

## **PARALLEL SESSION 1A**

### **Drugs, costs and consequences**

#### **Cool down the Saturday Night Fever: evidence based health advice for recreational Ecstasy/MDMA users**

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Acute MDMA can cause metabolic stress and overheating. In a series of studies we investigated various environmental and psychobiological aspects of dance club use. These findings allow us to offer some practical health advice for clubbers.

In Parrott and Young (2005. *J Psychopharmacol* 19, a26) we investigated the thermal comfort of 68 dance clubbers: current, former, and non-users of Ecstasy/MDMA. Body temperature was significantly higher amongst current Ecstasy users. Positive moods while clubbing were followed by rebound mood decrements two days later. Body temperature did not correlate with moods at the club, but did correlate with tiredness and low-elation afterwards. Poor memory ratings two days later also correlated with high body temperature when clubbing. In Lock et al (2006, *J Psychopharmacol*) 12 clubbers were assessed on and off ecstasy (MDMA confirmed biochemically). Temperature rises on MDMA were modest and variable, but cortisol rose dramatically, and testosterone also changed. In Parrott et al (*Hum Psychopharmacol*), 205 ecstasy users were assessed via the Internet. Self-rated dancing and feeling hot/overheated were related to several psychobiological variables including memory. Those who did not dance too much, and who did not feel too hot, reported the best level of functioning.

Ravers should become aware that stimulant drugs are energetic stressors. In stimulating environments they can generate excessive neural activation. Continuous dancing should be avoided, and the chill-out rooms used frequently. The optimal strategy is to be fully aware of bodily needs and energy requirements – and dance without drugs.

(slides follow)

## **Cool down the Saturday night fever: evidence based health advice for recreational Ecstasy/MDMA users**

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## **Neural metabolic aspects of MDMA**

Amphetamine derivative: hence stimulant

Acute dose may release 80% of serotonin into the synaptic  
cleft...over many hours

This causes metabolic stress within the pre-synaptic axon  
terminal (Huether, 1997).

Energy control and cellular repair/recovery processes are  
overstressed.

This can damage the axon terminal ...

Hence 'neurotoxicity'... or distal 5-HT axon terminal loss.

Robust finding in lab animals.. hence concern in humans.

## Thermal aspects of MDMA

Acute MDMA affects thermoregulation in laboratory rats. In the cold they cool down, in hot they overheat (Green et al 2003).

In humans, subjective reports of 'feeling hot' are very common (Davison & Parrott, 1997; Parrott, 2001, 2004)

Body temp sig increase in humans (Tancer et 2003; Freedman et, 2005), non-sig increase in others (Vollenweider et, 1998; Grob et, 1996; Mas et al, 1999). Cole et al (2005) no increase in clubbers.

Parrott (2002, 2004): how do the stimulatory environmental conditions at raves/dances interact with MDMA. Aims here:

- Temp and thermal comfort in recreational Ecstasy users?
- How do thermal aspects relate to psychobiological well-being?

## Parrott & Young (2005)

68 unpaid volunteers (age range 18-26) at dance clubs in Swansea and Cardiff.

- 32 current ecstasy users (plus other drugs)
- 10 former ecstasy users: not on Ecstasy that evening,
- 26 non-Ecstasy users: mostly on alcohol, but a few had also taken illicit drugs.

Core body (tympanic membrane) temperature.

Self-rating questionnaire: feelings of thirst, heat, fluid intake, dancing/exercise, memory, and various mood states.

Similar assessments two days later by mobile telephone

### Parrott & Young (2005): thermal findings

**Body temp** sig higher in current Ecstasy users than non-users controls ( $p < 0.001$ ). Former users lower than current users ( $p < 0.017$ ), but higher than controls ( $p < 0.039$ )

**Feeling hot** sig higher in both groups of Ecstasy users (current and former), than non-users. No difference between the two E user groups.

**Feeling Thirsty:** similar pattern of group differences to feeling hot.

### Parrott & Young (2005) : further findings

Significant mood gains amongst Ecstasy users when clubbing (eg. elation), followed by mood decrements two days later (eg. depression).

Body temperature *did not* correlate with moods at the club, but did correlate with mood decrements afterwards (e.g. with tiredness and low elation).

Self-rated memory problems while clubbing correlated with lifetime Ecstasy use, monthly cannabis use, feeling hot at the club, hot-cold flushes over the previous 6 months, but *not* with actual body temperature at the club.

However poor memory ratings two days later *did* correlate with high body temperature while clubbing.

**Dancing/exercise when on MDMA  
(Parrott, Buchanan, Rodgers, Scholey, Ling, &  
Heffernan, 2006)**

Based on our earlier www investigation (Rodgers et al, 2003)....now included the following two questions:

**‘While on Ecstasy did you generally experience dancing or exercise?’**

**‘While on ecstasy did you feel hot or overheated?’**

Wide range of answers: from low to high, in four response categories (see next slides).

