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Extinction of gambling cue-reactivity in offending problem gamblers

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Context / background

SA Courts Gambler's Intervention Program



Conditioning interpretation of cue reactivity for additions

Cue-related specificity

Preferred vs non preferred beverages among alcoholics (Staiger & White, 1991)

Cigarettes vs neutral cues among smokers (Carter & Tiffany, 2001)

Gambling related cue-reactivity

Sodano & Wulfurt, 2010	Video – active/abstinent PGs and social gamblers. No difference in HR. Active greater self-report urges (N=63)
Potenza et al., 2003	Video – PG higher urges FMRI than controls (N=22)
Blanchard et al., 2000	Video, fear, stressor – PGs and control. PGs greater subjective urges. No dif on HR, skin resistance, bp. (N=14)

Gambling related cue-reactivity

Anderson & Brown, 1984	Invivo vs lab. Invivo setting HR was greater among regular gamblers (N=24)
Lisham et al., 2011	Imaginal exposure greater self-report urges than photos among regular gamblers (N=48)
Kushner et al., 2007	Moderate to high self-report urges invivo casino environment among PGs (N=18)

Cue exposure with response prevention

- Cue exposure therapy (CET) assumes that the cue-reactivity is classically conditioned
- Non PGs exhibit elevated HR in response to gambling behavior
- Cue-reactivity is thus an unconditioned response (UR) to the stimulus of gambling behaviour itself

Cue exposure with response prevention

Neutral cues become conditioned stimuli (or cues) for a gambling response

External cues

- Money
- Venue
- Lights, sounds

Internal cues

- Negative affect
- Positive affect

Cue exposure with response prevention

- Urge to gamble is a negative state for the problem gambler
- Gambling alleviates this state
- Gambling behaviour is maintained

operant conditioning
paradigm

variable interval schedule
of reinforcement.

Cue exposure with response prevention

Based on conditioning theory

- Repeated exposure to the CS without the associated response results in extinction of the CR, if the exposure is prolonged until habituation
- Gambling cue-reactivity extinguished through repeated cue exposure with response prevention

Cue exposure and PG

Symes & Nicki, 1997	2 case studies. PG reduced 1MFU
Echeburua et al., 1996	BT, CT, CBT, wait. 12MFU BT higher success (N=64)
Echeburua et al., 2000	BT with & without RP (N=69) 12MFU RP higher success
Echeburua et al., 2002	Case study, PG reduced 12MFU

Cue exposure and PG

Oakes et al., 2007	Case study video-conf. PG reduced 4 yr FU
Tolchard et al., 2006	Case study single session. PG reduced 6MFU
Riley et al., 2011	PG reduced (n=347)
Smith et al., 2015	BT, CT RCT 6MFU. PG reduced both groups (N=51)

In summary

- CET provides an effective mode of treatment for PG, presumably by extinguishing gambling related cue-reactivity
- No previous study has investigated the extinction of gambling related cue-reactivity via CET using physiologic measurement

Aims of current study

- 1 Demonstrate gambling related cue-reactivity among a group of offending PGs referred for treatment by a local court diversion program
- 2 Examine the extinction of gambling related cue-reactivity following CET, using physiologic measurement

Methods



20 PGs ref by
Court

Participants



No active sub
abuse or psychosis



Complete set of
measures

Ethics

- The study was approved by the Southern Adelaide Clinical Human Research Ethics Committee, project number 402.13
- All participants signed individual consent forms

Participants

16 (80%) slots, 4 wagering (horses, dogs, sports)

14 (70%) Aus, 2 Thai, 3 African, 1 South Pacific

10 Male, Age 45 (SD=9.59)

Measures

Physiological
measurement

- Polar RC3-GPS with Polar H3 chest strap heart rate sensor
- Tested against standard clinical ECG equipment (Osanai 2010; Vanderlei et al., 2008)
- HR sampled at 1 sample per second
- Average HR in bpm for each recording
- Uploaded to PC for analyses

Measures

Subjective
measures

- Victorian Gambling Screen Harm-to-Self sub-scale (VGS-HS; Ben-Tovim et al., 2001)
 - 15 items
 - 0 to 60, PG \geq 21
- The Gambling Urge Scale (GUS; Namrata & Tian 2004)
 - 0 to 47

CET Procedure

CET delivery

- Manualised (Smith et al., 2015)
- Up to 12 weekly sessions
- 3 therapists, postgrad CBT, > 7 yrs experience

