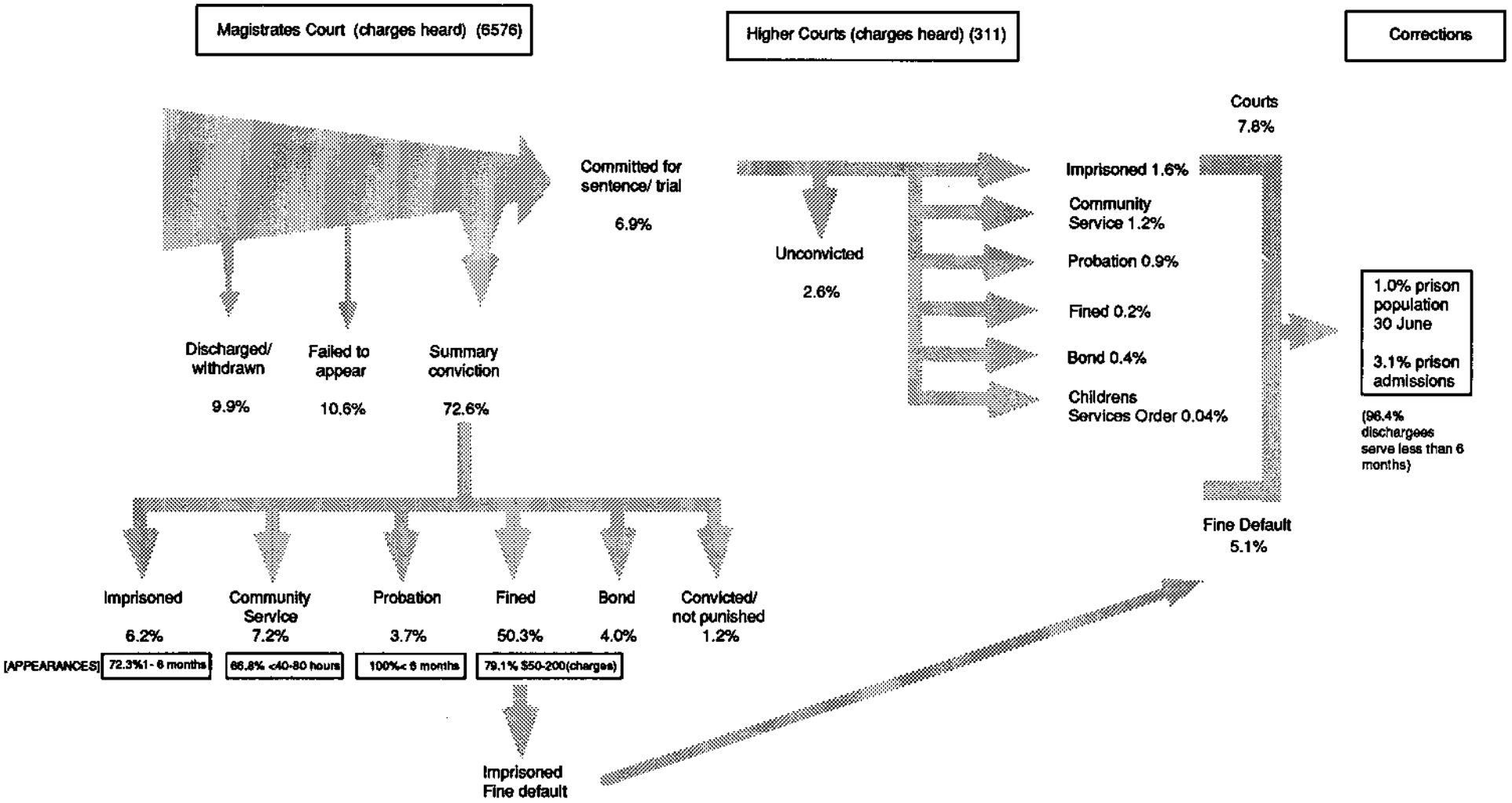
1. Includes offences relating to use of premises, proceeds of drug sales and possesion of things for drug use (93% of these relate to possession of a thing for drug use - of these 90-95% are utensils related to cannabis use. Souce: CJC Court Briefs Survey

2. Operational detections may not always be noted on court briefs which may affect the accuracy of this figure.

Note: The number of fine defaulters converting to community service is not accounted f

Figure 7.3

MINOR ASSAULT 1990-91

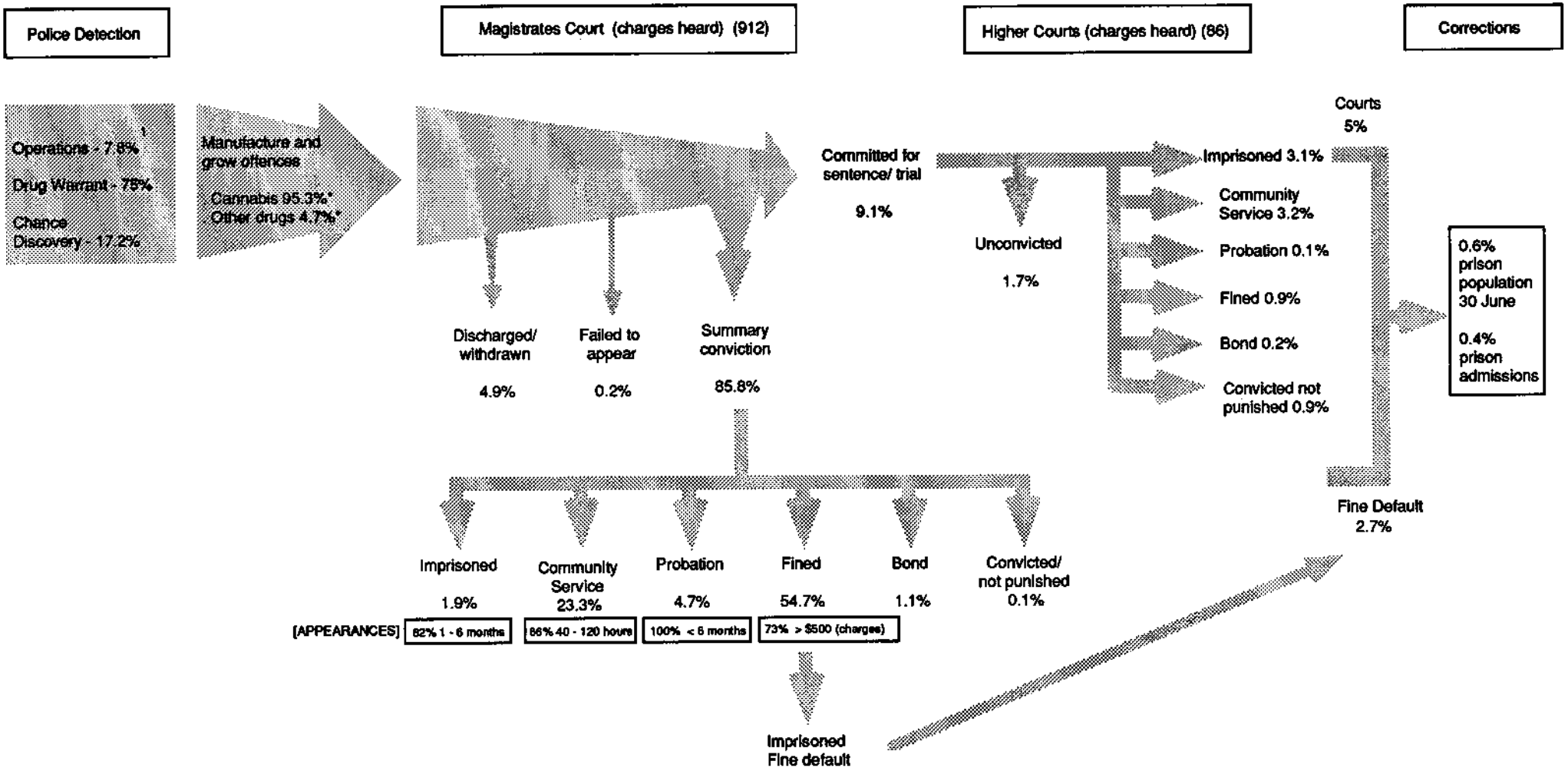


Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane (unpublished data).

Figure 7.4

DRUG LAW ENFORCEMENT - MANUFACTURE AND GROW 1990-91

(9.4% of 1990-91 Drug Offences)

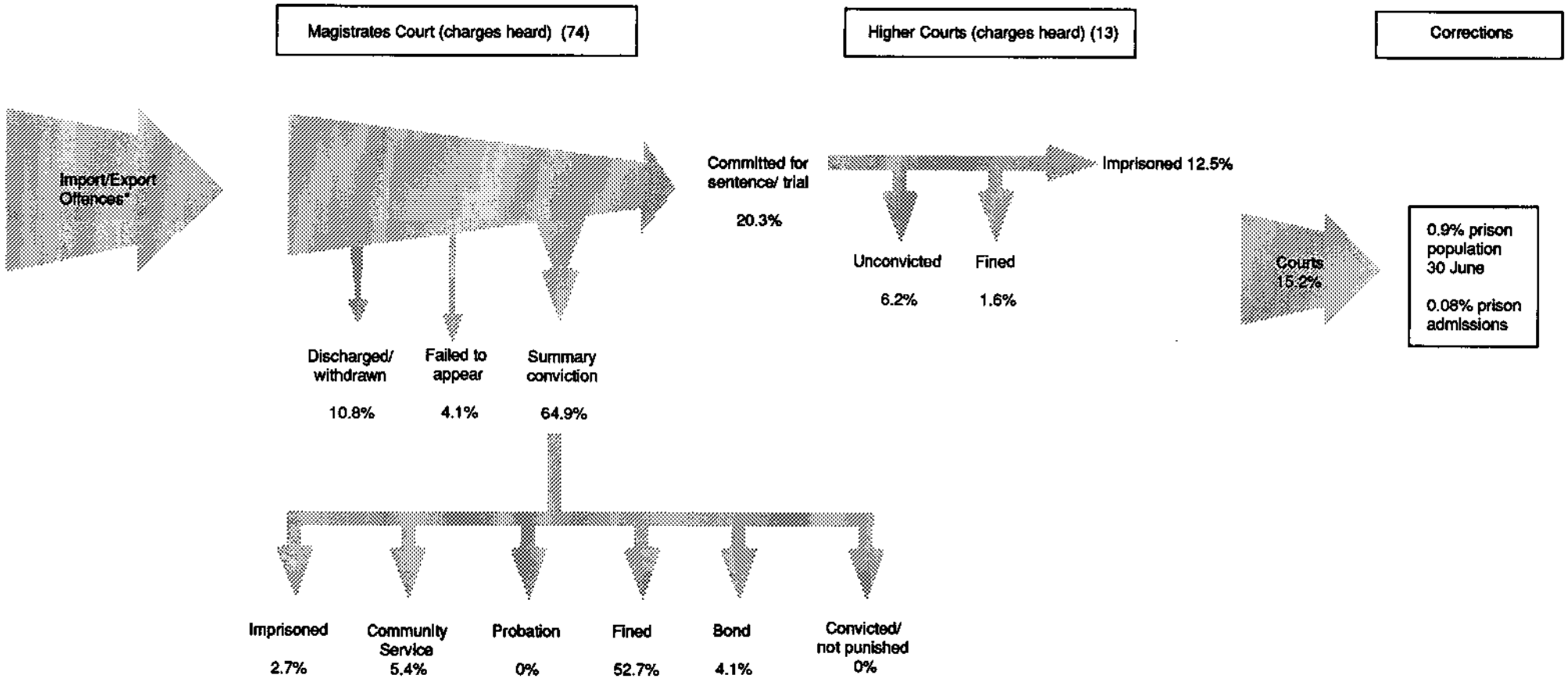


Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane (unpublished data); Court Briefs Survey 1991, (unpublished);
*Queensland Police Service statistics 1991-1992.
[1] Operational detections may not always be noted on the court briefs which may affect the accuracy of this percentage.
Note: The number of fine defaulters converting to community service is not accounted for.

Figure 7.5

DRUG LAW ENFORCEMENT - IMPORTING AND EXPORTING 1990-91

(0.05% of 1990-91 Drug Offences)



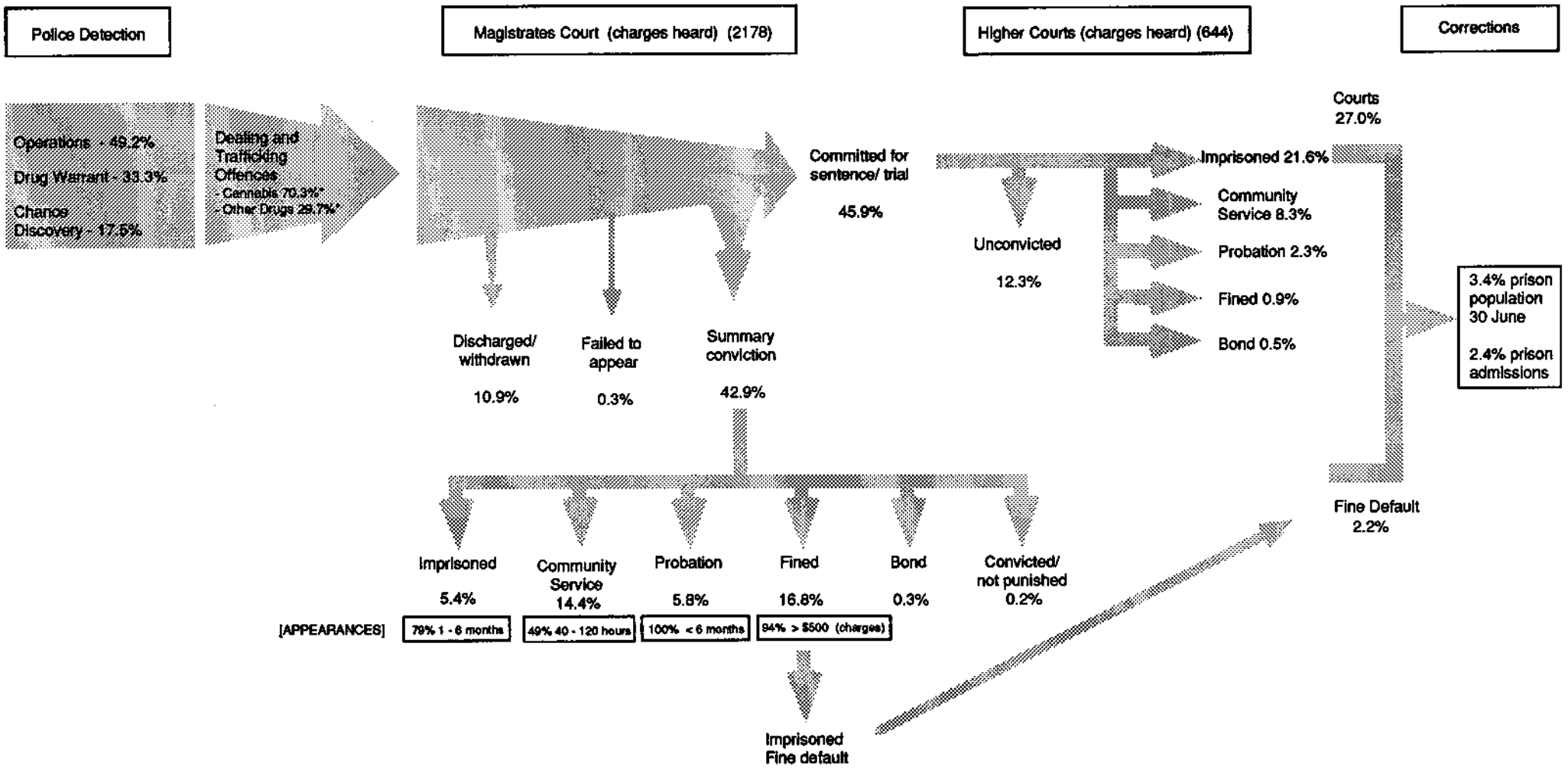
Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane (unpublished data);
* Cannabis and cannabis products 87.1% of customs seizures (Cf. AFP Qld, 1991-92)

Note: Caution must be used when reading this table due to the small number of offenders involved.

Figure 7.6

DRUG LAW ENFORCEMENT - DEALING AND TRAFFICKING 1990-91

(13.4% of 1990-91 Drug Offences)



Source: Compiled from Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990-1991, Cat. no. 4502.3, ABS, Brisbane (unpublished data);
Court Briefs Survey 1991, (unpublished);
* Queensland Police Service Statistics 1991-92.

Note: The number of fine defaulters converting to community service is not accounted for.

One other useful comparison is between the statutory penalties for drug offences, the sentences for imprisonment handed down by courts, and the sentences actually served. This information is presented in Table 7.10.

Consistently, both the penalties imposed and the penalties actually served are but a fraction of the statutory penalties.

Another element which appears to bear on the equity of drug law enforcement is the high level of previous convictions for drug offences among those apprehended. According to the Committee's court brief surveys, the proportion of previous offenders among those apprehended for drug offences was 51.4 per cent in 1991 and 45.3 per cent in 1987–88. Those persons being apparently repeatedly breached for cannabis offences are slightly more skewed towards the less privileged groupings than those generally apprehended; for instance, the proportion of unemployed among those with previous offences is 53.1 per cent, compared to a proportion of 46.1 per cent for all apprehended offenders.

Drug Law Enforcement and Youth

With the assistance of the Australian Bureau of Statistics and the Queensland Department of Family Services and Aboriginal and Islander Affairs the Committee was able to undertake some analysis of the treatment of juvenile drug offenders. The principal difficulty with these statistics is that police caution a large proportion of youthful drug offenders, but such offenders, and this manner of dealing with them, are not captured in the statistics.

Drug offences were the principal reason for 2.9 per cent of appearances before the Children's Court in 1990–91 and 2.0 per cent of charges. Comparatively then, there is a lower proportion of drug offences coming before the Children's Court than the Magistrates Court generally.[128] However, once again those cautioned at the time of the discovery of the offence are not represented.

Only 9.5 per cent of adolescents appearing on drug offence charges have been convicted of prior drug offences; however, significantly, some 46.3 per cent have been convicted of prior non-drug related offences.

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128 Australian Bureau of Statistics unpublished data on the Children's Courts, 1990–1991. The relevant comparisons for Magistrates Courts are that drug offences are the most serious offence in 3.8 per cent of appearances and 5.3 per cent of overall charges. Australian Bureau of Statistics 1991, *Law and Order, Queensland 1990–1991*, Cat. no. 4502.3, ABS, Brisbane.

Table 7.10 – Imprisonment: Statutory, Imposed and Served Sentences for Drug Offences 1990–91 (%)#

OFFENCE		
	MAXIMUM SENTENCE	CANNABIS PROPORTION (1991–92)
Possession or Use of Drugs	25/20/15/2 yrs imprisonment[1]	93%
Importing and Exporting Drugs*	Life/25/10/2 yrs imp'ment[2]	–
Supplying and Trafficking in Drugs	25/20/15/2 yrs imprisonment[3]	70.3%
Manufacturing and Growing Drugs*	25/20/15/2 yrs imprisonment[4]	95.3%
Other Drug Offences[5]	15/2 yrs imprisonment[6]	90.9%

SENTENCE IMPOSED 1990–91				
UNDER 6 MTHS	6 MTHS–1 YR	1 YR–2 YRS	2 YRS–5 YRS	5 YRS AND OVER
80.0%	8.9%	6.7%	4.4%	0%
28.6%	28.6%	0%	0%	42.9%
36.0%	14.4%	14.4%	27.3%	7.9%
40.6%	9.4%	18.8%	28.1%	3.1%
85.2%	11.1%	0%	3.7%	0%

SENTENCE COMPLETED 1990–91				
UNDER 6 MTHS	6 MTHS –1 YR	1 YR–2 YRS	2 YRS–5 YRS	5 YRS AND OVER
87%	5.1%	4.2%	3.7%	0%
50%	25%	0%	25%	0%
60.3%	18.4%	13.9%	7.4%	0%
47.2%	13.9%	30.6%	8.3%	0%
97.2%	0%	0%	2.8%	0%

Includes sentences imposed in both higher and lower courts; Note that 'sentences imposed' and 'sentences completed' do not relate to same group of offenders; statistics for completed sentences reflect the operations of a sentence remission scheme.

* Caution required due to small numbers of offenders involved.

[1] Possessing a first Schedule drug in a quantity greater than the fourth Schedule – 25 years; Possessing a first Schedule drug in a quantity greater than the third Schedule, but less than the fourth Schedule – 20 years if judge satisfied offender is drug dependant and 25 years if not; Possessing a second Schedule drug in a quantity greater than the third Schedule – 20 years; Possessing a first or second Schedule drug in a quantity less than the third Schedule – 15 years (s.9 DMA).

[2] Life imprisonment for commercial quantities (100kg of cannabis or 1.5kg of other illegal drugs); 25 years imprisonment for trafficable amounts of a drug other than cannabis and 10 years for a trafficable amount of cannabis (100g of cannabis or 2g of other drugs); 2 years for importing/exporting smaller amounts of drugs.

[3] 25 years if the dangerous drug trafficked is a thing specified in the first Schedule and 20 years if it is a thing specified in the second Schedule (s.5 DMA). For supplying drugs 25 years for 1st Schedule drugs in a case of aggravated supply and 20 years if not aggravated. For Second Schedule drugs in cases of aggravated supply the penalty is 20 years and if not aggravated, 15 years (s.6 DMA).

