All Bets Are Off:

Do Structural Characteristics of Online Slot Machines Promote Problematic Gambling?

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Gambling Harms from the Public Health Perspective

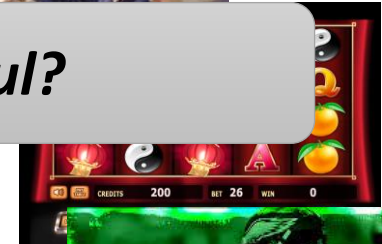**Player**

continuum of harm

Vulnerabilities
- Genetics
- Neurodevelopment
- Personality traits
- Adversity

What makes some products especially risky or harmful?

Gambling Harm

	Total GGR	Slot GGR	Table Game GGR	Sports Betting GGR	iGaming GGR
	$5.82B	$2.72B	$772.7M	$1.48B	$574.6M
Over Jan. 2023	+4.9% ▲	−4.8% ▼	−7.6% ▼	+39.2% ▲	+19.2% ▲

Environments

Products

Korn & Shaffer 1999

"Structural Characteristics"

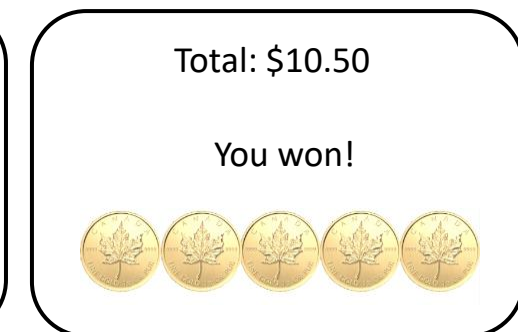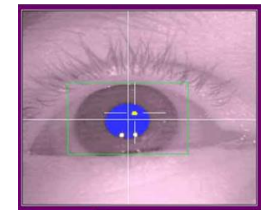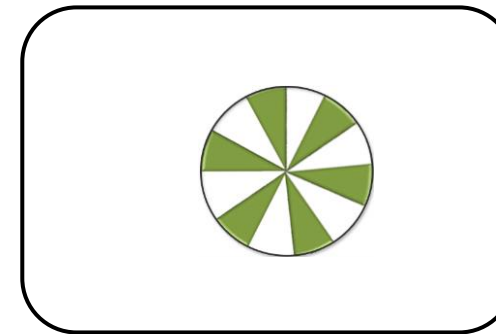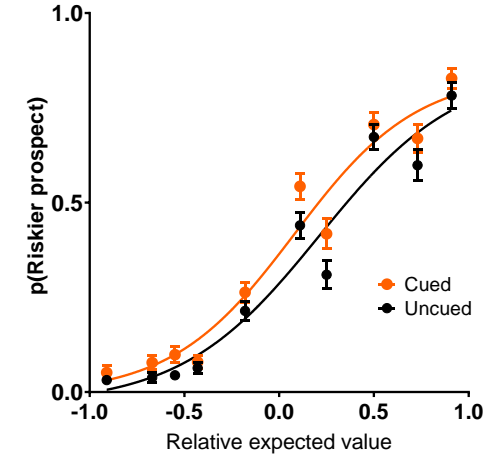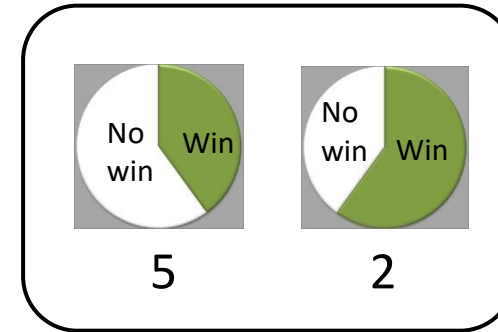| Risk potential criteria |
|---|
| Event frequency |
| Interval of payback |
| Jackpot |
| Continuity of playing |
| Chance of winning a profit |
| Availability |
| Multiple playing-/stake opportunities |
| Variable stake amount |
| Sensory product design |
| Near wins |
| **Totals** |

Effects of 'Bells & Whistles'

