 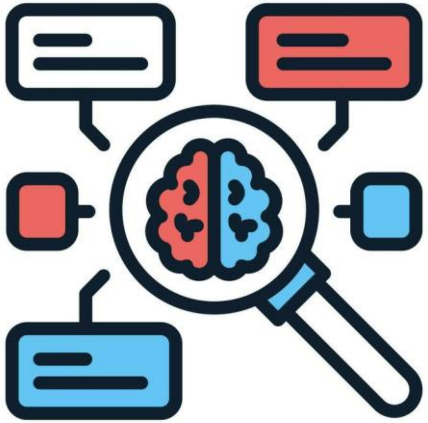 

Cognitive Neuroscience in Clinical Context: Insight from 3 studies

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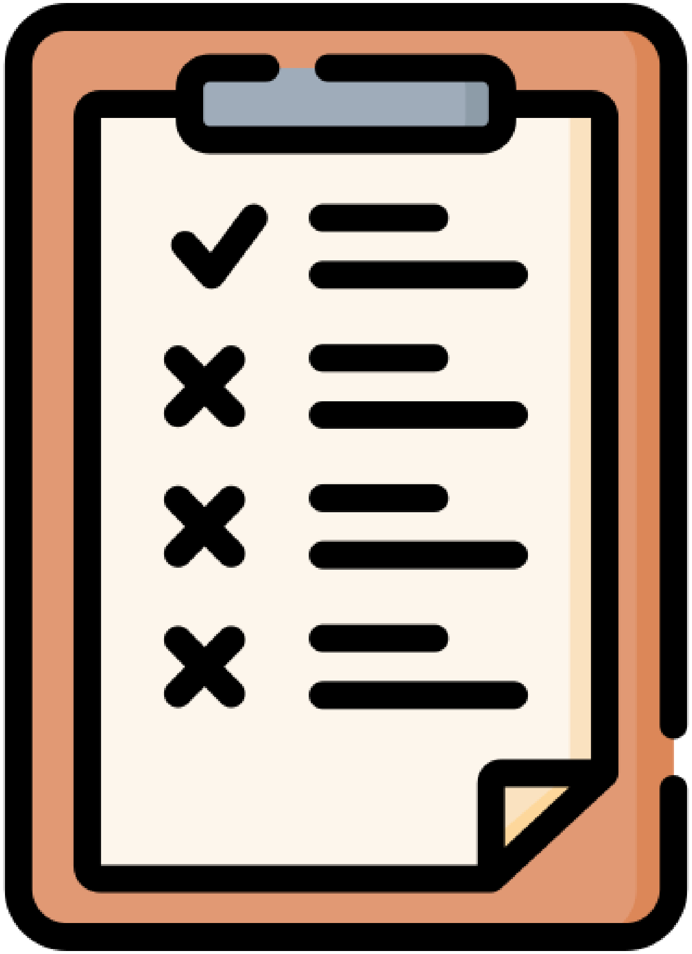
11 February 2025

Agenda

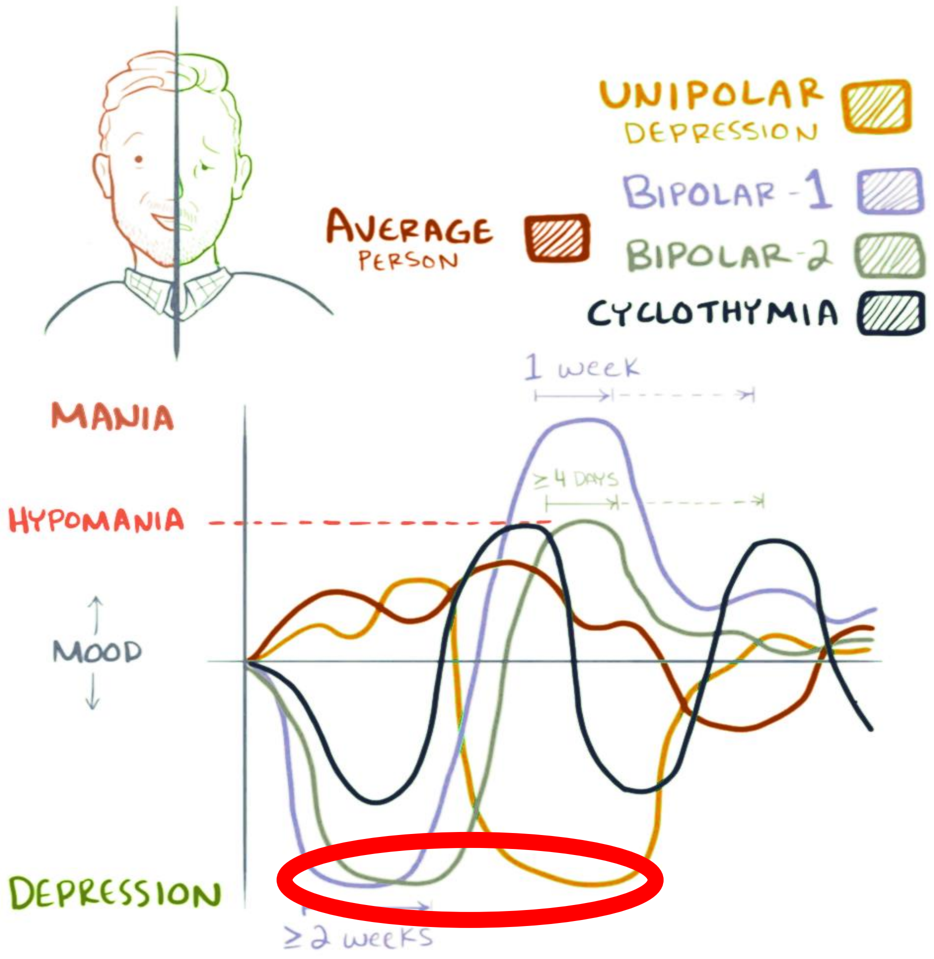
1. Cognitive-affective processes in Major Depressive and Bipolar Spectrum Disorders
2. Examining biased attentional processes post-concussion
3. The role of cognitive neuroscience in clinical neuropsychology