[4] Producing a first Schedule drug in a quantity exceeding that specified in the fourth Schedule – 25 years; Producing a first Schedule drug in a quantity exceeding the third Schedule but less than the fourth Schedule and judge is satisfied the offender is drug dependant – 20 years; if judge is not satisfied as to drug dependency – 25 years; Producing a first Schedule drug in a quantity less than the third Schedule – 20 years; Producing a second Schedule drug in a quantity exceeding the third Schedule – 20 years; Producing a second Schedule drug in a quantity less than the third Schedule – 15 years (s.8 DMA).

[5] Includes offences relating to use of premises, proceeds of drug sales and possession of things for drug use (93% of these offences relate to possession of a thing for drug use – of these 97% are utensils relating to cannabis use).

[6] Possessing a thing for use in the commission of a crime – 15 years; Possessing a thing for the consumption of a drug – 2 years (s.10 DMA).

Source: Queensland Criminal Code; Australian Bureau of Statistics Unpublished Data Table S23, 1990–91; Queensland Police Service Provisional statistics, 1991; Australian Federal Police figures 1991.

Broken down to age, 34.1 per cent of juvenile drug offenders brought before the court were aged less than 15, compared with 56.2 per cent of appearances for all offences before the Children's Court being for juveniles aged less than 15 (see Table 7.11).[129]

Table 7.11 – Children's Court Appearances: Offence By Age 1990–91 – Queensland (%)

	Age at Date of Appearance (Years)						
	10	11	12	13	14	15	16
All Offences	0.6	1.2	2.9	6.9	17.2	27.4	39.8
Drug Offences	0.0	0.0	0.0	0.7	4.8	28.6	61.9

Source: Australian Bureau of Statistics 1991, *Law and Order, Queensland 1990–91*, Cat. no. 4502.3, ABS, Brisbane (unpubl. data).

The profile of *recorded* juvenile drug offences is surprisingly less skewed towards possession and use type offences than adult offence profiles as shown by appearances before Magistrates and Higher courts (see Table 7.12). This probably reflects no more than the absence from the statistics of those adolescents cautioned for, in the main, possession and use offences.

Table 7.12 – Court Appearances by Profile of Drug Offences: Children's, Magistrates and Higher Courts 1990–91 – Queensland (%)

Court	Possession or Use of Drugs	Importing & Exporting Drugs	Supplying & Trafficking Drugs	Manufacturing & Growing Drugs	Other Drug Offences
Children's (n=147)	32.7	0.7	17.7	13.6	35.4
Magistrates (n=7380)	60.1	0.7	11.1	10.1	18.0
Higher (n=336)	18.5	3.0	61.0	17.0	0.6

Source: Australian Bureau of Statistics 1991, *Law and Order, Queensland, 1990–91*, Cat. no. 4502.3, ABS, Brisbane (unpubl. data).

129 Note: The *Children's Services Act 1965–1980* defines 'child' as follows;

> A Person under or apparently under the age of seventeen years:
> The term includes where necessary a person who though not under or apparently under the age of seventeen years may lawfully be dealt with by a court or has been dealt with by a court on the basis that he is a child.

So 17 and 18 year olds will generally appear before the Magistrates or Higher courts.

Table 7.13 – Children's Court Appearances – Drug Offences 1990–91 (%)

			UNCONVICTED				CONVICTED			
	Discharged/ Withdrawn	Committed for Trial	Admonished and Discharged	Committed into Care	Placed Under Supervision	Other	Committed into Care	Placed Under Supervision	Fined and/or Restit'n	Other
All Offences	3.4	2.3	51.6	8.2	17.3	0.1	7.5	1.5	7.8	0.2
Drug Offences	1.4	1.4	59.9	2.7	23.1	0.0	3.4	3.4	4.8	0.0
Possess Drugs	2.1	0.0	66.7	4.2	20.8	0.0	2.1	2.1	2.1	0.0
Import/ Export	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Supply & Traffic	0.0	0.0	50.0	7.7	23.1	0.0	7.7	3.8	7.7	0.0
Manufacture & Grow	5.0	5.0	40.0	5.0	35.0	0.0	0.0	10.0	0.0	0.0
Other Drug Offences	0.0	0.0	63.5	0.0	23.1	0.0	3.8	1.9	7.7	0.0

Source: Australian Bureau of Statistics 1991, Law and Order, Queensland, 1990–91, Cat.no. 4502.3, ABS, Brisbane (unpubl. data).

Table 7.13 details the consequences of appearances before the Children's court for all offences, for drug offences generally, and for particular categories of drug offences.

Notably, the use of the 'admonish and discharge' option is generally greater for drug offences than for offences generally. This is especially so in the case of the 'use' offences of possession of a drug, and possession of an implement (the latter making up the majority of 'other drug offences')(see Table 7.2).

Adolescents do not appear before courts for drug offences at a rate comparable to the proportion that they use cannabis. Adolescents make up 19.5 per cent of all appearances before the courts for drug offences[130] while the 14–19 year age group includes about 36 per cent of the cannabis user category.[131] Whether the inclusion of those who are merely cautioned would correct this discrepancy is not known.

A Trend to Lesser Penalties?

The Committee became aware of a widespread belief that penalties for the predominant drug offence, cannabis use, have been declining over time. Examination of the data available to the Committee would tend to indicate that this is so. The Australian Bureau of Statistics listing of court outcomes, in decreasing order of severity, is imprisonment, community service orders, probation orders, fines and bonds.

Table 7.14 shows the proportions of persons convicted of drug possession offences by outcome.

Since 1986–87, notable features are the decreasing use of the fine and imprisonment options and the steady increase in community service penalties. Table 7.14 needs to be interpreted in the light of Tables 7.15 to 7.17 following, which show a more detailed breakdown of the duration of imprisonment and community service orders and the amount of fines.

130 147 (Children's courts appearances for drug offences) + 1372 (under 17–19 year olds appearing in the Magistrates courts for drug offences) + 16 (under 18–19 year olds appearing in the Higher courts for drug offences)/7863 percent (total appearances for drug offences); Australian Bureau of Statistics 1991, *Law and Order, Queensland, 1990–1991*, Cat. no. 4502.3, ABS, Brisbane, p.13 and unpublished data on the Children's and Magistrates courts.

131 Australian sample, *NCADA Social Issues Survey 1991*, (Computer file).

Table 7.14 – Magistrates Court Outcomes – Possession and Use of Drugs 1982–91(%)

Year	Impris'd	Comm. Service	Probation	Fined	Bond	Discharged /Withdrawn *	Convicted not Punished	Higher Courts
1982–83	2.8	1.8	5.8	84.4	0.7	3.2	0.06	1.3
1983–84	3.2	1.9	7.0	82.1	0.9	3.5	0.1	1.3
1984–85	3.5	5.7	7.6	77.3	0.9	3.7	0.1	1.1
1985–86	4.4	6.2	5.9	78.4	0.5	3.0	0.04	1.6
1986–87	4.9	7.6	5.0	73.7	0.9	3.9	0.1	3.9
1987–88	4.2	8.6	4.4	74.1	0.8	3.6	0.4	3.9
1988–89	4.1	9.7	5.0	68.9	0.8	4.8	0.4	6.3
1989–90	4.6	12.3	4.3	64.5	1.1	6.5	0.3	6.4
1990–91	2.6	19.2	6.5	57.4	1.2	7.1	0.4	5.6

Note: *Drugs Misuse Act 1986* came into effect 5 September 1986; Certain penalties reduced by amendment 25 May 1990.
* Includes forfeit bail

Source: Australian Bureau of Statistics 1982–91 (unpubl. data).

In relation to fines (see Table 7.15), there appears to be a slow and slight upward trend in amounts; however, the extent to which inflation is taken into account in such decisions is not known. The proportion of prison sentences of less than one month (see Table 7.16) has more than doubled, from 9.5 to 20.8 per cent of prison sentences. There has also been a marked reduction in the number of hours sentenced in community service; in 1986–87, 40.8 per cent of orders were for 120 hours or more whereas in 1990–91, 86.3 per cent of orders were for less than 120 hours (see Table 7.17).

Table 7.15 – Magistrates Court: Amount of Fine, Drug Possession & Use (Charges) 1990–91 – Queensland (%)

	$0–$50	$50–$200	$200–$500	$500 & over
1986–87	0.001	7.5	73.7	18.8
1987–88	0	5.5	68.4	26.1
1988–89	0	4.6	69.4	26.0
1989–90	0.01	7.3	66.8	25.9
1990–91	0.1	6.1	67.7	26.1

Source: Australian Bureau of Statistics 1990–91 (unpubl. data), Table 6 – Magistrates Courts Charges Resulting in a Fine (a): Offence by Amount of Fine, Queensland.

Table 7.16 – Magistrates Court: Duration of Sentence of Imprisonment, Drug Possession & Use (Appearances) 1990–91 – Queensland (%)

	< 1 month	1 – 6 mths	6 – 9 mths	9 mths & over
1986–87	9.5	80.3	6.6	3.6
1987–88	6.5	78.5	10.8	4.3
1988–89	9.4	75.3	14.1	1.2
1989–90	18.6	67.4	9.3	4.7
1990–91	20.8	68.8	6.5	3.9

Source: Australian Bureau of Statistics 1990–91 (unpubl. data), Table 4 – Magistrates Courts Appearances Resulting in Imprisonment (a): Offence with Most Serious Outcome by Duration of Sentence, Queensland.

Table 7.17 – Magistrates Court: Duration of Community Service Order, Drug Possession & Use (Appearances) 1990–91 – Queensland (%)

	< 40 hours	40–120 hours	120–200 hours	> 200 hours
1987–88	0	59.2	21.3	19.5
1988–89	6.0	70.0	12.9	11.1
1989–90	7.2	76.9	9.0	6.9
1990–91	4.4	81.9	9.1	4.6

Source: Australian Bureau of Statistics 1990–91 (unpubl. data), Table 25 – Magistrates Courts Appearances Resulting in Community Service Orders: Offence Group by Duration of Order, Queensland.

Estimating the Cost of Drug Law Enforcement

The precise cost of drug law enforcement cannot possibly be determined on the basis of currently collected information. At present, a principal difficulty in attempting such a task is the non–collection or non–availability of information. However, even with more complete information it would have to be said that any estimate would still be the result of a large number of value judgements on what constitutes criminal justice costs and on the allocation of costing to various tasks within the criminal justice system.

One central difficulty would always be that many, if not most, criminal justice system costs are relatively fixed, in that they mainly consist of the costs of operating a police service, and courts and correctional systems. The extent to which these costs can be allocated against individual offences is currently limited and would possibly only ever be arbitrary.

Some costs are more precisely known; for instance, the expenditure involved in the operation of a specialised police drug squad was $2,499,814 in 1991–92 and $3,388,753 in 1990–91;[132] the Queensland Government Chemical Laboratory expended $878,472 in 1991–92 on the analysis of suspected drugs seized or purchased by police. Such precision is, however, rare.

A number of measures are available to apportion the cost of drug law enforcement. Although there is ample room for debate on which measure to use, the calculations in Table 7.18 are based on the following measures:

- drug offences comprise 6.3 per cent of all crime known to police;
- some 3.8 per cent of the most serious offences occasioning an appearance before the lower courts are drug offences;
- some 8.1 per cent of the most serious offences occasioning an appearance before the higher courts are drug offences; and
- on 30 June 1991, 6.7 per cent of the prison population had been convicted of drug offences.

Using such measures, the *notional* costing of criminal justice system resources devoted to drug law enforcement was $27,000,000 (see Table 7.18).

This estimate, based on taking the proportion of overall criminal justice system costs in accordance with the proportion of drug offences to overall offences, is therefore notional only. It may provide some estimates, not of precise costs, but of the order of magnitude of the costs of enforcing current criminal sanctions on drug use. Were such sanctions to be removed however, it would be unrealistic to expect 'savings' of even a small proportion of such estimates.

Table 7.18 – Notional Cost – Drug Law Enforcement 1991–92 – Queensland

Queensland Police Service	$16,000,000
Magistrates Court	$1,000,000
Higher Courts	$2,000,000
Corrections	$7,000,000
Other[133]	$1,000,000
TOTAL	**$27,000,000**

132 Arrest Returns for Queensland Police Drug Investigation Squad 1991–92, financial information.

133 Includes Government Chemical Laboratory, $848,472.

Again using a simple proportioning technique, the cannabis proportion of these offences would be 94.9 per cent, or about $25,600,000. In all likelihood, the notional cost to the criminal justice system of cannabis offences is probably substantially lower than simple apportioning would indicate, for a number of reasons. These include the routine nature of many cannabis breaches, the lower proportion of cannabis offences proceeding to higher courts and resulting in sentences of imprisonment, and the lesser degree of chemical analysis required. However, there are no measures available which could take these factors into account in any reliable manner.

The Committee did not attempt to do any accounting of social costs arising from drug law enforcement because it did not consider there was any valid basis for doing so. Some potential social costs are those of respect for the institutions of justice, the maintenance of lucrative illicit markets and any attendant organised criminal involvement, violence or corruption, the costs arising from the criminalisation of individuals, and the foregone value of other uses to which resources currently engaged in drug commerce and drug law enforcement could be put. In turn, to be kept in any sort of context, these would have to be balanced against the health, crime, productivity and social costs of drug use and abuse. Once again, there are few means by which any such costs could be estimated for illicit drugs.

PART 8 - CANNABIS MARKETS AND ENFORCEMENT EFFECTS

Illicit drug markets, and their behaviour in response to policy or enforcement variations, are very poorly understood. Until recently, little attention was given to any detailed drug market analysis; the general presumption was that illicit drug markets were like normal markets modified to a greater or lesser extent by the effects of prohibition and law enforcement. There is now much more interest, particularly in the United States, in the modelling of markets. In part, this is driven by a view that in market analysis lies the main possibility of evaluating policy and law enforcement practice, of explaining the effect (or lack of effect) of legislative or policy change and, most optimistically, in formulating effective policy.

'Supply reduction' is one designation commonly given to the intention of current policy and law enforcement practice, although in economic terms there would appear to be some intended 'demand reduction' - through prohibition - as well. In general, on the supply side of the equation, prohibition and law enforcement are intended to deter some from being suppliers and seize some of the product of those who are not deterred; reduced supply has the desired aim of reducing consumption (demand) through the dual effect of drug unavailability and higher and more unacceptable prices. On the demand side, prohibition is presumed to deter some otherwise would-be consumers and the apprehension of a proportion of consumers is presumed to reinforce such deterrent effects.

Proponents of drug or cannabis legalisation or liberalisation on the other hand focus on price effects. Prohibition, it is maintained, supports grossly inflated price levels although there is some dispute as to whether this is mainly the effect of shortages of supply over demand, of 'premiums' to cover the risk of apprehension, or of the monopolistic practices or simple greed of criminal suppliers. Demand is usually presumed to be relatively constant and, significantly, largely unresponsive to both price changes and prohibition. Law enforcement activities are said to benefit suppliers as a group by maintaining a high level of profitability, both through the maintenance of high price levels and the removal of excess competition (those individual suppliers who are apprehended).

There are currently few means, and none in which any confidence can be placed, of evaluating the effect of law enforcement on drug markets. Measures such as the amount of drug seized or destroyed or the number of arrests measure agency activity not effect. Little other information is collected: current information on drug prices for instance is too general for any meaningful application.

In consequence, the nature and operation of illicit drug markets is little understood. In relation to cannabis in particular, the market problem is to provide some explanation of how a commodity which is readily and inexpensively produced maintains an inordinate price level - by the ounce, the minimally processed clippings of what is essentially a weed are priced in the same general range as gold.

Australian consumer cannabis prices are also very high by developed world standards - estimates contained in this discussion paper have been calculated on a *conservative* price of $250 an ounce whereas the Committee was quoted less than $100 an ounce as an

average United States price and European prices are at fairly similar levels.[134] It would also appear that since the 1970s the price of retail cannabis in Australia has inflated to the extent of about 1,000 per cent.

The most sophisticated analysis of drug markets known to the Committee is that of United States drug researcher Mark Kleiman, who distinguished four theoretical models of 'drug enforcement effectiveness':

Drug removal model

Enforcement removes drugs from supply, thereby reducing the quantity available to fulfil demand; price increases and consumption decreases. Kleiman considered that this model depended on an assumption that there was limited capacity to supply; while this may happen in a temporary and most often strictly localised sense, in the long run and in the overall sense cannabis production and supply capacity is in considerable excess.

Through-put capacity reduction model

Enforcement limits the capacity of the cannabis production and distribution system by apprehending and removing significant participants, by adding to transaction costs (increased distrust and risk) and by confiscating 'working capital' in the form of drugs and money. Kleiman considered that this model also required a notion of limited cannabis supply capacity even though of more limited duration. In the United States, drug availability surveys showed little such effect.

Risks and prices model

Cannabis consumption is determined by costs of bringing it to market and price consumers are willing to pay. The number of suppliers will be determined by the number who can make greater profits in cannabis than elsewhere. Law enforcement imposes additional and considerable costs in bringing cannabis to market and acts in the same manner as a 'tax' in relation to consumption with the critical factor being the price elasticity of cannabis (the extent to which consumption is linked to price). The advantage of this model is that approximate calculations can be made for the effect of the 'tax', its effect on the price and the effect on consumption. Kleiman considers that this theory, although superior, has one fundamental defect – predictively, the price of cannabis should have been 'competed down' to a far lower level than it actually stands at.

134 Telephone communication, Peter Reuter, Co-Director Drug Policy Research Centre, Rand Corporation, Washington DC.

Learning–curve model[135]

Under this model, there are two sources of supply:

– 'experienced' (low cost)[136] suppliers whose capacity in the short term is relatively fixed and;

– 'inexperienced' (high cost) suppliers whose 'costs' are the basic determinant of the price.

Accordingly, as long as demand exceeds the capacity of experienced suppliers to fulfil, price can never be competed below the 'costs' of inexperienced suppliers and experienced suppliers make superior profits.

The effect of law enforcement is complex under this model and in part depends on the mix of high and low cost suppliers. If the effect of law enforcement is mainly felt by 'inexperienced' suppliers, their costs, the cannabis price and the profits of experienced suppliers will be increased. Enforcement against experienced suppliers however increases their costs and reduces their profits but does not affect supply and price. If the 'experienced' suppliers supply all or most of the market, then enforcement acts in the same manner as under the risks and prices model; however, under these conditions price is most likely to decline due to competition between low cost suppliers.

In the long term, price and market behaviour depends on the balance between the creation and destruction of low cost capacity.

Kleiman considers that although this model provides the best explanation of the observable workings of drug markets, its use in terms of being a quantifiable predictor is limited by a lack of currently collected (or collectable) data.[137]

If, as Kleiman considers, the learning–curve model provides the best explanation for the operation of drug markets, then the implications for law enforcement strategy are significant. Under certain conditions – price maintained by the 'costs' of inexperienced suppliers – then supply side law enforcement strategies designed to reduce consumption (abuse) increase returns to established suppliers and strategies intended to tackle this most entrenched criminality have no effect on consumption (abuse). Moreover, strategies focused on criminality create the conditions for its most profitable continuation (maintenance of price and profitability through removal of low cost capacity).

The effect of prohibition and law enforcement activity against consumers on levels of cannabis usage is harder to assess; while decriminalisation, de facto or otherwise, does not appear to produce any dramatic increase in cannabis use the same is not necessarily true of the absence of any restriction. This is an area where there is no comparative data, as there are no jurisdictions where cannabis use and commerce is totally unrestrained.

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135 See Appendix B for a fuller representation of the effects of this theoretical model.

136 'Cost' in this sense is the cost of production and supply to market *not* the price at which cannabis is delivered to market. The major component of cost (decreasing with experience) is 'transaction cost'; the costs of dealing with associates who can be trusted are much less than those of dealing with unknown associates who may be violent, steal or be law enforcement agents or informants.

137 Kleiman, M.A.R. 1989, *Marijuana: Costs of Abuse, Costs of Control*, Greenwood Press, Connecticut, pp. 51–66.

The two critical factors in any assessment of the demand-side effect of law enforcement policies are the price elasticity of cannabis – the extent to which price movements change consumption levels – and the substitution effects of cannabis price changes – the degree to which cannabis price increases or unavailability cause increased consumption of other drugs. The two effects are inter-related.

Although for many substances i.e. tobacco or petrol, price elasticity can be expressed as a ratio or number, this is not possible for cannabis. A speculative calculation based on comparison between tobacco and cannabis by Kleiman in the United States estimated that a doubling of enforcement (as measured by outputs) would lead to a 13 per cent increase in the price of retail cannabis which would in turn lead to a five per cent decrease in raw cannabis consumption.

However, this would not necessarily translate to a five per cent decrease in cannabis intoxication – other possibilities include a switch to higher potency cannabis and to more efficient modes of ingesting THC.

Price elasticity is usually linked to a particular level of price *per dose* which in the United States is comparable to that of tobacco. In Queensland, cannabis price and presumably the price per dose is somewhat higher than in the United States; the price elasticity is therefore not necessarily equivalent.

