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EDITORIAL

Applied human psychopharmacology: the practical psychobiological consequences of some novel and ancient psychoactive drugs

This special applied issue of Human Psychopharmacology is based on two symposia from the 27th International Congress of Applied Psychology (ICAP). This was held at the International Congress Centre, Melbourne, Australia, on July 2010. The first of our two symposia was entitled 'Psychoactive drugs, psychobiological health and wellbeing'. Here, the presenters covered the effects of a range of drugs, including cannabis, alcohol, nicotine, cocaine, ginseng and others. The second symposium was entitled 'Ecstasy-MDMA: psychological and health related implications'; hence, the articles on Ecstasy/MDMA and related recreational stimulant drugs. This special issue also contains some papers from groups unable to attend the Melbourne Congress.

Ten years ago, in December 2001, Human Psychopharmacology published a special issue on a previous MDMA conference in Canada. The papers from that special issue have become some of the most widely cited articles in the journal's 25-year history (Liechti and Vollenweider, 2000; Cottler *et al*., 2001; Parrott, 2001; Rodgers *et al*., 2001). We were therefore delighted when the past and current editors for Human Psychopharmacology, Stephen Curran, Lindsay Devane, and David Baldwin, agreed to publish this Special Applied Psychopharmacology Issue. We hope that these articles will attract a similar high readership. Every paper underwent the normal procedures of independent assessment by external reviewers. This process was supervised by the Managing Editor for this Special Issue, hence, our special thanks to Andrew Mayers for the skill and dedicated work this involved.

At our ICAP symposia, it was emphasised that psychoactive drugs are consumed for a wide range of reasons. Herbal preparations are taken for their pro-health properties, sedative compounds for feelings of relaxation, and stimulant drugs for excitement and euphoria. However, these target effects are often accompanied by untoward or 'side' effects. Several presentations noted that young people were especially at risk from developing drug-related problems. Personality, pre-morbid psychiatric status and gender, were also noted as potential contributory factors. The theme of 'psychological measurement' was a key issue for the 27th International Applied Psychology Congress in Melbourne, and this was also debated at our symposia. It was noted that whereas some health and behavioural outcomes may be readily apparent, others may be more subtle—and hence can only be revealed with sensitive assessment devices, such as the multi-tasking framework developed by Mark Wetherell (Northumbria University, UK). The Internet was also a focus for many ICAP papers, and was also featured here (Fabrizio Schifano, Hertfordshire University, UK).

Several of the current papers are concerned with recreational stimulants. Cocaine usage has been increasing worldwide (Herrero *et al*., 2008; Ciccarone, 2011). Helen Fox and colleagues (Yale University, USA) investigated immune system inflammatory markers in treatment-seeking cocaine users. Using a range of bio-markers, they showed that cocaine users were in a state of chronic enduring stress (elevated interleuklin-10), and elevated inflammatory responses to stressor cues (elevated TNF-α) (Fox *et al*., 2012). These results somewhat mirror the behavioural findings reported here by Wetherell (in collaboration with Scholey at Swinburne) where Ecstasy users reported both more negative mood at baseline and a greater negative mood change in response to a laboratory stressor (Wetherell *et al*., 2012). Con Stough (Swinburne University, Australia) investigated another recreational stimulant, methamphetamine, which is widely used in Australia (Cruickshank and Dyer, 2009). They assessed the effects of an acute dose of methamphetamine on car driving skills in a laboratory simulator (Stough *et al*., 2012). In previous studies, they have found deficits with MDMA and amphetamine, and these latest findings are part of an ongoing series (Stough *et al*., 2011a, 2011b; Silber *et al*., 2012). The social drug nicotine has mild stimulant properties, but a complex and multi-factorial relationship with stress. Emily Ansell (Yale University, USA) confirmed that cumulative stress was an important factor for cigarette smoking, and that the relationship occurred with many

different lifetime stressors, including traumatic stress and long-term or chronic relationship problems (Ansell *et al*., 2012). Andrew Parrott (Swansea University, UK) summarised the findings from a 15-year research programme, which revealed that paradoxically, nicotine use heightened daily stress. Youngsters who take-up to smoking become more stressed, and when adult smokers quit, their stress levels permanently fall to those of non-smokers (Parrott, 2006a). This model can be successfully explained to smokers using a simple explanatory leaflet, and may be useful for health-promotion or smoking-cessation packages (Parrott and Murphy, 2012).