Identifying patterns of cognitive-affective processing in bipolar and unipolar depression

Differentiating Unipolar and Bipolar Depression

- Clinically, it is difficult to differentiate BSDs from MDD during a major depressive episode
- BSDs can require different pharmacological treatment approaches than MDD
- Objective, behavioural markers can help with differential diagnosis



Why might behavioural markers help?

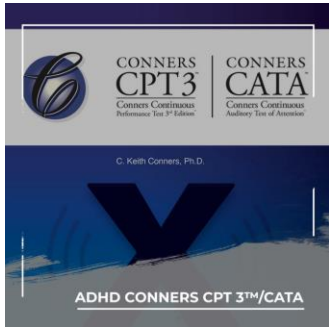
- Clinical features exist, but rely primarily on self-report

family history of BSD

earlier depression onset

fear-related symptoms, anxious temperament

- Behavioural tasks measuring cognitive-affective processes have been used to aid in the classification of other mental health conditions



continuous performance tests

facial emotion recognition tasks

Which cognitive-affective processes and why?

Reward Sensitivity

Differences in the tendency to **detect** and **derive** pleasure

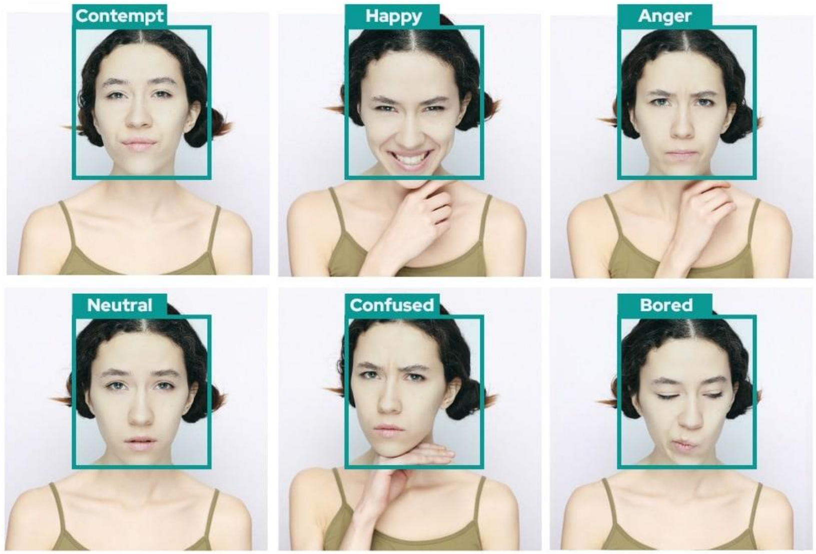
- Anticipatory reward sensitivity
- Consummatory reward sensitivity

Patterns of differential neural activation in MDD vs. BSD (Caseras et al., 2013; Chase et al., 2013; Satterthwaite et al., 2015; Wakatsuki et al., 2022)

Which cognitive-affective processes and why?

Facial Emotion Judgment

Ability to detect and differentiate facial emotional expressions



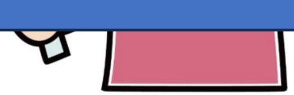
- General deficits in categorization and differential of all emotions in MDD and BD (Kohler et al., 2011)
- MDD: better at identifying facial expressions vs. BSD (Ruihua et al., 2021)
- BSD: require more intense expressions (Scahefer et al., 2010)

Which cognitive-affective processes and why?