The related substitution effects are also not known with any precision and it is possible also that these vary for different groups of cannabis users. Very recent ongoing studies in the United States are raising the possibility of an inverse relationship between cannabis and alcohol consumption among adolescents. This may, it has been suggested, have significant implications – in that the social and individual harm resulting from inappropriate alcohol use by adolescents may well be greater than that resulting from any illegal cannabis use.[138] Another consideration that relates to the question of overall social harm is the extent to which cannabis substitutes for other illicit drugs. The extent of substitution for drugs commonly injected has become a more prominent concern since the emergence of the AIDS problem. A survey conducted in connection with the Australian National AIDS and Injecting Drug Use Study suggested that if cannabis were easier to obtain in Brisbane 89.1 per cent of intravenous drug users claimed they would use intravenous drugs (mainly heroin, amphetamines) less and 2.5 per cent said they would use intravenous drugs more. (8.5 per cent said they did not currently use cannabis.)[139] While this may be an indication of substitution effects, such a finding would need to be treated with caution for two reasons: first, respondents were not given an option of saying increased cannabis availability would make no difference to their intravenous drug use; second, cannabis is, as far as is known, most usually readily available (although the availability of *inexpensive* cannabis apparently follows a seasonal pattern as is the case with many agricultural products).

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138 Cited by Peter Reuter, Co-director Drug Policy Research Centre, Rand Corporation, Washington DC.

139 Australian National AIDS and Injecting Drug Use Study, *National Report 1989*, pp. 95-96.

The final consideration on demand effects is that for any individual cannabis user, risks of apprehension are relatively low. While the number of drug offences of which police become aware is known, there is no such absolute certainty about the number of offenders. An estimate, sufficient for the purpose, would be that cannabis use type offences are the *most serious* reason for the apprehension of about 5,470 persons a year, out of a total of about 7,520 whose *most serious* reason for apprehension is a drug offence.[140] Assuming that the proportion arrested more than once in a year is insignificant and using a base the extrapolation from survey findings that 238,900 Queenslanders currently use cannabis in a year, the apprehension rate for persons is about 2.3 per cent. Given that the great majority use cannabis more than once a year – indeed a sizeable proportion use daily – the apprehension rate *per cannabis use offence* is infinitesimal. The question arising here is what rate of apprehension would deter consumption?

However, there are complicating factors. As shown in Part 7 of this discussion paper, apprehension rates vary considerably for various occupational groupings and many offenders are re–offenders. This raises other possibilities – are there some for whom the risks of apprehension are quite significant but who are not thereby deterred and is this balanced by others for whom the risks of apprehension are virtually non–existent?

140 Calculation performed on the basis of lower court appearances, Australian Bureau of Statistics 1990–91 (unpubl. data). (4,433 possession/use magistrate's court appearances x 93% cannabis proportion) + (48 possession/use childrens court appearances x 93%) + (1,381 other drug offence magistrate's court appearances x 91% cannabis utensil proportion) + (52 childrens court appearances x 91%) = 4,123 + 45 + 1,257 + 47 = 5,472. Total drug offence appearances = 7,380 magistrates court appearances + 147 childrens courts = 7,527.

PART 9 - ISSUES TO BE ADDRESSED

The issuing of this discussion paper marks the beginning of a three month period during which the Committee will receive and consider submissions.

Submissions should be addressed to the Secretary, Advisory Committee on Illicit Drugs, PO Box 137, Brisbane Albert Street, Qld, 4002 by 20 September 1993.

Submissions should, where possible, include references to or attachments containing any source material on which they are based.

Within the limitations imposed by its resources, the Committee will provide information from its research to persons or organisations compiling submissions. The Committee may also contact the writers of some submissions seeking additional detail.

While the Committee has no wish to place any limitations on the content of submissions, it would greatly assist if submissions specifically addressed the issues set out below.

1. General Issues

1.1 *What criteria should be used in determining whether a drug should be declared an illicit drug?*

1.2 *What should be the aim of policy on illicit drugs generally?*

Australian legislation on illicit drugs is the consequence of a series of international conventions, basically determined in the period 1911-31 but reaffirmed as recently as 1988. These conventions oblige parties to them to prohibit and enforce prohibitions on the use or non-medical use of a range of drugs and also to prohibit and enforce prohibitions on production and commerce in these drugs. This is generally known as the *prohibition* model; the policy implication is the use of law enforcement options to eradicate illicit drug use.

A related aim of policy might be the *minimisation of illicit drug use.* Proponents of drug use minimisation maintain that prohibition and the enforcement of prohibitions do not eliminate illicit drug use and it would be more realistic to seek to reduce illicit drug use to an attainable and acceptable level. This may include the utilisation of policy measures other than enforcement such as treatment and drug education. The goal of enforcement is also more explicitly spelt out in terms of reducing the supply of illicit drugs.

A competing contention holds that the aim of policy should be to prevent or ameliorate the abuse of drugs to the detriment of either the individual or the community. This may be called the model of *drug abuse prevention.* Law enforcement may be one measure flowing from such a policy aim but considerable emphasis is also given to such measures as treatment and drug education.

Although the aims of existing drug policy are rarely spelt out in legislation, most jurisdictions comparable to Australia in effect operate under some combination of *prohibition*, *drug use minimisation* and *drug abuse prevention* measures.

More recently, a further model has gained a considerable following – it maintains that the proper aim of policy should be the *minimisation of drug-related harm*. Proponents of this model argue that account must be taken, not only of the harm that results from the use of drugs but also of any harm resulting from drug policy or law enforcement. In Australia, the Ministerial Council on Drug Strategy and the National Campaign Against Drug Abuse have endorsed a policy of minimisation of drug related harm; internationally, drug related harm minimisation is the rationale for drug policy in the Netherlands. Although these measures can include legislative amendment such as partial decriminalisation, they can also take the form of changes in enforcement practice for certain categories of offence.

What should be the goal of illicit drug policy in Queensland?

- *Prohibition?*
- *Minimisation of illicit drug use?*
- *Drug abuse prevention?*
- *Minimisation of drug related harm?*
- *Some other goal?*
- *Some combination of goals?*

1.3 ***To what extent should there be different policy goals for licit and illicit drugs?***

1.4 ***Are existing means of evaluating the effect of illicit drug policy adequate and, if not, what means should be adopted?***

Despite general government acceptance of the appropriateness of the existing policies with respect to illicit drugs, the effect of policy is largely unassessed. What measures do exist are largely counts of numbers of persons apprehended or in treatment. Possibly more useful are population surveys of drug use patterns and attitudes to drug use but these are a relatively recent development.

When goals for drug policy are clearly articulated it then becomes possible to evaluate the effect of policy measures in meeting these goals.

If drug policy goals can be clearly articulated, how, specifically, should policy measures be evaluated?

1.5 ***In terms of effect upon individuals which drugs, licit or illicit, are of greatest concern and why? Which are of least concern and why?***

1.6 ***In terms of their impact upon society which drugs, licit or illicit, are of greatest concern and why? Which are of least concern and why?***

Should drug offences and penalties be related in any way to their (perceived) potential for individual or social harm? If so, by what specific means could such a relationship be established?

2. Cannabis Policy and Legislation

2.1 ***What should be the goal of policy in relation to cannabis? (See 1.2)***

Is there any basis for examining the position of cannabis in isolation from other licit or illicit drugs?

2.2 ***Should the current legislative classification of cannabis be altered, and if so, how?***

Cannabis is legally classified as a '*dangerous drug*' under the Drugs Misuse Act.[141] Like most other nominated drugs, cannabis is a second schedule drug under the Act, the only first schedule drugs being heroin, cocaine, phencyclidine and lysergide.

2.3 ***Should the penalty structure in relation to cannabis, or some cannabis related offences, be altered? Should some offences be decriminalised?***

In broad terms, penalties for second schedule drugs are determined on the basis of the quantity involved, which is specified in the third schedule. Maximum statutory penalties for the various offences are as follows:

Possessing cannabis (use): more than 500 grams, or if the drug consists of plants and their total weight is less than 500 grams, 100 plants – *20 years imprisonment.*[142]

less than above amount – *15 years imprisonment.*[143]

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141 *Drugs Misuse Act 1986*, section 4.

142 *Drugs Misuse Act 1986*, section 9(c).

143 *Drugs Misuse Act 1986*, section 9(d); this crime may be dealt with summarily (i.e. in a magistrates court) in which case the maximum penalty will be two years imprisonment (section 13).

Possessing things: for use, or used, in connection with a crime – *15 years imprisonment.*[144]

for use, or used, in connection with administration, consumption or smoking of cannabis – *2 years imprisonment.*[145]

Supplying cannabis: Supply to an unknowing person, a minor, persons within educational or correctional institutions or the intellectually handicapped – *20 years imprisonment.*[146]

other cases of supply – *15 years imprisonment.*[147]

Producing cannabis: if the quantity exceeds 500 grams, or 100 plants, or plants with an aggregate weight in excess of 500 grams – *20 years imprisonment.*[148]

other cases of producing a dangerous drug – *15 years imprisonment.*[149]

Trafficking in cannabis: *20 years imprisonment.*[150]

Permitting Use of Place: a person who occupies or is in management or control of a place and permits it to be used for the consumption, supply, trafficking or production of cannabis – *15 years imprisonment.*[151]

Any of the above offences for which there is a maximum 15 year penalty may be dealt with summarily (before a magistrate), in which case the penalties are limited to two years imprisonment. In general, penalties imposed and served fall well short of the maximum penalties; as much as possible actual sentencing practice is detailed in Part 7 of this discussion paper.

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144 *Drugs Misuse Act 1986*, section 10(1); this crime may be dealt with summarily (i.e. in a magistrates court) in which case the maximum penalty will be two years imprisonment (section 13).

145 *Drugs Misuse Act 1986*, section 10(2).

146 *Drugs Misuse Act 1986*, section 6(1)(c).

147 *Drugs Misuse Act 1986*, section 6(1)(d); this crime may be dealt with summarily (i.e. in a magistrates court), in which case the person is liable to imprisonment for 2 years (section 13).

148 *Drugs Misuse Act 1986*, section 8(d).

149 *Drugs Misuse Act 1986*, section 8(e); this crime may be dealt with summarily (i.e. in a magistrates court), in which case the penalty will be two years imprisonment (section 13).

150 *Drugs Misuse Act 1986*, section 5(1)(b).

151 *Drugs Misuse Act 1986*, section 11; this crime may be dealt with summarily (i.e. in a magistrates court), in which case the maximum penalty will be two years imprisonment (section 13).

2.4 ***Should a system of mandatory penalties for serious or large scale drug offences be re-introduced into Queensland? If so, for which offences and/or for which drugs, and at what scale of penalties?***

2.5 ***Should cannabis offences have any fixed equivalence to any other non-drug criminal offences? If so, to which offence(s).***

Under the current criminal law, most cannabis offences (i.e. those with a 15 year maximum penalty) are more seriously viewed than judicial corruption, attempt to commit rape, grievous bodily harm, robbery, housebreaking and burglary, receiving, procuring a minor for prostitution, procuring abortion or perjury (all 14 years).

When resolved before a magistrate, cannabis offences (maximum two years penalty) are viewed in a similar light to indecent acts, obscene publications and exhibitions, cheating, and harbouring escaped prisoners.

When the resolution of cases before the Magistrates Court is compared, the nearest equivalence for drug possession and use offences is minor assault. (Part 7 of this discussion paper.)

2.6 ***Should the possession or sale of cannabis paraphernalia remain an offence? If not, how specifically should current legislative provisions be amended?***

Queensland is one of few jurisdictions to retain such an offence. Although medical and scientific opinion is not unanimous on this point, the use of water pipes (the basis of the largest proportion of such offences) may reduce the potential for bronchial damage from the smoking of cannabis by cooling the smoke and, additionally, through precipitation of some particulate matter. (N.B. The smoking of any substance, by any means, has the potential to cause bronchial damage.)

2.7 ***Should Queensland institute a cannabis eradication program? What should the parameters of any such program be and how should it be funded?***

Some jurisdictions, including the United States and New South Wales, have what are known as cannabis eradication programs where systematic attempts are made to locate cannabis crops during the growing season through aerial searches. These crops are then either chemically sprayed or destroyed by ground parties.

3. Cannabis Use

3.1 ***Is there an appropriate level of cannabis use in society and if so, at what level should cannabis use be tolerated?***

3.2 ***What social harms arise from cannabis use at current levels? What additional social harm would arise from any increased level of cannabis use?***

3.3 ***Do any social benefits arise from the use of cannabis?***

3.4 ***To what extent does harm outweigh benefit, or vice versa?***

3.5 ***If medical uses are established for cannabis, should these be permitted?***

Although cannabis is an ancient remedy, more medical uses are claimed than have been established or accepted by the medical community generally for cannabis. Currently, chemical preparations of THC are used in some jurisdictions in tablet form for management of nausea and other cancer treatment side-effects, or in eye-dropper form in the treatment of glaucoma.

3.6 ***Should cannabis cultivation for the purpose of fibre production (i.e. for paper manufacture) be permitted?***

For most of history, cannabis (hemp) has been used in the production of fibre for the making of paper, card, rope and cloth. Use generally ceased in the early part of this century, mainly due to increased use of substitute fibre materials. In recent decades, there has been increased use of cannabis (hemp) in fibre and paper production, particularly in Europe, although in terms of the overall fibre sources, hemp production remains at a very small scale. Proponents maintain that, in relation to papermaking, cannabis (hemp) has the potential to provide more fibre, more rapidly and with less environmental cost, than the principal current fibre source, conifers.

Through the selection of varieties and cultivation practices, the cannabis plant can be grown to maximise either its fibre or intoxicant content.[152] A trial cannabis (hemp) planting for paper production is currently underway in Tasmania.

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152 The key factor may be the distance between plants; although lower THC varieties occur naturally or as the result of breeding, dense plantings of hemp naturally give a high proportion of stalk (fibre) to leaf (THC).

4. Cannabis Law Enforcement

4.1 ***What are the proper goals of law enforcement in relation to the regulation of cannabis use, supply and production?***

4.2 ***By what specific law enforcement measures should these goals be met?***

4.3 ***How should law enforcement measures in relation to cannabis be evaluated?***

4.4 ***What social benefits arise from current law enforcement practice in relation to cannabis?***

4.5 ***What social costs or harm arise from current law enforcement practice?***

4.6 ***Do benefits outweigh costs or vice versa? Would this balance be affected by any amendment(s) to law enforcement practice and if so, by what amendment(s) and by what means?***

4.7 ***What significance should be attached to current inequities in the impact of enforcement? Should these be ameliorated and if so, by what specific measures?***

Part 7 of this report detailed the discrepancies between cannabis use and apprehension rates for occupational groups. In general, lower socio–economic groupings are apprehended at a much higher rate than the rate at which they use cannabis, for higher socio–economic groupings, the apprehension rate is much less than the use rate. (N.B. There are no grounds known to this committee for ascribing this enforcement effect to any discriminatory intent in legislation or on the part of any law enforcement agency.)

4.8 ***Where should the main burden of law enforcement fall?***

4.9 ***Should on the spot fines or any similar scheme be used in relation to any classes of cannabis related offence? If so, how, specifically, should this be instituted? What specific measures should be used and what techniques adopted in the evaluation of any such scheme? Should any such system in relation to some offences be accompanied with any specific action in relation to other offences?***

In Australia, such schemes are known as 'expiation notice schemes' and have been adopted in South Australia (1987) and the Australian Capital Territory (1992). In South Australia payment of the 'expiation fee' within a 60 day period means that no criminal offence is recorded. The scale of offences that can be expiated in South Australia and the penalties applicable are as follows:

Possession of cannabis:

– less than 25 grams	$50
– 25 to less than 100 grams	$150

Possession of cannabis resin:

– less than 5 grams	$50
– 5 to less than 20 grams	$150

Smoking or consumption of cannabis or cannabis resin in a private place:	$50
Possession of equipment for smoking or consumption of cannabis or cannabis resin:	$50
– with other offence	$10

Cultivation of cannabis plants

– 10 plants or less (in 'non–commercial' circumstances)	$150

4.10 ***Should imprisonment remain a sentencing option for all classes of cannabis offences? If not, for which specific offences should imprisonment be an option and for which should it not be an option?***

5. Cannabis and Drug Education

Drug education and health promotional campaigns have been an element of drug control strategies for many years. For the past decade, the National Campaign Against Drug Abuse has provided an umbrella to the campaigns of government, semi–government and private organisations.

5.1 ***Should there be specific drug education or more general health promotional campaigns which include drug related issues?***

5.2 ***Should there be specific campaigns in relation to illicit drugs or should educational and promotional campaigns focus on drug issues generally?***

5.3 ***Should there be specific campaigns in relation to cannabis, or should cannabis be referred to in the context of illicit drugs, drugs generally, or health promotion generally? (If specific campaigns in relation to cannabis are preferred, what should be the content of such campaigns? [in general terms].)***

5.4 ***By what specific means should the effect of cannabis, drug education and health promotional campaigns be assessed?***

The principal means by which the National Campaign Against Drug Abuse has been assessed is through household surveys conducted every three years on drug use, attitudes to drug use and the perceived impact of the campaign. In addition to information in relation to campaign evaluation these surveys have produced the first large, nationwide, comparable data series for drug research.

A number of States also conduct more detailed surveys of drug use and attitudes among high school seniors, and this is also a source of much data for drug research.

5.5 ***What is an appropriate level of resourcing to be allocated to drug campaigns/health promotional campaigns? If not currently allocated, from what areas should the necessary resources be diverted?***

APPENDICES

APPENDIX A

A Critical Review of the Research Literature Concerning Some Biological and Psychological Effects of Cannabis

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Introduction

An electronic search of the published research literature through computerised on-line services, such as DIALOG Information Services, reveals that since the mid 1960's over 4000 papers, monographs and books on medical, psychological and social aspects of cannabis use and abuse have been published.[1] These studies cut across a wide range of disciplines including: the potential teratogenicity of Δ-9-tetrahydrocannabinol and related compounds (Cohen, 1986; Fried, 1989; Fried and O'Connell, 1987; Hill and Tennyson, 1986; Stern, 1981; Qazi, Mariano, Milman, Beller and Crombleholme, 1985); histopathology and functional occlusion of the pulmonary system (Henderson, Tennant and Guerry 1972; Tashkin, Shapiro, Ramanna, Taplin, Lee, and Harper, 1976; Tashkin, Shapiro, Lee, and Harper, 1976; Tennant, Guerry, and Henderson, 1980); cardiovascular changes (Aronow and Cassidy, 1974; Benowitz and Jones, 1975; Stimmel, 1979); possible permanent neurological effects (Campbell, Evans, Thomson, and Williams, 1971; Co, Goodwin, Gado, Mikhael, and Hill, 1977; Feinberg, Jones, Walker, Cavness, and Floyd, 1976; Fried, 1989; Grant, Rochford, Fleming, and Stunkard, 1973; Grant, Rochford, Fleming, and Stunkard, 1973; Hannerz and Hindmarsh, 1983; Heath, 1972; Heath, 1973; Heath, Fitzjarrell, Garey, and Myers, 1979; Kuehnle, Mendelson, Davis, and New, 1977; Tassinari, Amrosetto, Peraita-Adrados, and Gastaut, 1976); the likelihood of the existence of a psychological complex of behaviours and attitudes collectively referred to as the 'amotivational syndrome' (Creason and Goldman 1981; McGlothlin and West, 1968; Smith, 1968; Weller, 1985); the possible effects on learning and behaviour (*DSM-III-R*; Fabian and Fishkin, 1981; Fried, 1977; Johnston, O'Malley, and Bachman, 1986; Jones, 1975, 1980; Kolansky and Moore, 1971; McBay, 1986; Mullins, Vitola, and Abellera, 1974; Weller, 1985); and the possibility of a relationship between cannabis use and major psychiatric disorders (*DSM-III-R*, 1987; Andreasson, Allebeck, and Rydberg, 1989; Imade and Ebie, 1991; Lavik and Onstad, 1986; Meyer, 1975; Negrete, Knapp, Douglas, and Smith, 1986; Thacore and Shukla, 1976; Thornicroft, 1990; Tunving, 1985). Amongst these papers are a number of fairly thorough review articles and books which attempt an overview of most areas of cannabis research (Cohen, 1986; Hollister, 1988; Jones, 1980; Nahas, 1984; Nahas and Latour, 1992; Petersen, 1980).

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1 Searches were conducted in two data bases: Medline (Index Medicus) and PsychInfo (Psychological Abstracts). The following inclusive 'or' statement was searched: MARIJUANA OR THC OR CANNABIS OR TETRAHYDROCANNABINOL. Medline produced 2253 'hits' and PsychInfo 1935. One can assume that there is some overlap, hence the approximation of over 4000.

Although the total volume of this literature is somewhat daunting at first glance, a sampling of the material soon reveals that much is repetitive and a relatively small number of papers are continually referred to by most authors. Therefore, this review will concentrate on a selective group of these articles (90+), which represent the core of this research, but in doing so, we proceed with a high degree of confidence in the representative nature of those papers chosen for review and critique. Nonetheless, no review can be assumed to be free of bias and this one is no exception. The quality of much of this literature reviewed, however, is confounded by the political and social debate surrounding illicit drug use in general and cannabis in particular. There seems to be few neutral parties in the debate and some reports barely hide the prejudices which drive for particular conclusions, no matter what the empirical data appears to indicate.

