



The Influence of Image Content, Colour, and Type of Gambling Activity on Attentional Bias toward Gambling Stimuli

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Disclosures

- None to declare

Overview

- Cognitive processes in addiction
- Attentional biases (AB)
- Methods for measuring AB
- Eye-tracking
- Study 1: Colour vs. Content
- Study 2: AB and Preferred Gambling

Cognitive Processes

- Cognition plays an important role in gambling disorder (GD)
- *Explicit* Cognition
 - Irrational thoughts
 - Outcome expectancies
 - Motives
- *Implicit* Cognition
 - Below conscious awareness and without introspection
 - Become automatic through repeated use
 - Cues can trigger the process, leading to behavior

Attentional Biases

- Attentional Bias (AB)
 - Preferentially attend to stimuli over time from repeated exposures
 - Drug/gambling stimuli > competing stimuli
 - Automatic process
 - AB could lead to increased conscious awareness of the drug/gambling
 - Well established in alcohol, tobacco, cannabis, and illicit drugs

AB in Gambling

- Honsi et al. (2013) systematic review
 - Mixed results of AB in gambling
 - Most studies (7 of 11) indicated an AB for gambling over neutral stimuli
 - No consistency in methods
 - Stroop tests, reaction time tasks, attentional blink, dual tasks, lexical salience tasks, event-related potentials, and flicker-induced change blindness tests
 - Two studies using eye-gaze tracking

Eye-gaze Tracking



Eye-gaze Tracking

- Eye-gaze Tracking
 - EyeLink 1000 eye-tracking system
 - Infrared camera records pupil and corneal reflection
- Advantages
 - Direct measure of attention (eye-gaze and attention are tightly coupled)
 - Real-time monitoring of attention
 - Measured in microseconds
 - Numerous possible DVs

Study 1: Colour or Content?

- No standards for choosing eye-tracking stimuli
- Internal validity of AB methods questioned
- Miller & Fillmore (2010)
 - Twenty-five adult drinkers
 - Visual probe task & eye-tracking
 - 20 alcohol images, 20 neutral
 - Half 'complex' (i.e., real-life scenes)
 - Half 'simple' (i.e., against a bare wall)
 - 80 trials with paired images (1000ms)
 - DV: total fixation times

Study 1: Colour or Content?

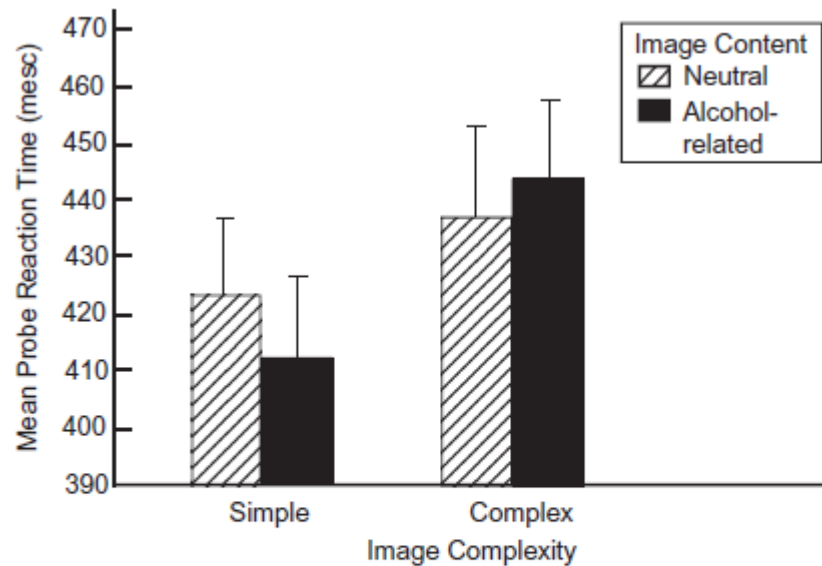


Figure 1 Mean probe reaction time (ms) to neutral and alcohol-related images presented as either simple or complex. Capped vertical lines indicate standard error of the mean (standard error of the mean)