- Appealing to players; increase play enjoyment, excitement *(Griffiths 1990; Loba et al 2001; Delfabbro et al. 2005)*
  - Particularly for pathological gamblers *(Griffiths 1990; Loba et al 2001)*
- Slot machine sounds increase physiological arousal *(Dixon et al, 2014)*
- Help disguise losses as wins in multiline games *(Dixon et al 2010, 2014, 2015)*
- Promote riskier choices in laboratory gambling tasks both
  - In rats *(Barrus & Winstanley, 2016)*
  - In humans *(Cherkasova et al, 2018)*

P1
1 pellet
or
5s time out

or
40s time out

or
10s time out

P3
3 pellets
or
30s time out

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The Effects of Sensory Feedback in Simulated Online Slot Machine Gambling

Behavioral analysis of habit formation in modern slot machine gambling

Mario A. Ferrari[a], Eve H. Limbrick-Oldfield [a] and Luke Clark [a,b]

[a]Centre for Gambling Research at UBC, Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada; [b]Djavad Mowafaghian Centre for Brain Health, University of British Columbia, Vancouver, British Columbia, Canada
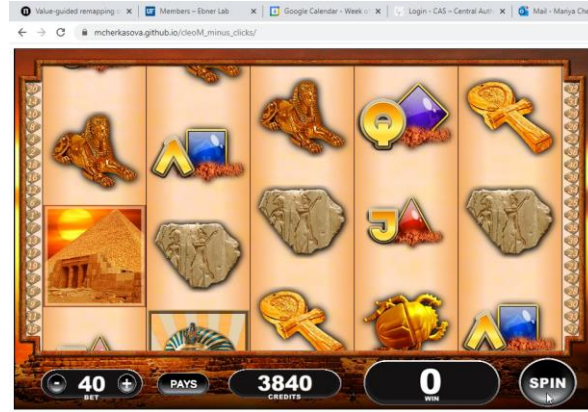
- Online
- Via Amazon Mechanical Turk

Questions:

1. Does SF affect gambling behavior?
    - Bet sizes (credits per line)
    - Spin initiation latencies
        - post-reinforcement pauses – measure of hedonic enjoyment

2. Does SF affect gambling experience?
    - Immersion ('the zone')
    - Affect

3. Do the effects of SF differ as a function of player characteristics?

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Methods

Sensory Feedback +

Sensory Feedback -

- 200 spins
- Constrained to play on all 40 lines
- Allowed to change bet size: 1-5 credits per line
- Given 4000 credits ($40) to play with
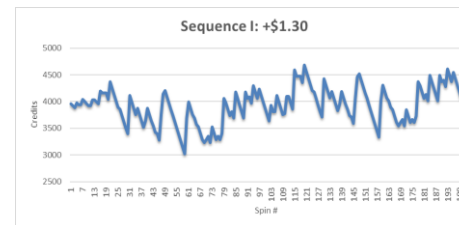 - Any amount won over $40 given as bonus

Sequence I: +$1.30

+$1.30

Sequence M: -$2.60

-$2.60

Gambling Questions
- Frequency
  - In-person
  - Online
- Problems (PGSI)

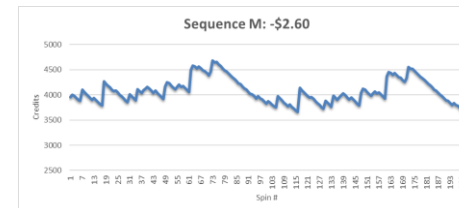**Random assignment**
SF+ vs SF-
- Bet sizes
- Speed of play

- GEQ-DQ *(Murch et al, 2019, 2020)*
- PANAS
- DASS
- ASRS

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Participants

| n = 354	NG n=104 (59 males) Mean age: 39		AG n=250 (164 males) Mean age: 36*	
Gambling Frequency: M (SD)	SF- (n=52)	SF+ (n=52)	SF- (128)	SF+ (122)
Casino themed app	0	0	3.80(2.09)	3.57(2.32)
Online slots	0	0	2.67(2.18)	2.77(2.41)
Internet	0	0	3.59(2.12)	3.49(2.44)
Casino slots	0.21(0.89)	0.42(1.23)	2.02(2.22)	1.92(2.24)
Lottery	2.23(2.78)	3.12(3.07)	3.92(1.95)	3.90(2.11)
Sports pools	0.33(1.00)	0.35(1.15)	2.50(2.27)	2.00(2.03)
Sports bet	0.31(1.26)	0.21(0.82)	1.98(2.19)	1.58(2.23)
PGSI	1.46(4.10)	1.58(3.17)	6.47(5.26)***	5.39(4.98)***

