Effective drug policies need grounding in scientific knowledge of the effects of psychoactive drugs, yet relevant research is scarce – particularly studies of the subjective experience of drug intoxication. Such research is now increasingly urgent both because of the unprecedented increase in the prevalence and consumption of illicit drugs over the last decade and also because of the relatively small but growing numbers of people experimenting with a range of hallucinogenic drugs (e.g. in the free-party dance sub-culture). This paper presents a model of the phenomenology of drug effects and a methodology for exploring individual experience of the effects of psychedelics and other drugs. A 10-dimensional model of the subjective experience of drug effects is presented, covering: class, category, stage, phase, duration, intensity, stability, consistency, consensus and evaluation. This model was developed from a top-down synthesis of concepts from several relevant theories and a critique of extant research, combined with a bottom-up modification process based on research into self-reported drug effects. The latter exercise involved a group of 10 experienced drug users who took various psychedelic and other drugs in rural settings over eight weekends between 1994 and 1999. Each participant was trained to report on their drug experiences, thus becoming a psychonaut: a scientific explorer of inner space. A methodology was gradually developed for measuring the subjective effects of drugs, based on three instruments: a general questionnaire about personal characteristics and drug-taking history; a periodic monitoring procedure employing physiological measures and external observations and a retrospective self-report questionnaire, based on response formats.
employing Shulgin’s 5-point scale of effect intensity, coupled with a directional indicator. This was supplemented by the psychonaut’s descriptive account of the drug experience. The psychonautics method has been used to explore the subjective effects of many drugs, including MDMA, LSD, ketamine, amphetamines and opiates. The most recent, sophisticated applications of the method involved exploring the subjective effects of 2CB and DMT, providing an ‘effects profile’ for each drug. It is concluded that the science of psychonautics is in its infancy and that resources are urgently required to expand theory and research in this field.

1. INTRODUCTION

1.1 The mind-body problem

Any discussion of the effects of psychoactive drugs takes a position on what metaphysical philosophers call the mind-body problem. For instance, when we talk about a person’s experience (e.g. a normal visual perception, or a visual hallucination) and the neurotransmitter changes in the brain to which it corresponds (e.g. a normal synaptic process, or drug-induced synaptic modification), are we talking about one event or two linked events? This is the essence of the mind-body problem and has puzzled philosophers for centuries. Monists believe that there is only one reality (mind or matter), while dualists believe there are two (mind and matter) and pluralists believe there are more than two (mind, matter and, for example, God). The two primary monist positions are physicalism and mentalism, represented by the key philosophies of materialism (reality is physical) and idealism (reality is psychological). The two core dualist positions are that mental states and events are an effect of the brain (e.g. an epiphenomena), or conversely, that brain events and states are brought about by mental processes. The basic position taken here is monist - that there is only one reality, one stuff making up the universe - but also there are (at least) two conceptual systems for thinking about and describing reality. For instance, when you perceive something (or hallucinate it under the influence of a drug), there is one event occurring in the universe, but we have two languages for describing it - a physicalistic language which explains it in terms of brain processes and a mentalistic language which describes it in terms of mind processes. An analogy is provided by computers, where a particular computation (e.g. producing an image on the VDU screen) can be explained in terms of hardware operations (e.g. electrical on/off sequences) or in terms of software operations (e.g. programming instructions). This paper presents a model of drug effects from the psychological perspective and thus focuses on mental "software " rather than brain "hardware".

1.2 Why study drug effects?
Many experts from different fields and professions involved with drug use have concluded that the development of an effective drug strategy urgently requires a major increase in the resources available for research into the effects of psychoactive substances. There are few other areas of national and international policy where a strategy towards a social problem is developed without recourse to a thorough knowledge base which maps out the main territory. Yet, in the case of the drug problem, the effects of drugs on mental processes and behaviour are notably under-researched and theories and models of the psychology of drug experiences are conspicuous only by their absence. Such research is now increasingly urgent both because of the unprecedented increase in the prevalence and consumption of illicit drugs over the last decade (Newcombe 1998) and also because of the relatively small but growing numbers of people experimenting with a range of hallucinogenic drugs – for example, in the free-party dance sub-culture (Newcombe 1999).

Why are the subjective effects of drugs so under-researched? There are a variety of responses to this question (depending on who you ask), from conspiracy theory views that the government would prefer knowledge of what drugs do to remain shrouded in mystery, to intellectual criticisms that science has trouble coming to grips with the phenomena of subjective experience. Yet there have been increasing calls from scientific authorities for more systematic study of conscious experience in general and the subjective effects of drugs in particular. For instance:

*Even if we understand how the brain works, can we really expect to understand subjective experience ... or will we need a whole new science to make any progress at all? ... biologist Francisco Varela argues for just that: "Why the reluctance to consider one’s experience as a realm to be explored with a discipline just as rigorous as the one invented by science for material phenomena?"


*In any debate about the possible decriminalisation of drugs of addiction we need reliable information about the effects of the drug on the normal population. The more we learn about heroin, cannabis, ecstasy and so on the more likely we are to formulate sensible policies for their control.*

In short, as well as developing a systematic description of the effects of different drugs at the microlevel (eg. on memory, perception, movement etc.), we also need to understand how they affect more complex experiences and behaviours at the macrolevel. The best examples of this are recent research into the effects of drugs on driving, sexual behaviour and occupational tasks.

1.3 Earlier research into subjective effects of drugs

Research into the psychological effects of drugs is relatively scarce, compared with the levels of research into areas such as prevalence, prevention and treatment. The relevant scientific discipline for the study of the psychology of drug effects is phenomenology, as used by existential psychologists and other explorers of conscious experience. Also known as introspectionism, phenomenology is the science of experience and its main method is verbal self reporting of mental phenomena (events, states and processes). Within this conceptual framework, the definition of a drug effect is the subjective awareness (experience) of a mental state/event bought about by a chemically induced modification of psychological processes.

Pioneering autobiographical examples of phenomenological research into the effects of drug use include De Quincey’s *Confessions of an English Opium Eater* (1822), Ludlow’s *The Hasheesh Eater* (1857), Freud’s *Cocaine Papers* and Cocteau’s *Opium* (1930) – see Jay (1999) for an excellent selection of such work. Interest in the effects of LSD and other psychedelics expanded from the early 1950s (eg. Huxley’s *The Doors of Perception*), with much research being conducted by the US military – primarily to find a drug which disabled the enemy during wartime. The late 1950s and early 1960s witnessed several studies into the addictive and mental disorder potentials of opiates and stimulants (eg. Connel’s 1958 classic monograph *Amphetamine Psychosis*). There were also small groups of studies which examined the effects of opiates and stimulants on the inmates of institutions - e.g. prisons - or medical services - e.g. drug clinics (see Parry 1992). The late 1960s and the 1970s witnessed a wave of research and theorising on the subjective effects of cannabis (eg. Becker’s *On Becoming a Marijuana User*, Tart’s
On Being Stoned

and quasi-scientific accounts of the effects of other "hippie" drugs (e.g. Timothy Leary on LSD, John C. Lilly on ketamine). These developments were accompanied by several classic literary contributions (eg. Junky by William Burroughs Snr, Speed by William Burroughs Jnr and Fear and Loathing in Las Vegas by Hunter S. Thompson).

