

The Dark side of Flow: Dark Flow, Depression, Gambling and Gaming to Escape.

Mike Dixon

Waterloo Gambling Research Lab, Ontario, Canada



University of Waterloo



Flow

“Czikszenmihalyi noted that when work on a painting was going well the artist persisted single-mindedly, disregarding hunger, fatigue, and discomfort”

(Oxford Handbook of Positive Psychology)



Some aspects of flow include:

- 1) clear goals
- 2) immediate and unambiguous feedback
- 3) focused concentration
- 4) time distortion
- 5) experiencing the activity as intrinsically rewarding

Flow occurs in many situations, e.g., surfing, rock climbing, sports etc.

Flow also occurs in slot machines



LOLLIPOP THREE ON A PLAYED LINE STARTS BONUS

THREE ON A PLAYED LINE STARTS BONUS PLAY 75 CREDITS

CREDITS	8,661	15	5	75	0
		LINES	BET	TOTAL BET	PAID

CASH OUT SEE PLAY HELP SELECT LINES BET FOR LUCK MAX BET SPIN



INSERT BILLS
 MACHINE ACCEPTS
 \$1
 \$5
 \$10
 \$20
 \$50
 \$100

1 LINE 5 LINE 10 LINE 15 LINE

PLAY 1 CREDITS PLAY 2 CREDITS PLAY 3 CREDITS PLAY 4 CREDITS PLAY 5 CREDITS

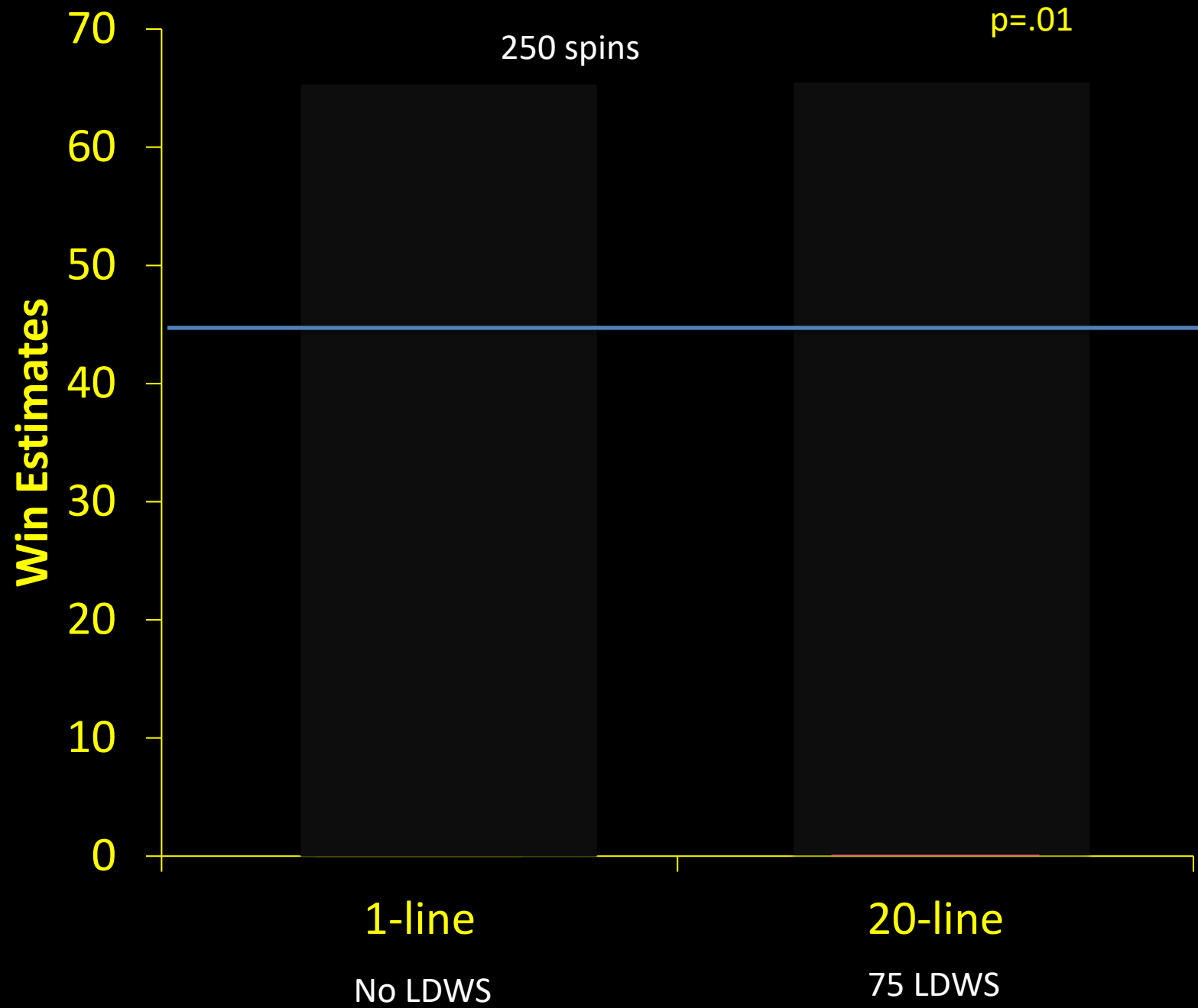
Losses disguised as wins (LDWs)



Losses Disguised as Wins

- About 70 percent of novice gamblers fail to even realize that they have lost money on these spins
- Experienced gamblers know about LDWs, but the LDWs and the wins get conflated in memory causing them to consistently overestimate the number of times they actually won.

Win Estimates



Do Slots designers know this?



“Positive Reinforcement Hides Loss”

Different Pathways to addiction



Gambling to Escape

The only time I am not thinking about how #@\$\$##! my life is, is when I am playing slots...

Gambling to Escape

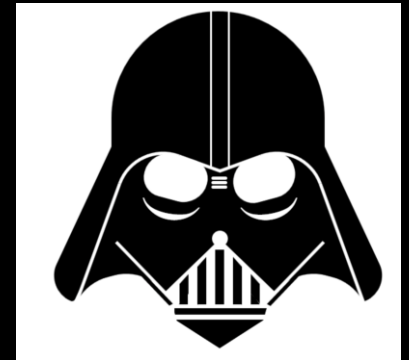
Gambling is an escape from reality. Because when you're gambling you don't think of anything else. You totally blank all your problems(Mick, age 44)

Wood and
Griffiths, 2010

“You go into that trance, that zone, that box. Nobody can touch you. You have escaped from reality. No one can ask you for anything”

- 1) clear goals
- 2) immediate and unambiguous feedback
- 3) focused concentration
- 4) time distortion
- 5) experiencing the activity as intrinsically rewarding

Dark Flow



LDWs, multiline slots and dark flow

Problem Gambling Severity Index

Never	Sometimes	Most of the Time	Always
0	1	2	3

Have you bet more than you could afford to lose?

Have you needed to gamble with larger amounts of money to get the same feeling of excitement?

Have you gone back on another day to try and win back the money you lost?

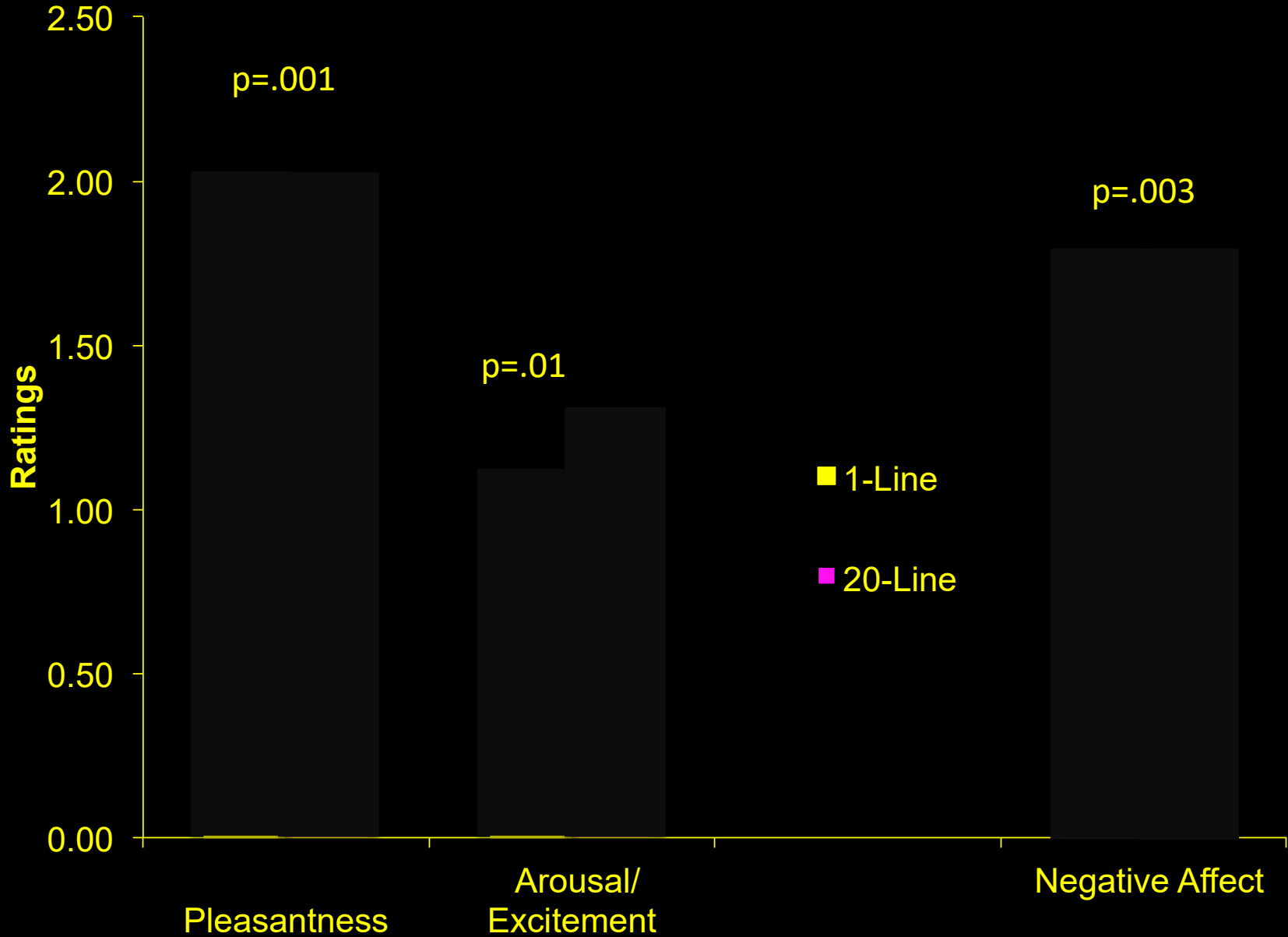
- 102 gamblers
 - 30 non-problem gamblers (0 Problem Gambling Severity Index PGSI)
 - 48 Low risk (1-4 on Problem Gambling Severity Index)
 - 21 High risk (5-27 on Problem Gambling Severity Index)

- 1-line game (250 spins – 0 LDWs),
- 20-line game (250 spins- 75 LDWs)
 - Given \$15.00 to play – told they could keep whatever was left
 - Equal number of wins (45) each game

Predictions

- Most players would prefer the 20-line game
- They would find :
 - More pleasant
 - More arousing exciting
 - Less negative

91 out of 98 players preferred the 20-line game!!!



What about dark flow?

I forgot everything around me.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

I was deeply concentrated in the game.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

I lost track of time.

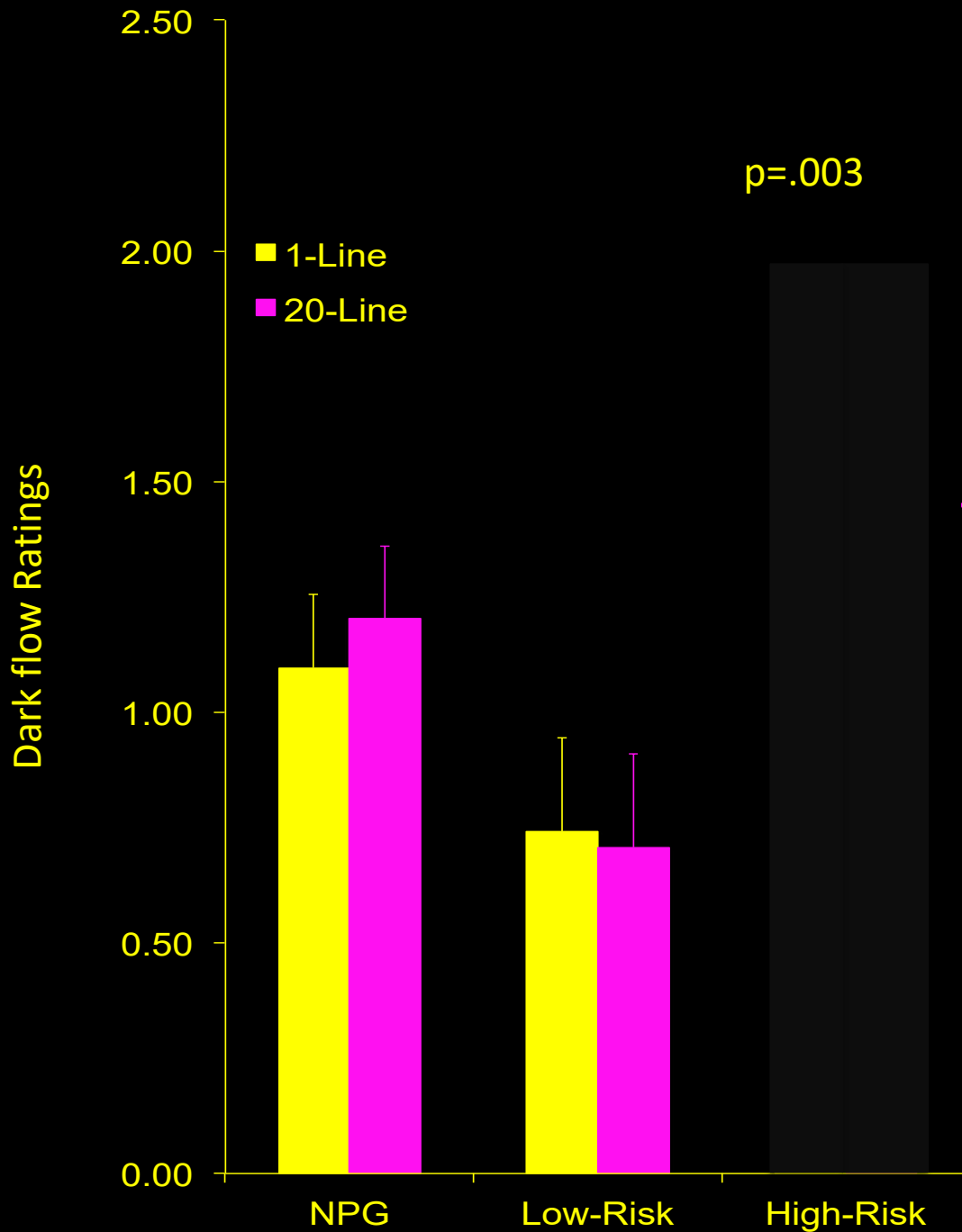
- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

I was fully occupied with the game.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