Turning to sedative drugs, one of the most popular of the social relaxants is alcohol. When used in small amounts, alcohol drinking may be comparatively safe, but when used intensively, the associated problems can increase dramatically. Catherine Montgomery (John Moores University Liverpool, UK) reported that in previous studies of light social drinkers, cognitive measures of executive function were not impaired. However, in a novel empirical study of heavier alcohol drinkers, nearly every aspect of executive functioning was significantly disrupted. Their study involved normal university students—who did not report alcohol-related problems, nor were seeking drug treatment. Hence, their study indicated the very real practical damage being caused by intensive alcohol drinking in many young people (Montgomery *et al*., 2012b). Tea, on the other hand, is consumed for its health-promoting and recently reported relaxant properties (Scholey *et al*., 2012). Emma Wightman (Northumbria University, UK) investigated the psychobiological effects of one key ingredient of tea—the polyphenol epigallocatechin gallate (EGCG). No cognitive or mood effects were apparent in an acute dose laboratory study, although the 135 mg dose of EGCG did significantly affect both cerebral blood flow and heart rate (Wightman *et al*., 2012). The illicit drug and dissociative anaesthetic Ketamine typically causes a range of psychobiological problems (Schifano *et al*., 2008). In a large collaborative European study, Ornella Corazza (University of Hertfordshire, and Institute of Psychiatry) undertook a review of a novel analogue for Ketamine–methoxetamine. This is a very recently developed drug, and there is little empirical data regarding its biobehavioural effects, with most information coming from Internet sources (Corazza *et al*., 2012). Cannabis, in contrast, is the most widely used of all the illicit drugs, and there are numerous empirical reports describing its damaging effects on health and well-being (Hall and Degenhardt, 2009). However, not much is known of its enduring psychological consequences in abstinent users. Mark Wetherell (Northumbria University) tested abstinent cannabis users, and found that they generally showed more negative mood responses to a multi-tasking framework and found the tasks more arduous. Hence, they remained psychologically impaired well beyond the period of acute intoxication—a laboratory finding with a number of real-world practical implications (Wetherell *et al*., 2012). Montgomery *et al.* (2012a) also report impaired prospective memory performance in abstinent cannabis users.

The MDMA symposium also covered a range of applied topics. Raimondo Bruno (University of Tasmania, Australia) presented the latest findings on visual processing integrity. In previous studies, they have found MDMA-related deficits with the visual tilt illusion, possibly due to serotonergic processing deficits in the V1 area of the visual cortex (Dickson *et al*., 2009). Their latest study provides further illumination on the type of adverse visual effect in recreational Ecstasy/MDMA (Murray *et al*., 2012). The most widely recognised psychobiological deficits are however neurocognitive. Philip Murphy (Edge Hill University, UK) has published a previous review of working memory deficits in abstinent users (Murphy *et al*., 2009). In this latest review, he undertook a meta-analysis of the empirical literature on visuospatial tasks, concluding that these aspects of working memory were also impaired (Murphy *et al*., 2012). Another widely-recognised deficit is in psychiatric status, with previous studies showing that abstinent users display worse symptom profiles than non-user controls (Parrott, 2001). This finding was confirmed and extended in a study, which also found more symptoms of attention deficit hyperactivity disorder (ADHD), in moderate Ecstasy/MDMA users. This was not apparent with the light Ecstasy/MDMA polydrug users, showing the problems were not a factor of drug usage per se, but rather reflected the heaviness of drug usage (Parrott *et al*., 2012). The discussant for the MDMA symposium, Andrew Scholey, noted there has been an enduring debate over whether Ecstasy tablets contained MDMA. He noted some recent findings from Swinburne University, which showed a very high concordance ($p < 0.0001$) between self-rated Ecstasy usage, and the presence of MDMA in hair samples (Scholey *et al*., 2011). Many synthetic 'ecstasy-like' compounds have been developed (Schifano *et al*., 2011), and Cathal Gallagher (University of Hertfordshire) undertook a review of another novel analogue—5,6-methylenedioxy-2-aminoindane (MDAI). Much of the information on its effects was taken from Internet sources, and authors noted the importance of developing novel investigatory approaches (Gallagher *et al*., 2012). Some of the research findings presented at the ICAP meeting have already been published elsewhere. Nadia Solowij (University of Wollongong, Australia) presented

an overview of the structural and functional effects of recreational cannabis usage. The adverse memory and psychiatric effects were reported earlier in Solowij *et al.* (2011), whereas the reductions in hippocampus and amygdala volumes were described by Yücel *et al.* (2008). Andy Parrott undertook an overview of the damaging psychobiological effects of MDMA, which have been described in a series of previous articles (Parrott, 2001, 2006b, 2009, 2010). Finally, Andrew Scholey covered the beneficial neurocognitive effects of one of the most widely used herbal drugs worldwide—ginseng (e.g. Scholey *et al.*, 2010).

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AC Parrott
Department of Psychology, Swansea University, Swansea, UK

P Murphy
Evidence-based Practice Research Centre and Department of Psychology, Edge Hill University, Ormskirk, UK

AB Scholey
Centre for Human Psychopharmacology, Swinburne University, Melbourne, Australia