In commenting on the problems of research into the effects of cannabis on humans Jones (1980) states:

> This large and rapidly growing literature demonstrates that all relevant information on all effects of cannabis will probably never be available. Because of the nature of science, usually facts change as experience accumulates. As more people use any drug for more time, as analytic instruments become more sensitive, and as researchers ask more focused questions, new facts appear and the significance of older facts is continually revised (pp. 54–55).

And, we might add, the interpretation of these 'scientific facts' appears to change with the changing political climate.

Of course, this growth of knowledge and evolving interpretation of the empirical data can be seen in the alcohol and cigarette literature as well. Like these two licit drugs, the effects of cannabis must be taken in relation to its frequency of usage and hence dose rate. Thus, it is still an issue of debate whether the moderate use of alcohol, as claimed by some, is beneficial to cardiovascular health. However, there is little disagreement that intense, prolonged use of alcohol is deleterious to both physical and psychological well being. In the case of cannabis, on the other hand, no one appears to be able to define what constitutes heavy use and in field research of illicit users the results become highly uncertain because of the inability of scientists to ascertain actual dose rates and hence life–time intake of cannabinoids. This is due to the wide range of concentrations of THC and related compounds in smoked marijuana and differences of smoking habits from one individual to another. A 'fifth' of single–malt whisky at a given percent strength is a very precise amount of ethyl alcohol, but a kilogram of marijuana can vary widely in its content of bioactive and psychoactive compounds.

Further, when reading the scientific literature on the effects of cannabis, it is important to put the emerging evidence into perspective. Very often statements are made about the effects of its use which, when taken out of context, appear to be somewhat exaggerated in their supposed effect on human health. For example, infant birth weight is considered an important indicator of later rates of cognitive and psychological maturation and thus taken to be a significant risk–factor in the use of any drug by pregnant women. Some studies relate cannabis usage to reduced birth weight, but neglect to put this finding in the context of other, more commonly used substances such as tobacco, which cause even greater effects on birth weights of the infants of using mothers (Hill and Tennyson, 1986; Fried and O'Connell, 1987).

Behavioural studies also have attempted to address the issue of the relative effect of cannabis, as compared to other licit drugs such as alcohol, in performance tasks – particularly for its effect on driving an automobile. One of the more recent of these studies by Chesher *et. al.* (1985) concludes that 'duration of impairment produced by all three drugs (cannabis was taken in two ways) at the doses used was very similar' (p. 624). A report issued in February, 1990 by the United States National Transportation Safety Board indicated that 12.8% of those involved in fatal truck accidents showed signs of cannabis ingestion in post mortem examination (cited in Nahas and Latour, 1992, p. 496). However, these published rates are usually confounded by multiple use of psychoactive substances in the majority of cases, particularly alcohol, which is believed to increase the deleterious effects on behaviour and judgement induced by cannabis alone. However, in an earlier and larger study drivers using cannabis *only* were involved in only 2.2% of recorded fatal accidents and Hollister (1988) concludes from the data that 'at present, THC plays a relatively minor role in fatal traffic accidents as compared with alcohol' (p. 113). Apart from the direct neuropsychological effects of both drugs, the problems caused by alcohol and cannabis in relation to motor vehicle accidents, in particular, are more due to the methods and circumstances of their use by a minority of individuals rather than the fact that these substances both cause, in the main, reversible perceptuo–motor deficits.

As indicated in the opening remarks, this review of the effects of cannabis on humans will not attempt to be exhaustive and will be divided into two broad categories – physiological and psychological. The physiological classification will include discussions of effects on the cardio–pulmonary system, teratogenicity and the central nervous system. The psychological grouping, on the other hand, will discuss the relationship of cannabis use to social adjustment, driving behaviour, toxic psychoses and schizophrenia. Of course, the psychological and neurological are inextricably intertwined, but for heuristic purposes they will be kept separate, being cross–referenced only where necessary.

Physiological

Since most cannabis users smoke either marijuana or hashish, it is reasonable to examine the effect of smoking cannabis on the occurrence of lung disease. Nahas (1984) reminds us that smoking cannabis releases plant constituents such as tars, carbon monoxide, acids, aldehydes, pyrobenzenes and particulate irritant substances, so any toxilogical or pharmacological studies must consider these by–products of smoking in addition to the Δ–9–THC content of the smoke, especially in the case of chronic use. The reader should also take note that many reporters on the effects of cannabis ingestion do not always make clear conceptual discriminations between the effects of smoke by–products (which are very similar to tobacco except for the presence or absence of nicotine or THC) and those specifically related to the pharmacology of THC. Of course, users primarily smoke cannabis, but it can also be ingested orally giving similar psychoactive effects. Thus, any reasonable discussion of the physiological effects of cannabis must take into account that it is illegally used primarily for its psychoactive properties and if THC were to be provided in an easily ingested rapid acting oral form, the problems due to smoking could be obviated.

When taken, Δ–9–tetrahydrocannabinol rapidly disappears from the blood plasma and is taken up in fat where it remains with a half life decay rate of 5–7 days. This means that after a single dose of THC, less than 1% of the primary active ingredient remains in fatty tissue after approximately 35–50 days (Nahas, 1984). THC's oil solubility and thus high affinity for fatty

tissue probably accounts for its attraction to neural tissue with its high lipid content in myelin and other components of the neurone. Herkenham *et. al.* (1990) used quantitative autoradiography to map the distribution of THC in mammalian brains in which they demonstrated that:

> ... in all species very dense binding was found in the globus pallidus, substantia nigra pars reticulata (SNr), and the molecular layers of the cerebellum and hippocampal dentate gyrus. Dense binding was also found in the cerebral cortex, other parts of the hippocampal formation, and striatum. In rat, rhesus monkey, and human, the SNr contained the highest level of binding. Neocortex in all species had moderate binding across fields, with peaks in superficial and deep layers. Very low and homogeneous binding characterised the thalamus and most of the brainstem, including all of the monoamine-containing cell groups, reticular formation, primary sensory, visceromotor and cranial motor nuclei, and the area postrema. The exceptions—hypothalamus, basal amygdala, central gray, nucleus of the solitary tract, and laminae I–III and X of the spinal cord—showed slightly higher but still sparse binding (p. 1935).

They conclude that the structure activity profile defined by the binding of the THC analogue used in the study is consistent with 'the same receptor that mediates all of the behavioural and pharmacological effects of cannabinoids, ...including the subjective experience termed the human 'high" (Herkenham *et. al.*, 1990, p. 1935). These binding sites are also consistent with THC's effects on loosening of associations, fragmentation of thought and short–term memory deficits. Further, dense bindings found in the basal ganglia and cerebellum suggest a role for cannabinoids in effecting motor control while involvement with the ventromedial striatum suggests connections to dopamine circuits. However, the expected reinforcing properties usually associated with these dopamine pathways is difficult to demonstrate in the case of THC.

There are over 60 other cannabinoids and cannabidiols present in cannabis smoke, most of which have very little psychoactivity and do not bind to these same sites. The effect of these substances is largely unknown, nor is the level of psychoactivity for any THC remaining in fatty tissue on the days subsequent to the original ingestion known. Although, in the case of light to moderate cannabis users, THC can be detected in body fluids for approximately 30 days after the last consumption, it is quite difficult to detect perceptuo–motor effects this long after a given average single dose (1–3 mg THC in cannabis to be smoked). This is unlike alcohol where a clear dose/response curve is demonstrable in which effects of ethanol on behaviour and judgement can be demonstrated at blood levels below 0.05%. In their comparative study Chesher *et. al.* (1985) have estimated that a dose of cannabis originally containing 1 to 2 mg THC produced a decrement in performance on a battery of psychological tests which was approximately the same as that produced by alcohol at a concentration of 0.05% (at peak) (p. 627).

The results of this last study suggest that many of the behavioural studies to be examined later in this paper may be seriously flawed. The high dose rates of the typical chronic cannabis user recruited for these behavioural studies, when taken in the context of the relatively long half–life of THC, suggest that behavioural and psychological tests conducted on chronic users who are supposedly no longer using cannabis are, in fact, being carried out on individuals still highly intoxicated. If, as Chesher *et. al.* (1985) suggest, the ingestion of 1–2 mg of THC to be smoked is the equivalent, in a behavioural sense, of achieving a 0.05% blood alcohol, then typical dose rates of 150 mg per day (to be smoked) are the intoxication equivalent of drinking more than fifteen 10 oz schooners of standard beer per hour. Cannabis users at this level of consumption will still have very significant accumulations of THC in their fatty tissue, and hence a serum equivalent of more than 0.05% blood alcohol, several

weeks after their last ingestion of cannabis. Thus, any studies conducted to examine the permanent effects of THC on behaviour for heavy cannabis users must be sure that their subject sample has not used any cannabis whatsoever for several months prior to examination.

Pulmonary Effects

There have been a number of anecdotal reports and uncontrolled clinical observations which link cannabis smoking to the risk of pulmonary pathology (Cohen, 1986). However, this evidence is much less conclusive than a controlled study of lung function tests carried out by Tashkin and colleagues (1980) in which 74 habitual cannabis smokers were compared to non-users. The results indicated no substantive difference between users and non-users but Cohen (1986) criticises these results as being skewed by the fact that all the participants were initially screened and those showing any respiratory pathology were removed from the study. In addition, Tashkin *et. al.'s* (1980) findings somewhat contradict their earlier (1976) report in which they conclude that very heavy marijuana smoking for 6 to 8 weeks appears to cause mild but significant airway obstruction.

Earlier studies of U.S. servicemen hashish smokers conducted by Henderson and Tennant (1972), however, make a more damaging case against cannabis in relation to lung disorders. These researchers found frequent and severe nose and throat inflammation often accompanied by X-ray findings which included sinusitis and lower airway diseases such as bronchitis and asthma. As part of these studies patients with chronic cough were subjected to bronchoscopy and biopsy of the epithelial lining of the posterior wall of the trachea. Microscopic examination of the biopsy samples revealed a number of cellular abnormalities which are associated with the later development of lung cancer and chronic obstructive pulmonary disease. These include the loss of cilia, basal epithelial cell proliferation and proliferation of atypical cells.

The authors acknowledge that most of these men smoked tobacco along with hashish, but insist that the development of the abnormalities observed significantly pre-dates their usual appearance in those who are tobacco smokers only. The problem with ascribing these pathological changes to cannabis alone is obvious. The later attempts of Tennant and associates to disconfound tobacco effects from those of cannabis tended to show that either smoking tobacco alone or use of hashish on its own is less deleterious than combining the two (Tennant, Guerry, and Henderson, 1980). However, the sample size used in this later study was much too small to allow any clear-cut conclusions to be drawn. Cohen summarises these findings.

Although not a single case of lung cancer has yet been attributed to chronic marijuana smoking in the U.S., the possibility cannot be ignored that chronic, heavy marijuana smoking, like chronic tobacco smoking, may be a risk factor for the development of lung cancer and that the risks of developing lung cancer as the result of combined marijuana and tobacco smoking could be additive or even synergistic (parentheses mine) (Cohen, 1986, p. 156).

Finally, it should be borne in mind that cannabis produces similar carcinogenic 'tars' to those of tobacco, but in greater quantities than for an equal weight of tobacco, and the deep inhalation techniques employed by marijuana and hashish smokers tends to deposit that tar more deeply in the lungs. It has been calculated that 70% of the particulate matter is retained in the lungs and it thus can be assumed that in the case of cannabis this percentage is even greater (Jones, 1980). Again, in contrasting pulmonary effects of cannabis smoking with that

of tobacco it should be recalled that most tobacco smokers are now using products which have been modified to reduce the 'tar' content and which are often filtered to that same end. Therefore, the comparison of illicit cannabis with legal, processed tobacco, in terms of health effects, is somewhat spurious.

Cardiovascular Effects

When cannabis is first smoked one of its most prominent immediate effects is tachycardia which tends to be proportional to the ingested dose (Stimmel, 1979). The rate increase varies from 50–100% of resting pulse with an accompanying decrease in orthostatic blood pressure. It was observed by Aronow and Cassidy that the consumption of one marijuana cigarette containing 19 mg of THC decreased exercise time until angina by 48% as compared to a marijuana placebo which only reduced time to angina by 9%. The authors of this study concluded that cannabis smoking increased myocardial oxygen demand while decreasing myocardial oxygen delivery (Aronow and Cassidy, 1974). Hollister (1988) concludes from these results that, although smoking is not recommended for anyone with angina, the shorter time until angina seen with cannabis combined with its induction of tachycardia makes it particularly deleterious for those suffering from arteriosclerosis of the coronary arteries or congestive heart failure. Nahas (1984) summarises what he believes to be the cardiovascular threat of cannabis ingestion based on the above findings:

> The smoking of marihuana increases the work of the heart by increasing heart rate, and in some cases by increasing blood pressure. This increase in work load poses a threat to patients with hypertension, cerebro–vascular disease, and coronary atherosclerosis.
>
> Marihuana can also cause postural hypotension. The drop in blood pressure could be hazardous in those individuals with compromised blood flow to heart or brain, especially if they are volume–depleted or if other drugs have impaired reflex control of their blood vessels. In older patients treated by Δ–9–THC or who had smoked marihuana for glaucoma, orthostatic hypotension has been disabling and a risk factor of cardiovascular complications.
>
> Marihuana appears to intensify the effects of the sympathetic nervous system on the heart, an undesirable consequence in patients with coronary artery disease and in those susceptible to arrythmias (p. 127).

Jones (1980) admits that distinguishing chronic from acute effects of cannabis on the cardiovascular system is problematic. Chronic, long term oral administration of THC can result in mildly depressed heart rate and slight lowering of blood pressure (Benowitz and Jones, 1975). Although these changes appear to be of little biological significance, Jones feels that long term use might be associated with lasting health consequences, drawing his argument from the accumulated data now existent on tobacco use and heart disease. It was, he argues, years before the connection was made between smoking and coronary artery disease. Jones claims that THC has 'far more profound effects on the cardiovascular system than does nicotine,' but fails to tell us how. In fact, the findings of Benowitz and Jones he presents on long term oral administration of THC (above) shows an effect which could be construed as potentially useful in combating the negative cardiovascular effects of long term stress. As is often the case in THC research, interpretation is in the eye of the beholder.

Jones' prediction concerning the effect of long term cannabis use as having potentially more serious effects than nicotine ingestion is somewhat peremptory. Until the effects of the 'tars,' particulates, carbon monoxide and differing smoking styles involved in marijuana smoking are disconfounded from the effects of the cannabinols (THC in particular), prognostications

about the future effects of cannabis on the cardiovascular system are somewhat precipitous. His statement comparing nicotine with THC is particularly ill founded. Most studies have not looked at comparisons between THC and nicotine, *per se*, but have made comparisons between smoked cannabis and tobacco cigarettes. The actions of both compounds are no doubt altered by the method of delivery (smoking) as well as by the combination of responses caused by other constituents of the smoke such as carbon monoxide, for example. Nicotine itself is known to be a strong activator of sympathetic pathways of the autonomic nervous system thereby having a direct, stimulating effect on the heart (Kalat, 1988). No such direct action has been demonstrated for THC or its other psychoactive derivatives.

Again, as in the case of possible pulmonary action of THC, conjecture seems to far outweigh empirical evidence. What evidence there is appears to be flawed by studies which are either uncontrolled, anecdotal, or based on small, idiosyncratic cases. Even more importantly, the research cited above does not control for the effect of psychological factors on cardiovascular activity. As will be described later in this paper, cannabis intoxication is well known for producing mild to severe panic reactions in naive users (Cohen, 1986; Hollister, 1988; Jones, 1980; Nahas, 1984; Weil, 1970). The level of stress produced by such states, and by altered consciousness experiences in general, often may be responsible for the clinical signs of stress syndrome such as shortness of breath, tachycardia, etc. There is little doubt that any individual with incipient cardiopathology may show symptoms of cardiac distress when so psychologically taxed.

Teratogenicity

Central to the issue of teratogenicity and THC is the possibility that there is a direct action of the cannabinoids on chromosomes. In studies by Stenchever, Kunysz, and Allen (1974) and Herha and Obe (1974) a significant increase in chromosomal abnormalities was observed in marijuana users as opposed to non-users. These changes consisted largely of breaks or translocations of chromosomes and more of the latter were found in chronic users than non-users. However, when breaks were included in the count, the effect was drowned and the differences were lost. A later study, however, found that after 72 days of chronic marijuana smoking, no increase in chromosomal breakage rate could be found when compared to the base level existing before the study (Hollister, 1988; Matsuyama, Jarvik, Fu, and Yen, 1976). The pre-test, post-test design of this last study can be considered superior to the previous two clinical investigations because of the built-in controls of a within-subject statistical design. Studies not using this particular design usually cannot approximate the dose rate received by their subjects nor are they able to rule out other causes of chromosome anomalies, which may be related to differences in life-style between users and non-users and/or the effects of other drugs rather than being due to the action of THC itself.

In addition, one must take any chromosome studies in the proper context. Many commonly used licit drugs are capable of causing chromosome abnormalities as well. For example, in a recent *in vitro* study it was demonstrated that Paracetamol is capable of producing concentration-dependent chromosomal aberrations in primary rat hepatocytes (Muller, Kasper, and Madle, 1991). Although these clastogenic effects in vitro were observed only at very high concentrations, pharmacokinetic data and other published mutagenicity data suggest that there might be a risk for human use. According to the authors, *in vivo* studies suggest Paracetamol is also weakly clastogenic in human lymphocytes when used at the maximum human therapeutic dose range. However, there appears to be no public alarm regarding this and earlier studies which made similar observations about the effects of aspirin. For both

THC and Paracetamol the long-term effects of induced chromosomal abnormalities remains unknown and thus we must be cautious in extrapolating to any possible teratogenic consequences without considerably more controlled research.

One of the more contentious areas of cannabis research concerns the effect on foetal development of the mother's use of THC containing preparations during pregnancy. As Cohen (1986) suggests, these effects can be highly confounded by other factors such as nutrition, alcohol, tobacco, other drug use and socioeconomic status. He further suggests that fairly large numbers of matched-pair subject would be required for the maintenance of external validity in such studies. Hingston *et. al.* (1982) studied 1,690 mother/child pairs in which 234 mothers used marijuana in varying amounts during the course of their pregnancies. The outcome of this study revealed that cannabis use was associated with lower infant birth weight and length for the babies of users. This results revealed a proportional effect for the level of consumption of THC, with higher use rates delivering greater birth weight deficits. Zuckerman *et. al.* (1989) obtained similar results in which they found a statistically significant average 79 gram decrement in foetal weight and a 0.5 cm reduction in body length for maternal THC users as opposed to non-users. In this study they further raise the issue of the importance of biological markers in differentiating users from non-users. When analysing the results of their subjects on verbal reports alone, the significant differences disappeared in contrast to a differentiation made by urinanalysis for THC metabolites.

Cohen (1986) states in his interpretation of the results of Hingston *et. al.* (1982) that maternal marijuana use was the strongest independent predictor of the occurrence of features compatible with foetal alcohol syndrome (FAS) and was better than alcohol as a predictor of FAS. In a later study Hingston *et. al.* (1984) clarified their earlier study and concluded that some adverse effects attributed to maternal drinking and smoking may be the result of an interaction with marijuana. In other words, there may be an additive effect of drug combinations on the foetus.

In a related study Gibson, Bayhurst, and Colley (1983) found that, of the 7,301 births sampled for abnormal infant characteristics, mothers using marijuana were significantly more likely to deliver premature babies of low birth weight. However, the largest study reported in Cohen's (1986) review of the literature is that of Linn, Schoenbaum, Monson, Stubblefield, and Ryan (1983). In this study 10 independent variables were analysed for 12,718 women who gave birth at the Boston Hospital. Marijuana was the most highly predictive of congenital malformation above alcohol and tobacco. Further, Qazi *et. al.* (1985) studied the infants of five regular marijuana only users and found that each infant had low birth weight, small head circumference, tremors at birth, abnormal epicanthic folds, posteriorly rotated ears, a long philtrum, a high arched palate and abnormal palm creases which are all considered signs of FAS. Cohen suggests the cause of these morphological anomalies can be found in the results of research conducted by Morishima (1984) in which he found that 5% of ova are damaged by exposure to THC.

Cohen (1986) admits that gross malformations in human infants have not yet been conclusively linked to THC exposure. Fried (1985), on the other hand, observed that any possible neonatal nervous system effects occurring from the result of regular marijuana use by mothers during pregnancy do not manifest in poorer performance on cognitive and motor tests at one and one half and two years of age. In addition, a later study by Fried (1989) found that, by age three, a dose response relationship between lower language scores, lowered cognitive scores and prenatal cigarette (tobacco) exposure is observable. At this age, some

cognitive and language deficits are also observable with prenatal marijuana exposure. In summary, although Fried observed that at one, two and three years of age, there are persistent effects of prenatal exposure to cigarettes, the effects of prenatal marijuana exposure, if present, are not as readily ascertained.