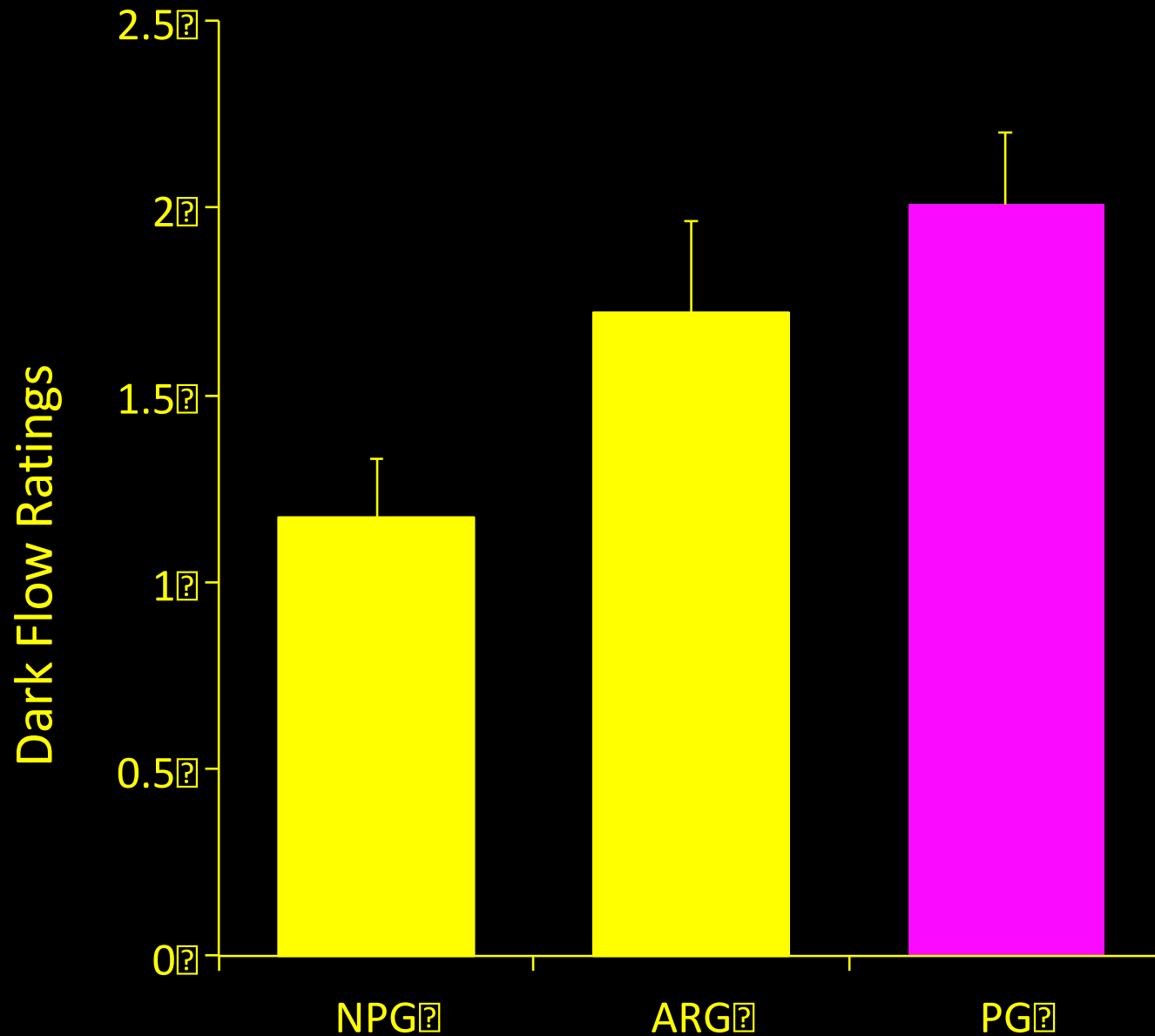
I lost connection with the outside world.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely



High – Risk Gamblers particularly prone to experience dark flow, but only in multiline games

PGs give higher ratings of Dark Flow



PGs give higher ratings of Dark Flow

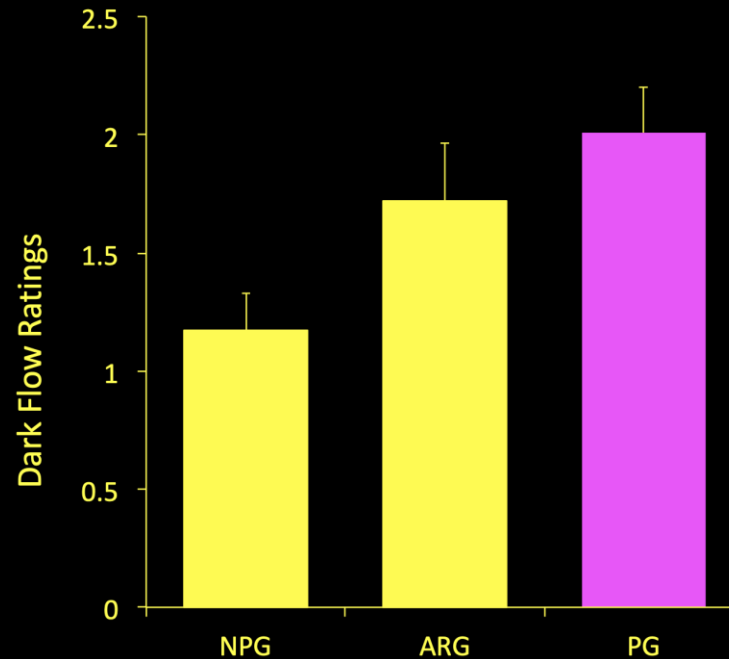
Correlations of PGSI scores and Dark Flow ratings

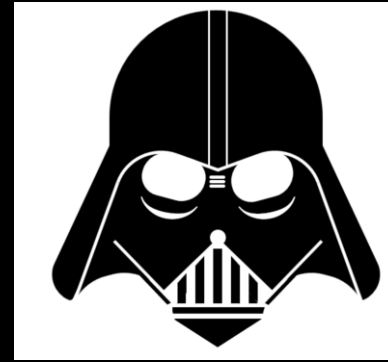
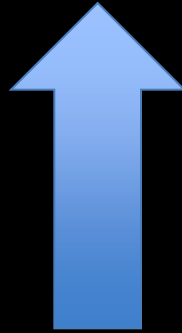
$r(98) = .301, p=.003$

$r(104) = .315, p<.001$

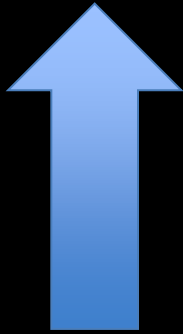
$r(134) = .572, p<.001$

$r(127) = .250, p<.01$

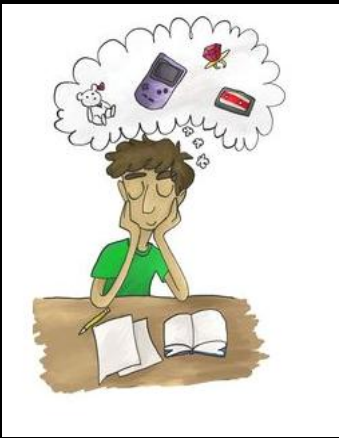




• Depression scores are also robustly related to dark flow while playing slots



$r(73) = .56, p < .001$



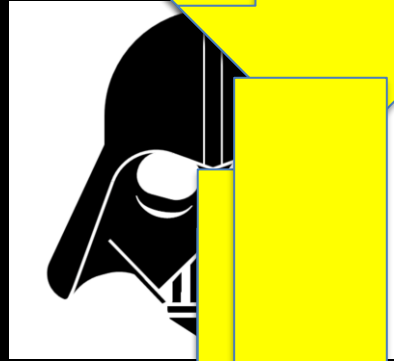
Is mind wandering the common link?

- Depressed individuals have problems staying on task in everyday life (Brown and Ryan, 2003)
- Problem gamblers have problems staying on task in everyday life (e.g. Reid et al., 2014; Lakey et al., 2007)

Compulsive
gambling

Lose track of time
and money spent on the game
and neglecting other things else

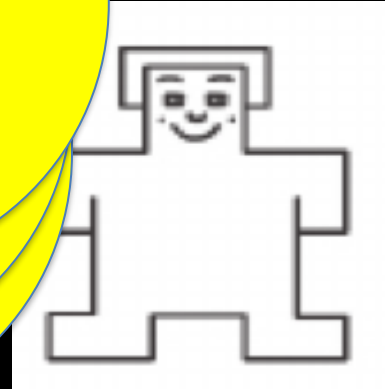
Depressed



When they quit they realize they spent
more time and lost more money than
intended



Off
Task



Gambling to "Escape"

LDWs ensure that your attention is reined in every three or four spins



Method

- 129 Participants completed three key questionnaires
- Mindfulness Problem Gambling Depression
- MAAS PGSI DASS21



Method



Played 300 spins on our slots simulator

Received thought probes every 50 spins

- Pop-up messages asking if their thoughts were “on-game” or “something else”
- After playing they completed the dark flow items and positive affect questions

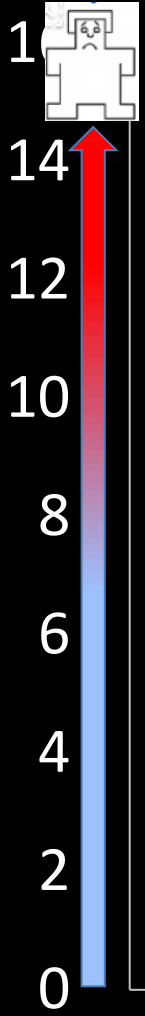
Predictions

- If **Depressed Gamblers** have problems with mind-wandering in everyday life they should score **low** on Mindfulness. (Mindful Awareness Attention Scale)
- I break or spill things because of carelessness, not paying attention, or thinking of something else.
- I find myself listening to someone with one ear, doing something else at the same time.
- I find it difficult to stay focused on what's happening in the present

1	2	3	4	5	6
almost always	very frequently	somewhat frequently	somewhat infrequently	very infrequently	almost never

$r(127) = -.459***$

Depression Score on the DASS21



1 2 3 4 5 6

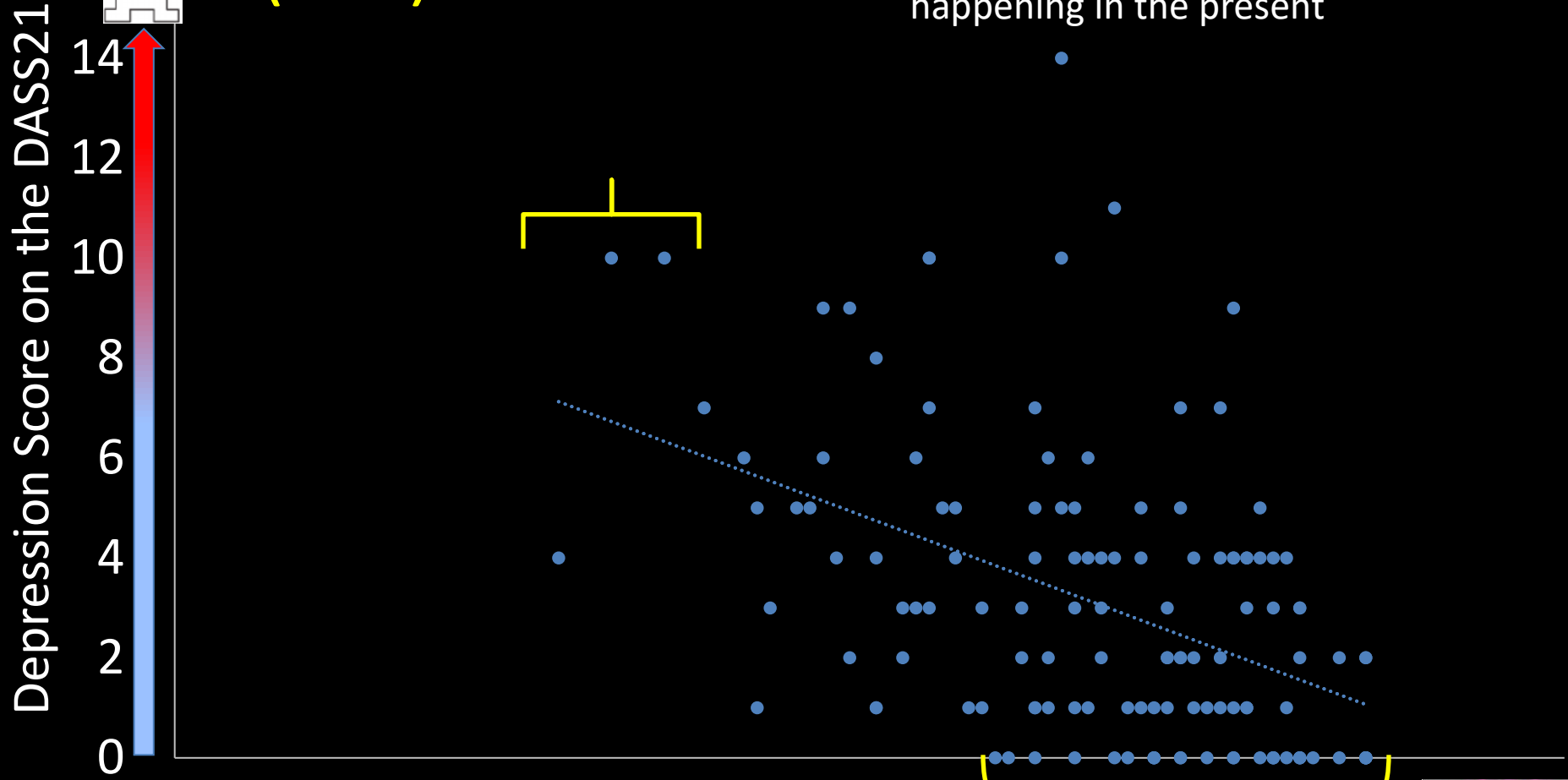
Mindful Attention Awareness Scale



1	2	3	4	5	6
almost always	very frequently	somewhat frequently	somewhat infrequently	very infrequently	almost never

$r(127) = -.459***$

I find it difficult to stay focused on what's happening in the present



1 2 3 4 5 6

Mindful Attention Awareness Scale



1	2	3	4	5	6
almost always	very frequently	somewhat frequently	somewhat infrequently	very infrequently	almost never

Predictions

- If Slot Machines “rein in the wandering mind” then we should see an **elimination** of mindfulness problems **During Slots Play**