	SF-	SF+
NPG	123	132
PG	57	42

Canadian Problem Gambling Index (CPGI): **0**=never; **1**=1-5 times/ year; **2**= 6-11 times / year, **3**=once / month; **4**=2-3 times / month; **5**=once / week; **6**=2-6 times / week; **7**= daily.
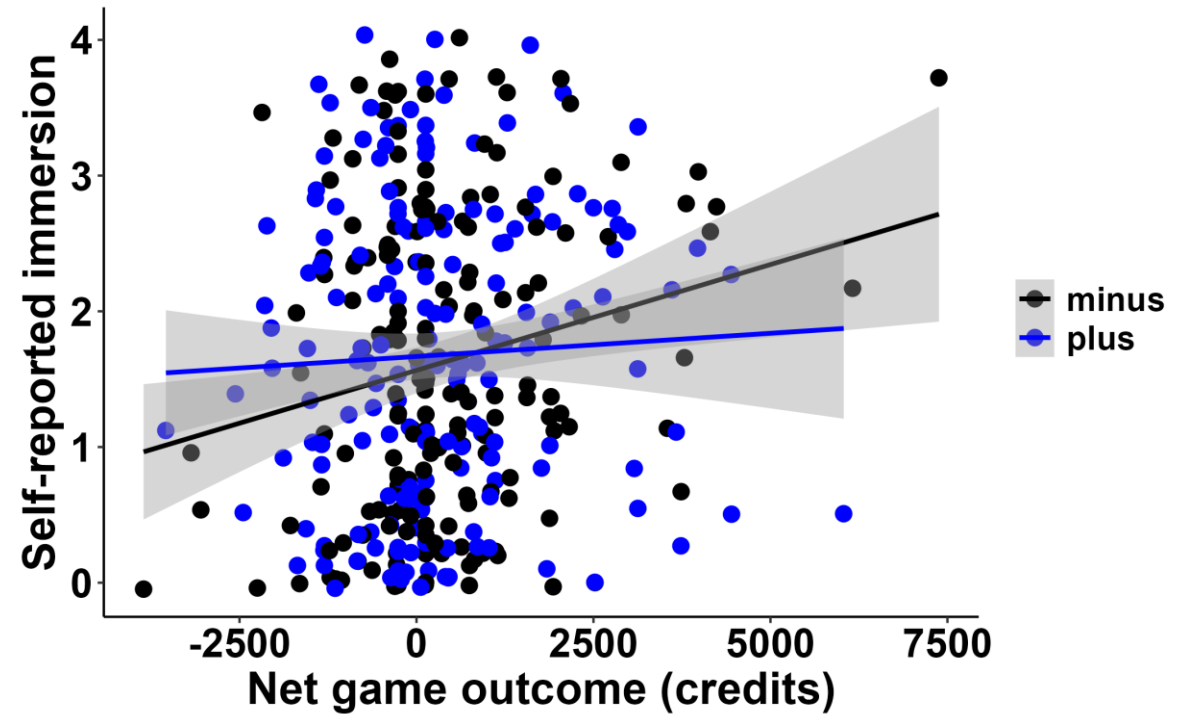
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The Effect of Sensory Feedback on Immersion