If, as noted in the introductory section of this paper, neonatal weight, length and head circumference are critical variables predictive of later psycho-motor development, there is good reason for concern based on the results of most of the studies cited above. However, Fried's (1985, 1989) work appears to contradict the conventional wisdom in the case of the THC users he studied vis-à-vis reduction in foetal body size and its relation to later learning and behavioural deficits. These contradictory findings would tend to indicate either that the research into birth effects is somewhat confounded, or there is not a simple relationship between foetal body size and behavioural development. Again, as in other areas of research into the effects of THC on humans, the disentangling of these issues awaits more exacting and controlled studies in the future (Nahas and Latour, 1992).

Neurological Effects

In many ways the existence or not of permanent, harmful changes to the nervous system caused by the use of cannabis is central to the debate on the drug's long-term effects. Obviously, any substance which has definite psychoactivity must, ipso facto, be neurologically active. That cannabis alters brain function there is no doubt. The questions addressed by most research is how and to what degree. Jones (1980) summarises the nature of cannabis intoxication and its relation to neurological clinical signs:

> Acute cannabis intoxication includes not only the pleasant state of relaxation, euphoria, and sought-after sensory alterations, but also impairs judgments of distance and time, memory for recent events, ability to learn new information, and physical coordination. At slightly higher doses the acute intoxication includes tremor, transient muscular rigidity, or myoclonic muscle activity. The subjective feelings of muscular 'weakness' or stiffness can be measured objectively. Low doses produce no changes in tendon reflexes, but high doses cause hyperexcitability of knee jerks with clonus. At even higher doses a full blown acute brain syndrome is possible (p. 67).

Jones (1980) goes on to add that some researchers would argue that such altered and impaired brain function represents a prima facie case of temporary neurological damage during the period of acute intoxication. The health issue which arises from this is whether these neurological alterations last only a few hours or whether they persist with deleterious cumulative effects. As will be seen below, the data is by no means consistent and conclusions are difficult to draw.

In the early 1970's press reports appeared which claimed that scientists had found that cannabis use caused 'shrinking of the brain'. These claims were based on the work of Campbell (1971), who used pneumoencephalography to examine a small sample (10) of cannabis users by examining the size of their neural ventricles. These measurements appeared to reveal that the ventricles were enlarged, a finding consistent with cerebral atrophy. The problem with this early research is that it was conducted on a population of patients who were suffering from various neurological disorders. This fact, together with the inaccuracy of the earlier air-volume measurement technique, is deemed by Jones (1980) to render the work invalid. Later, similar, small-scale studies conducted by Co *et. al.* (1977) and Kuehnle *et. al.* (1977) using computerised transaxial tomography (CAT scans) found no evidence of anatomic changes. In the latter research the subjects were preselected for being healthy, normal cannabis users. However, these last two studies beg the research question by, in

effect, choosing subjects who have not yet developed any pathology for an examination of possible permanent neurological effects of cannabis use.

Electroencephalographic (EEG) changes in humans using cannabis usually entail an increase in mean-square alpha energy levels and a slight slowing of alpha frequency. In general, only very minor changes tend to appear in the surface EEG's of cannabis users and those that do, such as increases in alpha wave activity, tend to be synonymous with drowsiness and relaxation (Jones, 1980; Cohen, 1986; Klonoff, Low, and Marcus, 1973). Although scalp EEG changes are minimal, Heath (1973) and Heath *et. al.* (1979) report significant alterations in electrical activity recorded in mid-brain structures of primates, most notably in the septal and amygdala areas. Although the focal EEG changes reported in this research have been seen only in the brains of monkeys which were exposed to marijuana smoke or given THC intravenously, the research of these authors has been quoted widely in both scientific review articles as well as in various anti-cannabis tracts. Therefore, a closer examination of some of this work is in order.

Heath *et. al.* (1979) found that continuous, daily exposure to the equivalent of the smoke from about 3 marijuana cigarettes per day produced abnormal electrical alterations after 2 to 3 months. Additional exposure of up to 3 to 6 months produced electrical abnormalities which persisted for up to 8 months. Heath also conducted histological examinations on brain tissue from the monkeys and found anatomic changes were apparent in the electronmicrographs, suggesting long-lasting changes related to the THC exposure. These changes included widening of the synaptic cleft, clumping of synaptic vesicles and other unspecified changes in morphology of neurones which occurred in monkeys after 6 months of forced cannabis intake and were still evident 6 months after cessation of cannabis use. However, it is unclear from his report whether a methodical evaluation of the supposed histopathology was made which included an independent panel of judges or whether these were his own personal judgements.

The deep sites from which abnormal EEG recordings were recorded are generally believed to be involved in emotional expression and hence affect disorders.[2] Heath's earlier work remains somewhat problematic when his experimental setup is examined in more detail. Although his monkeys included controls who were exposed to both very low THC containing marijuana and tobacco smoke alone,[3] this research remains highly confounded. The monkeys were strapped into chairs with transparent, sealed plastic boxes surrounding their heads. The smoke, together with oxygen, was pumped into the box for a pre-determined period while EEG recordings were made through permanently implanted deep electrodes. Given that in humans THC can induce panic anxiety attacks and given that monkeys do not like to be restrained, it is impossible to tell whether the abnormal electrical activity recorded in limbic

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2 The earlier, 1973, study of Heath, in addition to the septal area, included recording sites in the cerebellum, postero ventral lateral thalamus, hippocampus, and orbital and temporal cortices. The thalamic and hippocampal sites are major components of the limbic system and hence intrinsically involved with emotional expression and would most likely show unusual and significantly different activity in a situation of induced stress.

3 The experimental group received exposure to marijuana smoke containing 2.29% Δ-9-tetrahydrocannabinol and the controls were exposed to either marijuana smoke containing 0.1% Δ-9-tetrahydrocannabinol or tobacco smoke.

areas was directly induced in the brain by the action of THC or whether this activity was what one would observe when panic is induced in restrained monkeys intoxicated by THC.

Heath describes the monkeys' behaviour:

> All displayed dilated pupils and sharp reduction in level of awareness. The monkeys would stare blankly into space, sometimes displaying spontaneous nystagmus, and would become much less attentive or completely unresponsive to environmental stimuli. When their hands or feet were grasped, the clasping response, which was consistently elicited on baseline examinations, was absent. Responses to pain (pinprick) and to sound (hand claps) were minimal to absent. Although the monkeys were not particularly drowsy, spontaneous motor movements were notably slowed, and passive tests of muscle tone suggested a degree of catatonia, although true waxy flexibility never developed (Heath, 1973, p.4).

This certainly is not the way that the vast majority of human beings react to cannabis intoxication. The behaviour Heath describes appears to be more in line with an animal frozen in panic or manifesting what used to be called 'animal hypnosis'. Hunt (1984), a cognitive psychologist, has called this the 'negative capability' and it appears to be part of a neurophysiological mechanism for behavioural and cognitive shutdown when an animal is overwhelmed by, for example, a predator.

Another major problem with Heath's 1973 study was the control of O_2 partial pressure (PP) in the head chamber. From tables in his paper one can see that the PP of O_2 inside the monkey's 'breathing chamber' was 75% greater than room PP in the marijuana run but only 9% above for the control tobacco sequence. The measured serum PP of O_2 was 143% above pre-exposure levels as seen in his data for the marijuana sequence as opposed to a rise of only 22.4% in the case of the tobacco run. There is little doubt that high partial pressures of serum O_2 will affect brain function and hence the EEG recordings (p. 9). Thus, any comparisons between THC exposure and tobacco exposure in this study are at best spurious. Finally, Heath states that, as the choice of subjects for cannabis studies moves up the phylogenetic scale, it is observed that THC produces a more localised effect in the brain involving fewer areas. In other words, humans show the least generalised reactions to THC. In summary, apart from the confounding factors of behavioural variables and O_2 partial pressures in this research, any attempt to generalise from monkeys to humans is fraught with the possibility of committing a logical category error.

As mentioned above, the research of Heath and his colleagues has been widely reported and appears to have been accepted somewhat uncritically by a number of serious researchers as seen in two of the review articles being reported on here (Cohen, 1986; Jones, 1980). This seems to be a recurring theme in much of the cannabis research today. In most research into psychopharmacological effects on EEG reliable conclusions are rarely drawn from so small a number of studies. The interaction of pharmacological agents with brain and behaviour is complex and even the simplest relationships require many experiments in order to delineate the causal connections with any degree of reliability. It appears as though any findings in cannabis research are immediately set upon by the those opposed to it use for the purpose of adding power to already pre-drawn conclusions.

Sleep EEG recordings sometimes can be more sensitive indicators of drug effects than waking EEG (Jones, 1980). Reduction in rapid eye movement (REM) sleep accompanied by increases in total sleep time have been reported in humans together with considerable changes in surface EEG recordings as effects of cannabis use (Feinberg , 1976). The cessation of cannabis intake after prolonged use will then lead to a rebound effect in which REM sleep

stages and eye movements rise above baseline levels. This rebound is not unlike those seen after the cessation of other sedative hypnotic drugs. In addition to these EEG changes, cortically evoked potentials consistent with altered central nervous system (CNS) function have been recorded from scalp electrodes of waking subjects (Herning, Jones, and Peltzman, 1979). However, as is often the case in cannabis research, 'the pattern of change varies with dose and measurement technique, and between laboratories. The biological or functional significance of these alterations remains obscure' (Jones, 1980, p. 69).

Jones (1980) summarises the difficulties and uncertainty which must be accepted as part of cannabis research into its neurological effects:

> Many survey and laboratory studies comparing user and nonuser populations have reported no differences in cognitive, intellectual, or perceptual function between these two groups....Many of the studies reporting no neurological differences between users and nonusers have compared very selected people using 1, 2, or 3 marijuana cigarettes per week to those using none. It may well be that lasting impairment will be evident only at a greater dosage level or that the marijuana use interacts with some other unrecognised factor to produce lasting effects. The impairment will thus be missed in such limited studies. On the other hand, when deleterious, possibly marijuana-related, effects on function have been noted in groups of cannabis users, it is very difficult to determine whether the cannabis use caused the impairment, or was simply associated with it, or followed it.
>
> If one considers neurochemical data from test tubes, animal data, clinical case reports, survey data, controlled laboratory data, and semicontrolled field studies, the weight of the evidence so far is that lasting neuropsychological impairments are possibly but not inevitably associated with some undetermined level of heavy, prolonged cannabis use. However, the many factors that would determine the appearance of clinically evident cannabis-induced neuropsychological changes in any given user are so complex as to make any simple pronouncement of risk almost meaningless (pp. 70–71).

The research paradoxes revealed in the above section on physiological effects of cannabis can only be adequately resolved through the application of controlled experimental research techniques on large groups of humans. It is obvious that this is neither ethical nor practical. Of course, the tautological trap created by subject choice, as described in most of the above clinical research into cannabis, applies to all epidemiological studies, not just cannabis research. As we have seen with both tobacco and alcohol research in the past, reliable conclusions can only be pieced together slowly through large-scale and methodical data collection. So, it must be recognised that decisions probably cannot wait for the final datum to be collected because it is unlikely that all the data will ever be 'in'.

As with many decisions in other aspects of life, we must examine the apparent 'facts', while attempting to understand their context and accuracy, and then make the best possible choice based on the pragmatics of the circumstances rather than on absolutist principles posing as facts. One might well argue that if there is any doubt, whatsoever, that cannabis is safe to use, then it should be permanently banned. However, there may be useful social purposes served by allowing controlled use of cannabis which outweigh any possible deleterious effects it may have on the human organism. This is obviously the kind of thinking behind the current freedom we have to use analgesics, such as aspirin and paracetamol, in spite of their well documented negative side-effects.

Psychological

In any review of the psychological effects of cannabis, a clear distinction should be drawn between cannabis use, abuse and dependency. Because of the problems involved in

determining potency, as delineated in the opening section of this paper, it is often difficult to distinguish casual users from those who are abusers or dependent on the drug. The standard reference for differential diagnosis of psychiatric disorders, the Diagnostic and Statistical Manual of the American Psychiatric Association (1987), defines cannabis dependence:

> Cannabis Dependence is usually characterised by daily, or almost daily, use of the substance. In Cannabis Abuse, the person uses the substance episodically, but shows evidence of maladaptive behaviour, such as driving while impaired by Cannabis Intoxication (p. 176).

The DSM-IIIR asserts that the impairment of occupational and social functioning and the resultant physical pathologies associated with cannabis dependence tend to be less than those seen in other psychoactive intoxicants, such as heroin, cocaine and alcohol. As a result, people showing signs of cannabis abuse or dependency are less often seen by medical doctors and psychiatrists. This fact further clouds any attempts at delineating an accurate definition or symptomatology of cannabis abuse and/or dependency.

The Manual does list a set of general symptoms characteristic of dependency, however. These include lethargy, anhedonia, and attentional and memory problems. This dependency syndrome usually develops with repeated use over a considerable period of time with rapid development following initial use being rare. Although there has been considerable debate over the issue of the development of tolerance in cannabis users, the DSM-IIIR asserts that 'tolerance may develop to some of the substance's psychoactive effects and thus promote increased levels of consumption' (p. 177). This increase is not very great, according to the Manual, and if levels of consumption become very high, there may be a decrease in pleasurable effects with a concomitant increase in the number of dysphoric effects experienced by users. Jones (1980) summarises.

> Tolerance, that is, a diminished response to a repeated cannabis dose, is clearly associated with repeated use ... It appears now, both in animals and in humans, that tolerance develops quite rapidly to many of the effects of THC. The more frequent the administration and the higher the dose the more rapidly it develops, but even subjects smoking as little as one marijuana cigarette per day in a laboratory experiment demonstrate tolerance on some behavioural and physiologic dimensions when they are carefully measured ... Most of the tolerance seems to be lost rapidly, but this rate may vary with the sensitivity of the measures used (p. 74).

Other researchers, on the other hand, argue from both clinical and personal experience that one must learn to get 'high' and, therefore, it takes less cannabis for experienced users to obtain the desired effect than for neophytes (Tart, 1971; Weil, 1975). However, Weller, Halikas, and Moorse (1984) found, in a five-year follow-up study of regular marijuana users, that continuous use was associated with decreasing pleasurable effects. Cohen (1986) summarises their results.

> Users who had earlier reported positive feelings of relaxation, peacefulness, enhanced sensitivity, floating sensations, self-confidence, subjective impressions of heightened mental power, and other sought-after effects now said that these effects had significantly diminished. The undesirable aspects of the experience, however, persisted essentially unchanged (p. 158).

Psychopathology

Nahas (1984), a major contributor to the cannabis literature, takes a strongly proscriptive stand towards cannabis use and underscores the potential psychological dangers inherent in cannabis intoxication when he argues that exposure during the key developmental periods of foetal growth and adolescence may produce long-term, permanent psychopathological

changes in individuals thus exposed. In order to further emphasise the allegedly unseen threat of cannabis use, Brill and Nahas (1984) address the issue of the paradox of the apparent minimal physiological effects recorded in most cannabis users warning us that:

> The discrepancy between the marked psychological alterations and the slight physical symptoms associated with *Cannabis* intoxication represents another aspect of its deceptive nature. Many people today believe that since no apparent gross physical damage results from the absorption of *Cannabis* derivatives, there is little or no danger associated with their use. They are mistaken: *Cannabis* and all other hallucinogens have a common characteristic, their psychotoxicity and their ability to disintegrate mental function, which is not accompanied by any major alterations of the vital physiological functions. Mental illness, especially in the young, is also characterised by a similar discrepancy between the functions of the mind, which are markedly impaired, and those of the body, which are well preserved (p. 263).

This strongly held position, only loosely based on empirical data, often characterises the quality of discussion seen in the research literature concerning the psychological effects of cannabis. In the work of Brill and Nahas (1984) the unclear relationship between the physiological cause and psychological effect of cannabis intoxication is used to insinuate an almost 'devious' and/or 'sneaky' action for Δ-9-tetrahydrocannabinol. On the other hand, the actual argument given in the last section of the above quote, aimed at establishing a potent relationship between the minimal physiological causes arising from cannabis ingestion and its apparent strong psychological effects, is, again, typical of the cannabis debate and, in this case, spurious on at least two counts.

The first is the obvious logical category error of arguing from the class of mental illness to the psychological effects of cannabis intoxication without any evidence that these two phenomena are in any way the same category of event, physiologically or psychologically. The second, the argument as to the universality of deleterious psychological consequences of cannabis use, is based on a small minority of cases who have demonstrated some psychopathological effects directly attributable to cannabis use and thus have come to the attention of medical authorities. However, it should be remembered that the vast majority of users, whether occasionally experiencing some negative states or not, manage the use of cannabis and are able to integrate it into productive life-styles without developing any apparent psychopathology (Weil, 1975). The size of this majority is in the many millions whereas the minority from which most of the pathological data is drawn is a non-representative (statistically) few hundred.

In contrast to the view of cannabis as psychologically dangerous in itself, Weil (1975) has argued that it should be understood to be what he calls an 'active placebo.' Weil describes an 'active placebo' as 'a substance whose apparent effects on the mind are actually placebo effects in response to minimal physiological action' rather than being a direct cause of the psychological changes seen in users (p. 95). This effect is attested to, empirically, by the wide variety of responses individuals make to similar batches of cannabis in similar situations. Weil's conclusions, based on hundreds of clinical observations, led him to argue that it was highly unlikely that cannabis alone could be responsible for the very varied psychological responses and effects which he observed.

From the recent work of Herkenham *et. al.* (1990), cited earlier in this paper, there is no doubt that the cannabinols have affinities for specific brain structures. However, itis as yet unclear as to whether cannabis has any predictable specific behavioural, cognitive, and/or affective effects resulting from the particular receptor site bindings mapped in their study. To date it is not possible to describe a unique and repeatable constellation of psychological

responses to the action of the cannabinols as is possible for the opiate derivatives or the neuroleptic compounds used in the treatment of schizophrenia. This observation alone must cast some considerable doubt on most psychopharmacological ascriptions made for the actions of the cannabinols in humans.

There have been numerous attributions made about the psychological effects of cannabis. In the sections below a number of areas which have had considerable attention in the research literature will be reviewed. However, before embarking on issues, such as 'panic reaction' and 'toxic psychosis' amongst cannabis users, at least one popular misconception concerning cannabis intoxication requires clarification.

As a result of press and electronic media coverage there is a widely held belief by the community-at-large that those intoxicated by cannabis are more prone to show aggressive and violent behaviour. This idea also has found its way into scientific discourse (Brill and Nahas, 1984; Imade and Ebie, 1991). In their exploration of this issue, Brill and Nahas attempt to distil a phenomenology of cannabis intoxication based, to a large extent, on the idiosyncratic reportage of Jacques-Joseph Moreau who recorded observations about himself and other hashish users in the mid-Nineteenth Century. Moreau describes the quality of affect experienced during the mood swings he encountered while intoxicated on hashish:

> With hashish, the emotions display the same degree of overexcitement as the intellectual faculties. They have the mobility and also the despotism of the ideas. The more one feels incapable of directing his thoughts, the more one loses the power to resist the emotions they create. The violence of these emotions is boundless when the disorder of the intellect has reached the point of incoherence (Brill and Nahas, 1984, p. 270).

Not only is this description contexualised in Nineteenth Century cultural values and convictions, and thus not applicable as a direct comparison with late Twentieth Century experience, but the language itself is not easily interpretable from current contexts. The culturally embedded beliefs regarding the nature of emotions and mind have changed radically since Moreau's time as have the way individuals understand their relationship with their subjective lives. Therefore, using such a source in order to understand cannabis intoxication in the present is dubious at best. Claims concerning violence thus appear to be somewhat confounded and in summarising this issue Jones (1980) reports that:

> Most commissions and review groups that have specifically studied the relationship between cannabis and violence have concluded that the use of marijuana is not a major cause of aggression. There is little new that would change that conclusion (p. 73).

In fact, it is most often the case that chronic cannabis users have a depressed demeanour, a lack of drive and rarely show signs of violent behaviour (Tennant and Groesbeck, 1972). In contrast to the myth of 'hashishim' running amok, is the often witnessed syndrome referred to as 'panic reaction', which has likely been confused with aggression and violence in many cases.

Panic Reaction

One of the most common dysphoric responses to cannabis intoxication is what has been called the 'panic reaction.' 'Panic reaction' most often appears as part of an anxiety reaction in relatively inexperienced users, or in those ingesting a higher than expected dose, and is characterised by the appearance of an acute fear reaction sometimes associated with panic connected to the experient's possible, imminent death (Tennant and Groesbeck, 1972). This

'panic reaction' typically follows or is followed by an acute paranoid state characterised by mistrust of others and a belief that others have malintent towards the intoxicant. These reactions are generally acute and disappear with the loss of intoxication within hours (Cohen, 1986; Hollister, 1988).

Of this acute panic syndrome, Jones (1980) delineates the possible psychological progression:

> This reaction, which usually starts off with an exaggeration of normal cannabis effects, can range from mild anxiety and restlessness to panic with paranoid delusions, to a full-blown acute toxic psychosis with loss of contact with reality, delusions, hallucinations, and agitated and inappropriate behaviour. The reaction is more likely to occur in inexperienced users or in the user who unknowingly consumes more potent cannabis material than is anticipated. Preexisting psychological difficulties may also contribute. The symptoms usually diminish over a few hours and are somewhat alleviated by reassurance, a quiet environment, and generally supportive atmosphere (p. 71).