Depressed GAMBLERS



Depression Scores on the DASS 21



1

2

3

4

5

6

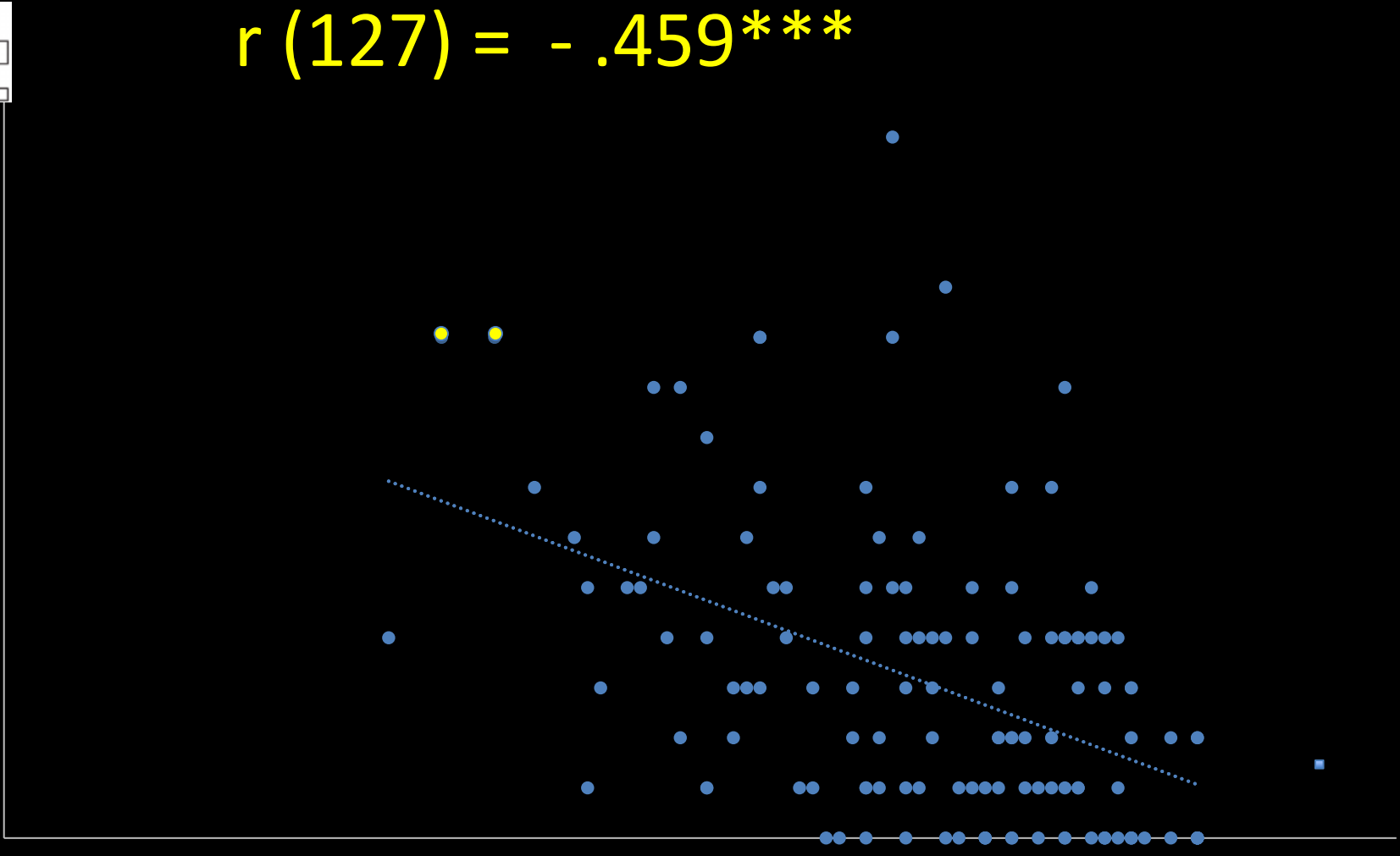
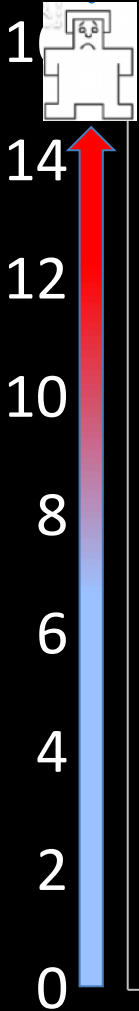
Slots Mindfulness



On
game!
!!

$$r(127) = -.459***$$

Depression Score on the DASS21



1

2

3

4

5

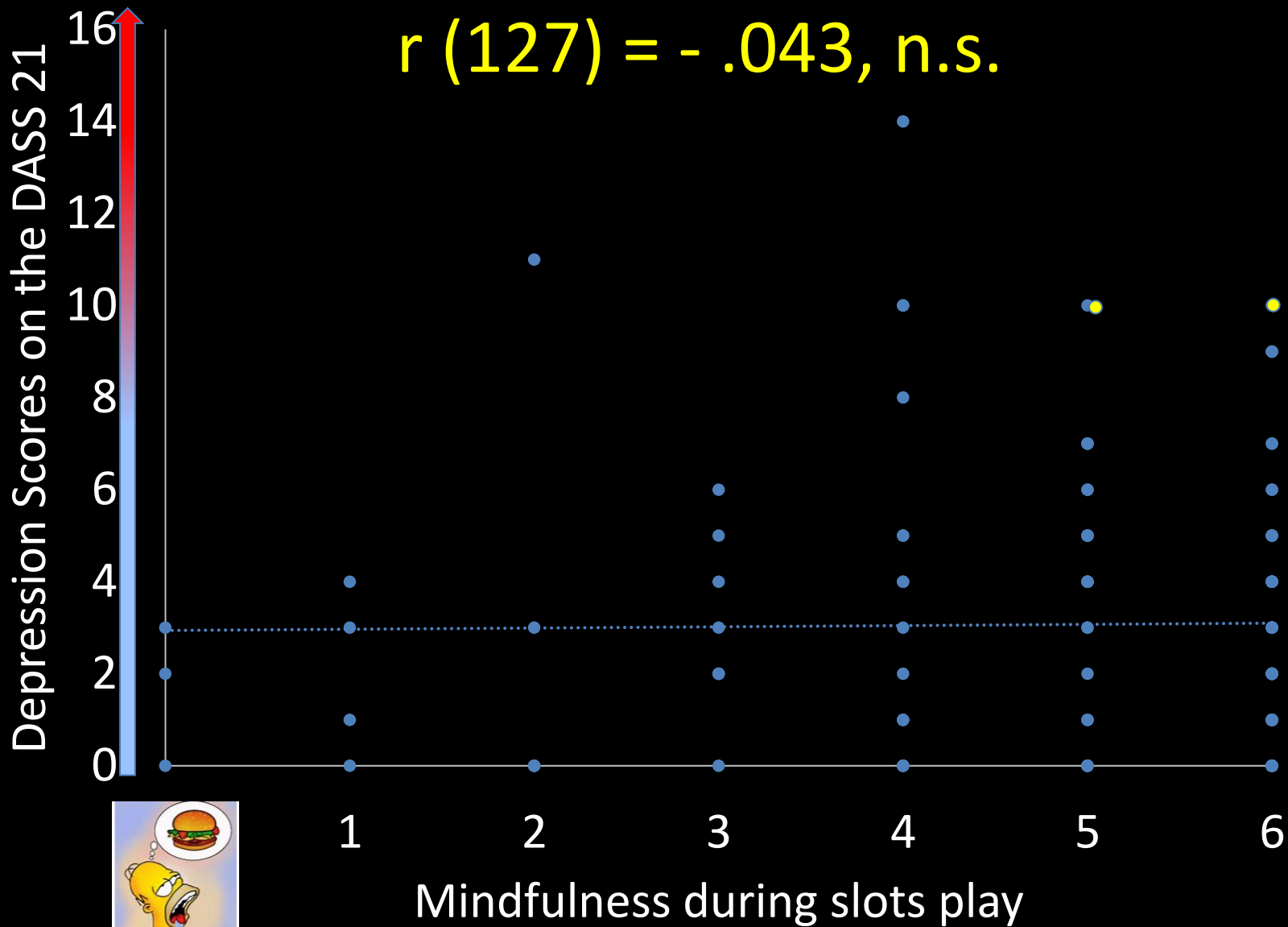
6

Mindfulness in Everyday life



1	2	3	4	5	6
almost always	very frequently	somewhat frequently	somewhat infrequently	very infrequently	almost never

$r(127) = -.043, n.s.$



On game!!

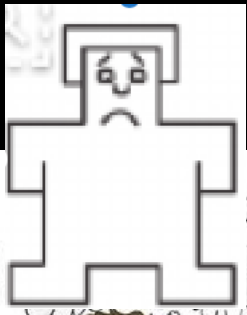
Conclude that Slots “rein in the wandering mind” and eliminate the mind wandering that they show in everyday life.

- The experience of focussed attention during slots play is so unusual for these habitual mind wanderers it will be reflected in dark flow ratings during slots play

On
game!!!

The only time I am not thinking about how #@\$##! my life is, is when I am playing slots...

Depressed GAMBLERS



Off
Task

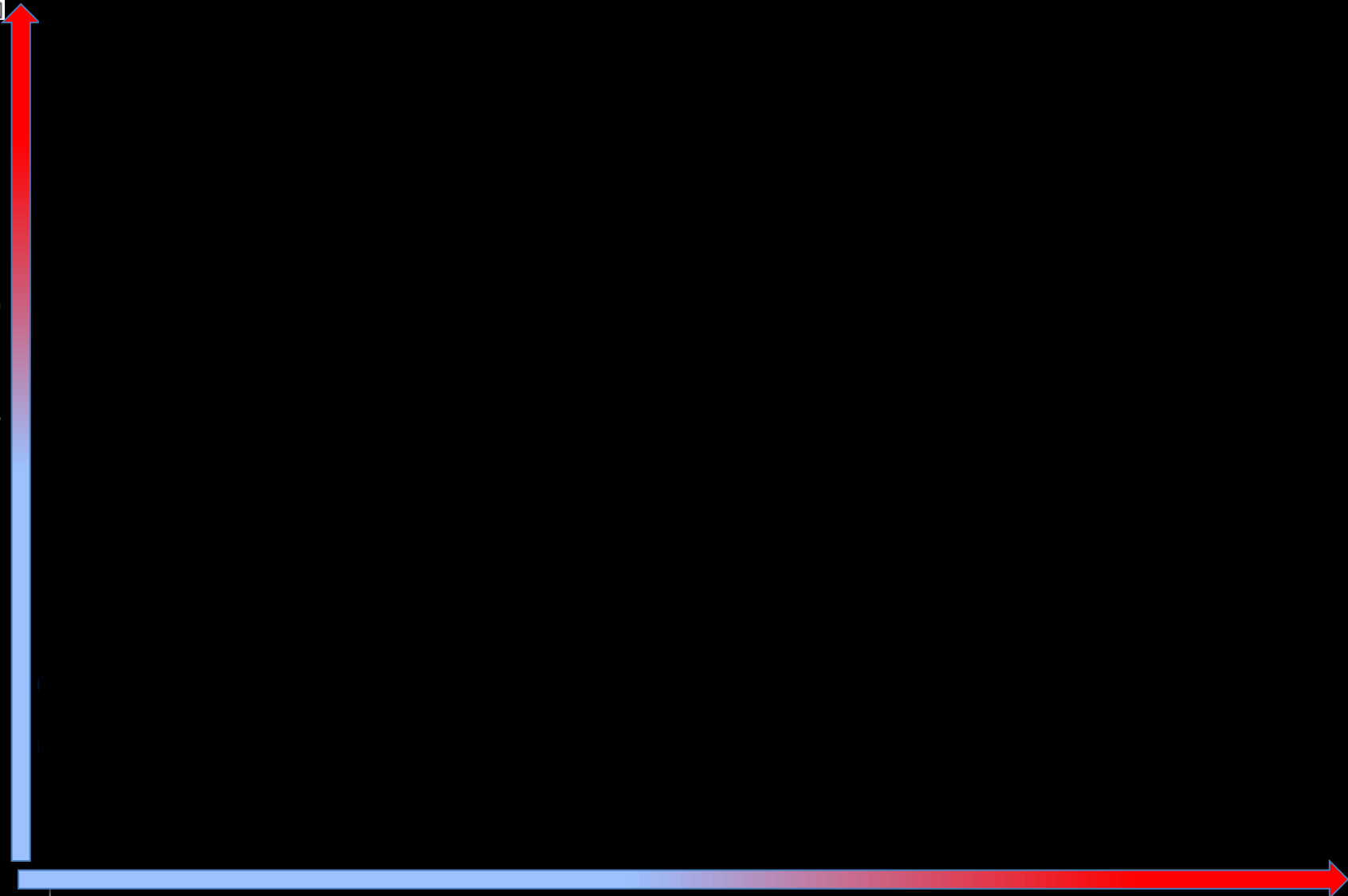


Depression scores on the DASS 21

13
11
9
7
5
3
1
-1

Dark Flow Scores

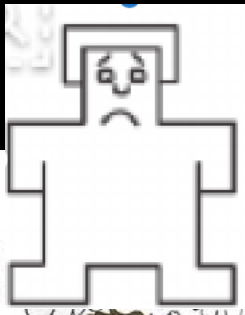
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21



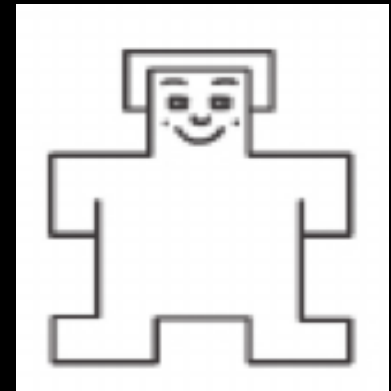
On
game!!!



Depressed GAMBLERS



Off
Task



Gambling to "Escape"

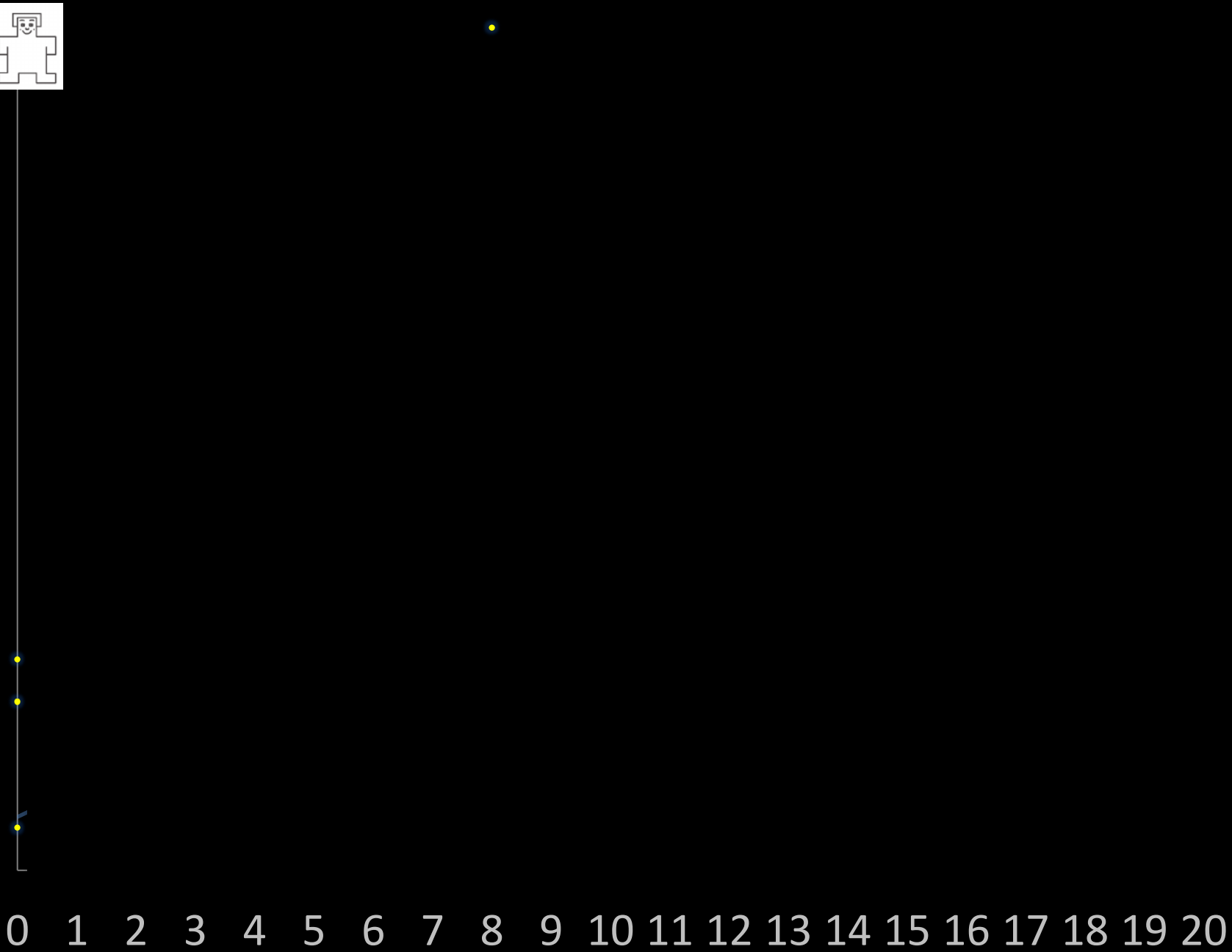


GEQ Positive Affect

20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

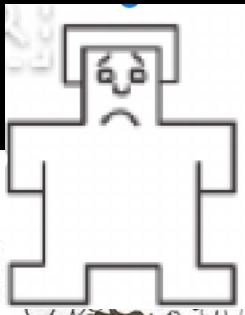
Flow Scores



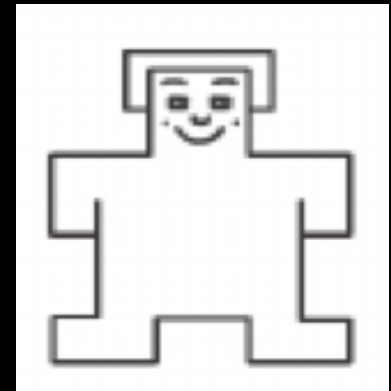
On
game!!!