For instance, Becker's classic study On Becoming a Marihuana User provides an early illustration of the importance of the new user's subjective experience and evaluation of a drug's effects on his/her future behaviour involving the drug. In brief, Becker noted that new users of cannabis became regular users through a three-stage process. First, new users have to learn to use the drug by the most effective methods and styles of use (eg. inhaling deeply when smoking cannabis) in order to experience the effects of cannabis. Second, users have to recognise and perceive the effects of the drug on subsequent trials. During initial uses of the drug, unusual changes in subjective experience may not be identified by people with weaker introspective capacities, or are quickly forgotten when the intoxication stage ends since there are no previous experiences to which they can be easily assimilated in memory. Indeed, it is a common observation that people trying cannabis for the first few times frequently report no effects while appearing to experienced users in the group as if they are as stoned as anyone else. When new users have learned to experience and recognise the effects, they are then able to label them with sub-cultural jargon so that the experience can be communicated. For instance, one well-known effect of cannabis is the sudden increase in hunger it can produce. Thus, rumbling noises in the stomach may pass unnoticed to the novice user, to be replaced in later cannabis sessions with "my stomach feels strange", then "I'm feeling really hungry" and, eventually, "I've got the munchies". Third, the user must then decide whether an identified effect is pleasant or unpleasant to them - for instance, do they regard cannabis-induced hunger as a desirable or undesirable experience?

1.4 Recent research into the subjective effects of drugs

Over the last two decades, the progress of the literature on subjective drug effects could be described as a disconnected undercurrent in the tidal flow of drugs research, with relevant
publications scattered across several disciplines and academic journals. For instance, novel conceptual frameworks for theorising about the psychological dimensions of drugs have emerged, including McKenna’s *Food of the Gods* and Wilson’s *Prometheus Rising* (which is receiving new interest in the 1990s), though these are not generally utilised by researchers. Indeed, systematic research into subjective drug effects has been particularly neglected – notable exceptions being D.M. Turner’s (1994) *Essential Psychedelic Guide* and the Shulgins’ PIKHAL (1992) – an acronym for *Phenethylamines I Have Known and Loved* - and TIKHAL (1997) – Tryptamines etc. - which provide guidelines for exploring whole regions of psychedelic space. Finally, a vast wealth of information about the psychological effects of drugs is kept in the private reports on clinical trials of pharmaceutical companies, but this is largely unpublished and difficult to access, for obvious reasons.

One clearly identifiable area of research into drug effects, which has emerged since the late 1980s, lies within phenomenological studies of the effects of *ecstasy* (e.g. Liester et al., 1992; Solowij et al., 1992; O’Dwyer & Raistrick 1994; Lenton et al., 1997). However, although a small number of studies have examined the phenomenology of the effects of individual drugs (notably cannabis and ecstasy) or sometimes compared two related drugs (eg. heroin and methadone, cocaine and amphetamines), there have been few studies which have systematically compared several drugs on a range of subjectively perceived effects. Only three have so far been found in the British literature over the last decade. Atha & Blanchard (1997) and Release (1997) have assessed drug users’ experiences of the good and bad effects of a range of illicit drugs. Parker and colleagues (1998) investigated users’ experiences of the good and bad effects of four dance drugs, with separate examination of effects in the initial and residual phases of intoxication. The methods and findings of these studies are briefly described below, followed by a critique of their approaches.

First, Atha & Blanchard (1997) conducted an anonymous questionnaire survey of drug consumption among 1,333 "regular users" of cannabis in Britain in 1994, which updated and extended the findings of a similar survey a decade earlier. The sample was made up of three voluntary sub-samples: 1,091 people attending a major pop festival (50% response rate); 160 people contacted through direct mailing to a list of members of a pro-cannabis lobby group (13% response rate) and 82 people contacted through snowball sampling. The male to female ratio of respondents was 2:1 and the mean age was 25 years (range: 15 to 68 years).

Two-thirds were employed and one in six were unemployed. The sample under-represented teenagers and ethnic minorities. Overall, 95.3% had used cannabis in the previous week and the vast majority had tried other illicit drugs - typically psychedelics and stimulants. In addition to asking several questions about the use of cannabis and other drugs, the survey also asked respondents about the subjective effects of drugs. Respondents first rated the effects of each drug on a 10-point scale, where zero represented highly negative effects, five indicated neutral and 10 indicated highly positive effects. Overall, the effects of nine drugs were rated as positive:
cannabis (8.8), magic mushrooms (7.3), LSD (6.9), ecstasy (6.4), tea/coffee (5.9), alcohol (5.9), cocaine (5.5), amphetamines (5.3) and other psychedelics (5.2). By contrast, the effects of five drugs were rated as negative: solvents (1.5), barbiturates (2.1), crack (2.1), heroin (2.5) and tranquillisers (2.5).

Respondents were also asked to indicate the best and worst effects and their experiences with each drug they had tried. However, the data are interpreted and presented in a manner which makes it difficult to draw direct statistical comparisons. Therefore, Chart 1 presents the main three worst effects and main three best effects (in order of mentions) for the six drugs whose effects were reported on by at least 50 respondents. It can be seen that users of each of these drugs tend to share certain universal good effects (notably euphoria) and bad effects (e.g. paranoia), though each of these drugs also typically has one or two specific effects which sets it apart from most or all of the others – and these are usually good rather than bad effects. Thus, for instance, confidence is the hallmark of cocaine, raised awareness characterises LSD and loving and sexual feelings distinguishes ecstasy from the other drugs.

