

## Theses

[27]

Aldiss, Ceridwen. [2000]. *"Designer drugs": an investigation of the drugs, their impacts and the relevant legislation, with particular reference to the status of "ecstasy" (MDMA) in New Zealand*. MSc, Forensic Science, University of Auckland, Auckland.

[Available from University of Auckland. The full paper is not available, this commentary is based on the introduction and conclusion.]

Reviews the concept of 'designer drugs' and discusses the associated health and legal issues. Incorrectly describes ecstasy as a designer drug.

Notes that most designer drugs in New Zealand are Class C. Some say this does not treat the issue seriously enough, though from a harm minimisation perspective the approach is sound.

Arguments have been raised both for classifying ecstasy as Class A, and for leaving it in Class B. Other strategies, not just legal classification, must be employed to deal with drug harm, Aldiss claims.

[28]

Anderson, Liam. [2000]. *Designer drugs: their use and the law*. MSc, Forensic Science, University of Auckland, Auckland.

[Full copy of the paper is not available. This is based on the contents page, introduction and conclusion.]

Discusses the effects, pharmacology, and history of GHB and Ecstasy. Discusses and compares national and international drug policies and legislation. Asks whether the classification of ecstasy in New Zealand should change.

The Misuse of Drugs Act 1975 needs to be amended in order to cover analogues that may become popular. The Act provides thorough coverage of analogues, but a few, such as GHB, "slip through the cracks".

Anderson claims that ecstasy remains a "large" threat to society.

*This seems like an overstatement, given the relatively low usage levels in this country.*

[29]

Finter, Nicola. 1997. *Ecstasy manufacture*. Research essay, Forensic Science, University of Auckland, Auckland.

[ill. Available University of Auckland. Whole thesis not available. This annotation based on the introduction and conclusion.]

Discusses the process of manufacturing ecstasy. The author confuses Ice, a form of methamphetamine, with a new form of ecstasy.

New Zealand has not experienced the problem of ecstasy due to its geographical isolation, but proximity to Australia means we may.

Ecstasy requires a complex process and many chemicals to manufacture; impurities are often found and the dismantlement of labs is hazardous.

Ecstasy "is one of the most dangerous drugs of the 1990s", and new analogues of ecstasy are continually being developed, such as Ice.

*The low death rate from ecstasy seems to disprove the first claim, and it is incorrect to describe Ice, a form of methamphetamine, as an analogue of ecstasy. At any rate, there is no trend towards the development of new ecstasy analogues.*

*The report treats ecstasy as a problem that must be controlled.*

[30]

Foley, Kristen Andrew Scott. 2001. *An exploratory investigation into the recreational use of drugs: a thesis submitted in partial fulfilment of the requirements for the Degree of MA (Applied) in Recreation and Leisure Studies*. MA (Applied), Recreation and Leisure Studies, Victoria University of Wellington, Wellington.

Investigates, through interviews, perspective on drugs and leisure of recreational drug users.

Six self-professed recreational drug users (including ecstasy and methamphetamine), aged between 22 and 29, are interviewed. Drugs are seen as recreational, something fun to do, often while doing something else and in a social setting. None reported experiencing problems while under the influence of illegal drugs, though all stated that they knew people who had experienced problems. All would use drugs less frequently as they got older, though some said they would try more expensive drugs. This view is located in the life span development literature, which states that recreational drug taking is part of the life course of many young people. Drug use, writes Foley, is no longer marginal, but has become normalised.

[31]

Gannaway, Marita Victoria. [1999]. *Designer drugs & drug laws*. Research essay, Forensic Science, University of Auckland, Auckland.

[Available from the University of Auckland. The complete paper was not available, this annotation is based on the introduction and conclusion.]

Reviews the laws around "designer" drugs, defining all illicit drugs as 'designer drugs'.

*This differs from the conventional definition.*

A history of designer drugs, including discussion of the dangers and of clandestine laboratories, is presented, followed by a chapter on drug legislation. The final chapter consists of an analysis of ecstasy (which is defined as 'tablets sold as ecstasy' - a useful working definition that may include MDEA and MDA as well as MDMA). The rise in popularity of MDMA followed, and may have been caused by, its criminalization. Media coverage is unbalanced and focuses on the negative side of the drug.