Self-referential processing

- Cognitions about the self
    - Positive

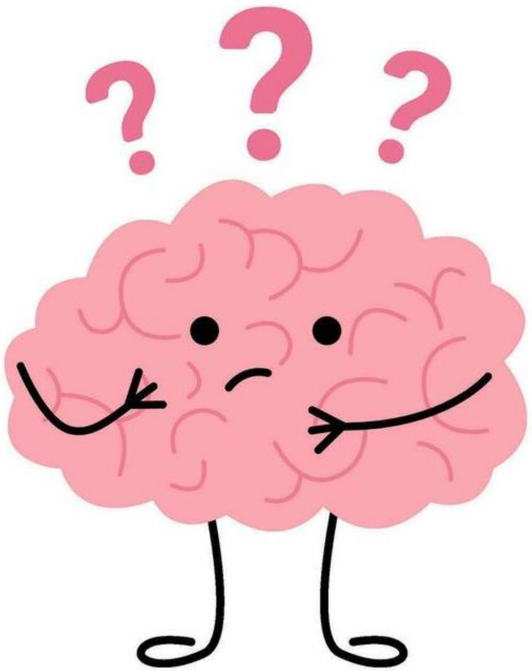
Overall limitation of the existent research: there are few direct comparisons between aspects of cognitive-affective processing in people with MDD and BSDs, and even fewer amongst those who are currently acutely depressed.



- No direct comparison yet

The Current Study

1. **Aim:** Investigate if and how reward sensitivity, facial emotion judgment, and self-referential processing differ between acutely depressed people with MDD and BSD, as well as healthy controls.
2. **Hypotheses:**
    1. Reward sensitivity: MDD < BSD < CTL
    2. Facial emotion recognition: MDD > BSD
    3. Self-referential processing: MDD = BSD > CTL



Methods

Participants:
MDD* n = 72
BSD n = 26
CTL n = 27

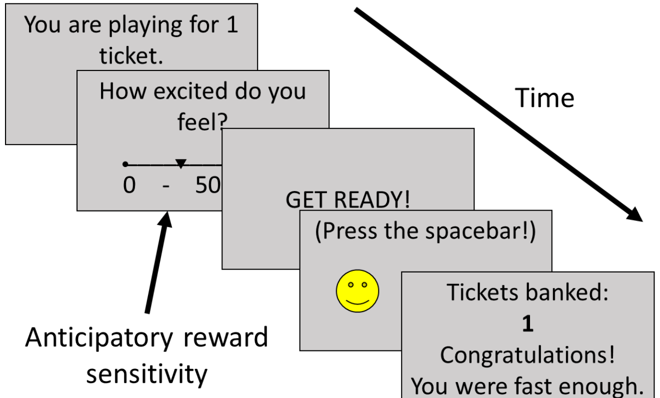
Inclusion Criteria:
- 18 – 70 years of age
- Pts.: Primary DSM-5 diagnosis of MDD, BDII or OS-BD with current MDE based on MINI
- CTL: no current or past psychiatric disorder
- No psychotropic medications

Exclusion Criteria:
- Meeting criteria for SUD
- No proficiency in English
- Have a neurological disorder

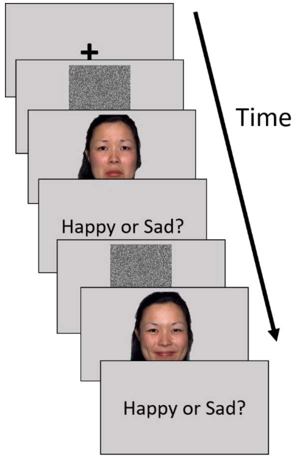
*participants were recruited from 2 sources

All participants completed the MINI, MADRS, YMRS, and <u>3 behavioural tasks:</u>