Kolansky and Moore (1971) studied a group of 38 subjects who had smoked marihuana twice per week or more, consuming two or more marijuana cigarettes per session. They found that their subjects consistently demonstrated poor 'social judgement', poor 'attention span', poor concentration associated with confusion, anxiety, depression, apathy, passivity and indifference. These changes appeared to be part of an alteration of consciousness characterised by: 1) a bifurcation of the ego into observing and experiencing selves; 2) an apparent inability of the subjects to bring their thoughts together; 3) a paranoid suspiciousness of others; and 4) a seeming regression to a more infantile state (p. 487). They summarise using a mixture of psychoanalytic and physiological metaphors, which appear to owe more to speculation than to good scientific inference:

> It was our impression in these cases that the use of cannabis derivatives caused such severe decompensation of the ego that it became necessary for the ego to develop a delusional system in an attempt to restore a new form of reality. It would appear that this type of paranoid reaction is a direct result of the toxic effects of cannabis upon the ego organisation of those patients described in this study (p. 489).

However, in this paper Kolansky and Moore (1971) appear to indulge in generalisations concerning the effects of THC which are based on a tiny, psychiatrically referred sample. Any conclusions thus drawn concerning the action of cannabis on the general population commit the logical error of inferring a universal from an existential instantiation. In addition, value judgements are made about their patients throughout which reflect a strong cultural bias in favour of American middle-class professional standards.

> There was marked interference with personal cleanliness, grooming, dressing, and study habits or work or both. These latter characteristics were at times present in some patients prior to smoking marihuana, but were always markedly accentuated following the onset of smoking (pp. 487-488).

There seems to be little introspective awareness on the part of the authors regarding their strong prejudices and value judgements. If science is supposed to be a value-free activity, then this current report does not begin to represent science in either spirit or praxis. These two psychiatrists appear to be blissfully unaware of the cultural changes taking place around them at the time (1968 - 1971) and thus much of their criticism is confounded by their cultural blinkeredness. Further, the appearance of opposite and contradictory symptomologies (some became apathetic while other became hyperactive) in their study group suggests that THC is not a strictly a causal agent of the observed psychopathology, as argued by Weil (1975), but, rather, a facilitator of predisposed conditions.

Negrete *et. al.* (1986) offers a conceptual description of what might be the underlying psychological mechanisms of the panic, ego decompensation and paranoid ideation sometimes seen in cannabis users. He states that it has been:

> ... observed that tetrahydrocannabinol (THC) impairs the rate, sequence and goal directness of thinking; that under the influence of cannabis the individual experiences an intermittent loss of information; that the feed–back and feed–forward perceptive mechanisms – which are essential in the process of reality testing – are upset. In addition, there is a distortion in the sense of time which leads to a telescoping of past, present and future. Unrelated events become peculiarly connected in the user's own 'psychological time'. All these phenomena foster projection and stimulate paranoid ideation (pp. 515–516).

Therefore, the evidence that new or inexperienced cannabis users are prone to panic, paranoid, or anxiety attacks must be seen from the perspective of this effect being largely a function of particular personality types (psychological 'set') and the quality of the 'setting' in which these personalities find themselves when intoxicated. Any substance or situation which is capable of facilitating (directly or as an 'active placebo') a fairly radical change in cognitive sequencing and affective states and, hence, an individual's relationship to and understanding of social reality, has the potential of generating panic, anxiety and paranoid states as a response to loss of control and attendant feelings of uncertainty. No doubt this is a danger in the use of cannabis as well as being a danger when one leaves home for the first time, marries, gives birth for the first time, or starts a new job.

When this type of psychological response does occur, there is, of course, a real possibility of it escalating into a fully fledged psychotic reaction. The literature on cannabis is, in fact, replete with cases and discussions of the relationship of cannabis use and abuse to the formation of toxic psychoses, a subject to which we will now turn.

Cannabis Toxic Psychosis

In 1944 the New York La Guardia study concluded that given a suitably oriented personality, marijuana use could lead, in the right time and environment, to a true psychotic state.[4] Even earlier, however, a physician from British Guyana in 1893 described the symptoms of what he believed to be a cannabis psychosis.

> The cannabis psychosis gives the impression of acute mania or melancholia. Most often the patient is in a state of mania, suffering from delusions and visual and auditory hallucinations. He moves incessantly, waving his arms, throwing himself from one side to another, running up and down in the room, crying and singing. The psychosis might be associated with violent behaviour. Sometimes the patient refuses to eat, sometimes he gets an intense hunger. The state may change rapidly and very soon the patient will recover and seem quite normal again. – But after two or three recurrences, every time triggered by relapses into cannabis abuse, the patient runs the risk of becoming apathetic and blunt. The cases of melancholia triggered by cannabis abuse are more rare. I have, however, observed such cases where the patients have become deeply depressed – to the limit of committing suicide (Tunving, 1985, p. 209).

Imade and Ebie (1991), working in Nigeria, assert that cannabis psychosis 'has gained recognition as a nosological entity' (p. 134). According to these authors cannabis psychosis is categorised by the ICD–9 and DSM–III as either a form of drug dependence or an induced

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4 Mayor's Committee on Marihuana, 1944, cited in Nahas, 1984, p. 285.

organic mental disorder. The diagnostic criteria given include intoxication marked by delusional disorder. The delusional behaviour appears to be caused solely by the ingestion of cannabis and persists for about 2 – 3 hours. Both social and occupational functioning are claimed to show impairment and these reactions, argue Imade and Ebie, 'vary according to the socioeconomic class, personality and attitude of the users' (p. 134).

These authors claim that members of lower socioeconomic classes derive feelings of power and self–engrandisement from cannabis use whereas members of the higher status classes perceive cannabis as a relaxant and thus take it to achieve greater calm. In contrast to Imade's and Ebie's position, Brill and Nahas (1984) maintain that 'at the present time there seems to be insufficient evidence to state that a purely cannabis–induced psychosis exists as a separate clinical entity' (p. 294). However, the latter two authors do argue strongly that cannabis is psycho–toxic and may precipitate a psychotic reaction.
Whether or not the dysphoric, psychotic–like response of some cannabis users is a 'nosological entity', the work of the Nigerian researchers may be over–generalising from the special conditions of their cultural and economic circumstances since there do not appear to be similar sociodemographic differences in response to cannabis reported by researchers in economically more developed countries. In fact, Brill and Nahas (1984) point out that most reports of 'cannabis psychosis' have their origins in the Third World which may reflect a special vulnerability of those people to any toxic substance due to malnutrition with its attendant low body fat and plasma protein concentration in affected individuals. In addition to the cultural, social and economic mismatches of many reports concerning cannabis induced psychosis, the problem with most of the data reported in these studies is that they are highly confounded and hence not scientifically sound. There is rarely any clear, clinical data on the psychiatric condition of these individuals pre–dating their cannabis 'psychosis' and, hence, no way of assigning cause or any other relationship between use and psychopathology. In addition, the age range in most of these studies is that of young adults which is a common time for the onset of psychotic disorders for non–drug takers as well.

Thornicroft (1990) summarises the possible relationships which may exist between psychosis and cannabis use:

> Previous reviews of the possible association between cannabis and psychosis have proposed six types of association. Cannabis may cause psychoses *de novo*. It may reveal a previously latent psychosis. Cannabis may precipitate a relapse of a pre–existing psychosis. Established psychotic mental disorder may lead to an increased intake of cannabis. There may be a spurious relationship. Finally, there may be no relationship between psychosis and cannabis.
>
> These views have, however, failed to make three vital distinctions. Firstly, they have not adequately separated organic from functional psychotic reactions to cannabis. Secondly, they have insufficiently discriminated between psychotic symptoms and the syndromes of psychosis. Thirdly, they have not balanced the weight of evidence for and against the category of 'cannabis psychosis' (p. 25).

Further, the symptomatology of the hypothesised 'cannabis psychosis' is very varied and often contradictory, indicating a lack of a true and coherent constellation of symptoms one would expect with an actual definable disorder. The only consistent set of responses appears to be those associated with any toxic brain syndrome whether caused by cannabis or any other neurologically active substance (DSM–IIIR; Weil, 1975). This lack of specificity is underscored by the following sample of symptom constellations given by various modern cannabis researchers including: a) shyness, irritability, hypersensitivity and arrogance with chronic cannabis users being more often alienated from the environment and indulging in day dreams (Stringaris, a Greek psychiatrist described in Tunving [1985]); b) loss of contact with

reality, delusions, and hallucinations as well as agitated and inappropriate behaviour (Jones, 1980); c) depression and agitation (Cohen, 1986); d) the occurrence of extravagant ideas such as being 'ageless' (Brill and Nahas, 1984);[5] e) the delirium similar to that of high fever (in its acute toxic phase) which includes confusion, prostration, disorientation, derealisation, and, at times, auditory and visual hallucinations (Brill and Nahas); and f) paranoia and depersonalisation occurring in a manner indistinguishable from acute brain syndrome and a belief on the part of the subject that s/he is going mad in spite of remaining oriented with unimpaired consciousness (Kaplan, 1971). The above group of symptoms taken with the descriptions given earlier could, in fact, constitute a wide range of conditions ranging from severe anxiety neurosis to true psychotic bipolar affect disorder.

Thacore and Shukla (1976) indicate that patients with 'cannabis psychosis' show panicky and violent behaviour with greater frequency, but they do 'not consider this behaviour psychotic, because reality contact is maintained' (p. 385). Further, from my own clinical and personal observations it often appears that many users who are having extreme dysphoric reactions are suffering from the fear of 'going crazy' rather than actually becoming truly psychotic. Thus, it is possible to interpret many of the so-called psychotic responses to cannabis use as extreme panic reactions which have escalated out of control. The force of this argument derives from the fact that a) the vast majority of these cases recover fully when the acute phase of intoxication is past and b) interpersonal support during this process is most often positively and constructively received by the victim in a non-psychotic manner, viz., consciousness is unimpaired thus allowing self-reflection and understanding in rational and non-delusional ways.

Individuals suffering from clinically diagnosed organic or psychodynamically identifiable psychoses do not respond in this manner. The acute phase of psychosis, for the majority of cases, moves into a chronic phase with life-long consequences. With these psychotics the clinician finds it almost impossible to penetrate the patient's delusional, referential thought process and, similarly, positive support appears not to be capable of penetrating the psychotic's world when in this acute phase. This is not to say that such a psychotic episode never happens in association with cannabis. However, it has not been possible, to date, to disconfound the role of cannabis as a conceivable facilitator of psychosis from its other possible roles as self-medication used to treat an impending psychosis or its coincidental use as part of a syndrome of disturbed behaviour in an already troubled individual.

Jones (1980) suggests that the toxic psychotic-like reaction sometimes associated with cannabis intoxication is often caused by unexpectedly high doses in experienced users, the reaction to intoxication by neophyte users, and/or the response of individuals with a pre-existing psychopathology. It has been observed that this 'toxic' response is not consistent with cannabis type or potency suggesting no direct, predictable pharmacological link. He summarises the overall state of research into 'cannabis psychosis':

> As is often the case with clinical reports, studies describing cannabis psychosis rarely present data in a way that would withstand rigorous scientific scrutiny. A number of reports finding no evidence of links between cannabis use and psychoses unfortunately have the same methodologic problems as studies claiming drug-related associations, making it very difficult to draw unequivocal conclusions (p. 72).

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5 This idea, of course, is also the claim of many famous, historical mystics and religious leaders. Cf. Happold (1963).

Moreau, in his mid-Nineteenth Century writings, seems to recognise that there is a difference between delusional psychosis and 'hashish fantasy' which suggests that researchers, today, may have to delineate, with some precision, this difference before any definable and consistent 'nosology' of extreme cannabis dysphoria can be found. One possible suggestion is that there is no such clinical entity as a 'cannabis psychosis' but, rather, a series of fear and panic reactions which sometimes achieve the intensity of a psychotic-like state. This extreme but temporary response should be understood more as a result of the user's inability to cope with the cognitive and affective reorganisation caused by THC rather than as a direct and permanent 'poisoning' of the CNS leading to a permanent psychosis.

Schizophrenia

There have been a number of studies which make a connection between cannabis and schizophrenia. As in the case of reports on toxic psychosis and cannabis, the relationship between cannabis use and onset of pathology is unclear. Again, cause and effect are difficult to establish because of the fact that most cases studied are the result of psychiatric referrals from which only post hoc attributions can be made.

In one of the very few longitudinal studies of cannabis and psychopathology designed to disconfound the aetiology of schizophrenia in relation to cannabis use Andreasson *et. al.* (1987) studied Swedish military conscripts. Commencing in 1969-70 this investigation used a pre/post research design, which, in its first stage, included obtaining a history of drug use, social background, psychiatric history, a current psychological assessment and, where necessary, a psychiatric interview. In their current paper, reviewing follow-up assessment made fifteen years later, Andreasson *et. al.* state that, in addition to cannabis consumption, increased occurrence of schizophrenia in the conscripts was strongly correlated with diagnosis of psychiatric disease other than schizophrenia at the time of conscription; indicators of a disturbed childhood; abuse of solvents; and poor adjustment at school. However, in this study no relationship was observed between the increase in schizophrenic occurrences and alcohol consumption, smoking, or socioeconomics.

Although the authors suggest that the association of cannabis usage with schizophrenic onset may possibly be a result of an 'emerging schizophrenia', they argue for the interpretation that cannabis is a likely a precipitating factor in schizophrenic onset for 'vulnerable' individuals. This conclusion was drawn as a result of the observation of an increasing risk for development of schizophrenia being associated with increasing cannabis consumption in individuals with previous psychiatric symptoms. For the authors, this conclusion is underscored with the additional finding that conscripts with no psychiatric symptoms initially also demonstrate an increased risk of schizophrenia with increasing cannabis consumption. In conclusion, Andreasson *et. al.* (1987) state:

> ... an individual might be vulnerable to schizophrenia but not get the disease unless it is triggered by some life-event stressor. The findings in this study suggest that cannabis may be such a stressor. The effect of cannabis on the central nervous system support this hypothesis (p. 1485).

The effect of THC on the nervous system, they argue, is localised in the hippocampus and is accompanied by a lowered turnover of acetylcholine. However, the more recent and comprehensive study of Herkenham *et. al.* (1990) reported earlier in this paper appears to contradict this hypothesis of Andreasson *et. al.* (1987). The distribution of THC in the human CNS is much more diffuse than these authors suggest and, to date, there is no definite evidence that acetylcholine systems in the hippocampus are associated with

schizophrenogenesis. In fact, it is more strongly argued that dopamine pathways in the ventral medial brain are more directly involved in some of the 'schizophrenias' (Helmchen and Henn, 1987).

Another problem with the Andreasson *et. al.* (1987) study is that the causal relationship of cannabis to the onset of schizophrenia still remains equivocal. Although the data appears to be suggestive of a possible link between cannabis and the precipitation of a schizophrenia in vulnerable individuals, the authors go beyond their data by strongly suggesting that cannabis is, nonetheless, another clue to the ***cause*** of schizophrenia. However, even a cursory examination of the literature on schizophrenia (which is beyond the scope of this paper) reveals that the stresses of late adolescence and early adulthood appear to be one of the major precipitating factors in the development of schizophrenia in vulnerable individuals – with or without the use of cannabis. Since this study examined young men of this age group, the relationship of increasing cannabis use with increasing incidence of schizophrenia may be an artefact related to the overall range of deviant behaviours adopted by young men suffering from the stresses of life change for which they are unprepared.
And finally, of the 55,000 conscripts entering the initial phase of the Andreasson *et. al.* (1987) study, only 274 schizophrenics emerged of which 21 were in the high cannabis consuming group with a total of 49 having ever consumed THC at all. Thus, taken together with the fact that the causal connection between cannabis use and the onset of schizophrenia was still left unclarified, these results should be considered insufficient for drawing any scientifically sound conclusions concerning a meaningful link between cannabis and schizophrenia.

In another large–scale military study of cannabis use carried out on American soldiers Tennant and Groesbeck (1972) found that for the 720 hashish users culled from the 36,000 subjects of the research sample direct medical and psychiatric observation revealed:

> that the casual smoking of less than 10 to 12 gm of hashish monthly resulted in no ostensible adverse effects other than minor respiratory ailments. Panic reactions, toxic psychosis, and schizophrenic reactions were infrequent occurrences except when hashish was simultaneously consumed with alcohol or other psychoactive drugs (p. 133).

The authors found 115 cases of acute psychosis analogous to schizophrenia amongst hashish smokers but only 3 were of hashish users only. The remainder were multiple drug users which included amphetamines, hallucinogens and alcohol taken together with hashish. Treatment with chlorpromazine did not entirely resolve the symptoms in these cases and most appeared to move into a stage which resembled chronic schizophrenia. However, Tennant and Groesbeck (1972) argue that because of the nature of such a soldier sample, they had good access to premorbid records for the entire group. 'In each case there was considerable evidence that latent schizophrenia probably preexisted' (p. 134). However, no indication is given in this paper as to how the pre–trial screening was carried out nor is there any evidence of how the criteria for determining pre–morbid latent psychosis was established.

Jones (1980) argues for a partial causal relationship between the onset of schizophrenia and cannabis use. He believes that patients with schizophrenia, or with a genotype for schizophrenia 'may be more prone to develop schizophrenic–like psychoses after consuming only modest amounts of cannabis' (p. 72). However, his use of the term 'schizophrenic–like' may indicate, as in the case of toxic psychoses, that some of these more extreme but transient negative responses to cannabis have characteristics in common with schizophrenic disorders but are not fully constitutive of the pathology itself. Imade and Ebie (1991), on the other

hand, in an empirical statistical study comparing schizophrenic and cannabis psychosis symptomologies, conclude that there is no significant difference between the two groups leading them to speculate that cannabis may be a possible additional risk factor in the development of schizophrenia. Surprisingly, this conclusion of no statistically significant difference in symptoms is contradicted by Table 2 (p. 135) in their published results which shows a statistically significant difference in 9 of the 13 symptom categories presented. One can only speculate as to why the authors draw conclusions in direct contradiction to their empirical findings.[6]

Other researchers appearing to agree with Imade's and Ebie's conclusions concerning the similarity of cannabis psychosis and schizophrenia are Thacore and Shukla (1976). Their study of chronic cannabis abusers in India found a constellation of symptoms some of which are similar to schizophrenia while other are not. Their work indicates that the special characteristics of schizophrenic thought disorder (loosening of association, thought blockage, disturbance in conceptual thinking, alienation of thought) occur statistically significantly more frequently in schizophrenic patients than in cannabis intoxicants suffering psychotic-like reactions. Hallucinations were experienced equally in both conditions but 'all (cannabis) patients had predominant persecutory delusions in a setting of clear sensorium' (p. 384) in contrast to schizophrenics who do not show any capacity for rational self-reflection while in an acute phase. Although these findings suggest some fundamental differences between the two conditions, caution must be applied in accepting these results because of the small sample involved and the culturally idiosyncratic method of scoring and interpreting patients' symptoms.

In conjunction with Jones (1980) Hollister (1988) asserts, based on research conducted by Knudsen and Vilmar (1984) as well as by Tunving (1985), that cannabis use may aggravate an already existing schizophrenia, and this would be true whether the pathology was as yet unmanifest, but he is not convinced that THC can cause schizophrenia or depressive disorders on its own. Moreover, referring to Rottanburg *et. al.* (1982), he declares that cannabis use may lead to 'a self-limiting hypomanic-schizophrenic-like psychosis' (Hollister, 1988, p. 112). Again, this statement suggests that the relationship between drug use and pathology may be linked through an as yet unidentified third factor involving the preference by schizophrenics for particular classes of drugs in their attempts at self-medication and thus control of frightening delusional states. Consequently, there appears to be an association between cannabis use by diagnosed schizophrenics which confounds the interpretations of a causal link between cannabis and schizophrenia. Needless to say, the connection is problematic and unresolved and certainly needs considerably more and better controlled research before any firm conclusions can be drawn.

Behaviour and Social Adjustment

Weller (1985) summarises a number of findings across a variety of studies aimed at establishing a profile of cannabis users:

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6 A possible reason for this apparent contradiction may lie in the sources of funding for cannabis research. Most money comes from government coffers and most governments are in opposition to cannabis use. Therefore, one may conclude that researchers will attempt to minimize findings which do not satisfy the views of their funders in order to insure future support. This may seem harsh, if one accepts the myth of scientific objectivity, but scientists are as competitive as any other group in their attempts to stay in the "game" and to win.

> One study found that marijuana users were more impulsive and nonconforming than nonusers. Another study discovered more 'psychiatric impairment' in users based on personality tests. A self-administered drug survey conducted at two colleges found that users were less likely to be at the top of their class, had looser religious ties, and were more dissatisfied with school. They were also more likely to be bored, anxious, cynical, disgusted, moody, impulsive, rebellious, or restless. In still another study, marijuana users were more opposed than nonusers to external control and likely to use the drug to relieve tension (p. 101).[7]

He criticises much of this characterisation by arguing that little effort was made to determine the personality types and differences before subjects became involved in a cannabis 'lifestyle'. Thus, it is arguable that any ascription of personality type for cannabis users must be seen as not scientifically grounded and hence somewhat spurious. This logical error of explanations given *post hoc propter hoc* appears to be a commonly repeated one throughout the cannabis literature. However, Weil's (1975) argument that cannabis is an 'active placebo' (p. 95) which facilitates already existent covert behaviours and pathologies offers an equally credible explanation for most observations made concerning pathological syndromes and cannabis use with the added benefit of accounting, in part, for the great variation seen from individual to individual. One such constellation of behaviours which has been repeatedly claimed as unique to chronic cannabis users is the so-called 'amotivational syndrome' to which we now turn.