SF does not increase immersion
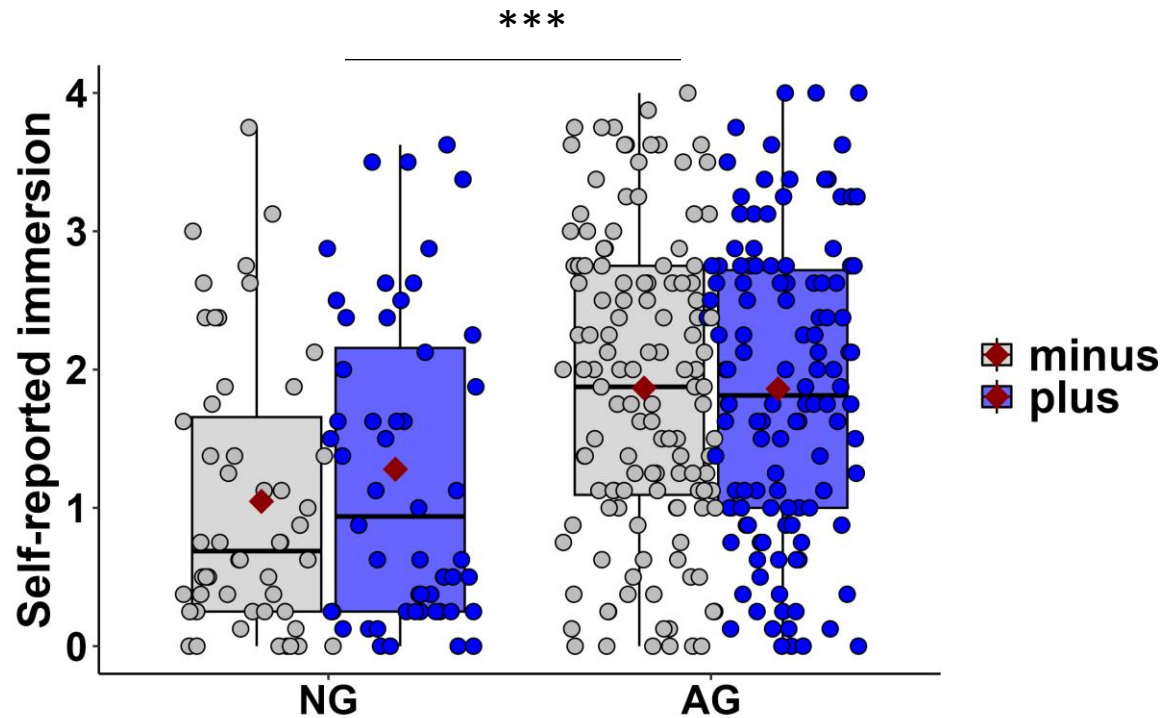
SF decreases the influence of profits on immersion

