Psychological and physiological responses to gambling cues in pathological gamblers

Steve Sharman¹, Dr Eve Limbrick-Oldfield¹, Dr Mike Aitken¹, Dr Henrietta Bowden-Jones¹, Dr Luke Clark¹

¹Department of Psychology, University of Cambridge, UK, ²National Problem Gambling Clinic, London, UK, ³Imperial College, London, UK

1. Introduction

Gamblers experience exposure to gambling cues on a daily basis, ranging from celebrity-endorsed TV commercials, to walking past a high street bookmaker. Research on substance addictions indicates that these cues are likely to activate urges / cravings to gamble.

Wulff et al (2005) found higher ratings of subjective excitement following a horse race with a wager on in students, Kushner et al (2008) used frequent gamblers in a simulated casino environment and found positive anticipation and positive priming increased urges to gamble, however these studies used only a single self-report item to measure craving. Ashrafoun et al (2012) used the Gambling Urge Scale (GUS, Raylu & Oei, 2004b) and found increases in craving following gambling cues in student gamblers.

Craving comprises the short-term, acute ‘urges’ to obtain reward and relief (Raylu & Oei, 2004b), as well as more stable aspects of ‘preoccupation’ (Pallanti et al, 2005). The current study used the Gambling Craving Scale (Young & Wohl, 2009) to measure stable preoccupation, and the three most heavily loaded factors from the GUS to capture short-term gambling urges generated by the images / adverts on a block by block basis, thus capturing both facets of craving.

2. Methods

Participants (n=15, age m=38.9; d=14.7) were recruited from the Inpatients at the National Problem Gambling Clinic, London. The cue reactivity task involved viewing 8 image blocks (4 gambling blocks, 4 matched control blocks). Participants were instructed to imagine themselves in the situation or using the device in the picture. Each image block contained 5 images, displayed for 4s each. Each gambling block depicted a specific form of gambling: Roulette, Sports, Slot Machines and Bookmakers shops. The images were randomised within the block and the blocks randomised within the task. Participants also viewed a single block of gambling adverts, and a block of control adverts, each containing four 30 second video clips.

A block was preceded by a 60 second ITI to stabilisation of physiological signals. After each block, a 3-item GACS was displayed, Cronbach’s alpha on the 3-item GACS was administered pre task, post pictures and post adverts.

Psychophysiological data was collected via a Biopac MP150 linked to a Dell laptop delivering the Eprime programmed task, and an Acer laptop running AcKnowledge 4.1. Skin Conductance was measured via two 6mm Ag/AgCl electrodes attached to the middle and index fingers of the left hand. Heart Rate was collected via 2 electrodes attached via recording disks to the left wrist and right ankle.

Psychophysiological data was manually extracted for i) a 10s baseline period pre-stimulus presentation, ii) the 20s for the 20s of each picture block, iii) for each individual 30s advert and whole advert block, and iv) for the 12 seconds post-stimulus following the craving rating. Raw data was converted into percentage change from baseline to allow for individual differences in analysis.

3. Results

3.1 Preferred forms

A repeated measures ANOVA (3 levels: preferred, other form, control) shows a significant main effect of block (F(2,22)= 5.6, p<.01). Further analysis with matched pairs t-tests performed on the 3-item GACS completed immediately after each block show increased craving following preferred gambling blocks relative to control blocks (t(11)= 3.95, p<.002). Further analysis with matched pairs t-tests performed on the 3-item GACS completed immediately after each block show increased craving following preferred gambling blocks relative to control blocks (t(11)= 3.95, p<.002). Other forms tests t-tests performed on the 3-item GACS completed immediately after each block show increased craving following preferred gambling blocks relative to control blocks (t(11)= 3.95, p=.002). Other forms tests t-tests performed on the 3-item GACS completed immediately after each block show increased craving following preferred gambling blocks relative to control blocks (t(11)= 3.95, p<.002).

3.2 Forms

A repeated measures ANOVA showed a significant difference in full GACS score as a function of timing of exposure (F(1,4,16)=5.8, p=0.02). Pairwise comparisons reveal the main effect of Block sizes significantly higher than the post adverts (task end) scores (t (12)= 2.82, p< .05).

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Performing the same analysis with treatment stage (pre vs. complete) as the between groups variable in a repeated measures ANOVA (3 levels: preferred form, other form, control) shows a significant main effect of gambling form (F (1, 9)= 5.34, p<.05)

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Psychology – Pictures

Skin Conductor: A paired samples t test indicated no significant change in skin conductance when watching gambling or control adverts (t(11)=.79, p=442). Within the gambling advert block, repeated measures ANOVA for skin conductance showed a significant effect of advert that approached significance (F(1,4,13)= 1.12, p=.088), with a significant effect restricted to advert 1 displaying online slot machines (t(12)=2.35, p=.037).

Heart Rate: A paired samples t test showed no significant change in heart rate from before to after advert 1 displaying online slot machines (t(12)=1.93, p=.096). The interaction is not significant (p>.05); however the block size of advert was non-significant (F(3,39)=2.1, p=.113).

Psychology – Adverts

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4. Results

4.1 GACS ratings by Group

The ratings provided after each block show the highest cravings are reported following presentation of cues from the preferred game. Non-preferred form fell intermediate between the preferred block and the control block, and did not differ from either. This highlights the importance of preferred games in cue reactivity research, showing that gamblers do not respond uniformly to all gambling stimuli (Sharpe & Tarrier 1995). The full GACS scores reduced significantly over the duration of the task, suggesting the initial pre-task questions capture the stable preoccupation identified by Pallanti et al (2005). It is possible that completing the full version 3 times in a relatively short time period modifies the scale sensitivity, given that cravings evidently were detected on the short version on a block by block basis.

The psychological data indicate no consistent changes in skin conductance or heart rate in response to gambling related images, but during the gambling adverts, there was some evidence of heterogeneity with a significant increase in skin conductance to an advert for online slot machines. It may be relevant that the slot machines consistently raised cravings as higher than other groups across all blocks and in both the short and longer form of the GACS. Besides the inference that dynamic gambling films may constitute a more powerful cue than a static image, our results also suggest that slot players may be more susceptible to cravings, or that the nature of the slot games induce more cravings. However these results should be interpreted with caution due to the small numbers in the groups.

Methodological issues- to allow for a return to baseline of the physiological measures, the ITI was 60 seconds; the picture controls only lasted 20 seconds, therefore the task was not very interactive and required longer periods of inactivity than activity. Secondly, the stimuli were the researchers interpretation of what represents each form of gambling. The gambler’s tries may well be subtlety yet significantly different from the researchers perspective. Finally, all changes in physiological measures were compared to a pre-block baseline; it is possible that the participants knew they were coming to the end of the ITI and therefore displayed an anticipatory increase in arousal, distorting the change created by the stimuli.

5. Discussion

To address the methodological issues raised in the discussion, further analysis of the data will be done to address if dynamic gambling stimuli is required longer periods of inactivity than activity. Secondly, the stimuli were the researchers interpretation of what represents each form of gambling. The gambler’s tries may well be subtlety yet significantly different from the researchers perspective. Finally, all changes in physiological measures were compared to a pre-block baseline; it is possible that the participants knew they were coming to the end of the ITI and therefore displayed an anticipatory increase in arousal, distorting the change created by the stimuli.

6. Conclusions

The psychological data presented show that greater cravings are generated by stimuli that are personally relevant to the individual gambler. This result is not fully supported by the physiological data, although the general trend of reduced heart rate is response to gambling stimuli warrants further investigation.

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Email sps48@cam.ac.uk