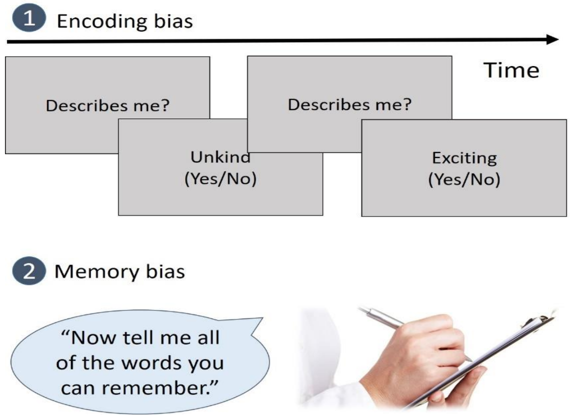
<u>Monetary Incentive Delay Task</u>



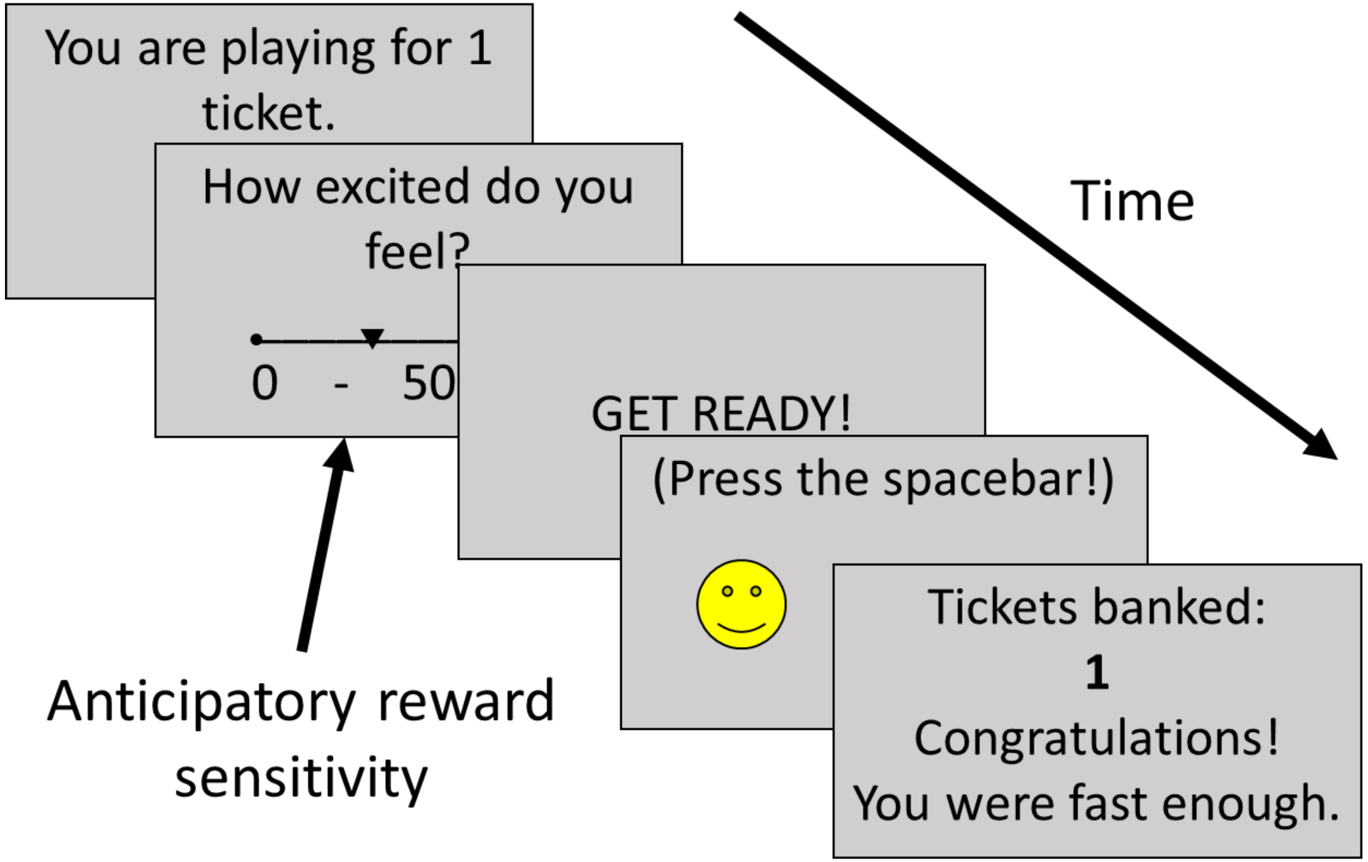
<u>Facial Emotion Labelling Task</u>



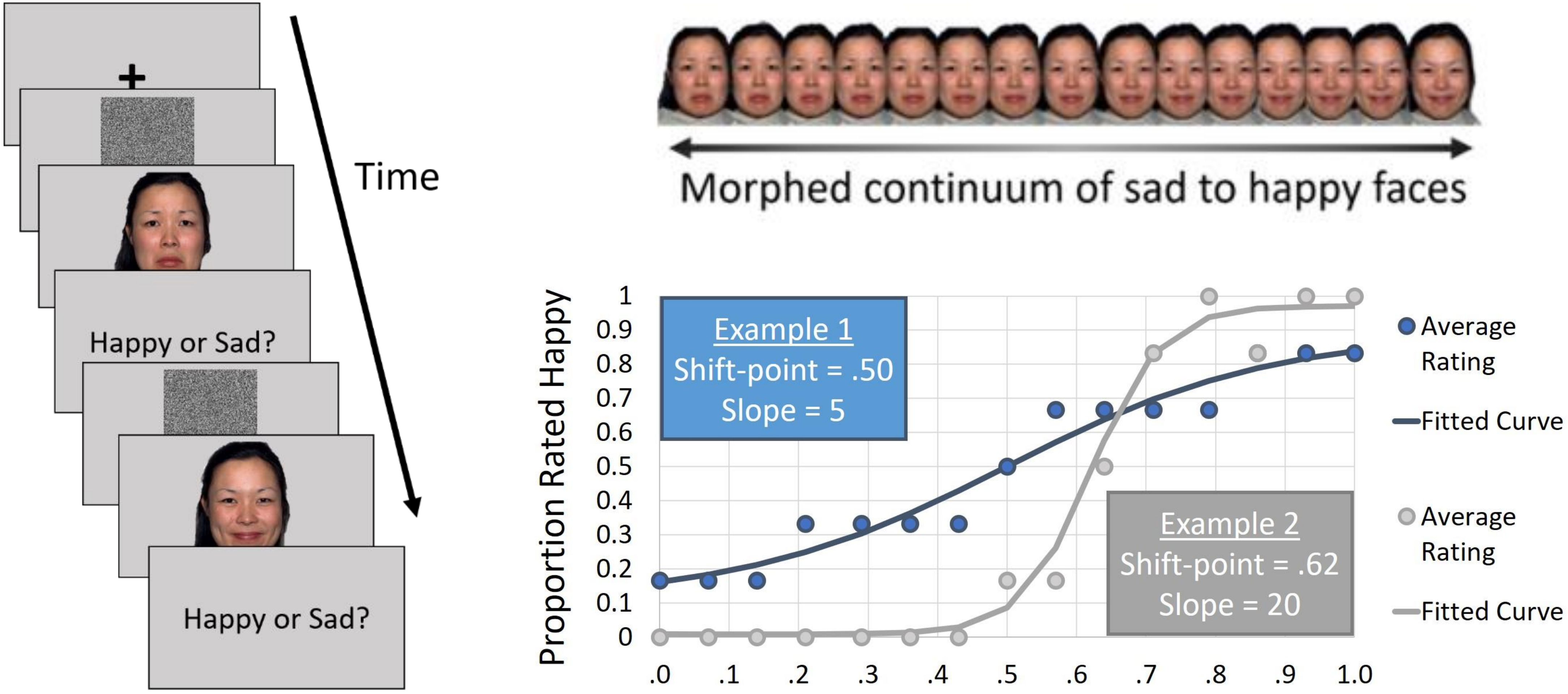
<u>Self-referential Encoding and Memory Task</u>