Depressed GAMBLERS



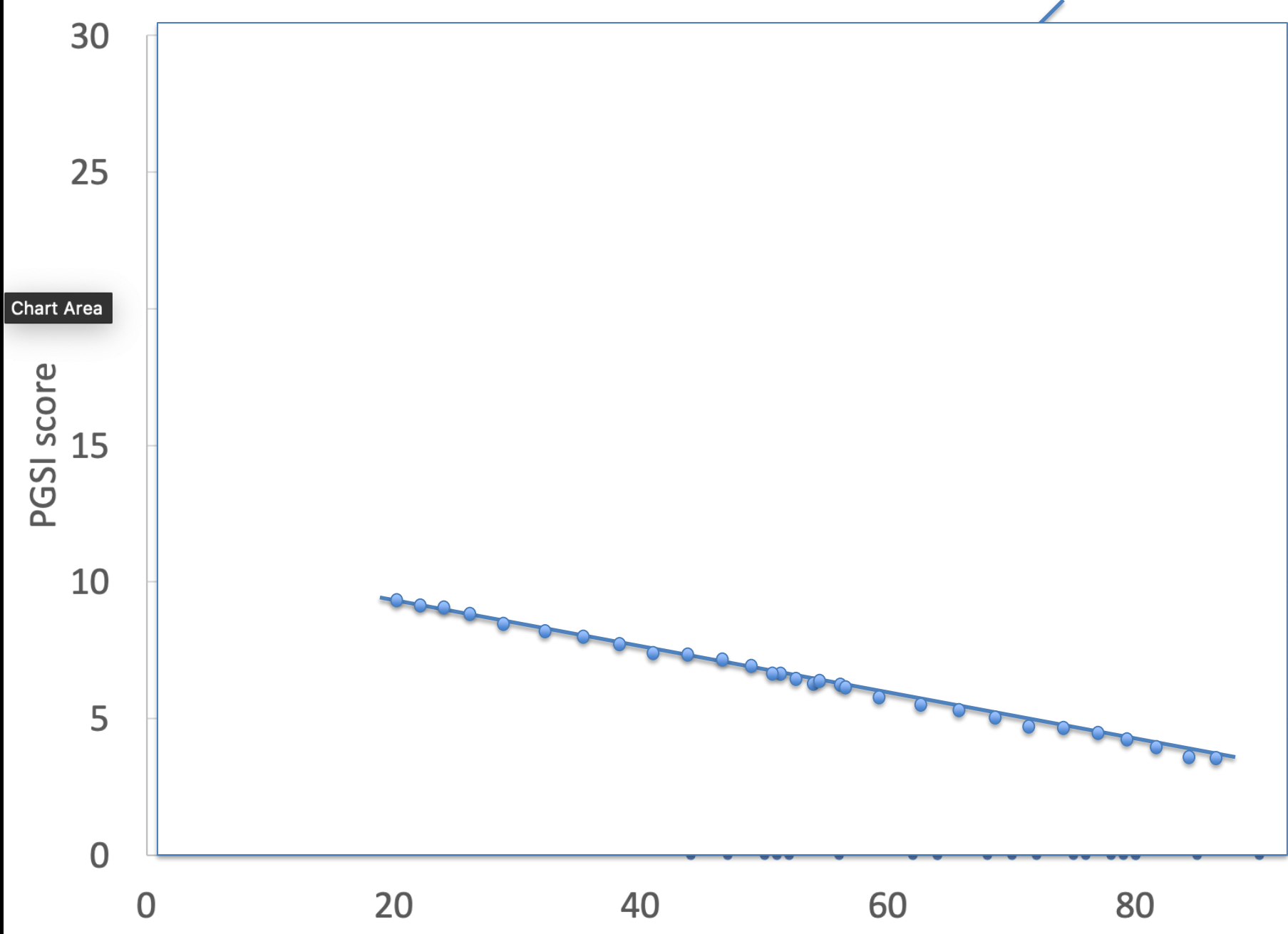
Off
Task



Gambling to "Escape"

Using Multiple regression to highlight
the downward spiral

Chart Area



Predicting PGSI scores using Hierarchical Multiple Regression

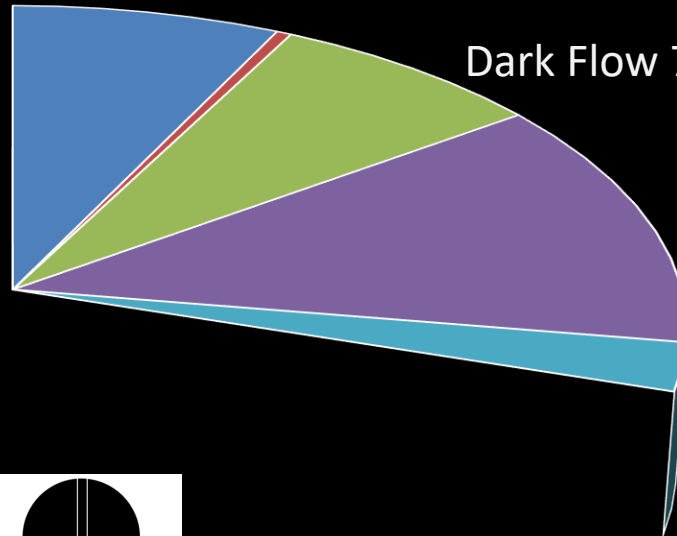


Age 7.2%

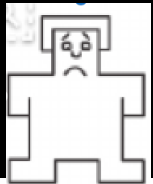
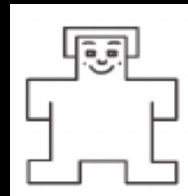
Dark Flow 7.2%

Depression 12.6%

Dep X Dark flow 2.4%



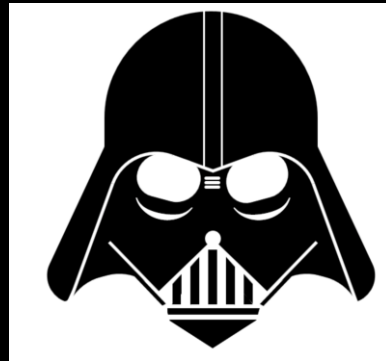
On game!
!!



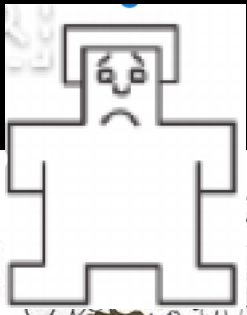
Assumption is that if people are using this maladaptive coping mechanism its going to lead to gambling problems

“You go into that trance, that zone, that box. Nobody can touch you. You have escaped from reality....”

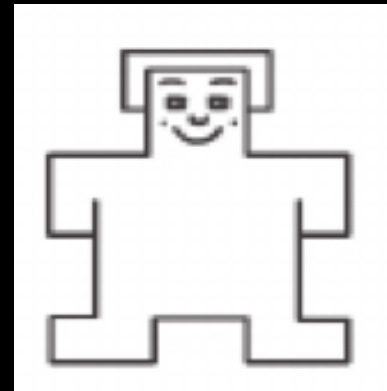
On game!!!



Depressed GAMBLERS



Off Task



Gambling to “Escape”

Is Dark Flow just Flow???



In flow, the artist is keeping themselves on task – endogenous control

In dark flow, the machine is keeping themselves on task – exogenous control

In flow, you experience the activity as intrinsically rewarding
The reward is the process – you get out of it what YOU put into it

In dark flow, the rewards are controlled by THE MACHINE (if it is a single line machine – little flow, a multiline machine = more flow)

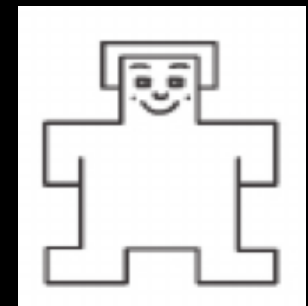
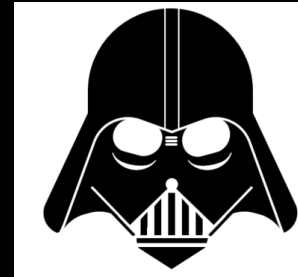
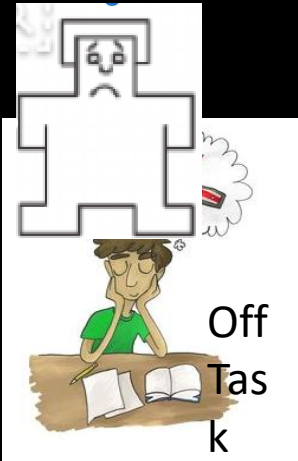
Slot machines appear to rein in the attention of minds that would otherwise be prone to wandering to dark places.

Show again and again that the more severe the gambling problems, the more strongly flow is experienced.

Dark flow, (and its accompanying positive affect), is an effective but maladaptive means of coping with negative mood that ultimately increases your gambling problems!

On
game!
!!

Depressed
GAMBLERS

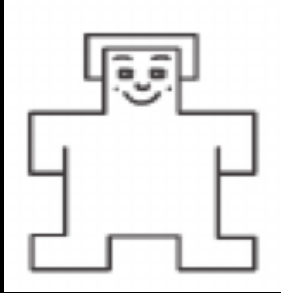
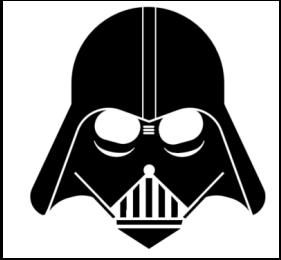


Are there other situations where attention can be captured exogenously and induce Dark Flow?

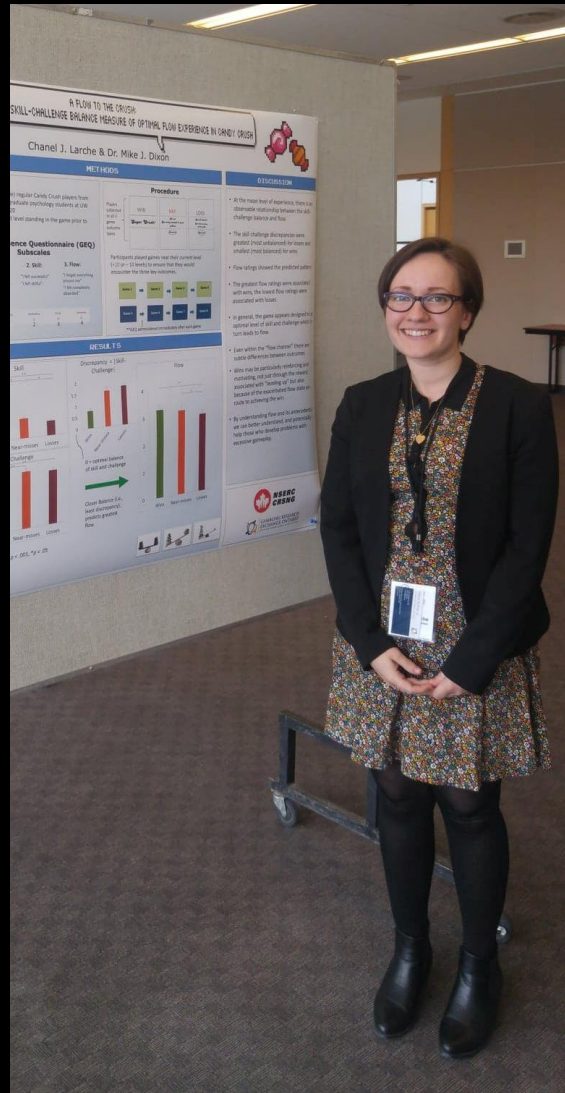
Gaming?



On game!!!



Chanel Larche



Escaping the Woes Through Flow? Examining the Relationship Between Escapism, Depression, and Flow Experience in Role-Playing and Platform Games

1 2 3 4 5 6 7

Completely disagree.

Completely agree

I like playing video games mostly because I find them very entertaining and exciting.

I like playing video games because they are thrilling

I like playing video games because they provide a break from reality

I like playing video games mostly because they take my mind off my everyday worries.

Excitement motivation

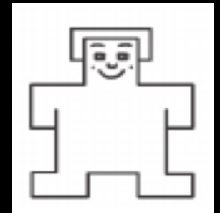
Correlation with depression scores $r(55) = .015, n.s.$



Escape motivation

Correlation with depression scores $r(55) = .296, p < .05$

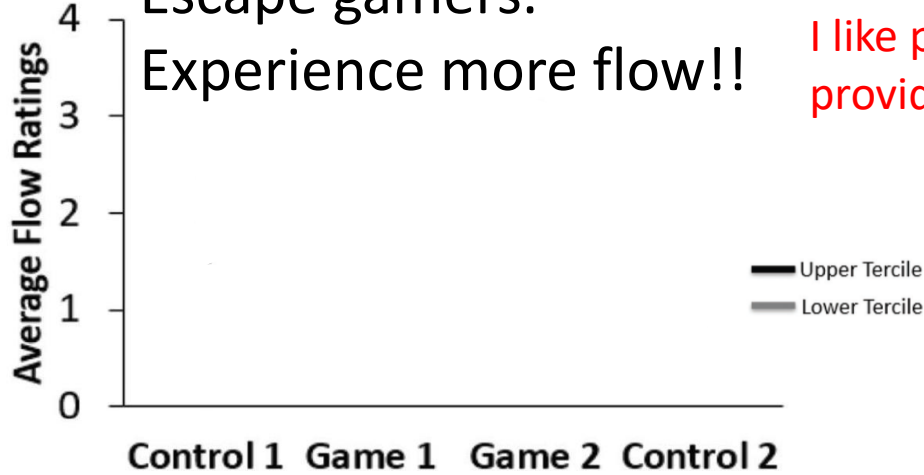
On
game!!!