*immersion ~ SF*outcome*gambling + ASRS + DASS.depression + ethnicity*

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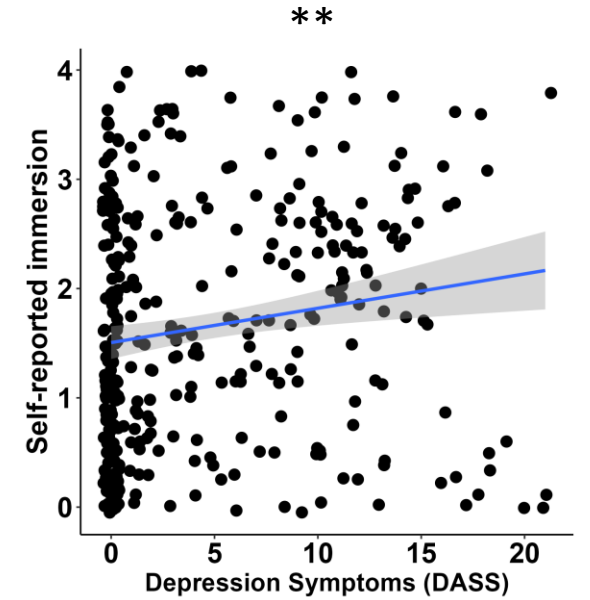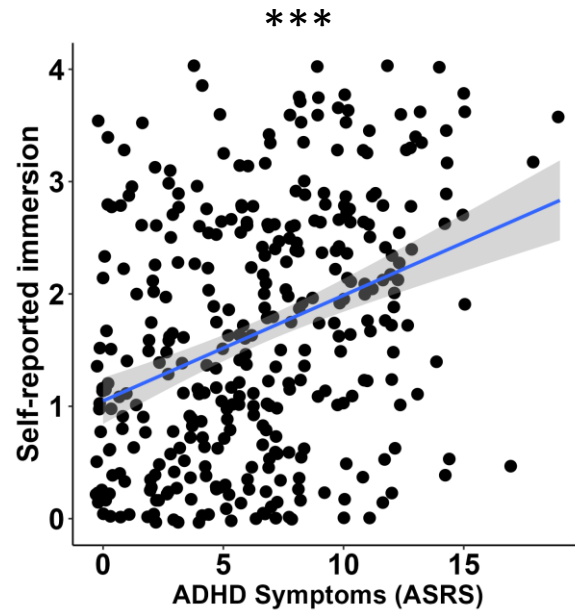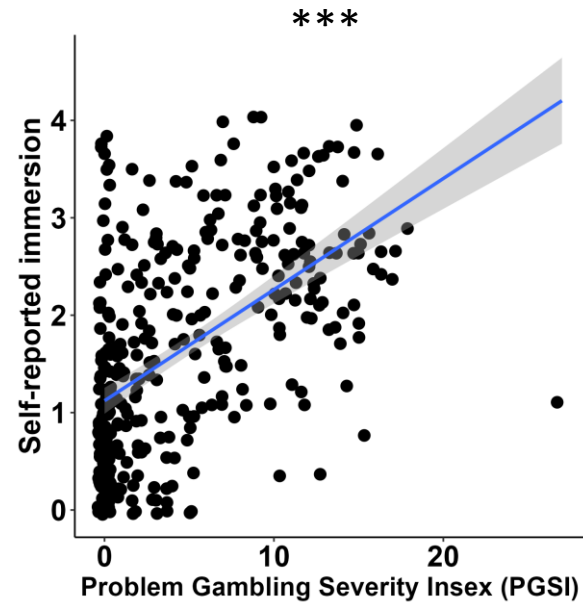