Ecstasy is a lesser problem in New Zealand than elsewhere, as the cost is prohibitive for young users. Cost also means that drink spiking is less of a problem.

The neurotoxic effects of ecstasy are reviewed perceptively.

Ecstasy fatalities may be caused by other substances being sold as ecstasy. But testing of pills is controversial, and the pill testing kits imported by the Wild Greens are unlikely to be accepted here. The reaction to Ngaire O'Neill's death would have been less had the victims been "juvenile delinquents from South Auckland".

The three MDxx compounds have similar effects but different legal status. Therefore, the author suggests, MDMA should be upgraded to the Class A, like MDA. Downgrading MDA is unlikely (though just as logical). The (similar) legal debate over MDMA in the USA is discussed.

[32]

Hely, Lincoln S. 2004. *The effect of chronic MDMA treatment on pre-trained DMTS performance and acquisition of a DNMTS rule in rats: a thesis submitted to the Victoria University of Wellington in fulfilment of the requirements of Master of Science in Psychology*. MSc, Psychology, Victoria University of Wellington, Wellington.

MDMA-treated rats showed a small deficit in accuracy on repeating a task they had already learned. However they showed no impairment on a novel task compared to controls. It appears that chronic exposure to a high dose of MDMA impairs memory, but not the acquisition of new tasks, in rats.

The literature review shows that negative effects of MDMA on memory have been commonly found in humans, but not typically in animals. There is speculation that this may be because human studies did not control for cannabis use, and it may be this, rather than ecstasy use, that is causing the memory problems.

[33]

Komen, Raymond Paul. [1997]. *Methods of synthesis for methamphetamine and their hazards*. Research essay, Forensic Science, University of Auckland, Auckland.

Knowledge of methamphetamine manufacturing methods is important to the police, in order that "controls can be implemented on reagents that may be used as precursors", and the sale of precursors can be monitored in order to identify manufacturers. This knowledge also helps ESR workers identify potential hazards when they are investigating clandestine laboratories.

Knowledge of syntheses may also be important to identify impurities, which can:

- reveal the synthesis used to produce the drug,
- link samples to a common laboratory or dealer, and
- because impurities may have potentially harmful effects on users.

General hazards of manufacture include solvents, irritants, corrosives, metals, non-metals and salts. Risk include irritation to lungs or eyes, loss of consciousness, chest pain, irritation to skin, dizziness, nausea and vomiting.

Methods of methamphetamine synthesis are described. The recipes are not presented in sufficient detail for a reader to manufacture methamphetamine. Ingredients are listed, but not volumes, and instructions to 'heat' are given, without specifying the temperature. Chemicals, apparatus, methodology and safety data, are provided for each synthesis.

Contains a brief but accurate discussion of the nature of methamphetamine, its desired effects and undesired side effects, as well as legal status.

[34]

McBriar, Todd. [2001]. *Forensic science project, 410:715*. Research essay., Forensic Science, University of Auckland, Auckland.

Explains the methods of synthesis of MDMA, and describes substances that have been found in pills sold as ecstasy, including ketamine, PMA and tiletamine.

Provides a standard history of ecstasy (MDMA), its pharmacological and toxicological effects. The sources cited are well-respected (including Shulgin).

*Intelligent comments include the observation that MDMA is neither a stimulant nor a hallucinogen, but should be called an empathogen. This is a subtle point that the media (and even some researchers) constantly miss. Some terms are not explained, however, for example 'set and setting', which would be understood by users, but not by lay people.*

MDMA neurotoxicity, including the effects of the enzyme CYP2D6 and of SSRIs, is described.

*Some information is dubious: "it is regarded that even after a single and relatively low dose (10mg/kg) of MDMA" animals experience neurotoxicity. 10mg/kg is not a low dose - it would equate to an average-sized adult male human taking around 8 strong pills at once.*

There is no good scientific study of exactly why ecstasy has caused deaths - size of dose, frequency of dose, physical condition of user and environment are all cited as possible culprits.

*This is an interesting and seldom-heard point.*

Another interesting point is that amphetamine psychosis is temporary. The effects are equivalent to schizophrenia, but last for days or weeks after usage is stopped, rather than being permanent.