I like playing video games because they provide a
break from reality

Tested 57 players familiar with the RPG game called SKYRIM

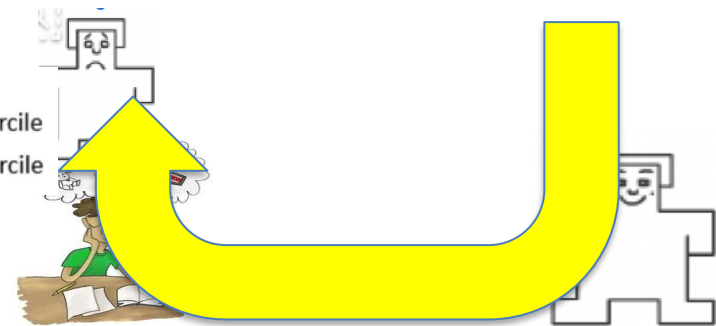
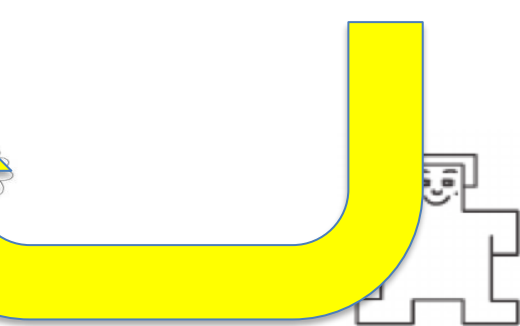
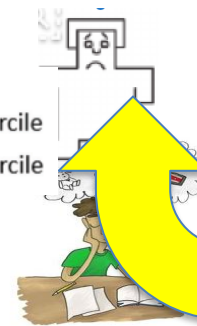
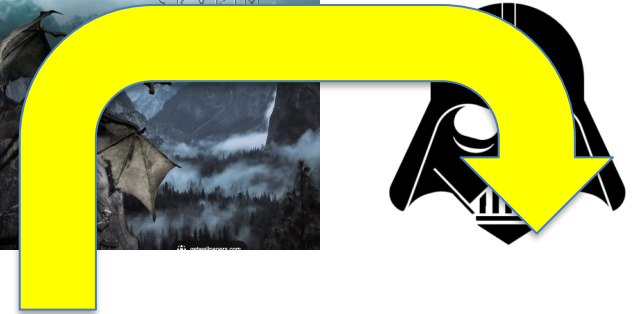
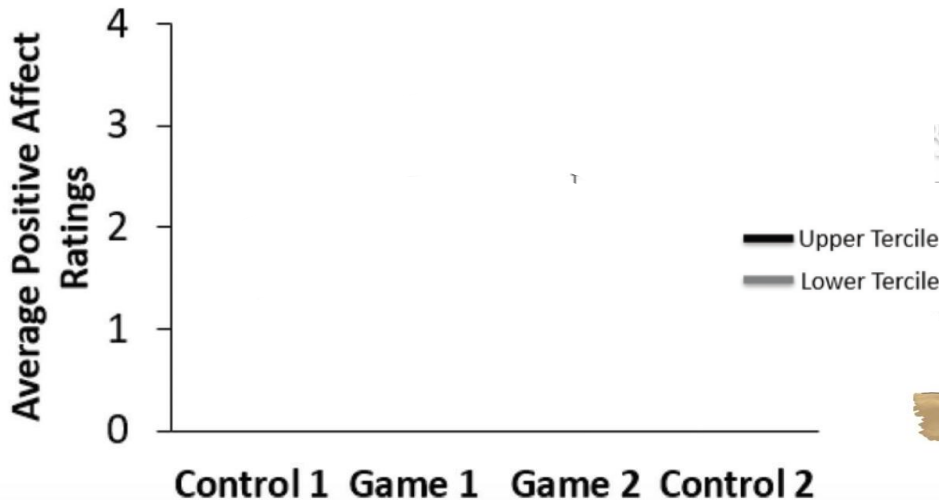
B) **Flow in Skyrim**
 Escape gamers.
 Experience more flow!!



Divided players into terciles based on their “escape gaming motivation”

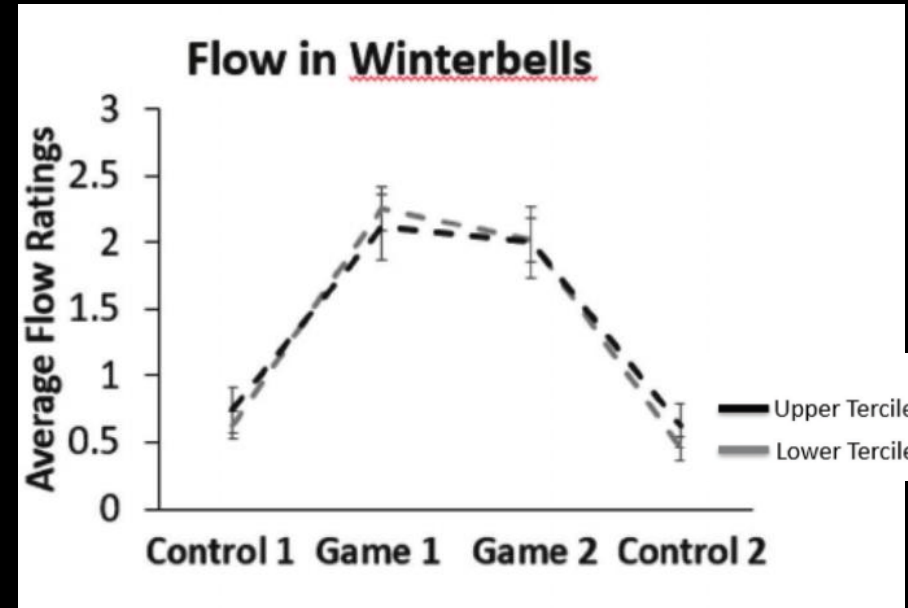
I like playing video games because they provide a break from reality

C) **Positive Affect in Skyrim**



Gaming to “Escape”

Not all games produce this effect!



No difference in flow for those who strongly vs weakly endorsed escape gaming motives when playing kid friendly Winterbells game. Is it just games RPG games with fantasy elements...?

family- friendly game



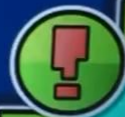
VERSION A

Description [Optional]



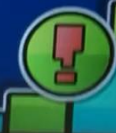
VERSION: 1

ID: NA (1556066)



VERSION B

Description [Optional]



XL



NIGHT DANCIN

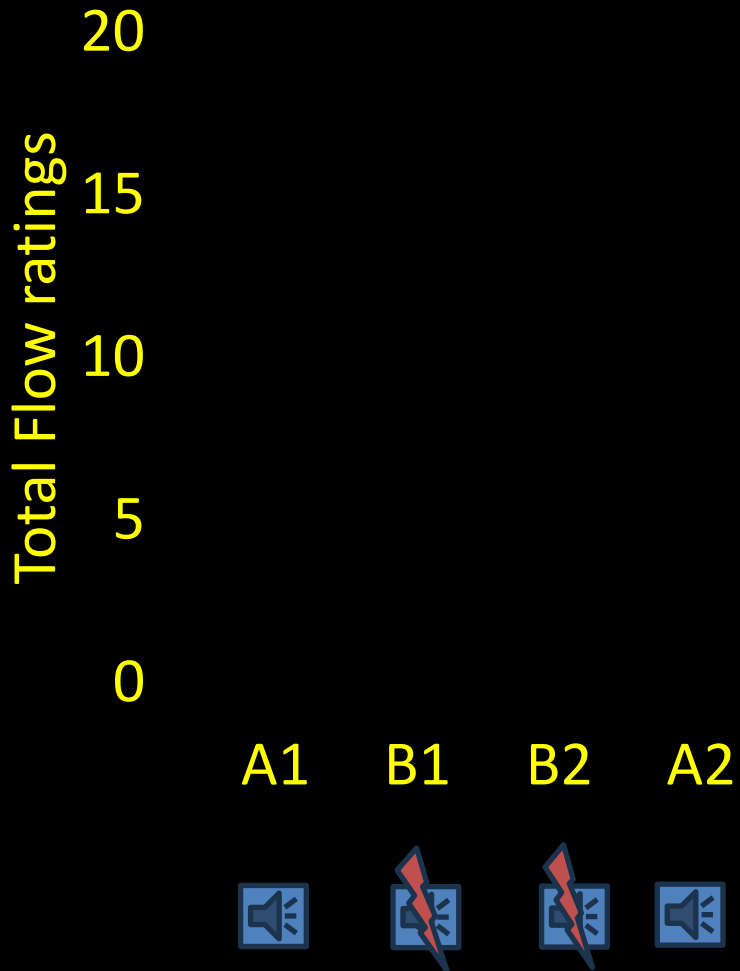


VERIFIED

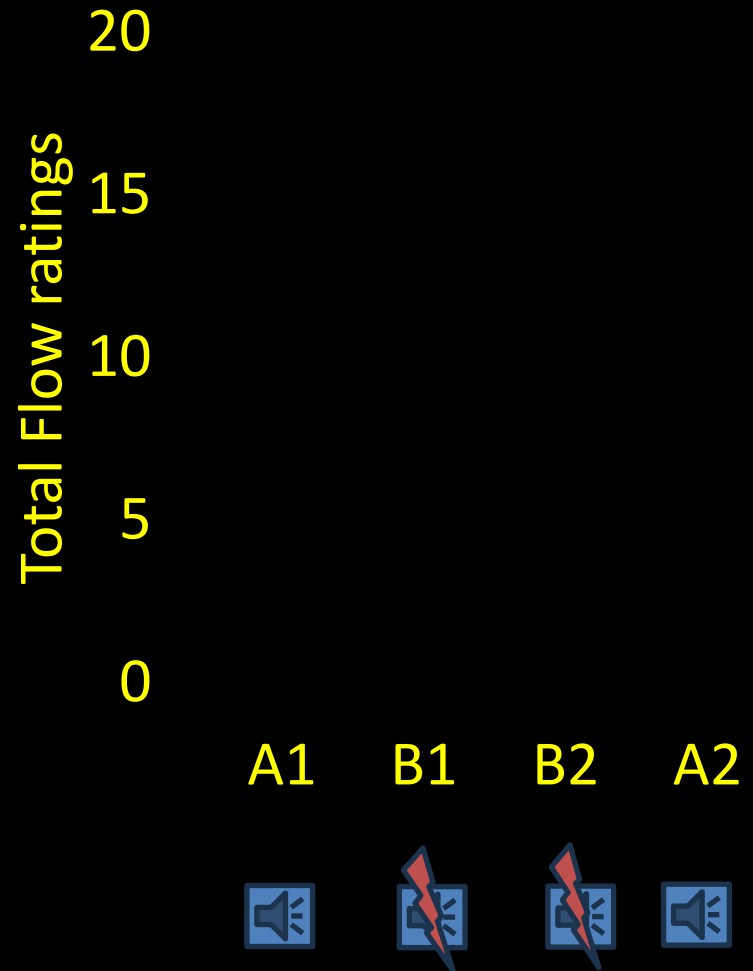
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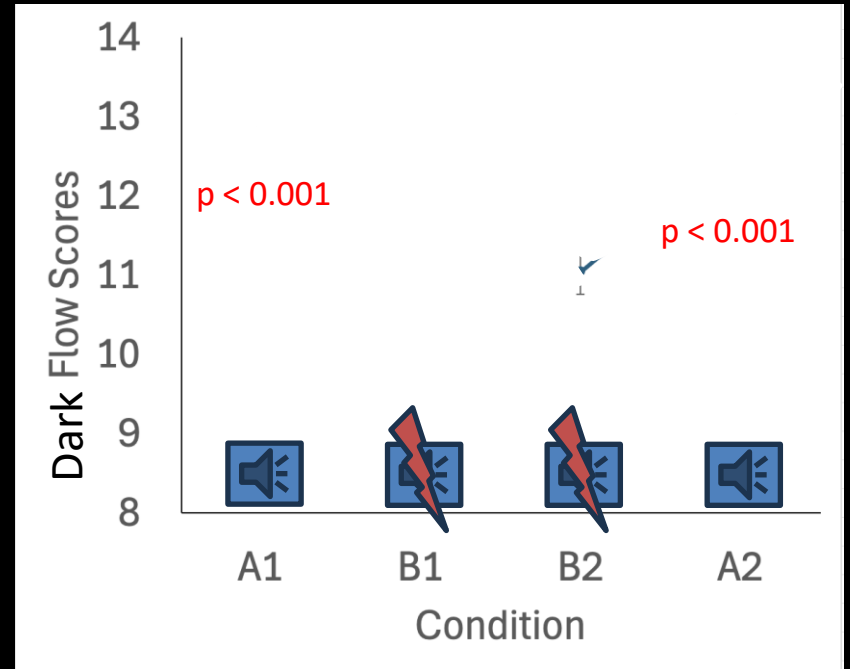
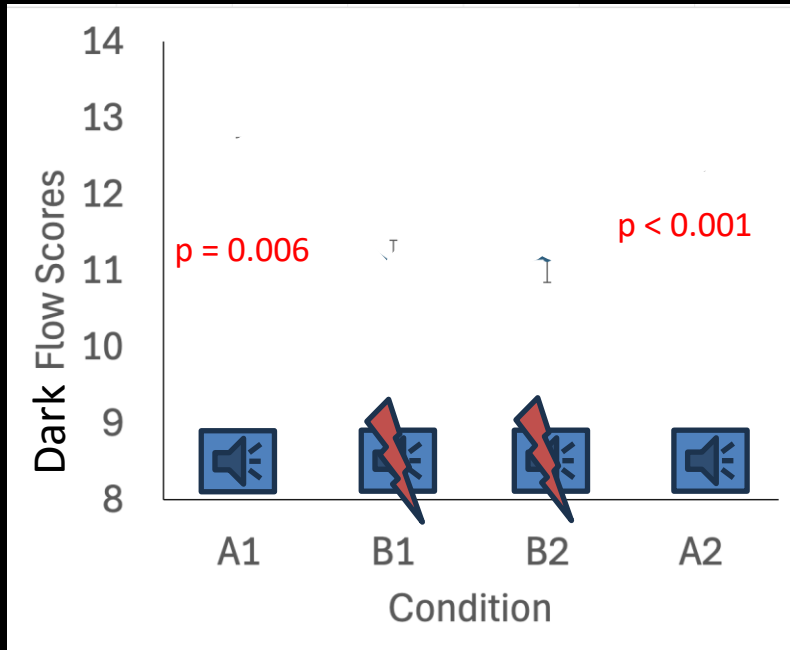
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First Round