The Effect of Sensory Feedback on Gambling Behavior
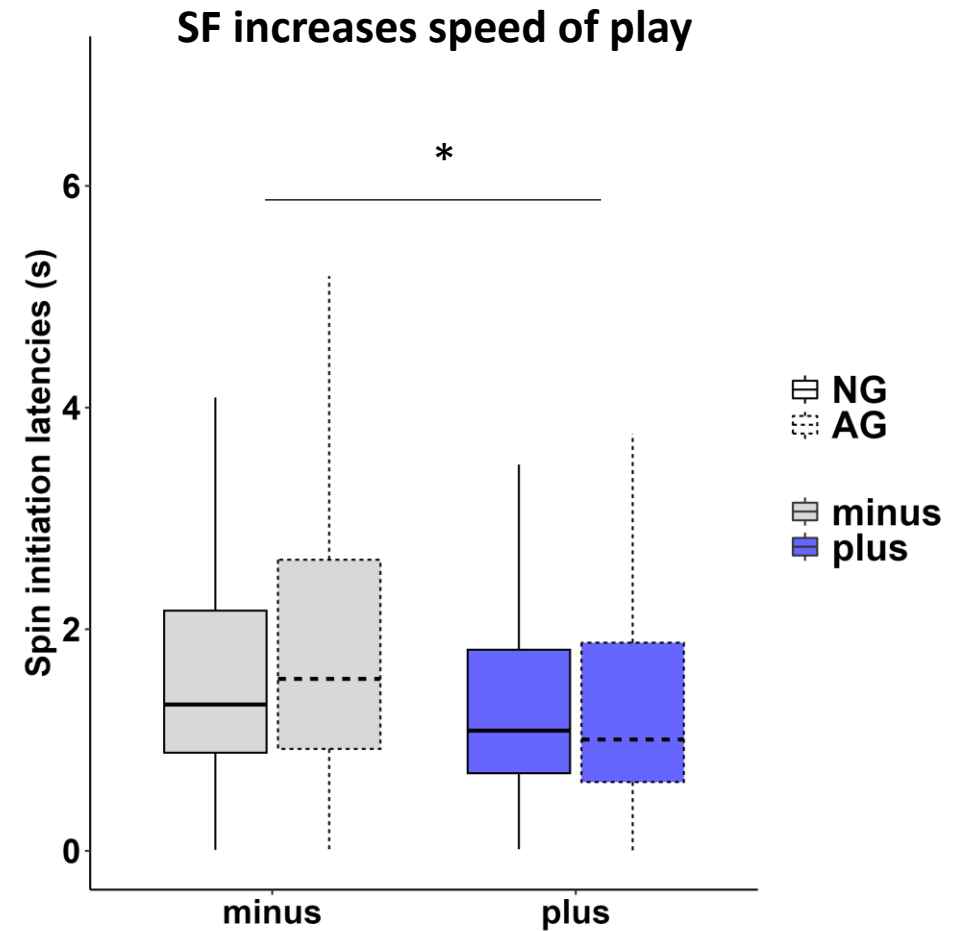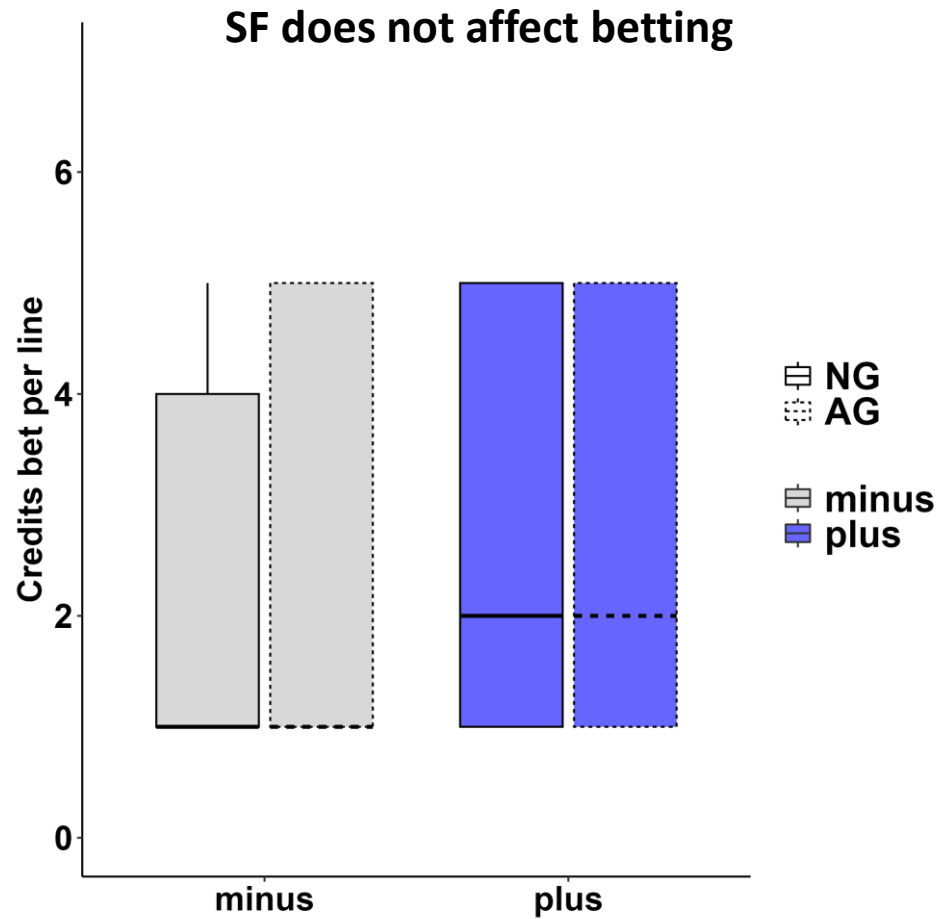
bet_per_line ~ SF*credits*gambling + sequence + ASRS + DASS.depression + gender + age +(credits|id)