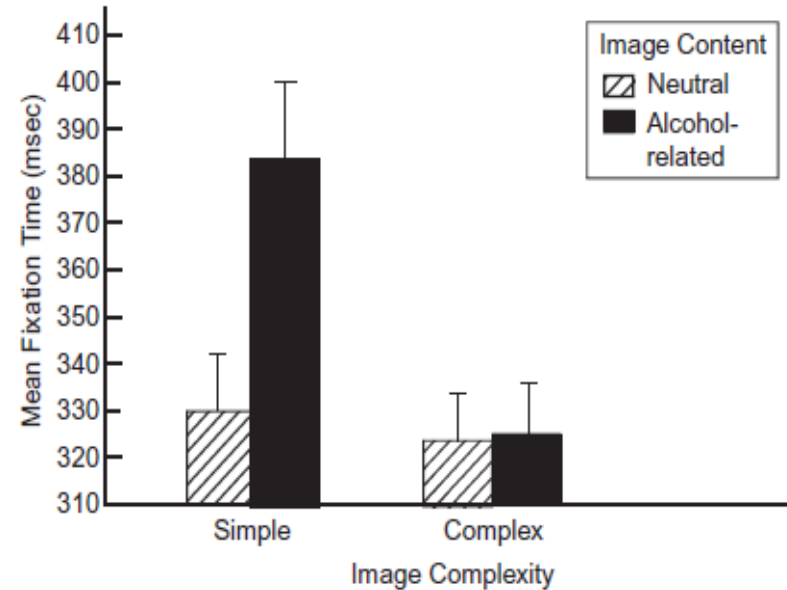


Figure 2 Mean fixation time (ms) to neutral and alcohol-related pictures presented as either a simple or complex image. Capped vertical lines indicate standard error of the mean (standard error of the mean)

Study 1: Colour or Content?

- Harrison & McCann (2014)
 - Explored 'low-level' features of alcohol stimuli
 - Visual probe task
 - Twenty-four regular drinkers
 - Stimuli
 - 8 practice trials; 84 test trials (500ms)
 - 14 image pairs (alcohol + neutral)
 - All pairs had one 'greyscale alcohol image'
 - 1) greyscale neutral same size
 - 2) greyscale neutral 25% larger
 - 3) colour neutral same size

Study 1: Colour or Content?