Synthesis issues are discussed.

Points out that PMA is not ecstasy, but is sold as it, and that education is the problem for helping people avoid health risks caused by this deception.

Concludes that the occurrence of a variety of drugs in ecstasy tablets is cause for concern, and the reason for the variability is not really known. The illegal nature of the drug trade is the probable reason. The dangers of this are "extremely adverse and unpredictable".

*An intelligent overview, with some original and insightful views.*

[35]

Rodda, Lana. 1998. *When drugs are synthesised, impurities can be present in the preparation that relate to the method of manufacture.* Research essay, Forensic Science, University of Auckland, Auckland.

[Available University of Auckland general library. Not all of the paper will be provided. This annotation is based on the introduction and conclusion only.]

Impurities are usually found in illicitly prepared drug samples, as the final product is not usually purified. The type of impurities will vary depending on the reactants used and the method of preparation, and so can be used to discover the manufacturing process used, and possibly the source of origin. The impurities can be matched with impurities in soil or water to support assumptions that amphetamines are being manufactured nearby. The article discusses means of manufacturing amphetamines (including methamphetamine and ecstasy) and means of analysing samples.

The author concludes by suggesting the creation of a database of drug samples, enabling faster profiling and greater matching of impurities.

[36]

Russell, Bruce R. 1999. *Neuroprotection, "ecstasy" & fenfluramine: a thesis submitted for the degree of Doctor of Philosophy at the University of Otago, Dunedin, New Zealand.* PHD, Pharmacology, University of Otago, Dunedin.

An attempt to identify substances that may be neuroprotective against the long-term toxicity induced by MDMA. Experiments were performed using male rats injected with MDMA and with one of three receptor antagonist (two dopamine receptor antagonist and a site-specific NMDA antagonist). Both the D1 antagonist SCH22390 and the NMDA antagonist ACEA1021 provided

neuroprotection against the long-term serotonergic and dopaminergic neurotoxicity caused by MDMA. SCH23390 also inhibited the hyperthermia induced by MDMA, without inhibiting locomotor activity. ACEA1021 produced a hypothermic response while partially inhibiting locomotor activity.

The author concluded that MDMA neurotoxicity involves hyperthermia and increased D1 dopaminergic stimulation.

A detailed description of the experimental process is provided.

A general introduction discusses the history and chemistry of amphetamine analogues, explains neurotransmitters and neurotoxicity, and possible reasons for the latter, is also provided. MDMA may cause long-term deficits on cognitive performance. Some studies show a decreased density of serotonin transporter sites, a sign of neurotoxicity. Primate studies show that neurotoxicity occurs at doses comparable to human doses.

Studies show that MDMA can substitute for methamphetamine, but not for hallucinogens, in animals trained to recognise the difference. Therefore, the author suggests, MDMA has minimal hallucinogenic effects - something that users would agree with.

[37]

Taylor, Penny. 2001. *Ecstasy: what's in that pill? the drugs, incidence and dangers surrounding the adulteration of illicit ecstasy pills*. MSc, Forensic Science, University of Auckland, Auckland.

Says that 'ecstasy' tablets often contain substances other than MDMA, and that this can be harmful for users due to the differing effects of these drugs, and the potential interactions of these drugs with MDMA.

Studies of the ingredients of ecstasy pills are typically small-scale and localised. Around 60-66% of pills contain ecstasy, and another 20% or so contain other drugs. Up to 20% contain no active ingredients.

The media often publishes myths about adulteration - claiming (incorrectly) that anything from heroin to rat poison or crushed glass has been found in pills. Typical adulterants, such as aspirin, are inert and harmless.

Substances like DXM and PMA in pills pose a potential risk as they interact badly with MDMA.

*An intelligent and well-argued thesis, covers all major issues relating to adulteration of ecstasy pills.*

[38]

Taylor, Penny. 2003. *An investigation into the detection and comparison of methamphetamine residues produced during smoking and manufacture*. MSc, Forensic Science, University of Auckland, Auckland.

[Requires permission from the author before any extract may be quoted in a published text. Contains commercially sensitive material that is embargoed until July 2004. Available from University of Auckland Library.]