Amotivational Syndrome

McGlothlin and West (1968) first reported that regular cannabis use can lead to the development of passive, inward-turning, amotivational personality characteristics. At about the same time, Smith (1968) made a similar observation, based on several young marijuana users, that regular cannabis ingestion leads to a loss of desire to compete and work which, like McGlothlin and West, he labelled the 'amotivational syndrome'. Weller (1985) describes the characteristics associated with this hypothesised syndrome:

> This contention was based on clinical observation of middle-class, heavy marijuana users referred to them for treatment. Conforming, achievement-oriented behaviour had changed to relaxed and careless drifting. Inability to concentrate for long periods, endure frustration, follow routines, and carry out complex, long-term plans, as well as apathy and loss of effectiveness, were noted. Such individuals became totally involved with the present at the expense of future goals. They had less objective productivity and seemed to withdraw subtly from the challenge of life (pp. 95, 98).

He reminds us, however, that no specific studies or case reports were cited to support McGlothlin's and West's (1968) observations. Other descriptors which supposedly characterise this syndrome include: shift or decline in ambition; unproductive, aimless life; poor class attendance; lack of goals; poor school performance; apathy; disorientation; and depression (Weller, 1985). Nevertheless, in most cases symptoms disappeared if marijuana was discontinued suggesting not so much as a syndrome but behaviour of chronically intoxicated individuals using their intoxicated state as a way of focusing their resentment of social and parental pressure.

In addition, Weller (1985) cites a number of studies which report lowered levels of sperm and testosterone. The latter change was observed in a closed ward situation with subjects at first showing no alteration in testosterone levels for about four weeks, followed by a subsequent

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7 For his summary he draws extensively on Halikas, Shapiro, and Weller (1978).

and gradual drop in testosterone level which continued until cannabis intake stopped. This situation reversed itself on cessation of cannabis intake with levels beginning to rise after one week's abstinence. Weller concludes that 'if testosterone affects aggression and drive, low testosterone might affect motivation. However, this relationship must be considered hypothetical without additional research (p. 102).'

Cohen (1986) reminds us that the syndrome is so variable in presentation and influenced by the magnitude and type of premorbid pathology, the very existence of such a syndrome remains quite controversial. On the other hand, lethargy and loss of ambition and goal orientation persist during intervals of withdrawal from cannabis. In many cases this anergic condition is apparently reversed after months of abstinence, but Cohen indicates that some clinicians report what they believe to be the occurrence of permanent brain dysfunction in some subjects. Again, as in reports of other psychopathologies being connected to cannabis usage, the constellation of symptoms tends not to constitute a definite syndrome with great variation being observed in each case.

The symptoms of what is being called "amotivational syndrome' could be understood as a facilitated endogenous depressive disorder which is brought to the fore by chronic cannabis use in a minority of individuals. Halikas *et. al.* (1978) reported a high incidence of depressive disorder in regular cannabis users who had smoked at least fifty times in the past six months before the commencement of the study. Weller (1985) indicates that an examination of the subjects of that study reveals that most were young (mean age = 22 years), middle-class and had been smoking cannabis for an average of 2 years. "Systematic evaluation revealed that most of their psychiatric problems predated marijuana use. About 18% had a history of definite or probable depression before significant marijuana use (p. 102).'

It should be borne in mind, once again, that the subjects of many of these studies are referred for treatment and hence do not represent the population of cannabis users. In fact, from the numbers given in many sources, those presenting with psychopathologies of any kind represent a very small minority indeed. For example, the 1991 NCADA survey of drug use in Australia reveals that 30+% of all Australians have tried cannabis at least once. 13.1% have used it within the past year and 5.4% within the last week. Thus, there are hundreds of thousands of cannabis users who apparently function well enough so that they do not come to the attention of medical or legal authorities. If "amotivational syndrome' was a fact of cannabis use, Australian society would unmistakably feel its impact. One can only conclude that this supposed 'syndrome' is, in actuality, the mis-labelling of a latent affect disorder which, in a small minority of unfortunate individuals, becomes manifest when facilitated by chronic cannabis use.

Task Performance

It is not surprising to find repeated assertions in the literature of reduced performance on learning and memory tasks in a population of cannabis users who are available for evaluation largely through psychiatric referral. The pathological symptoms leading to referral most often include agitation (panic disorders) and/or lethargy (amotivation). These symptoms are often primary manifestations of on-going affect disorders and, in the case of depression, are frequently accompanied by feelings of alienation, depersonalisation, flattened affect, memory and other cognitive impairments. A large-scale study by Mullins *et. al.* (1974) conducted for the United States Air Force on recent conscripts who were, for the most part, young, healthy

and not psychiatrically morbid, reveals a different picture regarding performance among cannabis users.

The authors compared 2,842 US Air Force trainees who had used only cannabis with 1,843 who had used cannabis and/or other drugs and with a control sample of 9,368 on whom no drug-using information was available. Comparisons were made on five separate aptitude measures, on educational level attained prior to enlistment, and on three measures of performance of Air Force duties. These aptitude measures are the Armed Forces Qualification Test (AFQT) and four aptitude indexes of the Airman Qualifying Examination (AQE); Mechanical (M), Administrative (A), General (G), and Electronic (E). Comparisons of scores were made between those who used only cannabis; those who used cannabis in conjunction with some other drug; those who used other drugs singly, but not cannabis; those who used other drugs in combination, but not cannabis; and the control group. It was found that every mean score for the drug using groups was significantly different from the control group at p = 0.01 or better. The most interesting finding, however, is that for level of performance "all means are significantly lower than the control mean except the means for the cannabis-only group, which are significantly higher than the control means' (Mullins *et. al.*, 1974, p. 4).

Mullins *et. al.* (1974) argue that the differences between the cannabis-only group and the other drug groups in relation to the controls may be the result of the degree of drug use. In other words, multiple drug users are seen by the authors as likely heavy users as opposed to cannabis-only user group. Thus, the lower means for the multiple drug groups are interpreted as resulting from the total overall consumption of drugs rather than the mixing of mind-altering substances. In addition, when controlling for total ingestion of cannabis, the authors conclude that the cannabis-only group is more talented on average (according to the operational definition of talent embedded in the Air Force aptitude tests) than any of the other groups tested. Although the authors argue that the lower scores of the multiple group are likely due to the degree of overall consumption of drugs, they conclude that one of the more notable dangers of cannabis is in coupling it with other drugs.[8]

The authors attempt to explain the results by first observing that the use of other drugs, with or without cannabis, is correlated with lower overall educational attainment in the study's subject group. They continue by noting that there are significantly more cannabis-only users who have graduated from high school (76.4%) than there are in the control group (70.7%), which is offered in partial explanation of the higher aptitude scores achieved by the cannabis-only group. In light of our earlier discussion concerning motivation, both achievement scores and educational level tend to be good indicators of higher motivation in the cannabis-only users than in the other experimental groups and the controls. On the other hand, of those controls and cannabis-only users who entered university, Mullins *et. al.* found a significantly higher percentage of control subjects (37.5%) than of cannabis-only subjects (24.9%) completed their studies.

Strangely, in summarising their study the authors conclude that this last difference indicates the possible existence of an "amotivational syndrome' in cannabis-only users and, in their final remarks, strongly suggest that cannabis has definite serious, negative effects on

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8 However, the authors qualify this statement later on by indicating that it is the heavy use of cannabis in conjunction with other drugs which is most likely the cause of the reduced scores. They fail to make the observation that heavy drug users of any kind, particularly heavy multiple drug users, are very likely to be suffering from some other psychiatric disorder which may affect motivation and/or performance.

behaviour. However, in summarising their findings they state:

> ... in general, the use of cannabis–only appears to be associated with a much less serious performance deficiency than the use of other drugs, singly or in combination' (Mullins *et. al.*, 1974, p. 11)

This statement can only be seen as a distortion of the empirical findings of these researchers. Except for the issue of university completion rates for the various groups, cannabis–only users in their study appear to be superior in performance on every measure used by the United States Air Force. The authors' conclusion, on the other hand, stresses that the performance of the cannabis–only group is merely less worse than the multiple drug groups rather than better than all other groups. Again, this is an good example of the problems which occur with value–driven research in the investigation of cannabis. No doubt this method of interpretation of the empirical findings arises because it is very unlikely that positive conclusions concerning cannabis use in young airmen would lead to career advancement for members of the military who conduct social science research on their own organisation.

Of course, there have been a number of other studies which have obtained very different results when measuring performance. It should be noted, however, that most of these have been conducted on a more select population than the Mullins *et. al.* investigation, with considerably smaller sample sizes and often on individuals who have been psychiatrically referred. Cohen's (1986) general review of these issues in relation to cannabis leads him to conclude that:

> A wide range of intellectual performance impairment due to marijuana intoxication is known. Cognitive tasks, such as digit symbol substitution, complex reaction time, recent memory and serial subtractions, are all performed with an increased error rate as compared to the sober state. These abilities are all generally recognised to be necessary to perform skilled tasks. Marijuana interferes with the transfer of information from immediate to short–term storage. Less demanding tasks such as simple reaction time are performed as well during the non–drug condition. A major unresolved question is whether long–term use produces irreversible effects (p. 157).

Two confounding issues are generally not critically addressed in the literature on cannabis and performance summarised by Cohen (1986) above. The first is proper control for the role of motivational levels in the outcome of performance tests conducted on cannabis intoxicated individuals. THC may have differential effects on motivation depending on the type of task to be completed. Cohen acknowledges that the apparent attenuation of the ability to learn while intoxicated with cannabis may be due to possible perceptual and motivational changes experienced by intoxicants. He speculates that the concomitant impairment of immediate recall associated with these changes is linked to a lack of motivation to learn and to the related attenuation of logical thinking abilities which makes the acquisition of new information more difficult.

Simply stated from a more phenomenological perspective, while intoxicated, "right brain' activities appear to be preferred by those using cannabis. Logico–deductive cognitions tend to be usurped by metaphoric imaging arising as a result of an intensified 'absorptive state'. "Absorption', a personality characteristic often studied in relation to hypnosis and other altered state of consciousness experiences, appears to deploy attention in ways antithetical to the more usual linguistically ordered information processing of daily life activities (Tellegen and Atkinson, 1974; Tellegen, 1982). Since the majority of memory and performance tasks used in many of the studies on cannabis and performance are dependent on language processing ("left brain') for recall, it is not surprising that most cannabis users do less well on these tests when intoxicated.

The second issue is, naturally, the notion of 'long' and 'short' term memory employed by Cohen (1986) and others. If we recognise that different styles of cognition and learning are associated with different states of consciousness (Tart, 1972), then the model of memory storage and transfer deployed by Cohen is likely to be inapplicable to the study of individuals in an "Absorptive' state of consciousness. In addition, the statement about information "transfer' as used by Cohen is, at this stage of learning and memory research, more metaphor than fact since the actual neuropsychological substrates and mechanisms of this hypothetical construct have yet to be located and their mechanisms delineated.

Creason *et. al.* (1981), on the other hand, do attempt to control for motivation in relation to cannabis consumption levels in their study of 55 high school adolescents. From this group four sub-groups were identified consisting of nonusers ("Never'), casual users ("less than once a week' or "once or twice a week'), heavy users ("three or more times a week' or "daily'), and heavy users who are now ex-users (p. 449). Motivation was operationally defined as:

> ... the difference between the subject's performance on a task when working for a reward and when the subject is not externally motivated. A subject who performed better working for a reward than when not was considered more motivated than a subject who performed at the same level regardless of whether there was a reward at stake (p. 448).

"The dependent variable was the difference in the number of solved single-solution anagrams between the first and second trials,' the assumption being the first trial measured actual ability and the second measured performance level when motivated, with the difference showing the effect of motivation (p. 449). From this research design the authors found that heavy users and heavy ex-users were significantly (statistically) lower in motivation than non-users or casual users, the latter two groups showing no significant difference. The authors thus conclude that the effect of heavy use on motivation is not dependent on the presence of the drug in the user's system. To account for this they hypothesise the existence of an intervening variable, such as a personality factor, which distinguishes those who are high users from low or non-users. In conclusion they argue that there is good evidence in the research literature to suggest that "heavy marijuana use is limited to those who are already inclined to low motivation and depression' (p. 452) Unfortunately, Creason *et. al.* were not able to assess for any possible pre-existing psychiatric morbidity or personality differences which may have indicated any prior conditions in heavy users before the commencement of their cannabis habit. Thus, there is no empirical evidence arising from this study which is able to support their explanatory hypothesis.

Although there have been suggestions regarding brain damage in cannabis users, as cited earlier in this paper, Varma *et. al.* (1988) find no evidence of a real difference between users and controls on measures of intelligence and memory. These findings are consistent with two United States Government studies (National Institute of Mental Health, 1972, cited in Rubin and Comitas, 1975; National Institute on Drug Abuse,1980) in which the authors suggest that any differences found between cannabis users and non-users in cognitive functioning pertain more to perceptuo-motor tasks. However, Varma *et. al.* (1988) observed that in Indian cannabis users who are not part of a deviant sub-culture, the users still appear to be significantly more disabled in "personal, social and vocational functioning' (p. 151). However, the higher rating of disability in this group of cannabis users did not, in the opinion of the authors, amount to a noticeable difference.

In assessing the work of Varma *et. al.* (1988) it is necessary to understand that the group studied is the equivalent, in the West, of heavy, chronic drinkers of alcohol. This is

underscored by the authors' recruitment of subjects amongst a known group of heavy users whose life-style revolves around congregating together specifically for the purpose of consuming cannabis. In addition, findings of higher 'neuroticism' and 'psychoticism' test scores for these individuals also indicates that they are not average members of the society being studied (Eysenck, 1960).

In effect, this research is confused by the usual problems of personality disorder and psychopathology almost certainly existing in the study group prior to cannabis addiction as indicated by membership in and adherence to a cannabis-based sub-group in the context of a country (India) in which this substance is widely accepted and probably broadly used in other social circles as well. If pathology was not present prior, then such extreme use could be regarded as a cause of the psychological problems (as in the case of severe alcohol abuse). Nevertheless, this cannabis sub-culture is an inappropriate group to estimate the long-term effects of social cannabis ingestion, just as it would be inappropriate to estimate the social, physiological and psychological effects of alcohol by studying chronic, intractable drunks.

In contrast to Varma *et. al.* (1988), a study by Schwartz *et. al.* (1989) claims to demonstrate definite adverse effects of cannabis on memory. The latter researchers evaluated the auditory/verbal and visual/spatial memory for groups matched on age, IQ, and absence of previous learning disabilities. The study used 10 cannabis-dependent adolescents and compared them with the performance two control groups consisting of 8 adolescent drug abusers, who had not been long-term users of cannabis, and 9 adolescents who had never used any drug. Significant differences between the cannabis-dependent group and the two control groups were demonstrated on the Benton Visual Retention Test and the Wechsler Memory Scale Prose Passages. The authors also found that, after 6 weeks of supervised abstention from intoxicants, those in the cannabis-dependent group demonstrated some improvement on the Wechsler Memory Prose Passages score and on the Benton Visual Retention Test. This improvement, however, failed to achieve statistical significance leading the authors to conclude that cannabis-dependent adolescents develop selective short-term memory deficits which appear to continue for at least 6 weeks after the completecessation of cannabis intake.

This last study employs very small numbers of subjects in its experimental and control groups, which makes the results somewhat weak in a statistical sense. Further, in this research the experimental subjects consumed approximately 900mg/week of THC (18 grams of high-potency marijuana @ 5% THC) which is about equivalent to 130 mg/day for a 4 month period - considerably higher than most heavy users. This level of cannabis was consumed to within a couple of days of end of the trial.

Heavy users use about 10 grams of cannabis containing about 2-3% THC, or 300mg of THC/week.[9] The ward study by Schwartz *et. al.* (1989) referred to here provided subjects with about 900mg THC/week, or three times the amount of *in vivo* heavy users. If the physiological half-life is taken as one week (Cf. Nahas, 1984), then at the end of a 6 week abstinence period following 12 weeks of cannabis ingestion at the rate of 900mg THC/week, the lipid burden of THC will be approximately 28mg THC.[10] Further, if, as revealed in the

9 See p. 57 *supra* for an explanation of the derivation of this estimate.

10 This was calculated using a discrete approximation of a half-life decay.

work of Chesher *et. al.* (1985), 1–2 mg of ingested cannabis causes a similar level of behavioural deficit as a 0.05 blood alcohol level, then the retest situation in the Schwartz *et. al.* study is on subjects who are still in a highly THC affected state.

Unlike alcohol, THC is highly soluble in body lipids and it is this property which causes it to remain systemically present much longer than water soluble alcohol. Thus, the resultant levels of THC accumulated by participants in the Schwartz *et. al.* (1989) study would be extremely high at the end of the first part of the study. With a half–life of 5–7 days it would be many weeks before the serum THC would be at an equivalent zero level for these extremely high–dose subjects. It is quite conceivable, therefore, that the subjects were, at re–test time, still at or above the intoxication equivalent of 0.05 blood alcohol.[11] This, of course, does not include an approximation for the effect of any additional THC remaining in brain lipids which, conceivably, could still be quite high. Therefore, low or zero measures of serum THC do not guarantee that participants in the post–test section of the Schwartz *et. al.* study are cannabis–free and, hence, the test subjects may still be affected by a low–level, background intoxication.

Returning to the issue of perceptuo–motor and cognitive performance, Chesher *et. al.* (1985), using nine different tests, attempted to ascertain the effects of cannabis consumption on performance in a controlled study employing individuals in a dose level by time pre– post–drug experimental design. Employing the centroids of the combined test scores for each condition, the authors compared the performance effects of smoked cannabis, orally ingested cannabis, and alcohol with the resulting evidence suggesting that "the duration of impairment produced by all three drugs at the doses used was very similar' (p. 624). However, the earlier findings of Weil *et. al.* (1968), that some dose–related impairment is observable on simple intellectual and psychomotor tests for naive subjects but not for regular users, indicates a need for finer elucidation of the observed effects, if the results of Chesher *et. al.* are to be taken at face value.

Chesher *et. al.'s* (1985) results also suggest that orally administered THC is 4000 times more potent than ethanol in its pharmacological action. Although exact comparisons could not be made between smoked cannabis and imbibed alcohol, it was estimated that 1–2 mg of THC in the marijuana–to–be–smoked produces a decrement in performance equivalent to 0.05 blood alcohol level (p. 627). This finding suggests that, since the average marijuana cigarette contains approximately 1–3 mg of THC, similar restrictions would have to be placed on cannabis consumption and driving as now exist for alcohol.

Hollister (1988) reports a summary of four separate studies in which the occurrence of positive serum tests for drugs in dead drivers involving 2610 fatalities was estimated. Alcohol was found in 1680 cases and THC in 351 with 294 of the latter involving alcohol as well. Of those found with THC, 278 has serum concentrations less than 5mg/ml, suggesting that "THC plays a relatively minor role in fatal traffic accidents as compared with alcohol' (Hollister, 1988, p. 113; McBay, 1986). In other words, only 2.2% of cannabis–only users were involved in these fatal accidents. Of course, the long half–life of cannabinols in the body and the presence of them in blood long after acute intoxication has ceased, as seen from the studies cited above, does not indicate whether or not those individuals who tested positive in the quoted road fatalities were intoxicated.

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11 It should be remembered that 1–2 mg of THC to be consumed is the equivelant of an alcohol blood level of 0.05 (Chesher *et. al.*, 1985).

Cohen (1986) asserts, in his summary of the drug and driving research literature, that 70% of all fatal auto crashes involve alcohol. However, he reports that 37% of the fatal crashes studied tested positive for the presence of serum cannabinols, but these were found mainly in combination with alcohol and other psycho-active drugs with cannabis-only users representing 12% of all those cases involving cannabis. Alcohol was mixed with cannabis in 81% of the cannabis cases and, again, it is impossible to tell, unlike with alcohol, whether those testing positive for cannabinols were in the acute phase of intoxication rather than several days away from last cannabis usage. From his summary of the statistics Cohen therefore argues that:

> Although alcohol is the prime cause of automotive accidents, marijuana and cocaine are currently being found frequently enough to constitute potentially significant problems. It is established that marijuana and alcohol have additive effects upon driving skills. Since marijuana metabolites were found in more than a third of the drivers, impairment due to marijuana is contributing to the problem (p. 158).

The above research likewise is confounded by the presence of alcohol in the majority of cannabis cases. In order to support Cohen's contention, data would be required to show that accidents are increasing, in any given demographic area, in direct proportion to the increase in use of drugs such as marijuana and cocaine while simultaneously controlling for alcohol use. Without such clear-cut quantitative relationships one must still conclude that alcohol is the primary cause of fatal crashes even where other drugs are present. Again, the findings of THC metabolites in 37% of the drivers involved in fatal crashes do not indicate that these individuals were intoxicated with THC at the time. However, the data may be suggesting that there is an increased danger when driving on alcohol for cannabis users even post acute intoxication. Whether the hypothesised additive effect of THC and alcohol is a fact and/or whether this effect happens post acute cannabis intoxication remains to be elucidated through carefully controlled research which has not yet been done.