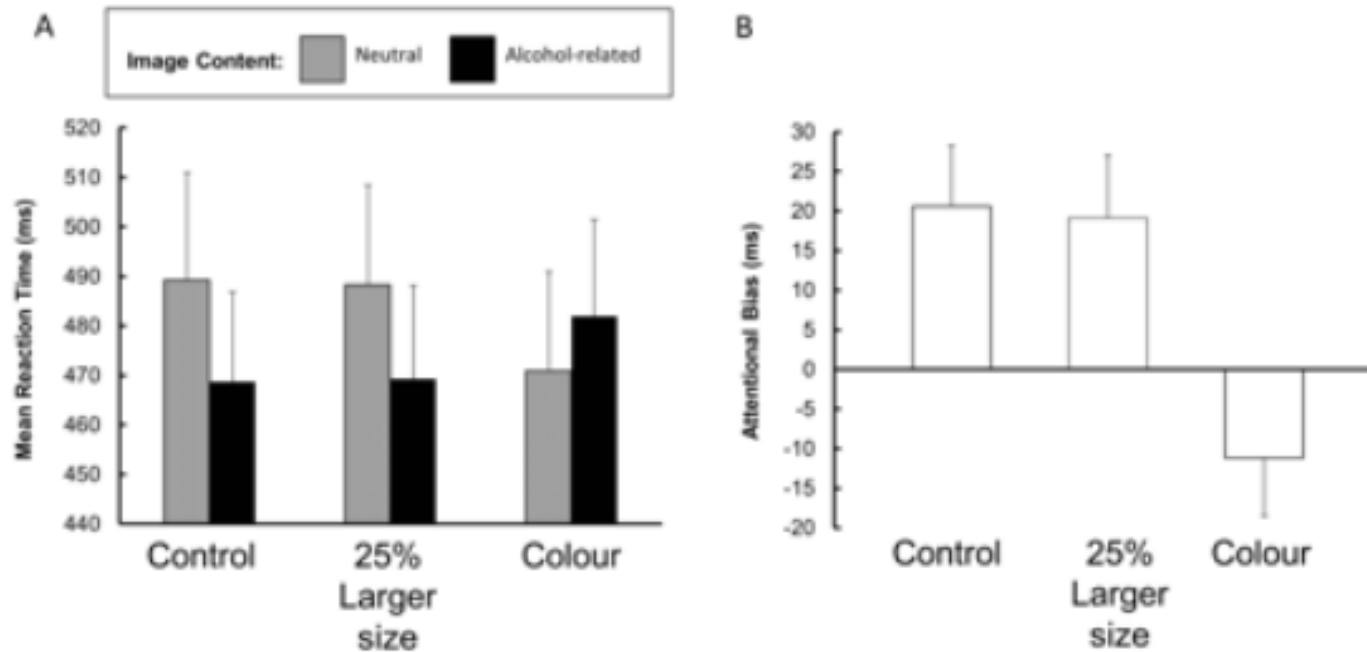


Figure 2. A) Mean reaction time (ms) to targets for neutral (hatched bars) and alcohol-related (solid bars) images, for control, 25% larger size, and colour conditions. Error bars indicate standard error of the mean. B) Mean attentional bias scores for control, 25% larger size, and colour conditions. Positive values indicate attentional bias towards alcohol-related cues.

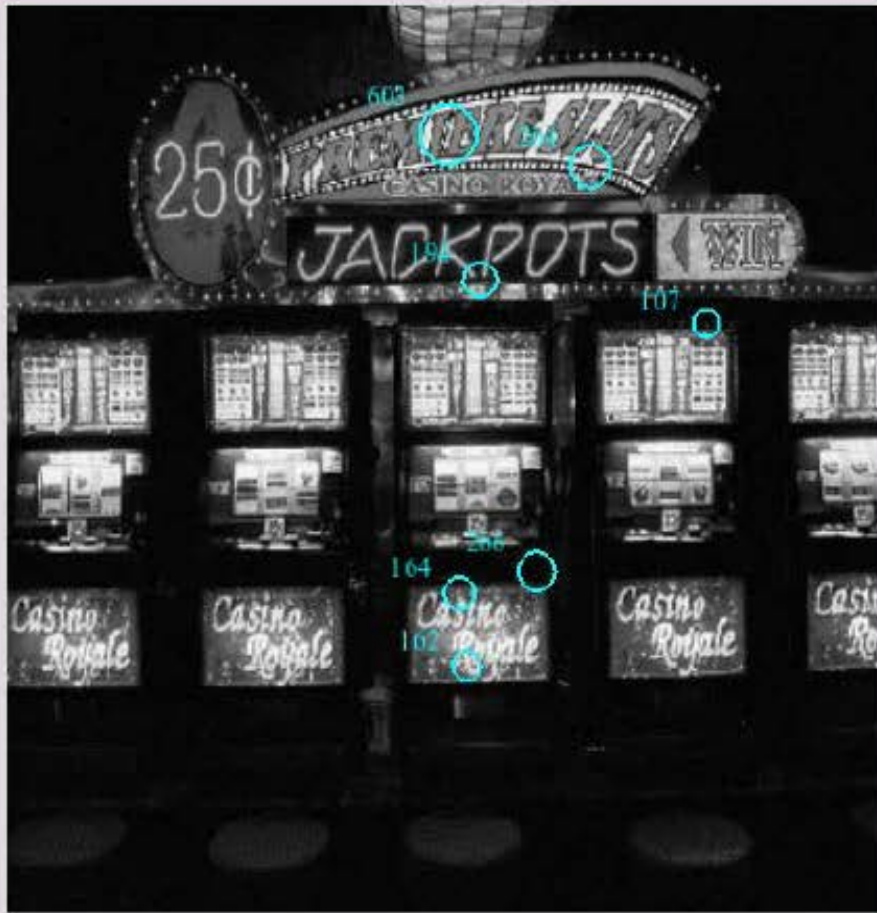
Study 1: Colour or Content?

- McGrath, Sears, & Garlicka
 - Laboratory experiment
 - Research Question:
 - “How important is content vs. colour?”
 - High-level features vs. low-level features
 - Recruited video lottery terminal/slot players (vs. controls)
 - Inclusion: Played a VLT/slot for money past 6 months
 - Control: Never played a VLT/slot