Second, Release (1997) conducted face-to-face interviews with 503 people attending dance events at 18 venues throughout London and the South East between March and November 1996. The interviews were voluntary, anonymous and confidential, though the procedure for selection of respondents was unclear (described as ‘randomised’ and achieving a 98.5% response rate). Amongst other questions about drug use and attendance at dance events, respondents were asked to indicate which of 16 negative effects and 16 positive effects they had experienced for each of 12 drugs, with breakdowns of findings by sex and age-group provided for ecstasy only. As in the study by Atha & Blanchfield, no distinction was made between stages or phases of intoxication and no measures were taken of the intensity or other dimensions of these effects (see next section). The findings show much correspondence with the findings of Atha & Blanchfield, though also some notable differences. The drugs with the most positive effects were (respectively) ecstasy, LSD, cannabis, amphetamines, cocaine and magic mushrooms. By contrast, just three drugs averaged more than one negative effect: ecstasy, amphetamines and LSD. The ratio of positive to negative effects was highest for magic mushrooms, followed by cannabis and cocaine.

It can be seen that positive effects were notably more likely to include affective states and states of consciousness, whereas negative effects were far more likely to be based on physiological effects. Cognitive and perceptual effects were rarely indicated – especially effects on vision and hearing, attention, short-term and long-term memory, thinking and learning. This may be due to general psychological issues (i.e. such effects may be less amenable to subjective awareness and conscious assessment) or to methodological artefacts (i.e. such effects may be harder to verbalise or spontaneously report upon). This is a critical issue for future research.
It can be seen that some effects are shared by many or most of the drugs, while other effects distinguish a particular drug or group of drugs from the others. For instance, happiness is a positive effect reported as a main effect of 11 of the 12 drugs (not ketamine) - mirroring the findings of Atha & Blanchard (who used the term ‘euphoria’ in place of ‘happiness’). Similarly, some negative effects were reported for half or more of the 12 drugs, including nausea, blurred vision and paranoia. The most prevalent positive effects associated with different drugs were happiness (75% of ecstasy users, 61% of cannabis users) and energy (69% of ecstasy users, 63% of amphetamine users). In contrast, the most prevalent negative effects were paranoia (28% of LSD users) and weight loss (27% of amphetamine users). Depressant drugs were characterised by the positive effect of reduced anxiety and, to a lesser extent, by the negative effect of fatigue. Stimulant drugs were distinguished by the positive effects of confidence and energy, and by the negative effects of mood-swings, insomnia and depression. Hallucinogenic drugs were characterised by the positive effects of hallucinations and heightened perceptions and - along with stimulants - by the negative effect of paranoia. This profile is particularly associated with psychedelic drugs (LSD, magic mushrooms) – that is, the effects of ecstasy seem more similar to those of stimulants than hallucinogens (Chart 3).

Age and gender-related differences in the self-reported effects of ecstasy were also examined by the Release study. Women were up to twice as likely as men to report most negative effects. Indeed, women were over twice as likely to report most of the negative physiological effects, namely nausea, stomach pain, headaches and skin problems (as well as irregular periods, which was not applicable to men). Men reported only two negative effects as much as women, both of which related to states of wakefulness, namely insomnia and passing out. Women were also more likely than men to report most positive effects of using ecstasy, though the gap was not as great as with negative effects. The smallest gender difference was reported on sexual excitement (30% of men and 31% of women). The authors concluded that "it is possible that women experience more effects, both positive and negative, due to their lower body weight" (1997: 23).

Reporting of negative effects diminished with increasing age, with 15-19s being one and a half times more likely than over-30s to report negative effects of using ecstasy. The biggest differences between the youngest and oldest age group – where the former were more than twice as likely as the latter to report the effect – involved physiological effects, namely weight loss, stomach pains, skin problems, irregular periods and blurred vision (although this effect could be classified as perceptual). The effects on which age seemed to have least influence were both states of consciousness: insomnia and fatigue. To gloss over the findings on negative effects, the distinguishing effects were blurred vision and nausea for 15-19 year olds, vomiting...
and skin problems for 20-24 year olds and mood-swings and panic/anxiety for 25-29 year olds. There may also have been a certain amount of age-related false attribution – that is, attributing experiences (particularly long-term effects) to the effects of ecstasy when it is fairly possible that these experiences/effects could be attributed to age-related characteristics. For instance, younger people in the survey were more likely to attribute skin problems and irregular periods to ecstasy use, while older people were equally likely to attribute memory problems and insomnia to ecstasy use. Lastly, over-30s were somewhat less likely to report positive effects than younger age-groups, though again the difference was not as notable as for negative effects. Two of the most notable age differences in positive experiences on ecstasy involved escaping from worries ((32% of 15-19s, compared with 12% of over-30s) and experiencing oneness with the world (14-16% of 15-29s compared with 26% of over-30s).

Finally, Parker and colleagues (1998) carried out a 5-year follow-up survey of a cohort of several hundred young adults in the North West of England. The initial cohort, recruited in 1991 when they were aged 14-15 years, numbered 776 fourth-year pupils from four schools in Merseyside and four in Greater Manchester. In 1995, the fifth year of the survey was based on a boosted sample of 529 respondents (now aged 18-19 years), including 229 of the original cohort. In the 1995 survey, those who had tried each of four drugs – cannabis, amphetamines, LSD and ecstasy - were asked about their experiences of the good and bad effects of these drugs on the last occasion of use, with separate questions about the effects in the initial and residual phases of intoxication. The number of respondents who had used each drug varied from 102 for ecstasy (20% of sample) to 294 for cannabis use (59%). The five main positive effects for each drug were reported by half or more of the ecstasy users and at least a third of the users of each of the other three drugs. Chart 4 shows that, of the 14 positive effects listed, three were found to be included in the five main positive experiences reported for each drug: friendliness, fun and happiness. A further two positive effects – excitement and energy – were included in the top five positive effects for three of the drugs (not cannabis, whose other two main positive effects were relaxation and carefree feelings). Ecstasy was also more likely than the other drugs to be described as producing positive effects, including loving and sexual feelings (echoing the findings of Atha & Blanchard). The least reported effect of the 14 which were listed was feeling strong (from 1% of cannabis users to 18% of ecstasy users).

Negative effects, numbering 11 in total, were far less likely to be indicated. The three main negative effects for three of the drugs – cannabis, amphetamines and ecstasy - were reported by between 5% and 10% of users, while the three main negative effects for LSD were reported by between 15% and 31% of LSD users. The most common negative effects – each listed in the top three negative effects for most or all of the four drugs – were feeling foolish, paranoia and anxiety. The most prevalent negative effect was reported to be queasiness by cannabis users, paranoia by LSD users, paranoia/anxiety by amphetamine users and loss of control by ecstasy users. LSD was more likely than the other drugs to be described as producing negative effects,
including feeling foolish and scared. Some of these ‘effect profiles’ (e.g. *fun* in all four profiles; *queasy* for cannabis; *foolish* for LSD) are notably different from those emerging from the Release survey and this may be partly or largely based on the labels and categories used to describe and classify drug effects – as well as the instruction to focus on the last occasion of use.