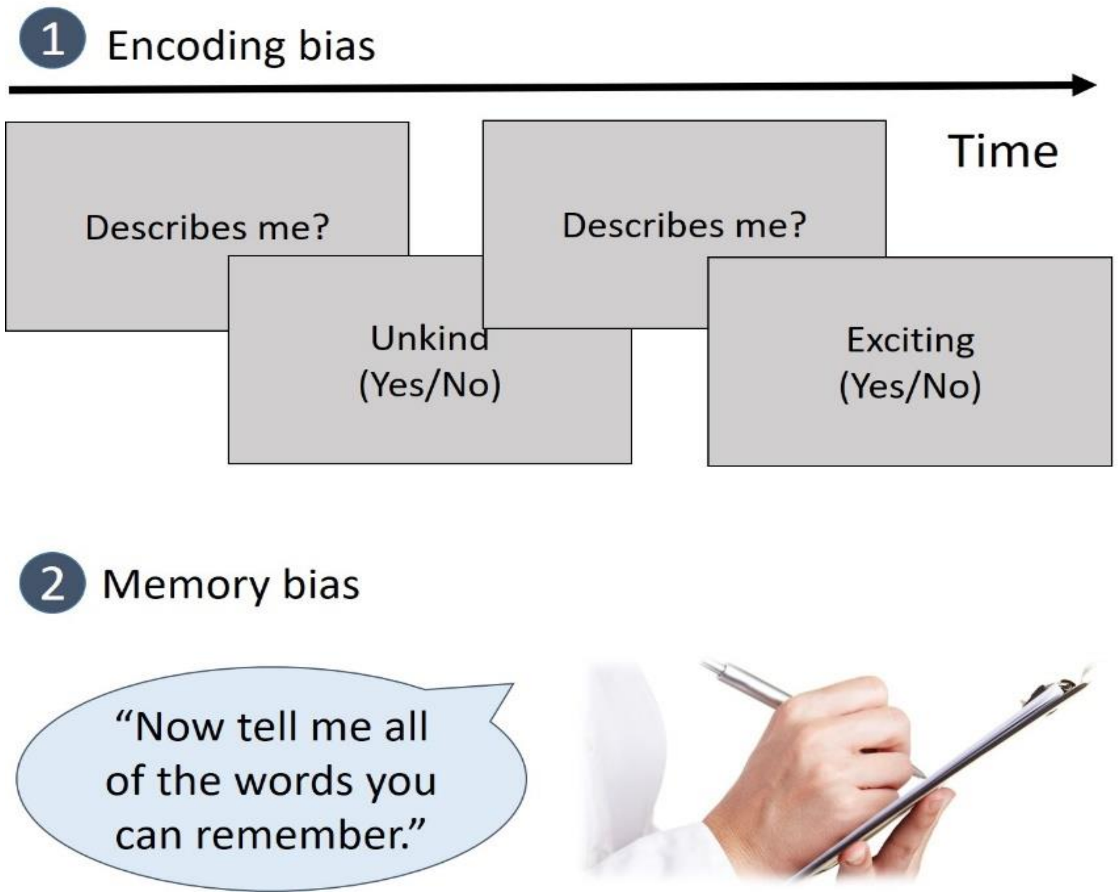
Monetary Incentive Delay Task



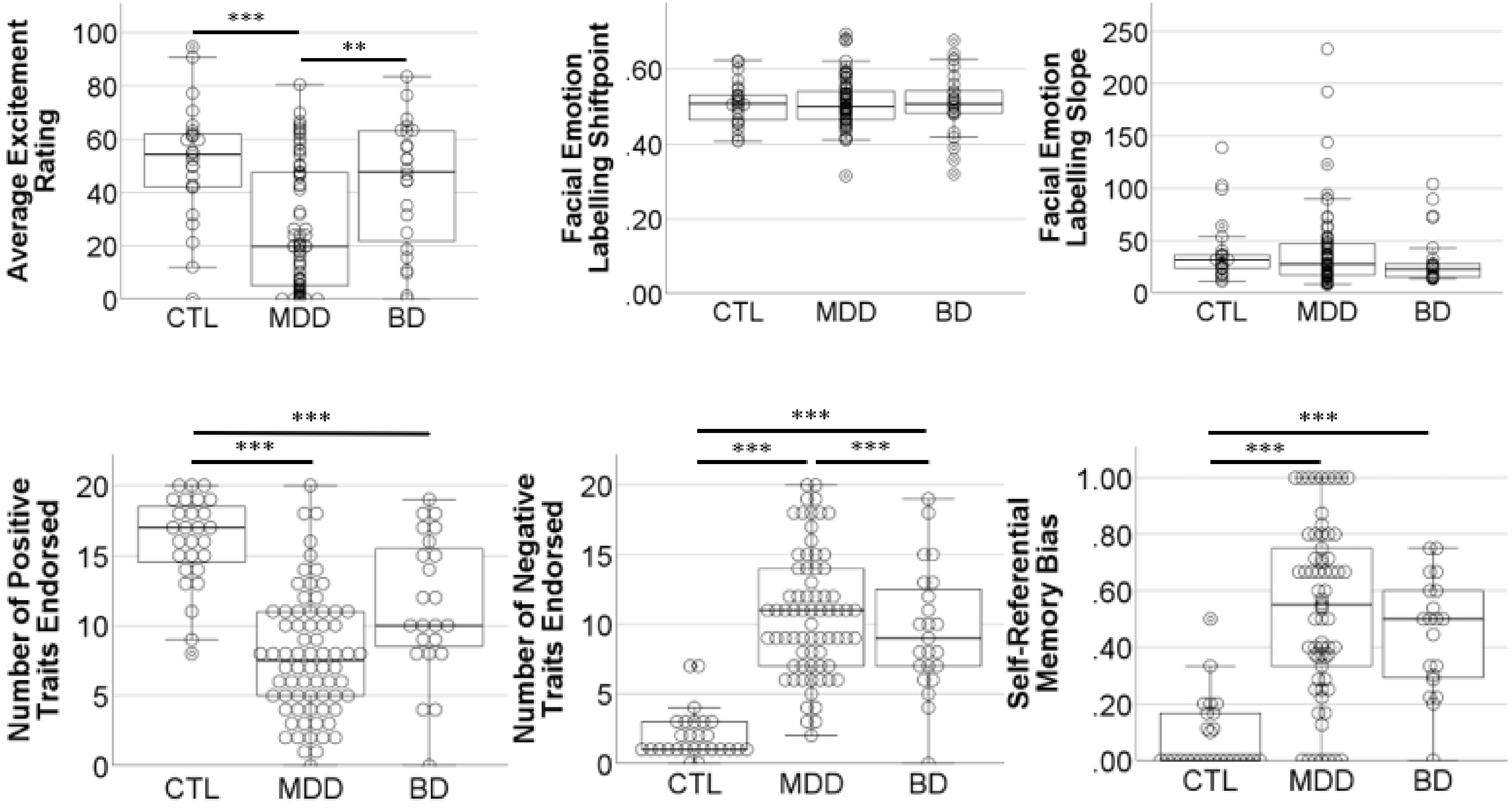
Facial Emotion Labelling Task



Self-Referential Processing Task



Results



Terpstra et al., 2024 (in review at *Journal of Affective Disorders*)

Identifying patterns of cognitive-affective processing in MDD and BSD

Results

Reward Sensitivity

- Individuals with MDD had sig. lower anticipatory reward sensitivity than BSD participants (p = .006, d = .73) and control participants (p < .001, d = 1.14)
- Participants with BSD did not differ from controls in anticipatory reward sensitivity (p = .454,)

Facial Emotion Recognition

- MDD/BSD/CTL groups did not have significant differences in labelling faces as sad vs. happy or sensitivity to the changes in expressed emotions

Self-Referential Processing

- Individuals with MDD endorsed sig. fewer positive traits than the BSD (p = .002, d = .80) and CTL groups (p < *.001*, d = 2.01)
- Individuals with BSD endorsed sig. fewer positive traits compared to CTLs (p <.001, d = 1.11)
- MDD and BSD did not differ sig. for number of negative traits (p = .535) or negative self-referential memory bias (p = .311)

Terpstra et al., 2024 (in review at *Journal of Affective Disorders)*

Conclusions and Implications

Anticipatory Reward sensitivity + Positive self-referential encoding **in**

(BSD)

vs.