latency~ SF*previous_outcome + sequence + ASRS + DASS.depression + gender + age +ethnicity+(previous_outcome|id)

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Effects of Player Characteristics on Gambling Experience
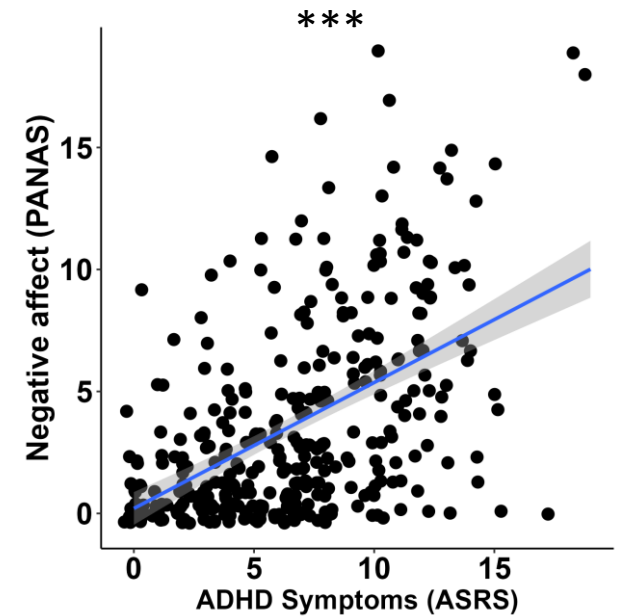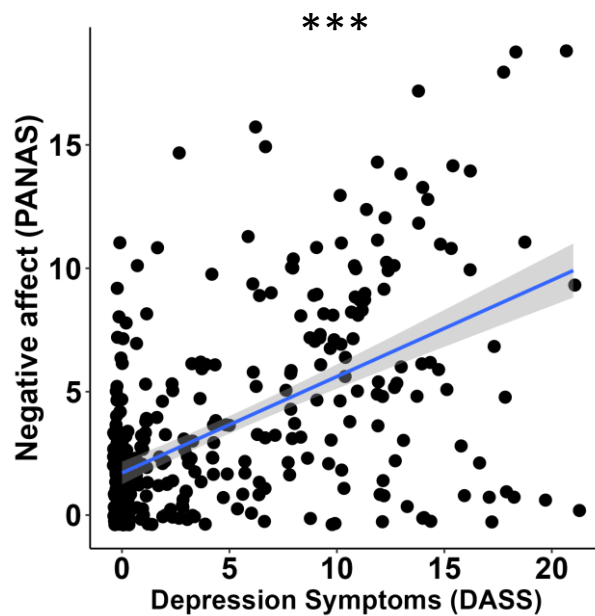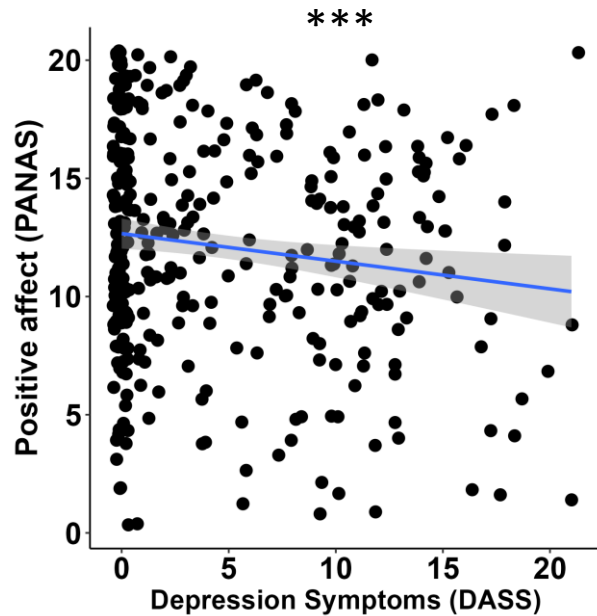
Summary & Conclusions

- Sensory feedback promotes risk taking in a laboratory task but not in naturalistic online slot machine play

- Sensory feedback promotes activation and arousal

  Faster spin initiation in naturalistic slot machine play

- Sensory feedback has a subtle effect on game immersion

- Game experience variables are predicted by player characteristics
  - Gambling involvement / problems
  - Symptoms of depression and ADHD

Sensory feedback likely not be the only structural characteristic that is important