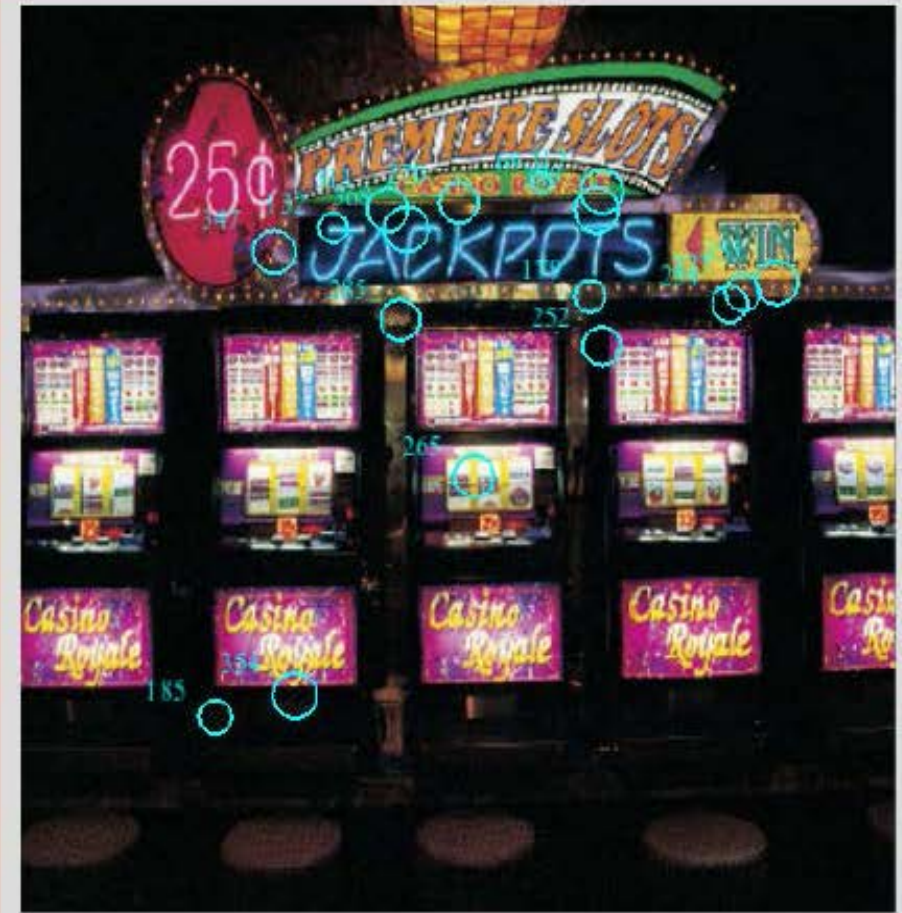
Study 1: Colour or Content?

- Participants
 - 62 participants (69% female; $M=21.4$ years)
 - 32 VLT/slot players, 30 controls
 - PGSI score ($M=0.84$, $SD=2.0$)
 - Days played VLTs past 6 months ($M=4.5$, $SD=4.9$)
 - Money on VLTs past 6 months ($M=\$97$, $SD=\$181$)
- Procedure
 - 48 experimental trials, 8 seconds per trial
 - 12 were gambling (25% of the time)
 - Course credit or gift card

Study 1: Colour or Content?