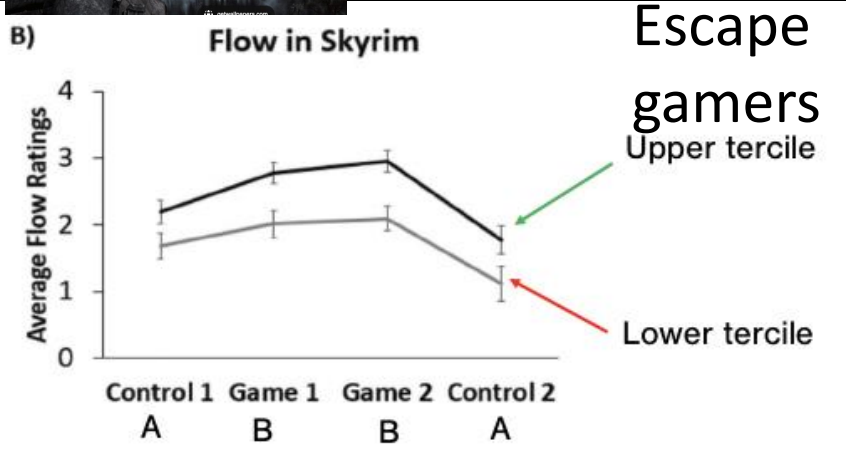


Second Round

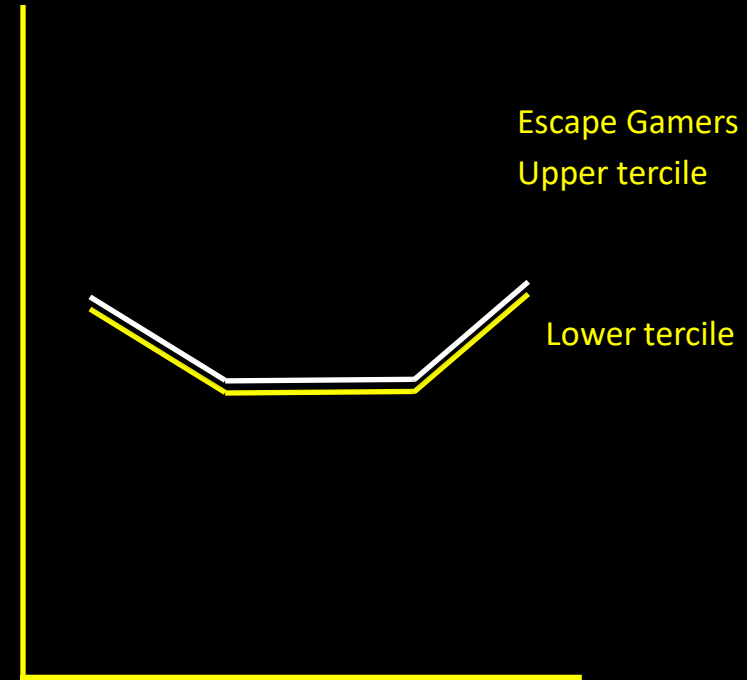




One simple way of increasing dark flow is to align game elements!



Total Dark Flow ratings

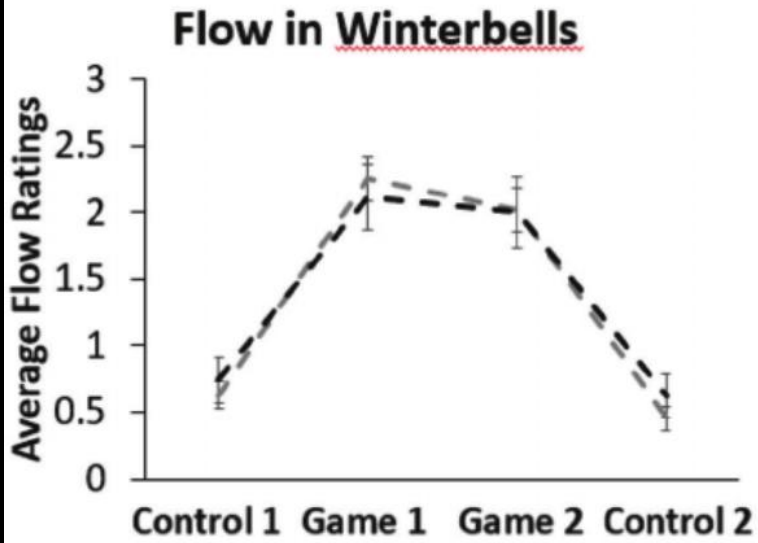


A

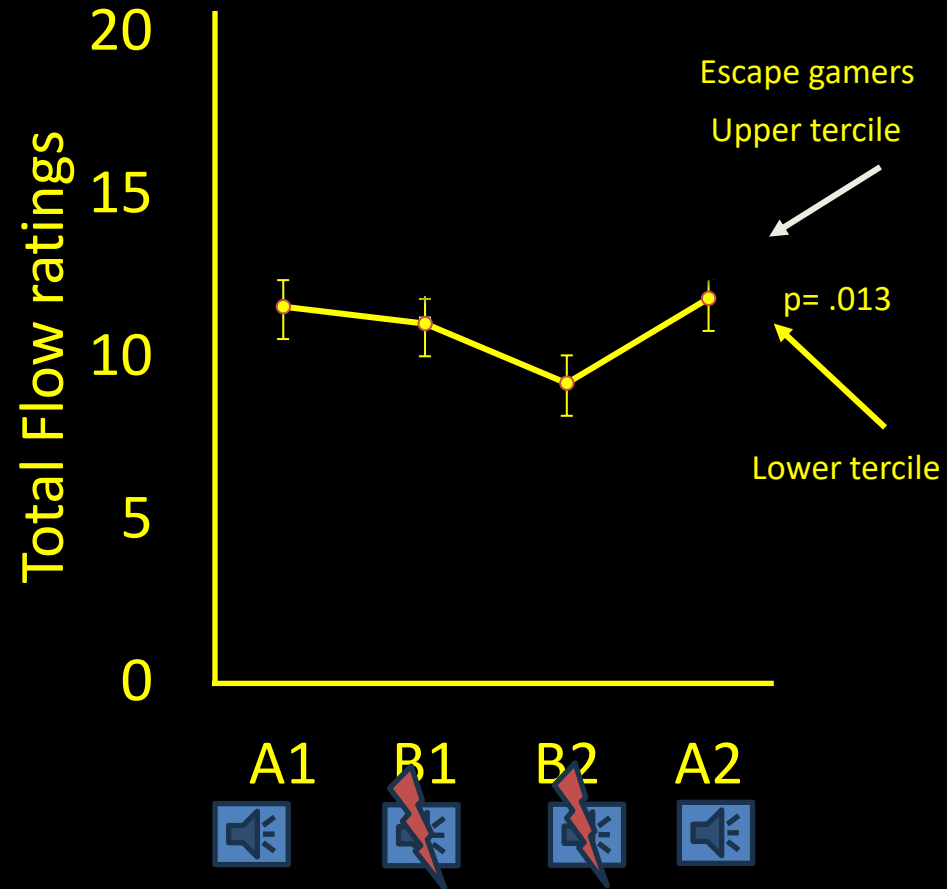
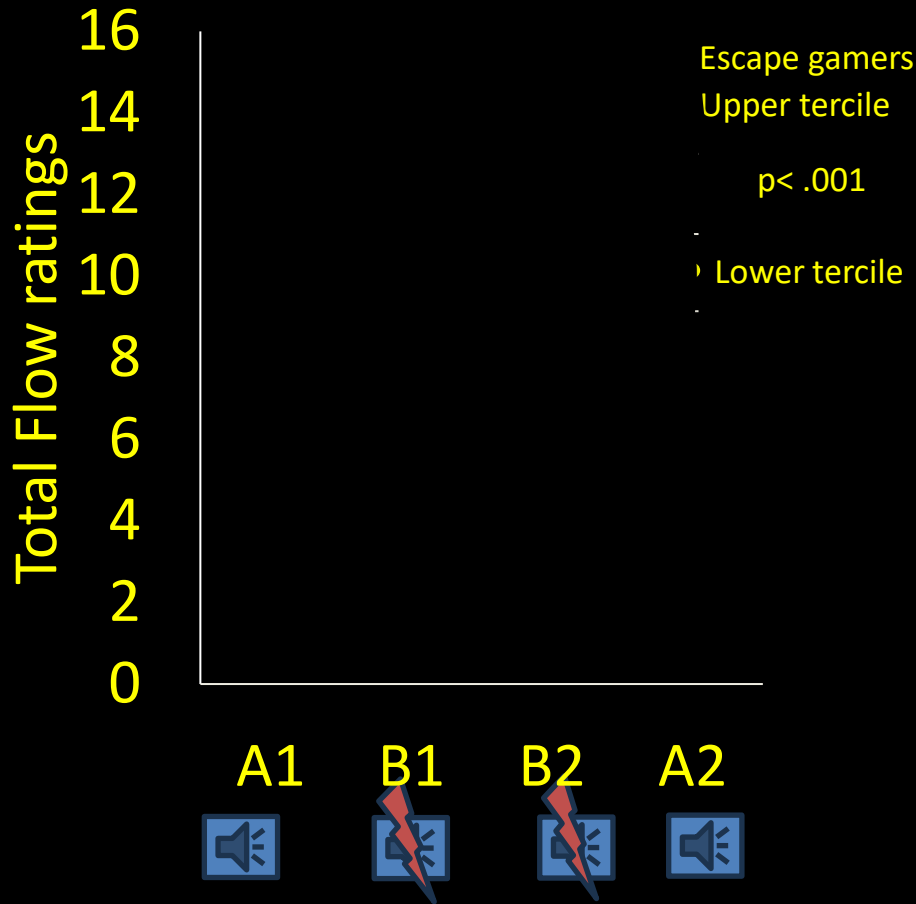
B

B

A

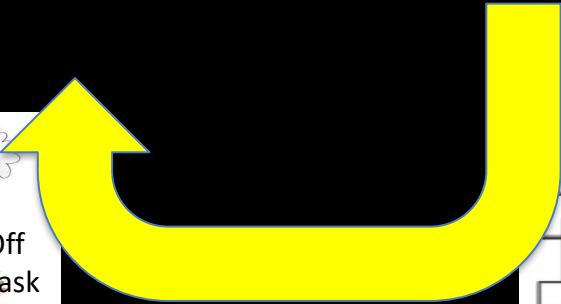
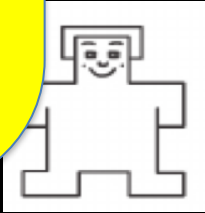
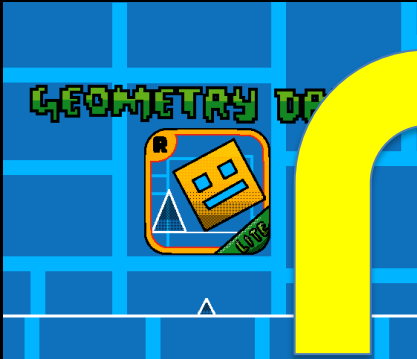


88 people played Geometry Dash



Those who strongly endorsed gaming to escape showed significantly greater dark flow scores than those who only weakly endorsed gaming to escape

On game!!!



Take Home Message

- Even in this family friendly game, there is the potential for those who game to escape to find the relief that they seek through dark flow

Instagram

Sara Ahmed




Research Article

Journal of Addiction Research

Instagram, Depression, and Dark Flow - Using Social Media as a Maladaptive Coping Mechanism

Sara Ahmed* and Mike J Dixon

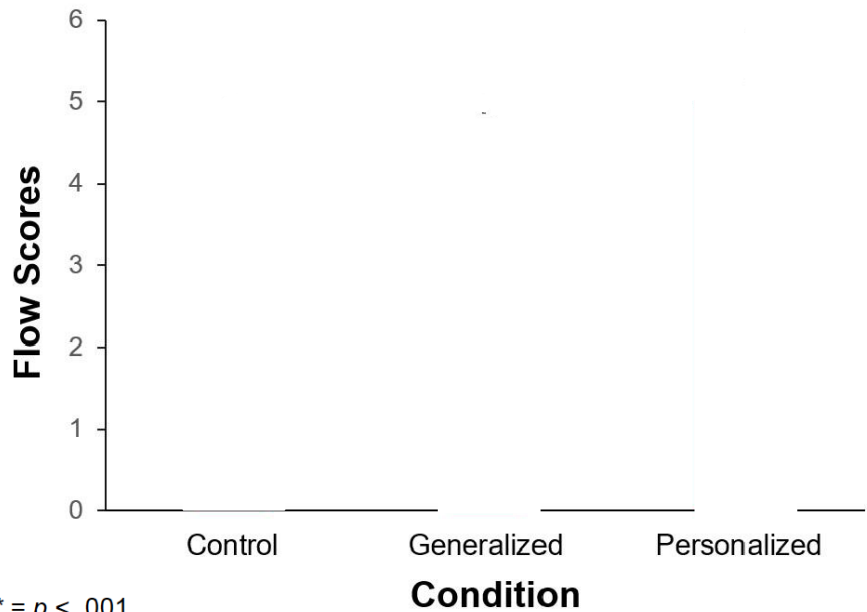
Could people use social media as a maladaptive coping mechanism?

- 114 people tested (Daily or near daily Instagram users)
- 3 conditions (10 minutes each) 
 - pegboard task (monotonous)
 - general Instagram account (based on the interests of 30 random people tested before the study)
 - their **personal** Instagram account (algorithm tailors content to the *individual's* interest)
- Measured flow and positive affect after each condition
- Measured depression, problematic Instagram use, and whether they used Insta as a means of escape

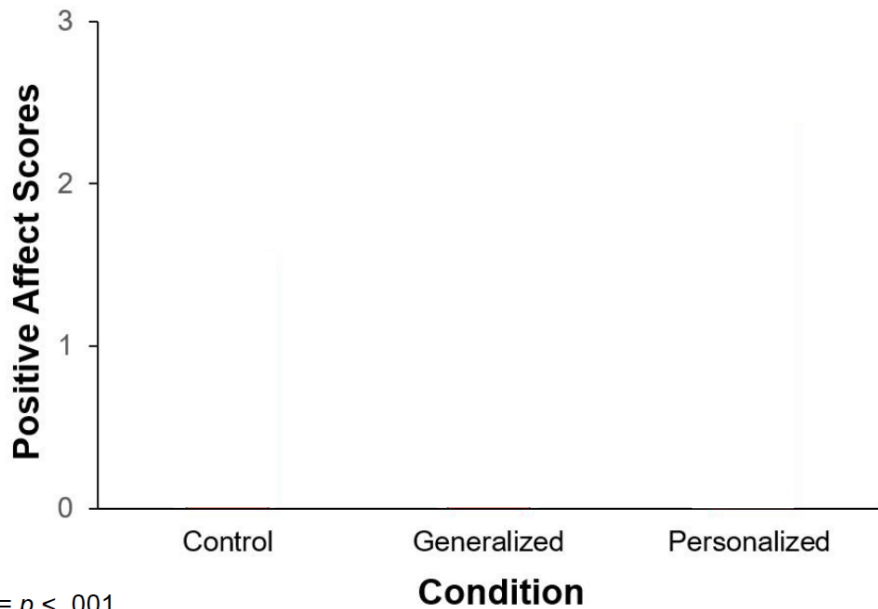
Effectiveness of the algorithms

Repeated Measure ANOVA Analyses

Flow and Positive Affect Across the Conditions



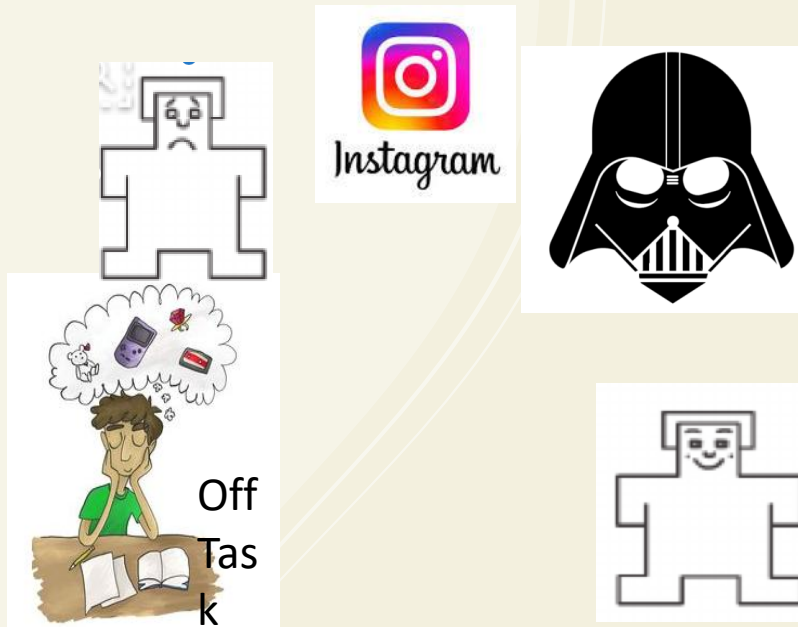
*** = $p < .001$



*** = $p < .001$

The algorithms effectively increase flow and positive affect!