Respondents were also asked about their positive and negative drug experiences ‘as the effects were wearing off’. Between one and three in 10 respondents indicated that they felt no problematic effects in the residual phase of intoxication, from 11% of amphetamine users to 27% of cannabis users. Three residual positive experiences were reported by more than one in 10 respondents for each of the four drugs. Included in the top three positive effects for all four drugs were relaxation and happiness, though three of the four drugs – cannabis, LSD and amphetamines - exhibited ‘sadness that it was over’ as their top residual ‘positive’ effect. The ‘desire for more’ was the fourth most prevalent residual positive effect.

The first and second most frequent experiences for three of the drugs were feeling depressed and having a headache, though these were also first and third ranking effects for cannabis users. Similarly, feeling sick was in the top four effects for three drugs (not LSD). The fourth most prevalent negative effect was feeling disappointed, which ranked fourth for both amphetamines and ecstasy.

Comparison of the findings of these three studies reveals many similarities but also several salient differences, though these could be largely or wholly due to differences in the methods employed. For instance, Atha & Blanchfield and Release did not find as much headache and depression reported as did Parker and colleagues – though the latter were concerned with both initial and residual phases of intoxication. In addition, compared with the studies by Atha & Blanchard and Parker and colleagues, the Release study was more concerned with specific effects rather than general drug experiences and also included more physiological effects.

In conclusion, though recent phenomenological studies of drug experiences should be applauded for their revival of research into the subjective effects of drugs, they share many methodological problems. Thus, while noting that each of the three studies described above were primarily focused on other drug issues, their approaches to measuring and reporting the phenomenological effects of drugs were fundamentally flawed. First, there are ambiguities in the level of description – with concepts like effect and experience being used interchangeably and ‘effect’ being used to cover both complex mental states like paranoia as well as simpler
component processes like heightened perceptions, confused thinking and hostility (Newcombe 1996). Second, these studies either presented respondents with restricted, haphazard lists of effect items or else applied an unsophisticated, undetailed conceptual analysis to open-ended responses. Third, respondents were either asked about drug effects they had experienced in general for each drug or about the last occasion of use – which may have been last week or last year. Fourth, the use of terminology to label drug effects was generally vague and often ambiguous and inconsistent. Each study tended to adopt different labels for presumably similar effects. More consideration needs to be given to the similarities and differences between the following pairs of terms/phrases, all of which were employed in these studies: feeling sick/nauseous; happy/euphoric; calm/relaxed; disappointed/sad it is over; panic/lost control. Lastly, the classification of certain effects as positive (good) or negative (bad) is also debatable – for example, ‘sad it was over’ (positive) and glad it was over (negative).

Clearly, what is needed to develop the science of psychonautics is a conceptual model of drug effects, coupled with a methodology which allows the design of measurement instruments which systematically explore drug effects. Such an approach would develop and utilise a standardised terminology for subjective drug effects, as well as paying more attention to such important issues as level of description and the dimensions of drug effects. The development and current state of such a model is described in the next section.

2. A CONCEPTUAL MODEL OF DRUG EFFECTS

2.1 Dimensions of drug effects

A useful, viable classification system has categories and concepts which are mutually exclusive, totally exhaustive, internally consistent, clear and unambiguous and empirically testable. This paper presents an initial model of the subjective effects of drugs which attempts to meet these criteria, as well as having practical applications in social policy responses. This model has evolved from a top-down synthesis of concepts from several relevant theories and a critique of extant research (see previous section), combined with a bottom-up modification process based on research into self-reported drug effects (see next section). There are 10 key dimensions of the subjective effects of drugs which comprehensively and explicitly define them. Strictly speaking, the first two of these are not dimensions but basic, nominal categories of "content", while eight are dimensions along which each effect can vary. However, for convenience, each dimension may also be trichotomised into high, medium and low levels.
2.2 Content classification

The first two related conceptual tools concern the basic classification (taxonomy) of the content of the effect. The three basic ways of classifying a drug effect are physical, mental and social. Each of these classifications involves fundamentally different levels of human existence and thus requires its own theoretical language and framework – namely physical science (e.g. biology), psychological science (e.g. cognitive psychology) and social science (e.g. sociology). For instance, take a specific drug effect like ‘seeing’ geometrical patterns in one’s visual field while under the influence of LSD. The broad classification of the effect is psychological - that is, it must be described and interpreted within the concepts and theories of psychology - the experience cannot be reduced to physiological events in the brain (though neurological theories offer another kind of explanation). In contrast, a perceived rise in body temperature can be classified as physical - that is, can be given a physiological (biological) explanation (though the subjective perception of the temperature change still requires a psychological explanation).

Within each of the three main classes of effect, there is a hierarchy of sub-classes or categories, which can be described in terms of a taxonomy (similar to biology's classification of life-forms into kingdoms, species, families etc.). For instance, ‘seeing’ geometrical patterns on LSD can be initially classified as a perceptual effect and within perception, can then be categorised as a visual effect and, within visual effects, can then be categorised further as a form effect. Other visual effects might include replicating images, changes in colour intensity, light flares and movement traces.

Psychological effects can be classified into five classic groups:

1. Cognitive - information-processing aspects of mind (eg. memory, learning, planning)
2. Perceptual - a special class of cognitive processes based on sensory information
3. Affective - emotional states and events (basic feelings, social emotions, moods)
(4) States of consciousness – including energy, identity,

(5) Unconscious – drives, intuition, non-conscious states (eg. dreams, trance).

Consciousness is the most complex of the higher-level psychological processes and it is important for a conceptual framework to distinguish the key general parameters of consciousness from closely related physiological, cognitive and affective processes/structures (Newcombe 1986). For instance, fatigue (awareness of low energy levels) is considered a dimension of consciousness, whereas aching muscles is a physical effect and lack of concentration is a cognitive effect. The primary parameter of consciousness is awareness (varying from comatose, through various levels of sleep, to various levels of waking consciousness from drowsy to alert). Other abstract parameters of consciousness range from waking states to more non-conscious states, including comfort (general awareness of body sensations), sociability (orientation to other people), wisdom (capacity to intelligently apply knowledge and experience), intuition (capacity for preconscious, non-rational inferencing), the closely related dimensions of naturality (degree of integration with/alienation from the natural world) and spirituality (awareness of and sensitivity to mystical aspects of life) and finally the unconscious states of dreaming, hypnosis and trance.