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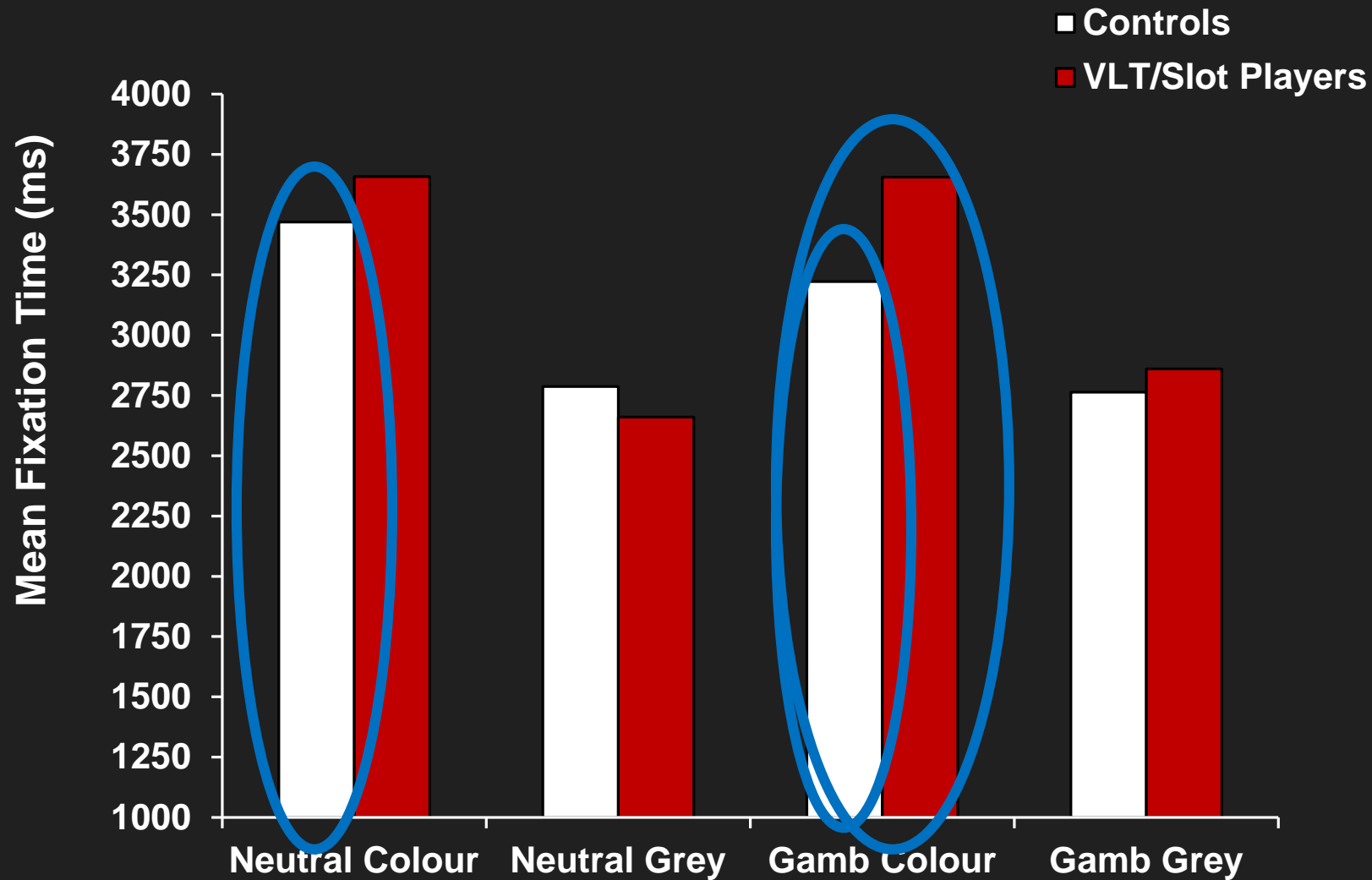
Study 1: Colour or Content?



Study 1: Colour or Content?



Study 1: Mean Fixation Time



Study 2: Gambling Type

- Gamblers are heterogeneous
- Strategic (skill) vs. Non-strategic (chance)
 - Differ demographically
 - Gamble for different reasons
 - Differing rates of DG
- Yet, the literature often lumps 'gamblers' together
- AB develops through classical conditioning
 - Experience with the drug/form of gambling is necessary

Study 2: Gambling Type

- Brevers et al. (2011)
 - Paired eye-tracking with a change detection task
 - 'Gamblers' were recruited
- Grant & Bowling (2014)
 - Paired eye-tracking with a dot-probe task
 - Non-DGs were recruited
- ABs were detected
- However, stimuli were varied
 - Roulette, horses, dice, cards, sports, etc.

Study 2: Gambling Type

- McGrath, Sears, & Meitner
 - Laboratory experiment
 - Research Question:
 - “How important is preferred gambling in AB?”
 - Strategic vs. non-strategic gambling
 - Recruited young male gamblers & controls (18-35 years)
 - (1) **VLT/slot**: ‘preferred’ form + past 3 months + no poker past 3 months
 - (2) **Poker**: ‘preferred’ form + past 3 months + no VLTs/slots past 3 months
 - (3) **Control**: no gambling past 12 months (except lottery)

Study 2: Gambling Type

- Participants
 - 79 participants ($M=21.9$ years)
 - 18 VLT/slot, 31 Poker, 30 Controls
 - PGSI score ($M=1.6$, $SD=2.6$)
 - Hours spent gambling past 30 days ($M=8.4$, $SD=17.5$)
- Procedure
 - 25 experimental trials, 8 seconds per trial
 - Always 1 poker; 1 board game; 1 VLT and 1 bingo image displayed
 - \$20 gift card