Weil (1975), although writing in the early 1970s, still provides a useful and insightful summary of research on cannabis and performance:

> Because marihuana is such an unimpressive pharmacological agent, it is not a very interesting drug to study in a laboratory. Pharmacologists cannot get a handle on it with their methods, and because they cannot see the reality of the nonmaterial state of consciousness that users experience, they are forced to design experimental situations very far removed from the real world in order to get measurable effects. There are three conditions under which marihuana can be shown to impair general psychological performance in laboratory subjects. They are: (1) by giving it to people who have never had it before; (2) by giving people very high doses that they are not used to (or giving it orally to people used to smoking it); and (3) by giving people very hard things to do, especially things that they have never had a chance to practise while under the influence of the drug. Under any of these three conditions, pharmacologists can demonstrate that marihuana impairs performance (p. 86).

Most altered states of consciousness, such as those produced in hypnosis, meditation and ecstatic experiences, involve deployment of attention strongly in the present. This 'unreflected', unself-conscious attentional state, which is focused primarily in the 'now', will, whether induced by drugs or not, possibly interfere with the normal memory processes associated with the 'reflected' conscious state required for discursive thought and logico-temporal activities usually associated with memory and learning. Thus, any discussion of memory and THC use must consider the possibility that THC facilitates a free-floating 'absorptive' state which favours engagement in spatial-metaphoric cognitive styles of the 'unreflected' state (Fabian and Fishkin, 1981). It is thus possible that the apparent memory deficits seen in individuals intoxicated with THC, who are being required to perform and

attend to verbal, temporal, logico-deductive activities, is the result of 'time-sharing' between the two states. The effect is to interrupt the usual cognitive and memory consolidation processes.

This 'time-sharing' process can be conceptualised as a temporary and rapid movement out of the induced 'unreflected' state of consciousness into 'reflected' consciousness when enough 'demand' is made to attend to a temporal, discursive information stream. As soon as demand falls below some critical threshold required for attention, the 'unreflected' state resumes thus disrupting any on-going learning process. The laying down of short-term memory and the ability to attend accurately to objective (clock) time may require a certain level of continuous background 'self-observation' - a primarily 'reflected' state activity. Therefore, assigning the cause of memory deficits measured in THC intoxicated individuals to the pharmacological action of cannabis may be an attribution error with cannabis being primarily a catalyst for these altered states which are the actual cause for a failure to process discursive information in the usual way.

Conclusions

Although this review has ranged over a rather broad area encompassing a number of different research disciplines, there appears to be a common concern linking most of the research reviewed - is cannabis a significant public health risk? It is the opinion of this author that this question is still, after almost thirty years of research effort, unclarified.

In the physiological domain there certainly appears to be reasonably strong evidence of the potential threat to the human respiratory system associated with chronic, heavy cannabis smoking. However, whether use amongst moderate, social cannabis smokers poses the same risk is a question as yet unanswered. This risk is, of course, from the combustion by-products of the cannabis leaves, stems, and flowers and is not directly associated with the active ingredient for which cannabis is sought and used, Δ-9-tetrahydrocannabinol. One method for obviating such a health risk would be to make pharmacologically pure forms of orally ingestible THC available to those who want it in a similar manner to the way in which governments now regulate the production and distribution of alcohol.

In general, the results of much of the research concerning the effects of THC on the CNS appears to be either negative or inconclusive. The work of Heath and colleagues is an exception, of course, but as was shown above, this research is highly confounded and cannot be considered to be reliable in spite of the fact that it is widely quoted in scientific and other literature on cannabis.

Turning to the psychological dimension, the "amotivational syndrome' appears to be a not very useful hypothetical construct which is poorly grounded in empirical psychological data. The populations studied in this type of research are often psychiatric referrals and it has been revealed in other, more methodologically thorough research, that supposed sufferers of cannabis-induced "amotivational syndrome' often had signs of clinical depression prior to their use of cannabis. As argued earlier in this paper, "amotivational syndrome' appears to be a category seeking content, especially when the profile of individuals studied is better understood through the more conventional psychiatric diagnostic category of depressive disorder. Nevertheless, there is little doubt that cannabis has some effect on behaviour and performance. Driving a motor vehicle while intoxicated with cannabis will certainly increase

the risk of an accident. However, the apparent 'permanent' changes to memory and performance as demonstrated in some 'ward' studies are not entirely convincing considering the exaggerated dose levels used and the long half-life of THC in humans.

Studies in performance and aptitude such as that by Mullins *et. al.* (1974) highlight the value-driven quality of much of the research reviewed here. When the effects of alcohol and other drugs are controlled, cannabis-only users apparently show significantly greater overall aptitude than any other group amongst U.S. Air Force recruits. Nevertheless, this did not stop the authors from sounding alarms concerning the potential harmful effects of cannabis on performance in young men. In fact, it appears as if most of the research reviewed by this author commenced from a position that cannabis is dangerous to human health, physiological and psychological, it only remains to discover just how dangerous. In pursuing this objective authors such as Brill and Nahas (1984) breached all current good scientific practice by using the writings of a Nineteenth Century physician to make a supposed empirical case in the late Twentieth Century without any apparent recognition on their part of the potential for misinterpretation or misapplication.

It appears as though two possible hypotheses are available regarding cannabis and public health. The first is that cannabis is a potential public health problem, it merely remains to be discovered to what degree. The second states that cannabis represents no significant or unreasonable threat to the general public well-being. According to the physicist, James Jeans (1958), expanding on William of Occam's 'Razor':

> When two hypotheses are possible, we provisionally choose that which our minds adjudge to be the simpler, on the supposition that this is the more likely to lead in the direction of the truth. It includes as a special case the principle of Occam's razor - 'entia non multiplicanda praeter necessitatem' (p.183).

From the position of this widely held scientific principle it is arguable that only the second hypothesis is reasonable regarding the current debate on cannabis. From the use levels observed in Australia (31.9% have ever tried cannabis and 7.1% use it once a month or more [Department of Health, Housing and Community Services, 1991]), when taken in conjunction with the very small number of cases who actually come to the attention of medical authorities as a direct result of cannabis use, one can only conclude that the simpler hypothesis which covers the facts is that cannabis use does not pose a significantly increased risk to public health over and above many other activities which are considered necessary and/or socially acceptable.

As suggested by Weil (1975) altered state experiences appear to be a natural human capacity which can be facilitated by the ingestion of psychoactive substances such as THC. The negative reporting, vis-à-vis cannabis and performance, may be understood as a value judgement regarding what type of mental state and hence style of performance is deemed useful by society. In other contexts, the present-centred altered state of consciousness, which can be induced by cannabis, is highly prized in the contemplative religious traditions of Christianity, Buddhism and Islam. The ability of this altered state to open broader perspectives and, hence, new life meanings appears to be part of a growth process which has the power to bring about personal renewal and relieve psychological suffering. Although these religious traditions have developed methods for achieving these altered states without the use of pharmacological facilitators, the need for such experiences is probably innate to human personality. In the age of high-tech medicine the use of chemical substances to achieve these ends should not be surprising.

The psychiatrist Arthur Deikman (1982) suggests that the bifurcation of consciousness into "observing' (objective) and 'experiencing' (receptive) selves is the basis of mystical experience with the latter, 'unreflected' state, too often missing in our lives. He further reminds us that without the cultivation of the "experiencing self' we may fail to enter into mystical awareness and therefore be unable to heal the psychopathology innate to our human condition. He thus argues for a return to mysticism as both outlook and technique in the process of human growth:

> The mystical tradition has been concerned with the very problems that modern psychotherapy has been unable to resolve. It makes sense, therefore, to investigate mysticism with a view to dealing more effectively with those problems and gaining wisdom as human beings (p. 4).

Finally, it has been suggested by numerous renowned philosophers and psychologists that without the ability to enter wholly into these 'experiencing' altered states, we may fail to fully actualise our human creative and cultural potentials (James, 1936; Jung, 1960; Maslow, 1968; Wilber, 1977). Thus, we may understand the use of cannabis in society not only as a public health issue, but as a sign of a fundamental but unfulfilled human need, which cannabis users attempt to fill by use of the drug, albeit inadequately.

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APPENDIX B

Learning-Curve Model of the Cannabis Market

(Graphs from M.A.R. Kleiman 1989, *Marijuana; Costs of Abuse, Costs of Control*, Greenwood Press, New York, pp. 59–64.)

The learning-curve theory of the cannabis market provides the best explanation of the continued maintenance of a high price for a commodity which can be readily produced without extensive lead times or abundant capital.

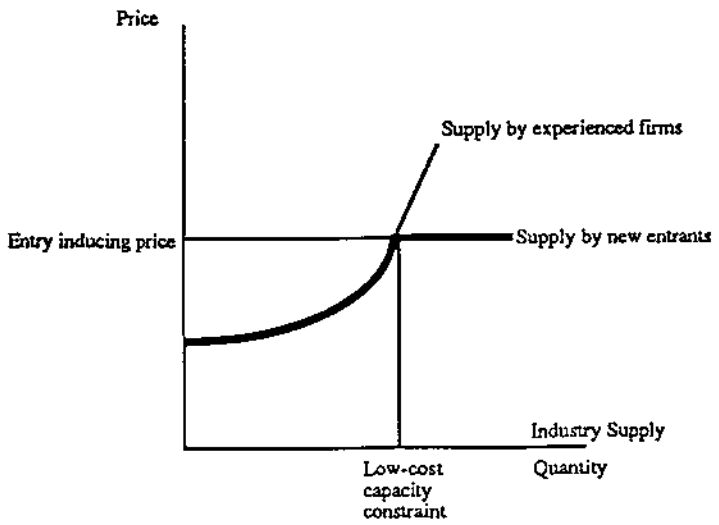
It is based on the premise that there are two grades of suppliers – experienced (low cost) and inexperienced (high cost). The major component of cost in relation to illegal commodities is presumed to be the cost (risk) of dealing with others who may steal, threaten violence or otherwise fail to fulfil contractual obligations or alternatively may turn out to be law enforcement agents or their informants. These costs (risks) are related to experience.

In general, low cost suppliers cannot become larger without taking additional risks; to expand, most must, for a period at least, revert to being 'inexperienced' (high cost) suppliers. There is, in effect, a constraint on overall low cost capacity.

If the market requires a greater quantity than can be supplied by low cost suppliers then additional 'inexperienced' suppliers will find it worthwhile to enter the market. The price level at which such entrants find it *just* worthwhile to enter i.e. where the promised profits begin to outweigh the risk and the alternative returns from other enterprises, can be called the entry-inducing price.

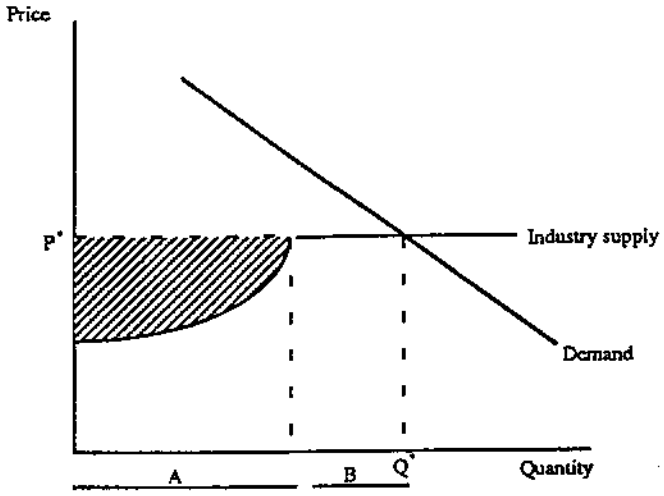
Given the relative ease with which cannabis can be produced and supplied, in the long run, competition between inexperienced suppliers will tend to reduce the price to about the level of this entry-inducing price. The new entrants are in effect the price setters and the supply curve for cannabis is therefore a combination of the low cost supply schedule and the newcomer supply schedule, as in Graph 1.

Graph 1 – The Learning-Curve Model of the Marijuana Market



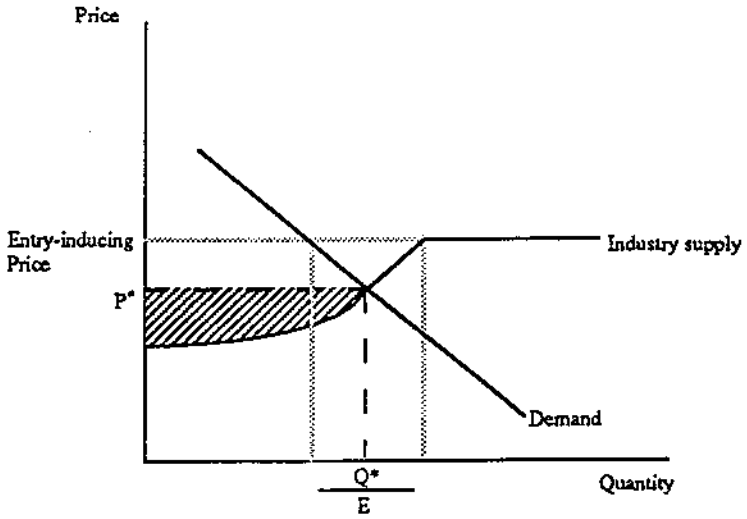
Graphs 2 and 3 add in the dimension of the quantity required by the market, illustrating what occurs when experienced firms are not able to supply the entire market and the extent to which such firms are able to make extraordinary levels of profit.

Graph 2 – Learning-Curve Theory: Quantity Demanded at the Entry-Inducing Price is Greater than Supply by Experienced Firms



A: Quantity supplied by experienced firms
B: Quantity supplied by new entrants
Hatched area: Experienced firms' quasi-rents

Graph 3 – Learning-Curve Theory: Supply by Experienced Firms at the Entry-Inducing Price is Greater than Quantity Demanded



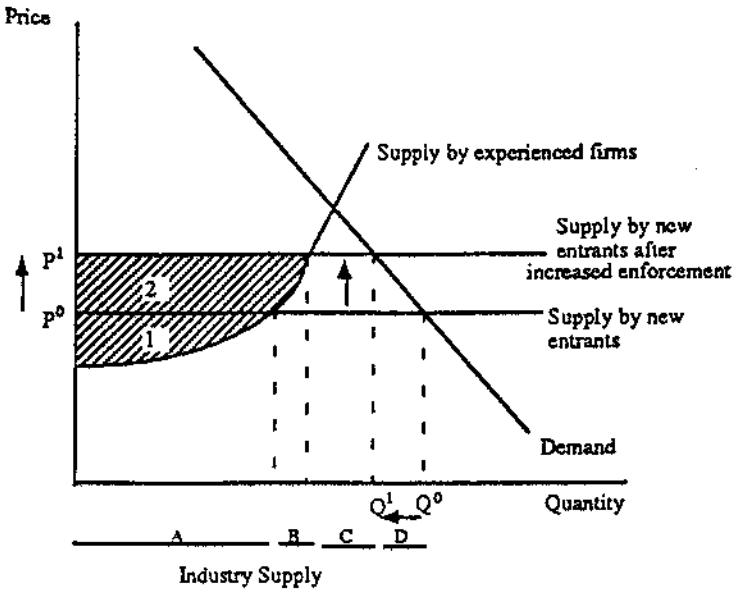
E: Excess of quantity supplied by experienced firms over the quantity demanded at the entry-inducing price

Hatched area: Experienced firms' quasi-rents

The Effects of Enforcement

If enforcement is directed or mainly felt by new entrants this will have the effect of increasing the cannabis price (and of ensuring a supply of new entrants). The abnormal profits of experienced firms will increase while any decrease in consumption will be from the market share of the new comers. These effects are shown in Graph 4.

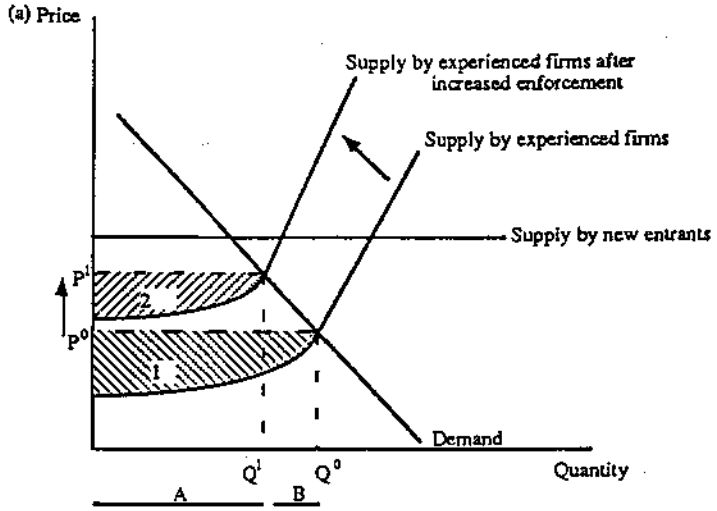
Graph 4 – Learning-Curve Theory: Enforcement Aimed at New Entrants



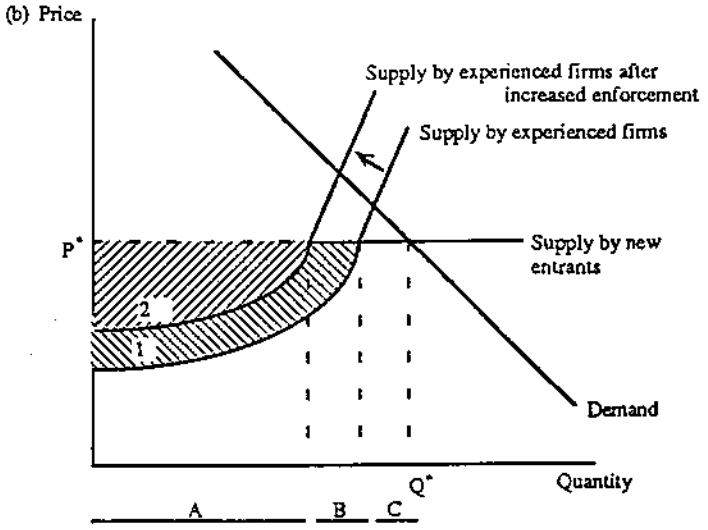
A: Quantity supplied by experienced firms before increased enforcement
B+C+D: Quantity supplied by new entrants before increased enforcement
A+B: Quantity supplied by experienced firms after increased enforcement
C: Quantity supplied by new entrants after increased enforcement
Hatched area 1: Experienced firms' quasi-rents
Hatched areas 1+2: Experienced firms' quasi-rents after increased enforcement

If, on the other hand, enforcement is specifically targeted on to 'experienced' firms, their costs of doing business will increase and their level of extraordinary profit will be reduced (Graph 5(a)). However, if the market is large enough to sustain newcomers, cannabis price (and consumption) will be unaffected (Graph 5(b)).

Graph 5 – The Learning–Curve Theory: Enforcement Aimed at Experienced Firms



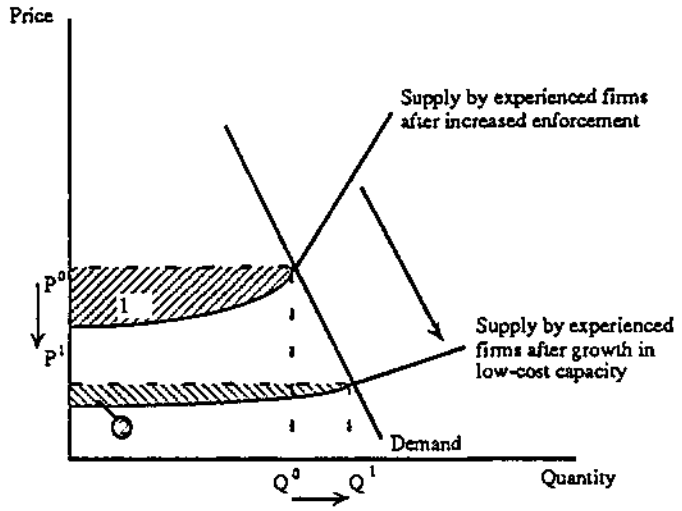
A+B: Quantity supplied by experienced firms before increased enforcement
A: Quantity supplied by experienced firms after increased enforcement
Hatched area 1: Experienced firms' quasi-rents before increased enforcement
Hatched area 2: Experienced firms' quasi-rents after increased enforcement



A+B: Quantity supplied by experienced firms before increased enforcement
C: Quantity supplied by new entrants before increased enforcement
A: Quantity supplied by experienced firms after increased enforcement
B+C: Quantity supplied by new entrants after increased enforcement
Hatched areas 1+2: Experienced firms' quasi-rents
Hatched area 2: Experienced firms' quasi-rents after increased enforcement

If offenders are effectively removed from the market (i.e. through being incarcerated) this is effectively a removal of low cost capacity and an increase in the market share of newcomers (some of whom will become 'experienced'). This balance between the creation and the removal (through retirement, imprisonment or death) of low cost capacity is the significant long run influence on the market. Graph 6 illustrates the hypothetical situation where there were no limits to the growth of low cost capacity. Competition between low cost suppliers and the abnormal profits would disappear (the US cocaine market may provide just such an illustration).

Graph 6 – Learning – Curve Theory: The Growth of Low-Cost Capacity



Hatched area 1: Experienced firms' quasi-rents
Hatched area 2: Experienced firms' quasi-rents after growth