The typical experience, whether “ordinary” or drug-induced, has all four aspects in variable weightings. Thus, two primary levels of description are required in a taxonomy of drug effects: atomic and molecular. Atomic effects are the conceptual building blocks of the model and molecular effects are the core structures, made up of patterns of atoms. For instance, paranoia is a molecular effect made up of the atomic effects of increased attention to others’ behaviour (perceptual pick-up), biased attributions about their intentions (cognitive process) and feelings of persecution and vulnerability (emotional states). In developing a classification model of drug effects, efforts should also be made to make the definition of each effect category mutually exclusive (no overlapping content) and internally consistent (no conflicting content); while the completed set of categories should be totally exhaustive (cover all possible effects). Ideally, this requires the design and elaboration of a formal descriptive language - a set of symbols and their possible relationships (like Schank & Abelson’s conceptual dependency theory, which models the types of events and causes involved in episodes of social interaction). However, it is possible to proceed in an "organic" fashion, developing parts of the theory of drug effects as and when it becomes appropriate (i.e. when feedback from others arrives or there are new empirical inputs). Hopefully, this gradual and partly lateral construction of the drug effects theory will also allow one part of the model to catalyse or "bootstrap" another part. It also facilitates strategic flexibility and more plasticene manoeuvres than a stricter approach to theorising would permit, and since we are heading into uncharted territory, this is clearly a wise approach.
2.3 Stages and phases

The third and fourth conceptual tools - *stage* and *phase* - mirror the structure of the *class* and *category* system but on the temporal dimension. That is, stage refers to the three broad time-slots that characterise any target event: before, during and after. In the case of drug effects, the before-stage concerns expectations and conditioned responses - for example, some heroin users, especially before they have their first hit of the day, will retch when they see a bag of smack. This pre-intoxication stage is followed by the main intoxication stage (sometimes called short-term effects) and this is followed by the third and final post-intoxication stage (sometimes called medium and long-term effects. After-effects is an ambiguous term, which blurs the distinction between the residual phase of intoxication and the post-intoxication stage (see below).

These stages can also be further divided into sub-stages called phases. There are three phases of the intoxication stage - onset, main and residual effects. For instance, the most famous effects in each intoxication phase are the *rush* caused by injecting drugs (onset phase), the peak effects of psychedelic trips (main phase) and the come-down from use of stimulants (residual phase). Most studies of subjective drug effects have neglected the phase dimension, though there are recent notable exceptions (e.g. Curran & Travill 1997; Parker et al., 1998). Lastly, there are two key phases in the post-intoxication stage: medium term and long-term after-effects. The former phase concerns effects in the days and weeks following intoxication, while the latter phase concerns effects occurring several months and years following intoxication.

2.4 Intensity, duration and stability

The fifth to seventh dimensions - *intensity*, *duration* and *stability* - can also be grouped together for conceptual reasons. The intensity of an effect concerns its subjectively perceived quantitative level (i.e. strength, amount). For instance, effects such as euphoria, nausea etc. can be described as weak, moderate/clear or strong in intensity.

The Shulgins (1992, 1997) have developed a six-level system of classification, based on the three traditional levels - weak, clear and strong – ‘topped and tailed’ by a zero level (no change) and a maximum level. The sixth level is a special category designed to represent the unique
intensity of a ‘peak experience’ (transcendental experiences which typically bring about major, lasting changes in the way someone thinks, feels and behaves).

The duration of an effect concerns how long it lasts, which depending on the type of effect, can be measured in seconds, minutes, hours or even days. One of the more useful devices for describing drug effects is the "intensity by duration" graph (see Figure). The schematic diagram shows the two intensity-duration graph lines which characterise the euphoriant effect of cocaine when smoked (as crack rocks) compared with sniffed (in hydrochloride powder form).

The seventh dimension - the stability of a drug effect - concerns the extent of change in the presence or absence, or intensity, of an effect. The key dichotomy can be expressed in the question: is the effect continuous or intermittent? Stability is related to both duration (the occurrence of an effect over time) and intensity (level of awareness of an effect). That is, stability represents a primary feature of the relationship between intensity and duration - the extent to which an effect has constant levels of intensity (eg. high/low) over a set period of time. When the intensity of an effect alternates between high and low (or present and absent) over the course of the stage, the effect is called intermittent. When intensity is constant (high or low, present or absent) across the entire duration of the stage, the effect is called continuous.

The stability dimension is applicable to each stage of intoxication, from pre-intoxication to post-intoxication. For instance, take the example of an LSD trip and the effects which some people experience. In the main intoxication stage (short-term effects) visual hallucinations tend to be intermittent, whereas the effect of raised awareness is relatively continuous. In the post-intoxication stage (medium to long-term effects), flashbacks are intermittent effects whereas when a model psychosis occurs it tends to have a continuous duration from onset to recovery. Lastly, there are additional conceptual dimensions which apply only to long-term drug effects (see Box).

2.5 Consistency and consensus

The eighth and ninth primary dimensions of drug effects are consensus and consistency. These concepts are borrowed from attribution theory, a cornerstone of social psychology. Consensus concerns the likelihood or prevalence of the effect across different individuals and groups. A high consensus effect is one experienced by most people when using that drug and a low consensus effect is one rarely experienced by people who use that drug. For instance, talkativeness is generally a high consensus (prevalent) effect of cannabis smoking, though for some people (eg. introverts) it remains fairly unlikely. Consistency concerns the prevalence of
an effect across different occasions (times and settings) for the same individual. For instance, the high consensus effect of talkativeness caused by cannabis use may be low consistency for a particular individual, who may experience the effect only on some occasions of being stoned, perhaps only in some sets (e.g., very good mood) and some settings (e.g., company of close friends). In short, by contrast to the other dimensions which are internal measures of psycho-biological effects of drugs, consensus and consistency are external, psycho-social measures of drug effects which represent their prevalence across people (drug users) and places/times (drug-taking episodes).

As has been argued above, wild claims are increasingly being made about the prevalence of a drug effect based on isolated incidents, or a small series of cases highlighted by the mass media (e.g., ecstasy psychoses, instant addiction to crack). One important task for the scientific study of drug effects is therefore to establish in each case the prevalence of an effect across people (including population sub-groups) and contexts (including personality types, social situations and cultures).

2.6 Subjective evaluation

Last, but by no means least, is the tenth dimension of drug effects: *subjective evaluation* - the user’s personal assessment of the value of a drug effect. It should be immediately stated that this is clearly the dimension of most interest to most drug users and also that one person’s euphoria is another’s dysphoria. The aesthetics of an experience - the evaluative feelings that the user experiences in relation to the effects of a drug on their mind - are bathed in subjectivity. Good, bad and neutral are three values which provide a broad tripartite classification of this currently mysterious evaluation process. However, it should be clear that subjective assessments of the value or worth of a drug effect can be based on various questions, depending on a person’s worldview, attitudes and so forth - for instance: how good did it feel? how interesting? how useful? how emotional? how instrumental? how spiritually enlightening? how challenging? etc.