Investigates the volatility of two forms of methamphetamine - methamphetamine base and methamphetamine hydrochloride. The base form was far more volatile than the hydrochloride (salt) form.

Investigated (in the laboratory) the identification, detection and movement of trace elements of methamphetamine hydrochloride that had been deposited on room surfaces after smoking.

Reviews methamphetamine's history, legal status and effects. Claims (without citing supporting research) that methamphetamine can produce irreversible damage to the central nervous system. Discusses recent drug trends in New Zealand, including the increasing number of users and the increasing number of clandestine laboratories being discovered.

Being able to detect residue of drugs from smoking is extremely important. It is currently assumed that, if drug residues are present, this indicates that manufacturing is taking place. If the residues were caused by someone smoking methamphetamine, clearly a less serious crime has been committed.

Knowing the volatility of forms of methamphetamine is important for scientists analysing drug samples - more volatile forms might evaporate if not treated carefully.

Results showed that drug residues can move between rooms after smoking, and can be detected in the room, even if only a small amount has been smoked. So detection of a small amount of methamphetamine may merely indicate smoking of methamphetamine, not necessarily that drugs have been manufactured there.

Describes the manufacture of methamphetamine using the reduction of pseudoephedrine with hydrogen iodide (the most common method used in New Zealand). Describes the by-products of this method of manufacture, which would obviously be of interest to forensic scientists.

[39]

Thom, Katey. 2004. *Doing ecstasy in Christchurch: ecstasy users' experiences in relation to drug regulation strategies in New Zealand: a thesis submitted in partial fulfilment of the requirements for the Degree of Master of Arts in Sociology at the University of Canterbury*. MA, Sociology, University of Canterbury, Christchurch.

[Availability is restricted, this annotation based on the abstract only.]

"Explores the relationship between ecstasy users' experiences in a variety of settings and drug regulation strategies in New Zealand", based around interviews with 10 Christchurch ecstasy users, and responses to 40 questionnaires. Aims to "contribute to the development of harm reduction strategies".

Claims that what ecstasy does is neither completely socially constructed nor a product of its pharmacology. Instead, experiences emerge as a result of users' employment of specific practices and knowledge: "users both 'make' and 'let' the effects of ecstasy occur".

Discusses topics such as:

- 'the four benefits of ecstatic pleasure',
- the stages of the ecstasy experience;
- how and where it is taken;
- consumption of other drugs;
- "setting, friends, and frame of mind";
- purity, access, dependence, and short and long-term consumption;
- control mechanisms, regulating use, and reducing hangovers; and
- how this contributes to the development of harm reduction policies.

[40]

Zheng, Yiwen. 1998. *Neurotoxicity of amphetamine analogues: a thesis submitted for the degree of Doctor of Philosophy at the University of Otago, Dunedin, New Zealand*. PhD., University of Otago, Dunedin.

Examines the mechanism by which methamphetamine neurotoxicity occurs.

Begins with a general discussion of the chemistry and history of amphetamine analogues. Suggest that amphetamines are taken to "induce....abnormal psychotic responses" (as well as for "kicks"). Most would think that psychotic responses are an *unwanted* side effect, not a desired one. A history of MDMA bears a close textual similarity to Russell's (1999) thesis (see p.6 of Zheng and p.5 of Russell).

Evidence for short and long-term neurotoxicity is discussed. This mainly comes from animal studies. The exact nature of neurotoxicity varies from animal to animal, even (as seen in the research reported in this thesis) between different strains of mice. One interesting observation is that repeated low doses cause more wide and extensive damage to serotonin neurons than do the single high doses which seem to be more commonly reported in scientific studies. The implications of this for human use are clearly not good. Human studies show no dopamine damage, but in mice MDMA damages both dopamine and serotonin receptors.

The results support the argument that neurotoxic metabolites may play an important role in the neurotoxicity induced by MDMA. Further results suggest that acute 5-HT depletion plays an important role in neurotoxicity. Analogues that do not cause neurotoxicity are identified. This result holds implications for the development of non-neurotoxic amphetamines for use as medicines.

*From the point of view of this bibliography, it is interesting that no mention is made of the development of non-neurotoxic recreational drugs.*