Flow ratings and Positive affect
 $r(112) = .544, p < .001$





1

2

3

4

5

6

7

Completely disagree.

Completely agree

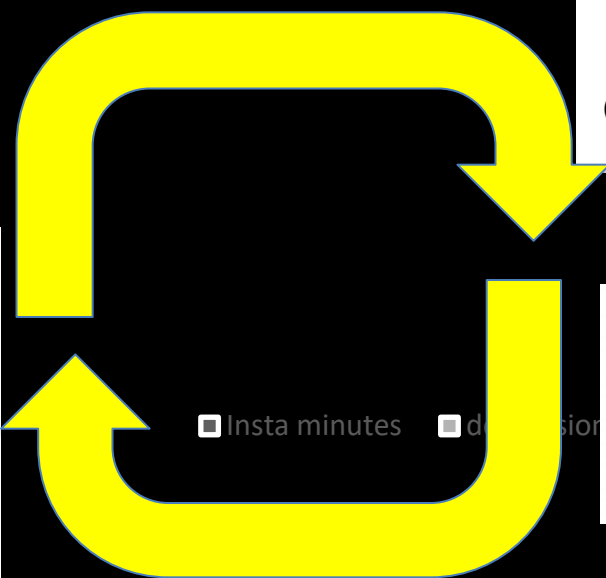
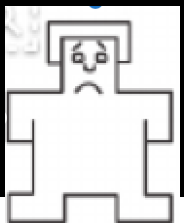
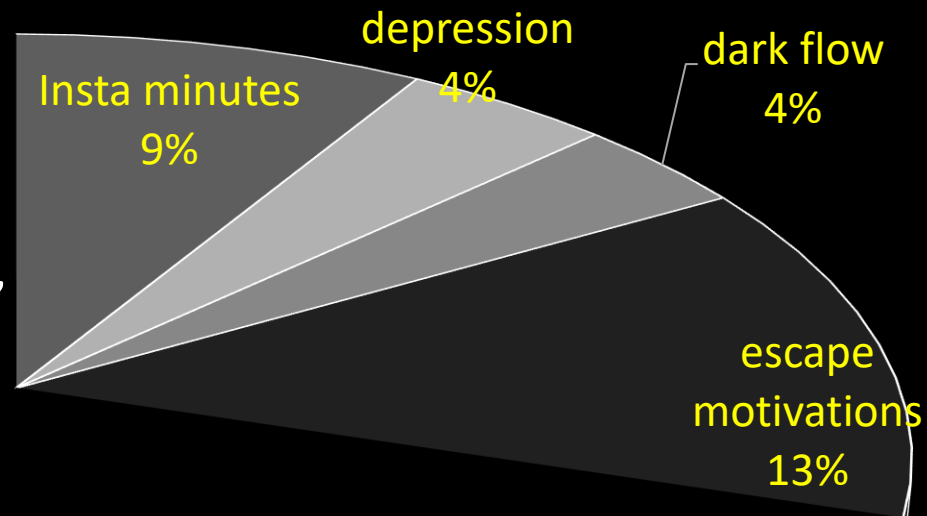
I like using Instagram because it provides a break from reality

I like using Instagram mostly because it takes my mind off my everyday worries.

Problematic Instagram use!!

Instagram Use Questionnaire

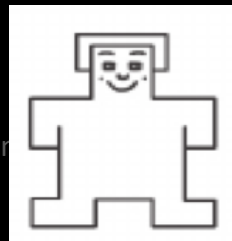
e.g., I feel angry when I am unable to access my Instagram account (rated 0, never, to 4 always) (Kircaburun & Griffiths)



- 1 Time spent on Instagram
- 2 Depression
- 3 Dark flow
- 4 Escape game motivation

(I like using Instagram because it provides a break from reality)
 $r(112) = .554, p < .001$

■ Insta minutes ■ depression ■ dark flow ■ escape motivations



Relevance to high school/Uni samples?

In slots we repeatedly show that problem gamblers experience more flow than those without gambling problems and that gambling may provide escape from depression

While not many students play slots regularly, many many students play video games and use social media.

Our work on video gaming and Instagram suggests that those who play to escape may, (like their slot machine counterparts), be using dark flow during gaming/insta as a coping strategy to modulate their mood.

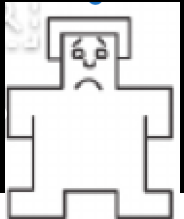
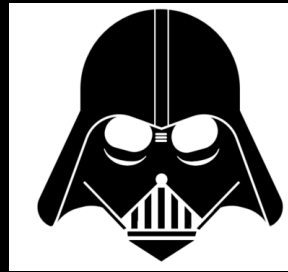
This can cause problems

- More time than intended playing video games and insta

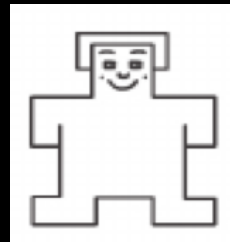
- Less time available for interacting with social supports etc...

For these people, there may be a downward spiral – the only way they see to cope with their depression is to play video games or go on social media - the dark flow elevates their mood, and time distortions lead to playing longer than intended, neglecting their friends and family, causing greater depression...

On Insta!



Off
Task



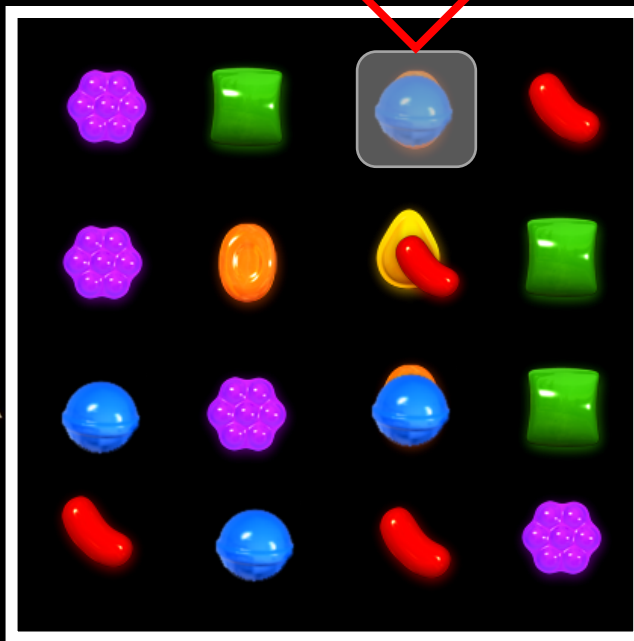
Instagram to “Escape”

Questions?????

Candy Crush

SAGA

J
E
L
L
Y



Sweet!

Moves:
43

In Candy crush you have a certain number of moves to win the game.

If you win then you “level up”.

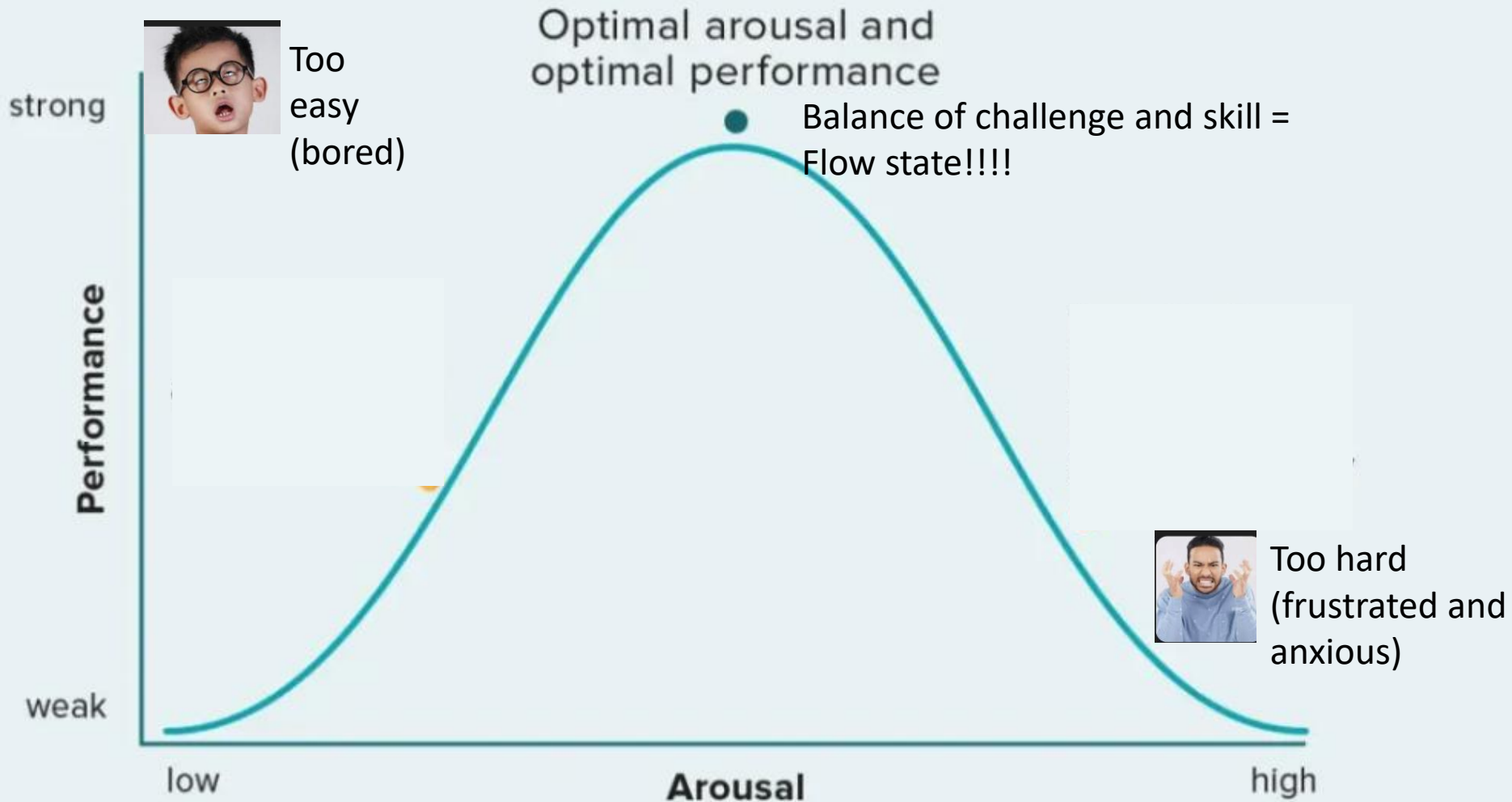
If you don't come close to winning you simply repeat the same level

If you just miss leveling up (a near-miss) then you receive a message “Out of moves you only need one more jelly”

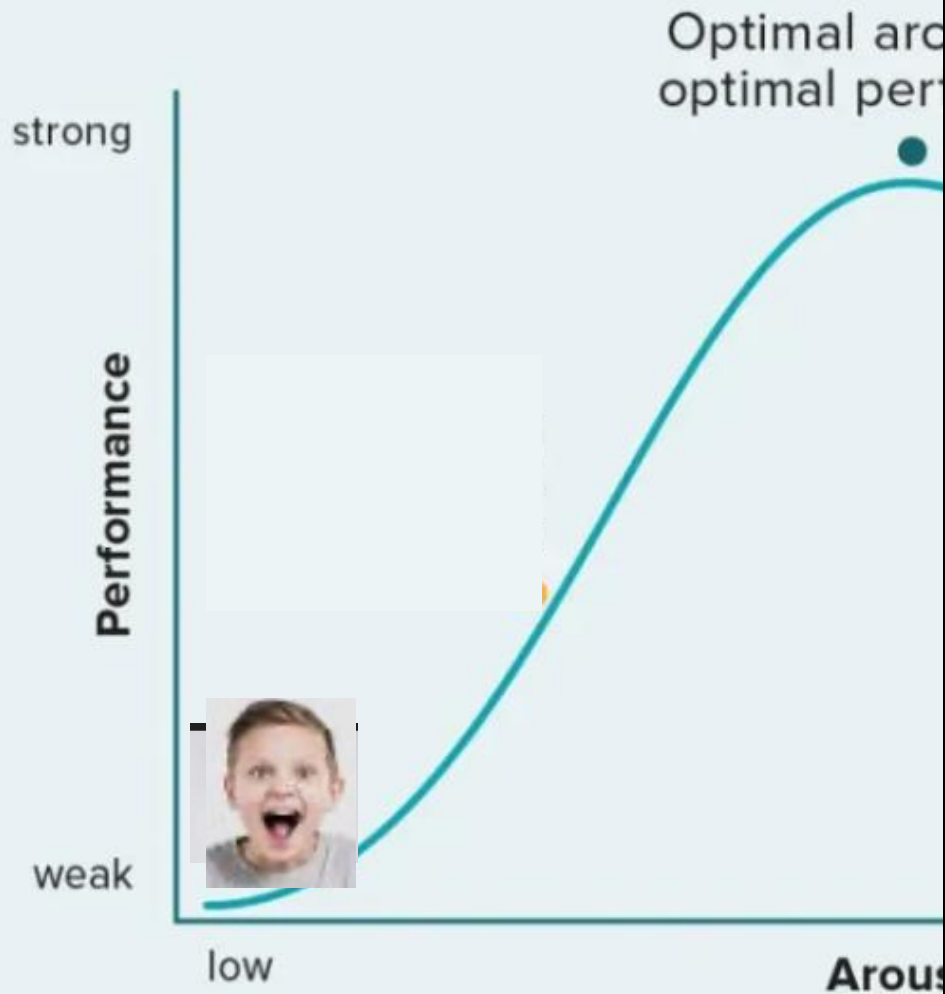
The design of these games encourages players to keep playing.

Some suggest that arousal is THE reinforcer in gaming.