DIMENSIONS OF POST-INTOXICATION DRUG EFFECTS

In addition, there are three other important dimensions of drug effects which apply only to the post-intoxication stage – medium and long-term effects - and so are not general dimensions of drug effects. These conceptual dimensions are permanence, reversibility and functional significance. The typical scenario in which these concepts are applied are debates about the
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Written by Russell Newcombe
Thursday, 16 December 1999 00:00

harmful long-term effects of drug use - for instance, the effects of ecstasy (MDMA) on serotonergic neurotransmission and thus on mood and mental health. The validity and weight of such claims need to be evaluated by assessing five sequential questions, the first two of which are preconditions for the subsequent three questions – namely:

(1) Does the effect exist? More specifically, how prevalent is the alleged effect of the drug among occasional and regular users?

(2) If the drug effect exists and/or is prevalent among users, is it caused wholly or largely by use of the particular drug, or are other factors important (e.g. other drugs, consumption factors, set and setting features)?

Once evidence of a link between a harmful neuro-psychological outcome (e.g. mental disorder) and the use of a particular drug (e.g. ecstasy) is established, the next three relevant questions derive from the three dimensions of long-term drug effects mentioned above, namely:

(3) is the effect temporary or permanent (e.g. does it start to disappear when use of the drug ceases)?

(4) if the effect is permanent, is the effect reversible or irreversible (e.g. by medical treatment, therapy, etc.)?

(5) if the effect is irreversible (or even if it is not), is it functionally significant?

The question of significance concerns whether a permanent change in mental/brain processes actually has any impact on a person’s behaviour which is relevant to their capacity to perform the tasks required by people in general or by them in particular. For instance, research may find evidence of permanent changes in the brains of some people using particular drugs, but this may have no (significant) effects on their psychological functioning; and if it does, these changes in mental functioning may have no (significant) effects on behaviour. Thus, the crux of many such debates often rests on what people regard as "significant" changes in mental processes or behaviour. Such a judgement ultimately rests on moral values and consensus
among experts is perhaps the best yardstick which can be offered.

In summary, the relevant chain of questions in assessing claims about the long-term psychological effects of a form of drug use may be summarised as: does the effect happen? Does the drug cause it? Is the effect permanent? Is it reversible? And, lastly, does it significantly affect the behaviour or life of the person?

3. METHODOLOGY

3.1 Participants

The research instruments were developed between 1994 and 1999 by testing and discussion among a voluntary group of psychonauts over 10 weekend sessions. A psychonaut is defined as an adult user of psychoactive drugs who agrees to participate in voluntary, confidential and anonymous research which investigates the subjective effects of drugs as they are used in normal, everyday settings. They also need to meet three other criteria for selection:

(a) they should have experience of regularly using psychoactive drugs over at least 10 years, particularly hallucinogenic drugs;

(b) they should currently be in good physical and mental health, with no drug-related problems;

(c) they should be educated to university/college degree level and preferably have professional experience of dealing with drug problems or responding to drugs issues (e.g. relevant education, research, training, service provision, etc.).

The age range of the 10 psychonauts was 25 to 55 years (seven were men and three were women). All but one were white Europeans. Their occupations included writers, medics, academics, drugs workers and other professions.
3.2 Procedure

Each of the ten individuals who met these preconditions participated in between one and eight of the 10 research sessions conducted during the 5-year period, averaging two or three sessions each. The setting for the sessions was generally a rural house/cottage and the locations included various parts of the UK, France, Switzerland, Netherlands and Germany. Before taking part in a research exercise, most potential psychonauts were present at sessions in which other people participated as psychonauts and each received some degree of training in the evolving methodology, depending on their natural introspective talents and the stage in development of the training techniques. At present, the initial psychonautics training session takes between one and two hours and is based on describing the conceptual model of subjective drug effects, as well as the related methodology for measuring such effects and a 'dress rehearsal' (simulation) of the self-reporting tasks involved.

Turning to the main research session, each psychonaut is involved in a four-stage procedure:

1. they complete an initial questionnaire before consuming the drug to be monitored – this asks general demographic and personal questions, as well as taking a history of their past and present drug use, and, ideally, this stage should also incorporate a battery of personality and other standardised psychological tests;

2. they consume the drug to be monitored and are subject to external monitoring by the research team during the intoxication stage;

3. as soon as possible after the drug experience is over, they complete the main self-report questionnaire for measuring subjective drug effects;

4. the completed questionnaires are examined, and a group discussion is held about the nature of the drug experience and the capacity of the research instruments for effectively measuring such experiences.
The main drugs explored over the 10 psychonautics sessions included:

*Hallucinogens:* cannabis, LSD, DMT, MDMA, MDEA, 2CB, psilocybe, mescaline,

*Deliriants:* ketamine, nitrous oxide, alky nitrites

*Stimulants:* amphetamines, cocaine, khat

*Depressants:* benzodiazepines, heroin, morphine, alcohol

### 3.3 Research instruments

As mentioned above, there were three research instruments – one for before, during and after the drug experience. These questionnaires have been in a perpetual state of *dynamic* evolution through theorising and testing, though are now nearing a *static* ‘ratchet’ stage of completion (see Pirsig 1991). The initial questionnaire, completed before the drug experience, collects demographic and personal information and a detailed record of past and current drug use. In larger sample surveys, such information, along with other psychological measures, would be used to investigate the influence of set (personality, mood, expectations, etc.) and setting (situation, behaviour) on the subjective effects of drugs. Psychonauts who reveal a personal or family history of mental disorder are also advised at this point that some drugs can trigger latent mental disorders. However, the decision to take a drug remains their own.

During the intoxication stage, each psychonaut is externally monitored by a researcher in order to collect information about a core set of physical and mental effects. General observations are taken throughout this stage, accompanied by the taking of systematic measures at periodic intervals – the time being dependent on the duration of the drug experience (e.g. a one-hour experience may be systematically measured at 15-minute intervals, whereas a six-hour experience may be systematically measured every 60 minutes). At present, the core set of systematic measures can be collected in about 5 minutes. The number and frequency of
systematic measures was kept to a minimum in order to reduce the influence of research ‘intrusions’ on the experience of the psychonauts. The core set of physiological measures include pulse rate, temperature, breathing rate, muscular tension, digestion and characteristics of the eyes (e.g. pupil dilation), mouth (e.g. saliva levels) and skin (e.g. perspiration). The main behavioural and psychological measures taken cover body movements (motor activity, coordination), speech (rate of talking, coherence), level of cognition (awareness, memory) and affective states (mood, emotions).