(MDD)

Terpstra et al., 2024 (in review at *Journal of Affective Disorders)*

Defining cognitive-affective processing subgroups in major depressive and bipolar spectrum disorders

We know that…

- Differences in cognitive-affective processes exist among currently-depressed individuals with MDD vs. BSD.

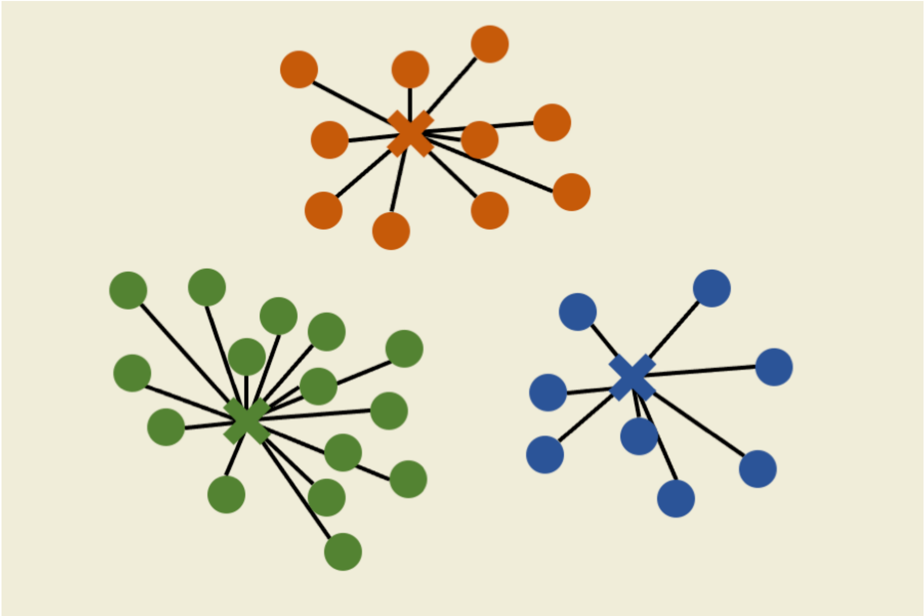
- **As a group**, individuals with BSD ascribe more positive traits to themselves compared to those with MDD and CTLs and have greater anticipatory reward sensitivity compared to people with MDD.

- But, how much heterogeneity might there be?

Why might there be heterogeneity?

- Previous research that has explored clusters of cognitive-affective processing across the mood spectrum include participants who are not acutely depressed
  - Among those studies, they looked primarily at facial recognition tasks

The Current Study



Aim: To identify data-driven subgroups based on cognitive-affective processing amongst acutely depressed individuals with MDD and BSD

Methods

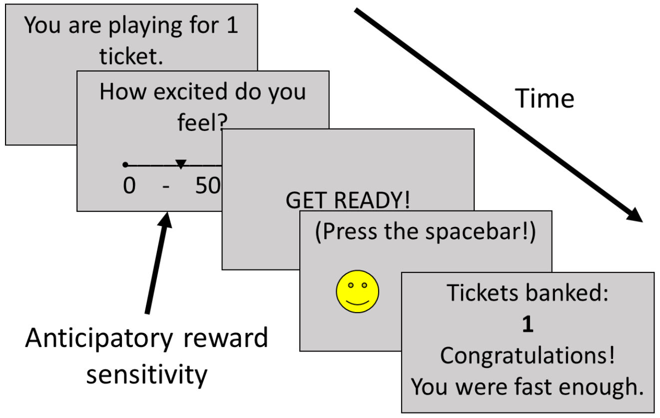
Participants:
MDD* n = 65
BSD n = 19
CTL n = 25

Inclusion Criteria:
- 18 – 70 years of age
- Pts.: Primary DSM-5 diagnosis of MDD, BDII or OS-BD with current MDE based on MINI
- CTL: no current or past psychiatric disorder
- No psychotropic medications

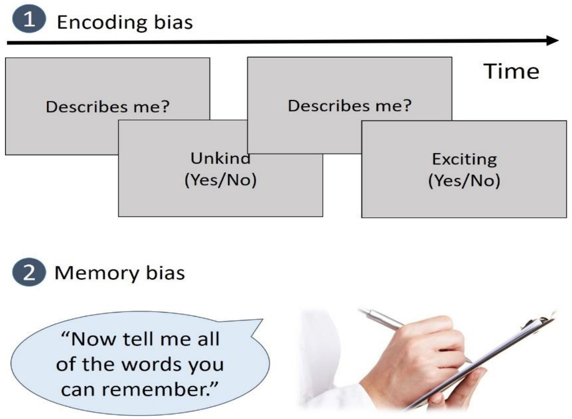
Exclusion Criteria:
- Meeting criteria for SUD
- No proficiency in English
- Have a neurological disorder