YERKES-DODSON LAW BELL CURVE



YERKES-DODSON LA

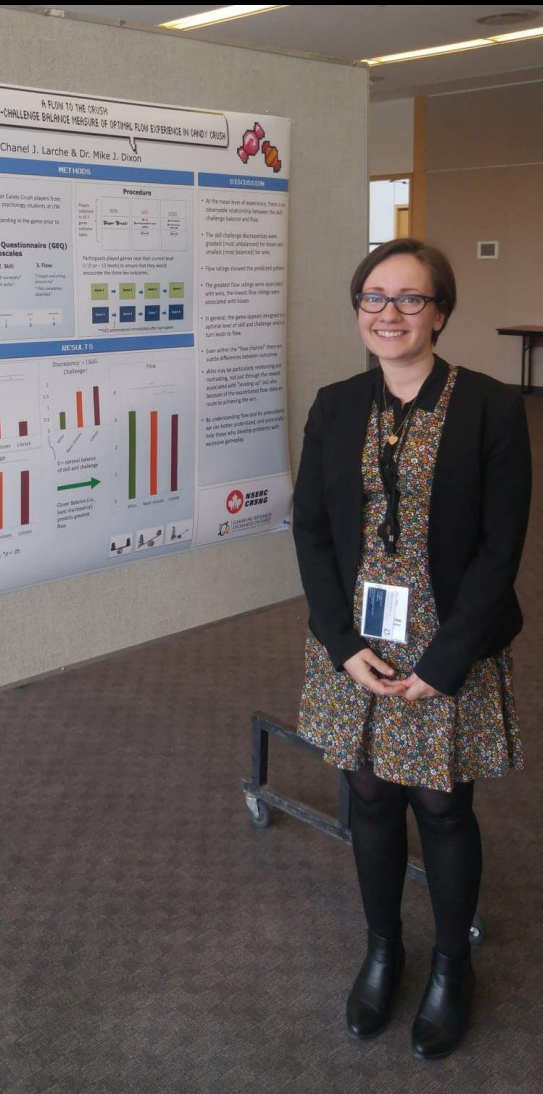


Not all kids find video games appealing...

Despite all the efforts of the game designer this kid just doesn't find it interesting. Their arousal will be low, they won't perform very well. Their urge to keep playing will be low.

Imagine another kid who finds this game really exciting and compelling. As they play their arousal increases. Importantly as their arousal increases so does their engagement in the game! In other words they should experience increased dark flow. For these players their urge to keep playing should be high.

Measuring Urge to play in Candy Crush (a proxy measure for gaming problems)



How is keep playing:

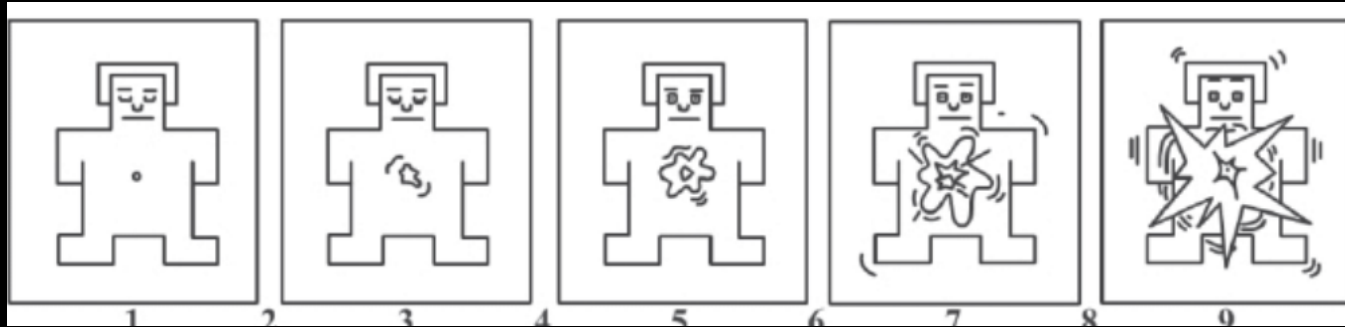
3 4 5 6 7
neither agree or disagree Strongly agree

How I can almost feel it:

3 4 5 6 7
neither agree or disagree Strongly agree

Measured urge following: 1) losses
2) Near-misses (just missed “leveling up”)
3) Wins

Measured urge to keep playing, arousal and dark flow after gameplay



I forgot everything around me.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

I was deeply concentrated in the game.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

I lost track of time.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

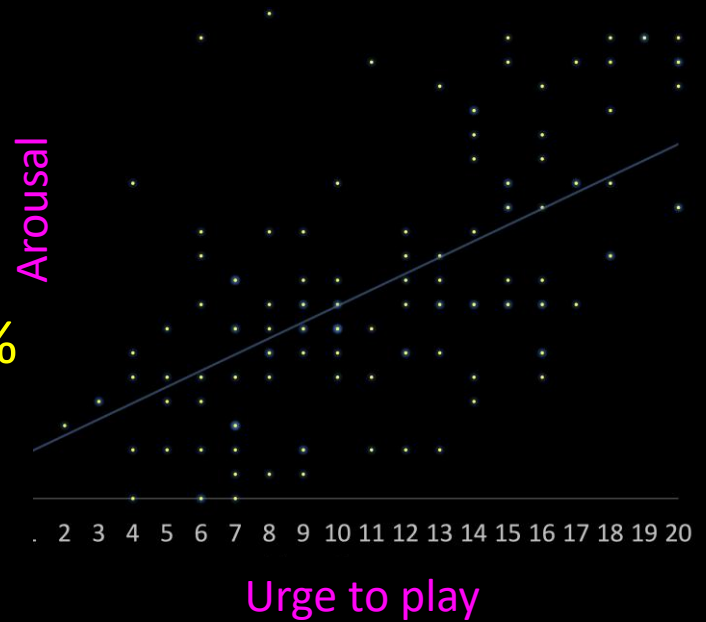
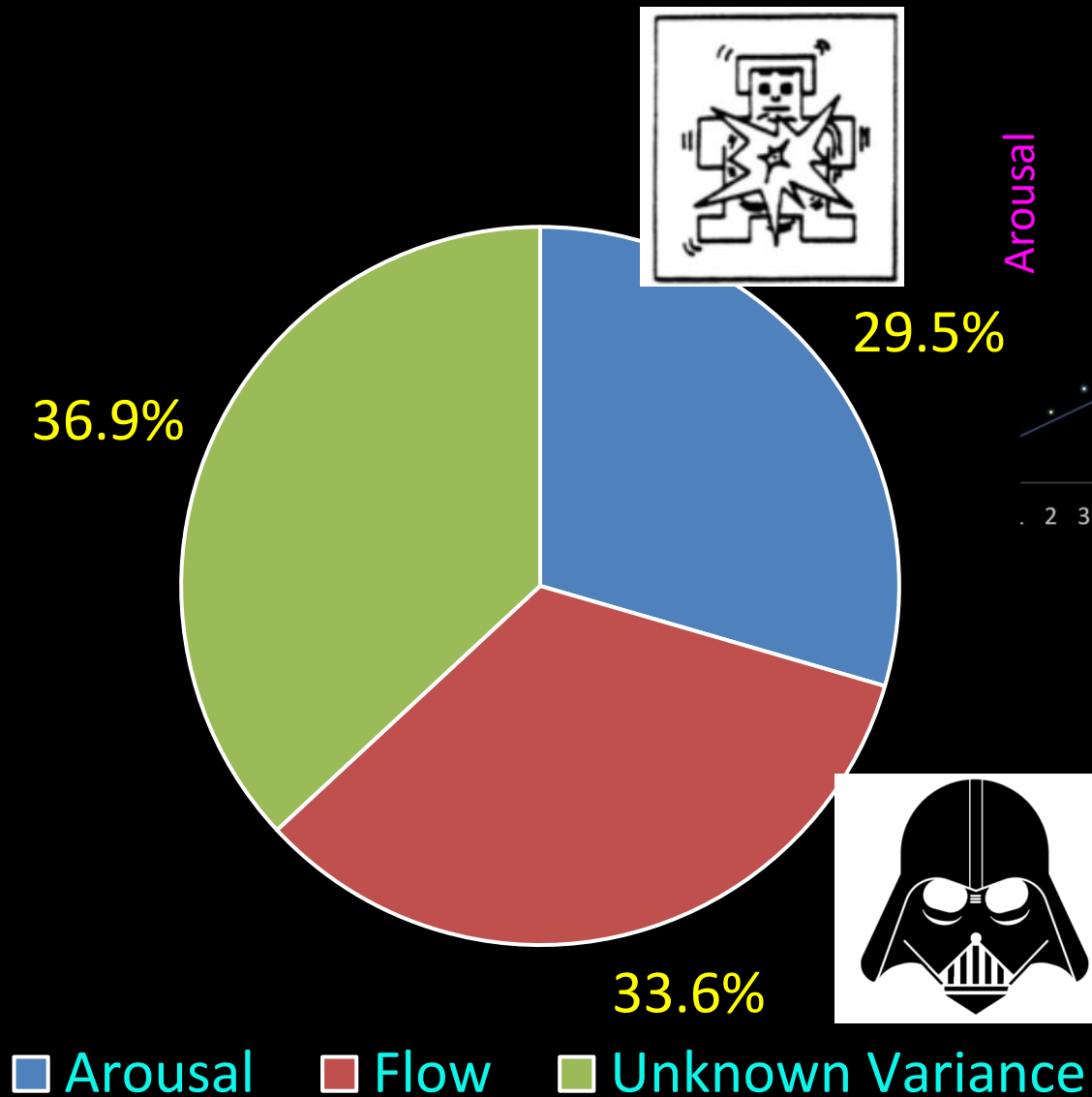
I was fully occupied with the game.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

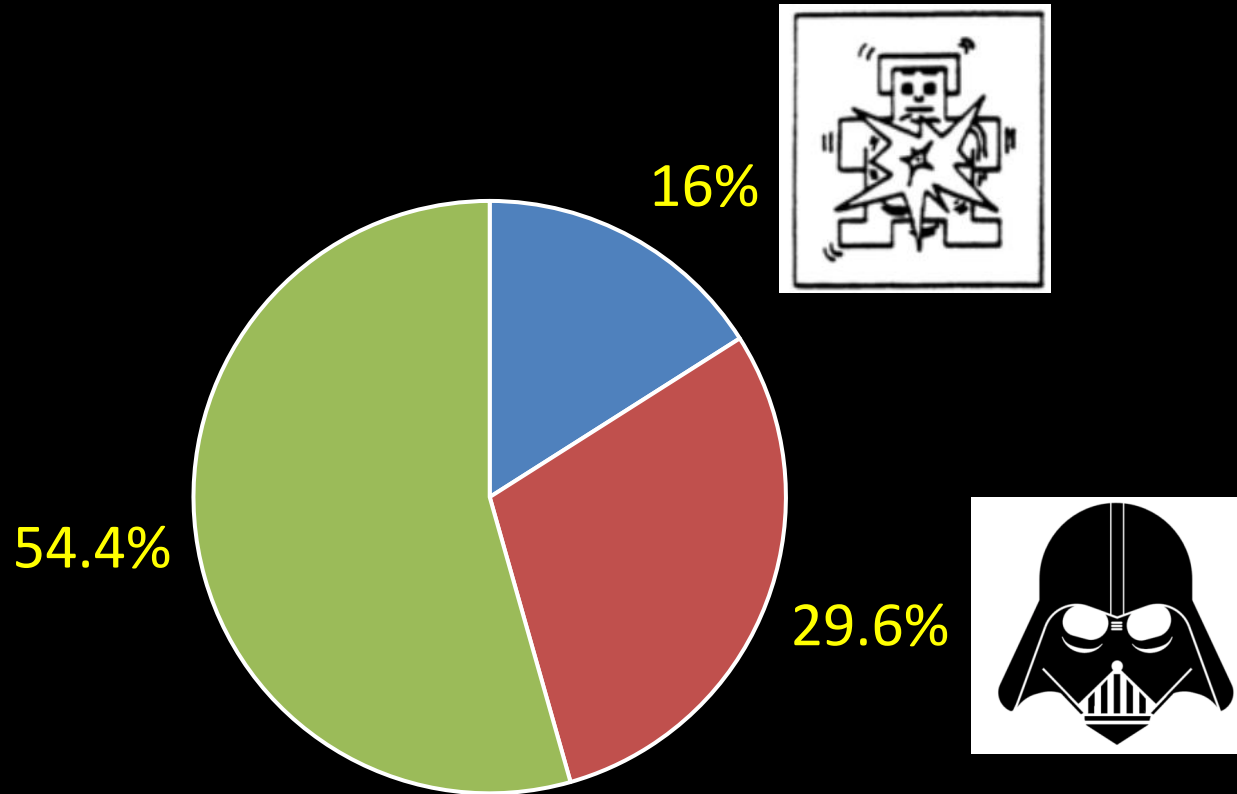
I lost connection with the outside world.

- Not at all
- Slightly
- Moderately
- Fairly
- Extremely

Predicting the urge to continue playing after Losses

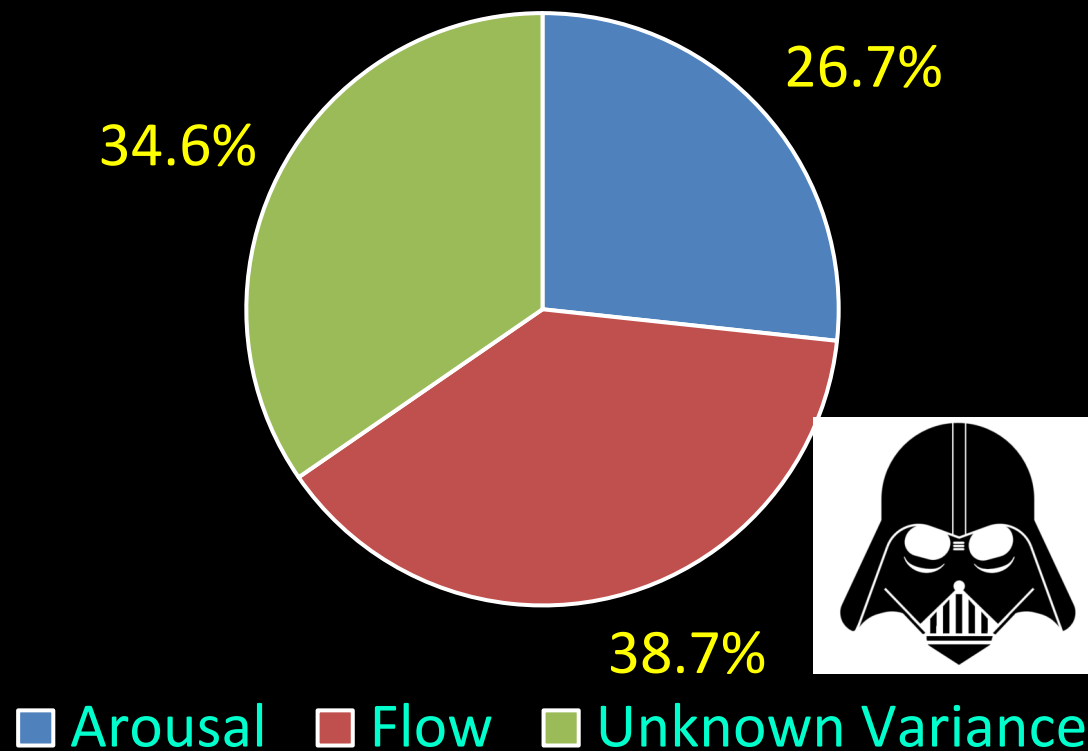


Predicting the urge to keep playing after near-misses



■ Arousal ■ Flow ■ Unknown Variance

Predicting the urge to keep playing following: Wins



Regardless of the outcome, the degree of dark flow you experience predicts how much you want to keep playing even more than arousal!