The main self-report questionnaire was completed by all psychonauts as soon as possible after the drug experience. For some, this would be on the same day before sleeping, while others completed the questionnaire the following day after sleeping. The booklet currently has four main sections, which are designed collectively to cover most of the important dimensions of subjective drug effects – though further modifications will inevitably be required. The first section assesses some of the general parameters of the experience, including:

(1) Consumption factors: drug(s) taken, route of use and dose;

(2) Intoxication parameters:

(a) the duration of the three phases of intoxication (onset, main and residual);

(b) key dimensions of the overall experience – intensity, pleasure and interestingness;

(c) the extent to which the experience met with or conflicted with expectations.

The second section briefly assesses the subjectively experienced physical effects of the drugs, using two types of measure. Five dimensions of physical effects were found to be both highly important across a range of drugs and reliably reported when measured on five-point bipolar scales, employing very and quite qualifiers and a normal/average midpoint. These were: muscular tension (relaxed-tense), temperature (cold-hot), pulse rate (slow-fast), breathing (slow-fast) and state of mouth (dry-moist). Instead of circling one of the five numbers, psychonauts were also given the option of indicating that the physical effect
varied across the experience (e.g. felt hot and cold at different times). Other physical effects which were reported from the early stages of research but which were typically less frequent or specific to particular drugs, were presented as a list of 30 items. Psychonauts were then asked to indicate the level of their experience of these effects during intoxication – none, a little, or a lot (or don’t know). These physical effects ranged from autonomic reactions such as shuddering and yawning, through affective displays like crying and laughing, to partly voluntary actions such as pacing and sighing.

The third section focused on the main effects of interest: psychological phenomena. These were divided into four sub-sections, based on traditional classifications in psychology: perceptual modalities, cognitive processes, affective states, states of consciousness and social behaviours. The first sub-section has six measures pertaining to the six perceptual modalities – visual, auditory, olfactory, gustatory, tactile and balance. The second sub-section focuses on five measures of thought and reasoning (e.g. short-term memory, decision-making). The third sub-section covers the six basic emotions (happiness, sadness, anger, fear, disgust, surprise) and some higher social emotions (e.g. shame, love). The fourth sub-section focuses on a miscellany of mental states not easily classified under the first three headings – including drives (e.g. libido, hunger, comfort) and complex higher-level states of consciousness (e.g. humour, sense of identity, intuition, mystical states). The final sub-section focuses on three key measures of social behaviour (e.g. group orientation, talkativeness). Each measure of subjective psychological effects is based on a five-point unipolar scale of effect intensity coupled with a directional indicator. Following experimentation with other measurement approaches, this has so far turned out to be the most ‘intuitively right’ approach to psychonautics. The intensity scale was adapted from Shulgin’s scheme for classifying the level of awareness of drug effects, excluding the four-plus special category (see previous section). On the current intensity scale, zero represents no change, 1 stands for weak effects, 2 indicates clear effects, 3 represents strong effects and 4 indicates maximum effects. Ideally, three copies of the second and third sections should be provided, one for each of the three phases of effects: onset, main and residual. However, in practice this can make the questionnaire difficult and tedious to complete and its retrospective nature means that the accuracy of such a detailed assessment could be restricted by memory and fatigue effects. Thus, a more useful and viable approach might be to question psychonauts about whether there are any salient differences between the effects reported in the main phase and those in the preceding phase (onset) and following phase (residual). If salient differences are reported, these can then be measured on an appropriate sub-set of scales.

Finally, the fifth section allows psychonauts to give an account of the experience in their own words. Though there is an obvious argument why this account should be given before completing the previous four sections, the reason why it is presented as the final exercise is so that psychonauts are able to identify any aspects of the experience that are not covered by the previous questions and rating scales and so give details of these unmeasured effects of the
drug in their descriptive account. Future revisions of the method can then attempt to develop ways of measuring the ‘untapped’ content of the drug experience.

4. SOME PRELIMINARY FINDINGS

4.1 The 2CB and DMT sessions

In the initial sessions, the main aim was to develop the methodology of psychonautics. Though this remains a major aim of the research, more recent sessions have involved exploratory efforts to develop a framework for systematically describing and comparing the effects of specific drugs. This is achieved by constructing an ‘effect profile’ for a target drug through sifting the findings for a group of psychonauts in two stages:

(1) a numerical summary of the numbers reporting each level of intensity and each directional indicator for each listed effect;

(2) a verbal summary of the effects reported at the top two levels on the consensus dimension – that is, by whether the effect was reported by all or most, as compared with half, some or none of the psychonauts.

The preliminary findings reported here concern the construction of effect profiles for two psychedelic drugs:

(1) DMT: dimethyltryptamine, an indolealkylamine hallucinogen (related to LSD); and

(2) 2CB:bromodimethoxyphenethylamine, a phenylalkylamine hallucinogen (a chemical cousin of MDMA/ecstasy).
Eight psychonauts participated in this session, each having decided of their own free will to take 2CB on the first day (swallowing 5mg pills in doses of either 20 or 25 mgs), while a further six took DMT on the second day of the weekend session (smoking it in a glass pipe – some just once, others twice or more). The setting for the session was an isolated cottage in a rural area. However, two problems were encountered, one with each sub-session. First, the 2CB sample was reduced to six for the data analysis because two psychonauts who took 20mg doses reported no effects whatsoever after 2 hours, and so both resorted to taking a dose of LSD in order to overcome their disappointment. They were thus excluded from the analysis, which was intended to produce an ‘effect profile’ for 2CB alone. Some psychonauts also consumed moderate amounts of cannabis, nicotine and/or alcohol either before or during the session. Since such recreational drug use was part of these participants’ normal behaviour, and since the researchers were invited observers, this ‘contamination’ had to be accepted – though all psychonauts agreed not to consume any other drugs (unless, as was the case with the 2CB, no effects were experienced after a reasonable period of time had elapsed). Second, respondents reported greater difficulties with reporting the effects of DMT compared with 2CB due to the far shorter duration of the experience (for instance, they were somewhat more likely to indicate ‘don’t know’ for DMT effects than for 2CB effects). After inhaling DMT smoke, effects came on and peaked in about 10 seconds (the onset phase), lasting about 10-20 minutes (main phase), before tailing off with diminishing effects for another 5-15 minutes (residual phase). In contrast, after swallowing the 2CB, the ‘wait’ for effects varied from 30 to 90 minutes for different psychonauts, thereafter increasing fairly rapidly for another 30-60 minutes (onset phase); the subsequent main intoxication phase then lasted for 3-5 hours – with most psychonauts reporting a very sudden termination of the experience and a residual phase of weak, diminishing effects for about 1-2 hours. Thus, the very short duration of the DMT experience means that there was less time to contemplate the effects and less information to reflect upon afterwards.