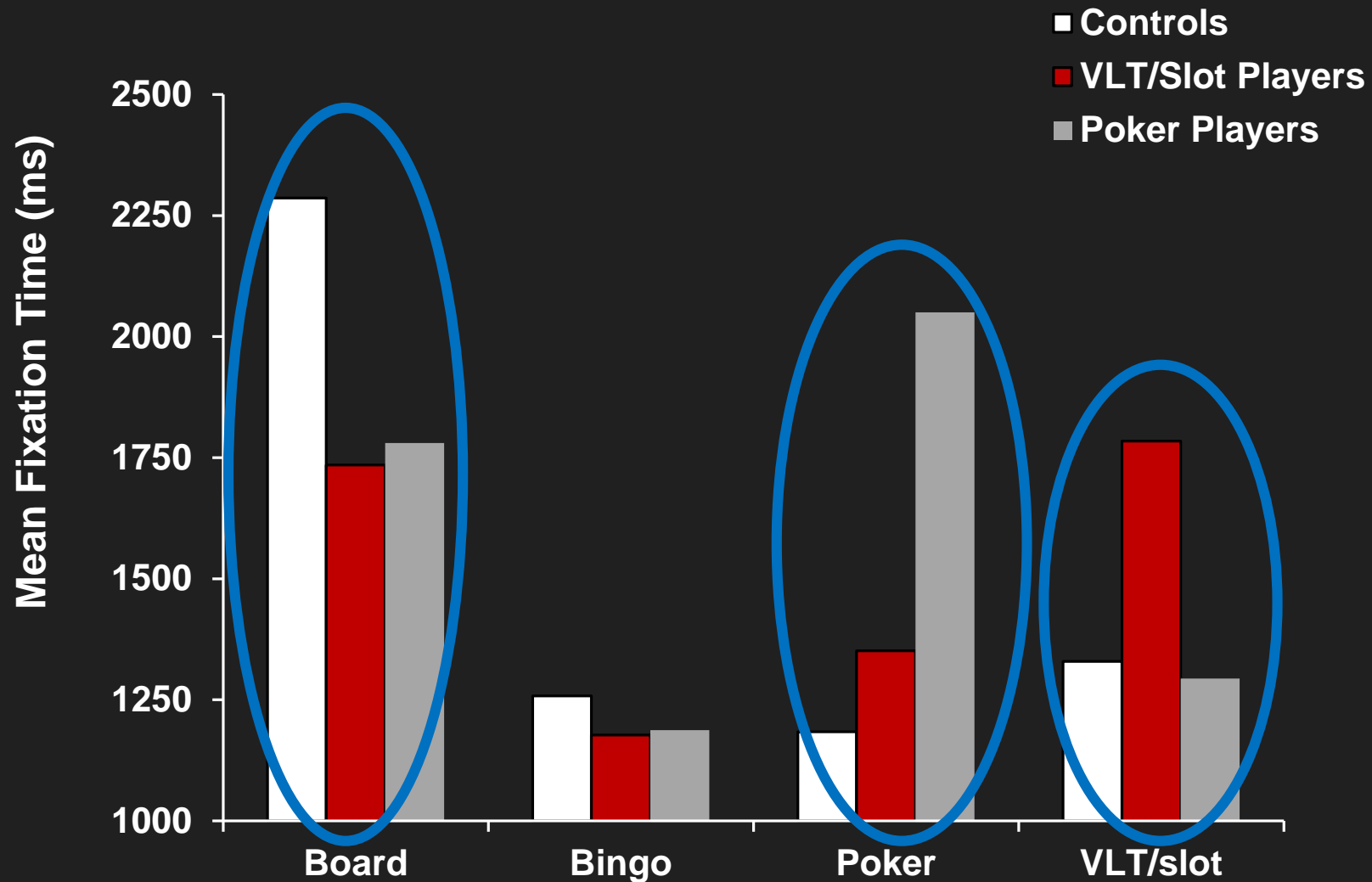
Study 2: Gambling Type



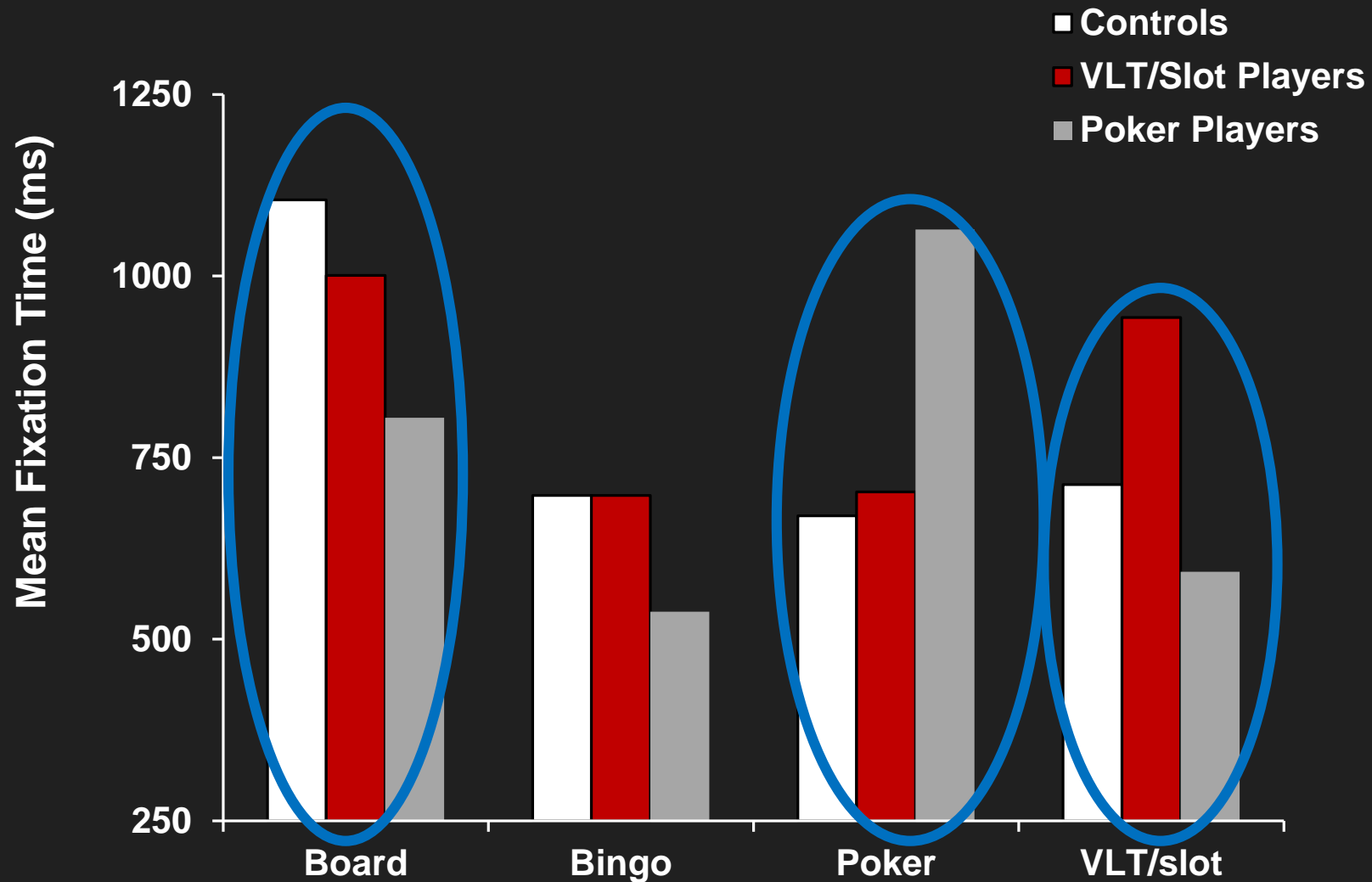
Study 2: Gambling Type



Study 2: Mean Fixation Time



Study 2: Mean First Run Dwell Time



Conclusions

- Study 1
 - Low-level features such as colour grab attention
 - Gamblers did *not* preferentially attend to Greyscale gambling images
 - Gamblers attend to combination of gambling + colour
- Study 2
 - Very evident AB toward 'preferred' gambling
 - Further evidence of heterogeneity in gambling
 - Board games preferentially attended to (novelty?)
 - A competing form of gambling (Bingo) was not attended to

Conclusions

- Limitations
 - Student gamblers (low PGSI)
 - More females Study 1; none in Study 2
 - Challenges in choosing neutral stimuli
- Future Directions
 - Psychological characteristics and AB
 - Longitudinal analyses of AB
 - AB for gambling cues in the periphery?

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Thank you for listening!