**Self-reported Memory Problems in the days  
after taking Ecstasy/MDMA:  
across four 'dancer' subgroups**

**Dancing on E :    No/occasional    Sometimes    Frequent    All the time**

No memory problems (N=82)	51%	41%	43%	26%
Mild memory probs (N=69)	32%	41%	35%	26%
Mod-Extreme probs (N=53)	16%	18%	23%	47%

Chi-Square 16.25; p= 0.012

**Post Ecstasy come-down depressive feelings across four subgroups of 'dancers on Ecstasy'**

**Dancing on E    No/occasional    Sometimes    Frequent    All the time**

No Depression (N=64)	51%	28%	30%	20%
Mild Depression (N=83)	38%	36%	47%	37%
Mod-Extreme Dep (N=57)	11%	36%	23%	43%

Chi-Square 17.37; p= 0.008

**Post Ecstasy reports of poor concentration: across four subgroups of 'feeling hot/overheated when on Ecstasy'**

**Feel Hot/Overh't on E    No    Slightly    Moderately    Strong/Extremely**

Poor concentration in the days after taking Ecstasy?

No (N=47)	35%	26%	16%	12%
Mild (N=90)	44%	51%	40%	36%
Mod-Extreme (N=67)	21%	23%	44%	52%

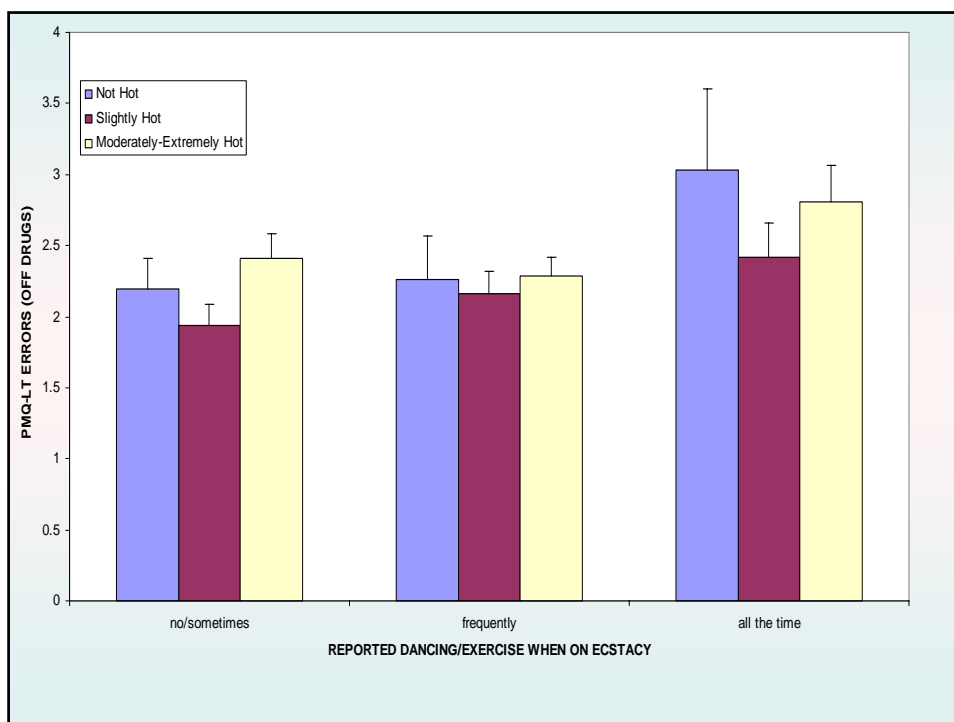
Chi-Square 16.32; p= 0.012

(note: Mod-Extreme = moderate, strong, & extreme categories)

### Off drug problems attributed to Ecstasy: percentage in 'dancing-on-E' subgroup

<u>Dancing on E ?</u>	<u>N</u>	<u>No/occas</u>	<u>Sometim</u>	<u>Freq</u>	<u>All-time</u>	<u>Sig (chi)</u>
Mood fluctuation	121	49%	54%	58%	74%	(.08)
Depression	100	38%	46%	45%	66%	.04
Poor Concentration	88	32%	46%	37%	58%	(.052)
Anxiety	85	38%	44%	37%	50%	
Poor sleep	82	43%	44%	40%	37%	
Memory problems	79	41%	25%	34%	54%	.04
Weight loss	72	24%	26%	35%	50%	.04
Impulsivity	53	11%	26%	27%	36%	(.07)
Tremors/twitches	51	19%	23%	24%	32%	

N= total number reporting an effect, from the overall sample of 205



### **Lock, Parrott, Thome and Kissling ( 2006)**

12 regular E users assessed while clubbing, when both on and off Ecstasy/MDMA.

Body temp rise modest (non-para test sig; parametric test, non-sig).

Thermal ratings of 'feeling hot' sig higher under MDMA

'Hot and cold flushes' also sig increased under MDMA

Sig rises in cortisol and testosterone.

### **Conclusions**

MDMA affects thermoregulation: in both rats & humans.

Rats have poor temp control and show strong overheating

Humans are naturally far better at thermoregulation. Hence temp changes in humans often quite slight.

Temp increase is linked to the incidence of psychobiological problems afterwards.

Former E users show some similarities to current E users.

Currently – more questions than answers

## Practical Advice

Metabolic stress the main concern for MDMA users (see Freedman, 2005; Tancer et al, 2002; Parrott, 2006).

Hence MDMA is intrinsically psychobiologically damaging, independent of any thermal aspects. **However:**

- Beware of 'feeling hot' or 'very hot': MDMA related deaths very rare, but mostly in dancers/ravers with high core body temp (Henry, 1992)
- Take rests & use the 'chill out' room frequently (Suy, 99)
- Thermal control may still be impaired if you are a former Ecstasy user, so still be aware of overheating.

Be optimally aware... dance through life without drugs !

## Selected References

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