The small number of psychonauts participating in the session was naturally determined by the voluntary nature of the event, but were also sufficient for research purposes at that time – namely, developing both the methodology and a reporting format for the mass of findings generated by the methods. (Future studies will of course need to collect data from far larger samples than this.) The researcher was invited to monitor and investigate the effects of these drugs as on previous occasions and was assisted on this session by a second researcher. The research instruments employed were earlier versions of the present instruments, the main differences being the type of effect items employed (though there is substantial overlap) and the utilisation of a 3-point intensity scale - none, noticeable and strong (noticeable has since been divided into weak and clear levels of intensity and strong has now been divided into strong and maximum levels of intensity). Data from the eight respondents was analysed using Microsoft Excel and SPSS. Due to space constraints, the main findings reported here are based on responses about effects in the main and residual phases of the intoxication stage, as measured by the third research instrument (self-report drug effects questionnaire).
4.2 Effect profiles for 2CB and DMT

Charts 8 & 9 provide the numerical summaries for 2CB and DMT respectively. Effects are listed under the main intoxication phase and residual phase. The main phase is further divided into physiological, perceptual, affective/conative, cognitive and social effects; while the residual phase was monitored at this time by a set of five key ‘after effects’. Also, at this stage of development, perceptual and social effects did not have directional indicators which could be checked, although the direction of other effects is indicated by a plus or minus sign (both if mixed effects are reported) – generally representing a more/less or better/worse dichotomy. At the general level, it can be seen that physiological effects and cognitive effects were typically noticeable but not strong for each drug, while other groups of effects were typically strong or noticeable for 2CB. In contrast, the other groups of effects were typically just noticeable for DMT – with some perceptual and conative effects being hardly reported at all. In short, keeping in mind the greater difficulties the psychonauts had when reporting on DMT, these findings still strongly suggest that 2CB has a much broader range of effects compared with DMT (or at least more higher-intensity effects).

Effect profiles are based on shorter verbal summaries of the effects reported by a majority of psychonauts, and therefore adopt a cut-off point above a consensus of half - i.e. an effect reported at the noticeable or strong levels of intensity by at least five psychonauts. Chart 10 presents the preliminary effect profiles for DMT and 2CB, employing a structure and format which should allow standardised and more meaningful comparisons of the effects of these two drugs – including main and residual phases, 30 categories of main effects organised into five general classes of effect, two levels of consensus on these effects and three levels of intensity.

The hallmark effects of DMT and 2CB both included changes in visual perception, while the DMT experience was also primarily distinguished by enhanced mood and self-awareness; the 2CB experience was primarily distinguished by a second set of perceptual alterations - in balance and co-ordination. Both drugs shared the primary effect of changes in visual perception, when interpreted within the context of periodic monitoring data and psychonauts’ descriptive accounts of their drug experiences. However, the specific categories of visual phenomena experienced appear quite different phenomenologically (underlining the importance of developing more specific measures of the content and structure of subjective drug effects). More specifically, DMT produced powerful visual pseudo-hallucinations, which incorporated major distortions and illusions of form, colour and movement. With eyes open, people reported psychedelic visions superimposed upon the real world - including perceiving other people in the room as aliens androids and/or ancient warriors. With eyes closed, the DMT hallucinations were maximised, with reports of visual experiences of moving through vast psychedelic panoramas, including outer space, forests/jungles and computer-animation-like scenarios. In contrast, 2CB was more typically associated with less overwhelming visual
illusions and enhancements, such as brighter colours, sharper outlines and patterns in the visual field. The hallmark effects of 2CB also included disturbed balance and coordination, although this was also a main effect of DMT. Furthermore, a confounding variable here is that the psychonauts tended to move round and engage in various activities during the several hours of the 2CB experience, whereas during the much shorter DMT experience, the typical behaviour of psychonauts was to remain seated with eyes closed.

Beyond changes in visual perception, the main-phase effects largely or wholly shared by the two drugs can be summarised as follows:

1. **Physiological effects**: higher temperature and mixed effects on muscular tension;

2. **Perceptual effects**: changes in hearing and touch (in addition to vision and balance);

3. **Emotional/conative effects**: enhanced mood, intuition and libido;

4. **Cognitive effects**: enhanced self-awareness and reduced verbal skills, accompanied by reduced logical thinking and time perception for DMT users and mixed effects on these two cognitive factors for 2CB users;

5. **Social effects**: increased empathy and changes in communication and group behaviour.

Conversely, the two main effects which distinguish these drug experiences are as follows:

1. 2CB users are more likely than DMT users to report changes in taste perceptions;

2. 2CB users are more likely than DMT users to report reductions in the hunger drive.
Since 2CB users are also somewhat more likely to report discomfort in the stomach and intestines during the main intoxication phase – and gave verbal accounts of increased hunger in the residual phase - this profile of effects suggests that the entire digestive process may be disturbed by 2CB.

In short, in terms of general classifications of subjective effects, DMT and 2CB are more similar than different, sharing the hallmark effect of altered visual perceptions and generally having similar physiological, cognitive and social effects – as well as comparable residual effects. However, the DMT experience is clearly far shorter in duration and appears more rooted in the visual hallucinations it induces, which are far ‘stronger’ than those produced by 2CB. In contrast, 2CB is associated with a far broader range of consensual effects and there is convergent evidence that it may cause greater disturbances to digestion than DMT.

4.3 Interim conclusions and future research

To distort a cliché, the science of psychonautics is not so much in its infancy as in a foetal position in the womb of intellectual thinking. Resources are urgently required to expand theory and research in this field. Just as researchers need to devote more attention to the subjective effects of drugs in their studies of drug users, policy-makers and service providers also need to incorporate the findings of phenomenological research on drugs into the planning and delivery of their strategies and interventions. If this call is not heeded, we are in severe danger of developing a drug policy which lacks a fundamental cornerstone: understanding of what drugs really do and why people really want them.

Finally, an urgent area for future research is the enormous but essential task of relating models of subjective effects to theories of how drugs affect the electro-chemical processes of the brain. Depending upon the degree of sophistication of our theories, this would eventually allow us to predict many subjective effects of a drug on the basis of its chemical structure and psychopharmacological action – and vice-versa.

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Written by Russell Newcombe
Thursday, 16 December 1999 00:00

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