Player

Gambling Harm

Environments   **Product**

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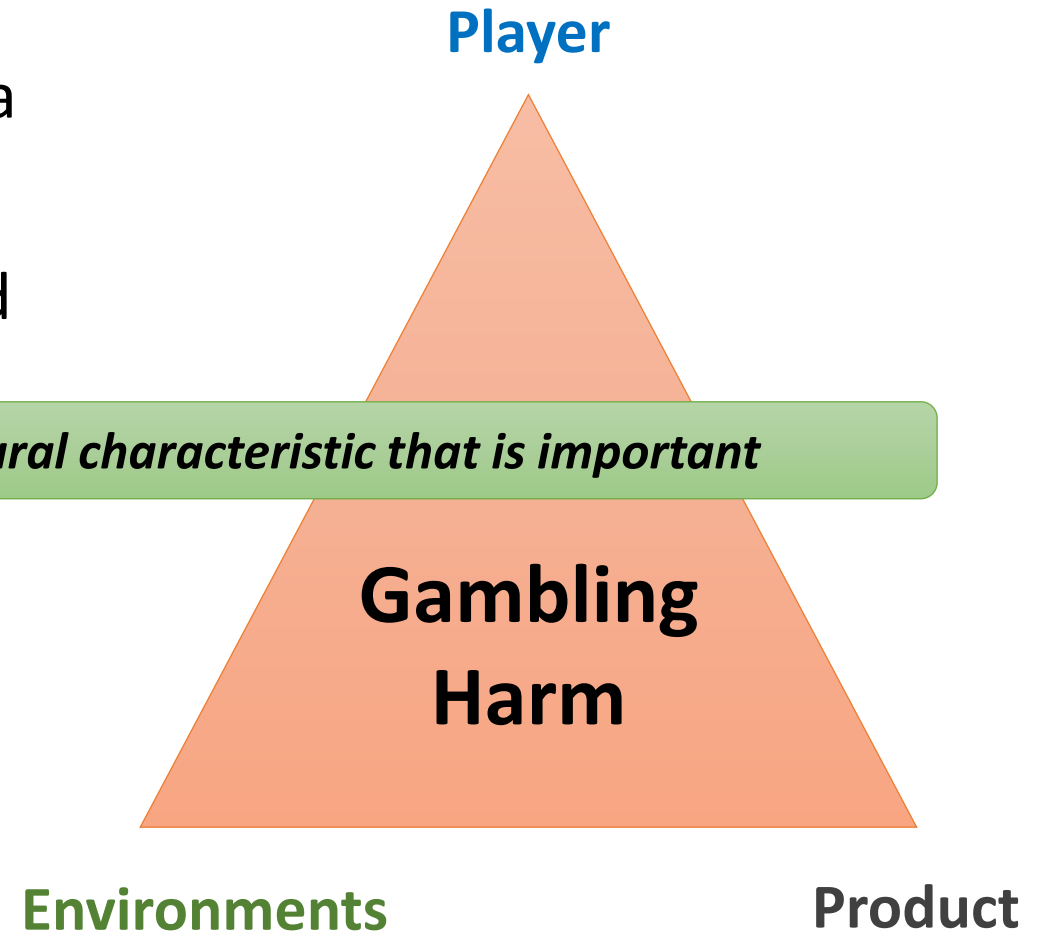
Ongoing Work

Cherkasova MV – PI, Clark L, Kestner K – co-Is

Objective:

- To examine unique and joint contributions of reinforcement schedules and sensory feedback to slot machine immersion
  - Reinforcement schedules
  - Sensor feedback
- In a nationally representative sample (Qualtrics panels)
- Within-subjects design

Ongoing Work

Aim 1: To test the unique and joint contributions of reinforcement schedules and sensory feedback to immersion

Simulator Versions				
	Standard	**Sparse**	**Slow**	**Sparse & slow (supra-additivity)**
Pay lines	40	40	40	40
Reinforcement ratio	36 % (~VR3)	18% (~VR6)	36 % (~VR3)	18% (~VR6)
Reinforcement interval	7 - 56 s (M=25s)	7 - 56 s (M=25s)	12-82 s (M=40s)	20-142 s (M=70s)
Reel spin duration	3 s	3 s	8 s	8 s
Total bet size	40 credits	40 credits	40 credits	40 credits
Sensory feedback	SF+/ SF-	SF+	SF+	SF+/ SF-

Aim 2: To test individual differences in the effects of these product features

Aim 3: To validate eye-tracking & EEG as an objective measures of immersion
- Lab study

Acknowledgments & Disclosures

THE UNIVERSITY
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- Eve Limbrick-Oldfield

Thank you!

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- **Margaret Craw**

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INTERNATIONAL CENTER FOR RESPONSIBLE GAMING

CIHR IRSC
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BC's health research funding agency