CET

- CET rationale 1st session
- Cue hierarchy 2nd session
- HW from 2nd session (Riley, 2015)

HR measurement Procedure

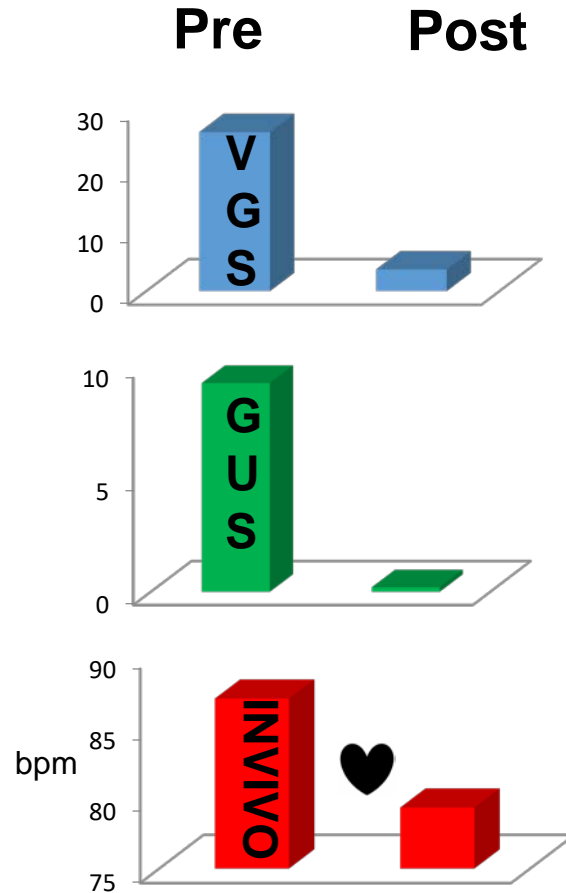
Conditions	Resting	Exposure
<ul style="list-style-type: none">• No caffeine or meal 30 mins prior• Taken pre and post• Resting & exposure each point	<ul style="list-style-type: none">• Sitting, at clinic• 5 mins to habituate to procedure• 5 mins continuous recording	<ul style="list-style-type: none">• Sitting, local venue• 5 minutes quiet sitting• Focus on CS, 5 mins continuous recording

Results

- Participants attended average of 7.95 sessions (SD = 3.32)
- All participants scored above VGS-HS cut off for PG

Effectiveness CET outcome across dependent variables

- Wilcoxon Signed-ranks test
- All pre and post differences were significant $p \leq 0.001$



Cue-reactivity Pre-treatment

- Positive cue-reactivity
- Higher median HR ranks during invivo exposure, $Z = -3.78$, $p < 0.001$,



Cue-reactivity Post-treatment

- ns difference between resting and exposure



Cue-reactivity Post-treatment

Change scores calculated at pre and post by subtracting resting from exposure HR

Pre = 6.9
Post = -.1

Difference significant
 $Z = -3.88, p < 0.001$

Discussion

- In-vivo gambling cues elicited a significant arousal response
- Cue-reactivity was extinguished following CET

- Increase of 7bpm

Greater than Blanchard et al. (2000)
lab setting

Less than Anderson & Brown (1984)
invivo actual gambling

Discussion

- 7bpm arousal response is comparable to individuals with PTSD during exposure to traumatic imagery (Barkay et al. 2012)
- Urge a significant predictor of both relapse, and continuing to gamble (Smith, Battersby, Pols, et al. 2015)

Discussion

- Extinction of the urge to gamble appears to be an important factor in PG recovery
- Further research – is extinction of physiologic cue-reactivity related to lower relapse rates?

Discussion

- No sig association between HR and GUS
- 3 possible explanations

Measurement error GUS	Previous 24 hours GUS vs invivo HR
Low urge awareness	Previous research has found low levels of mindfulness among PG
Reliance of honest responding	Under reporting of GUS due to legal context

Limitations

- Small sample
- No follow up data – sustainability of change unknown
- No control
- Sample comprised offending PGs
- Sample may be different to problem gamblers not facing criminal charges
- Need to repeat with non-offending PGs

Conclusions

- First step in demonstrating the extinction of gambling related cue-reactivity using physiologic measurement
- Portable HR monitors may offer a novel and useful tool for problem gambling therapists and their patients to observe cue-reactivity during the treatment process

Questions / comments

Thank you

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