*participants were recruited from 2 sources

<u>Monetary Incentive Delay Task</u>

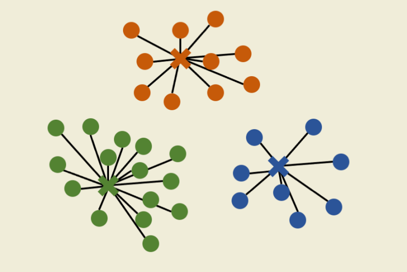


<u>Self-referential Encoding and Memory Task</u>



Analyses

k-means clustering

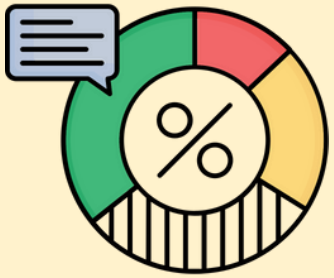


1. Identify clusters/sub-groups

one-way ANVOA

2. Assess cluster differences in task performance as well as clinical (MADRS score) and demographic variables

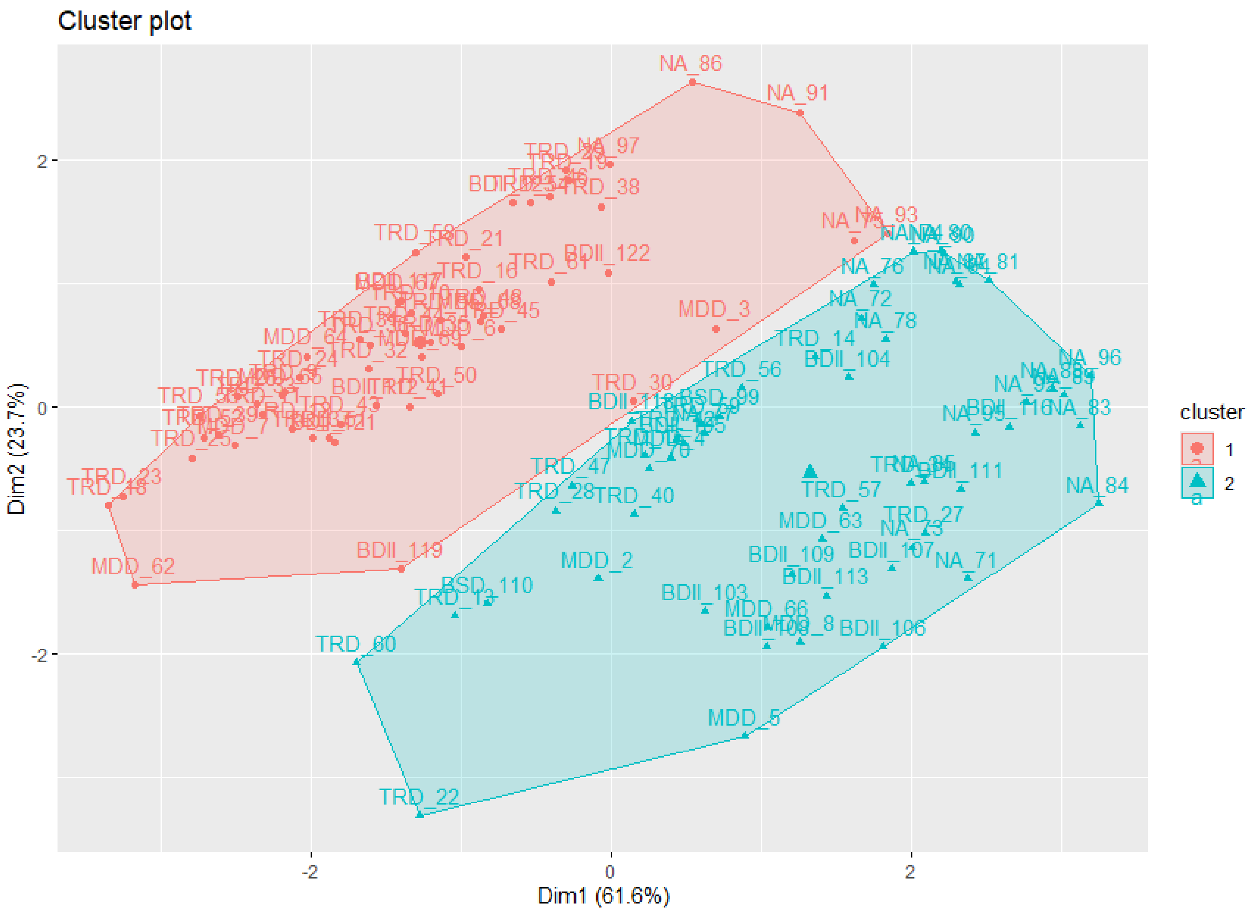
chi-square



3. Assess proportion of diagnoses across clusters

Results – Identifying Clusters

k = 2 clusters was the optimal solution (as per gap statistic).



On visual inspection, those in **Cluster 1** had:

- Lower reward anticipation
- Higher negative encoding
- Lower positive encoding
- More negative memory bias

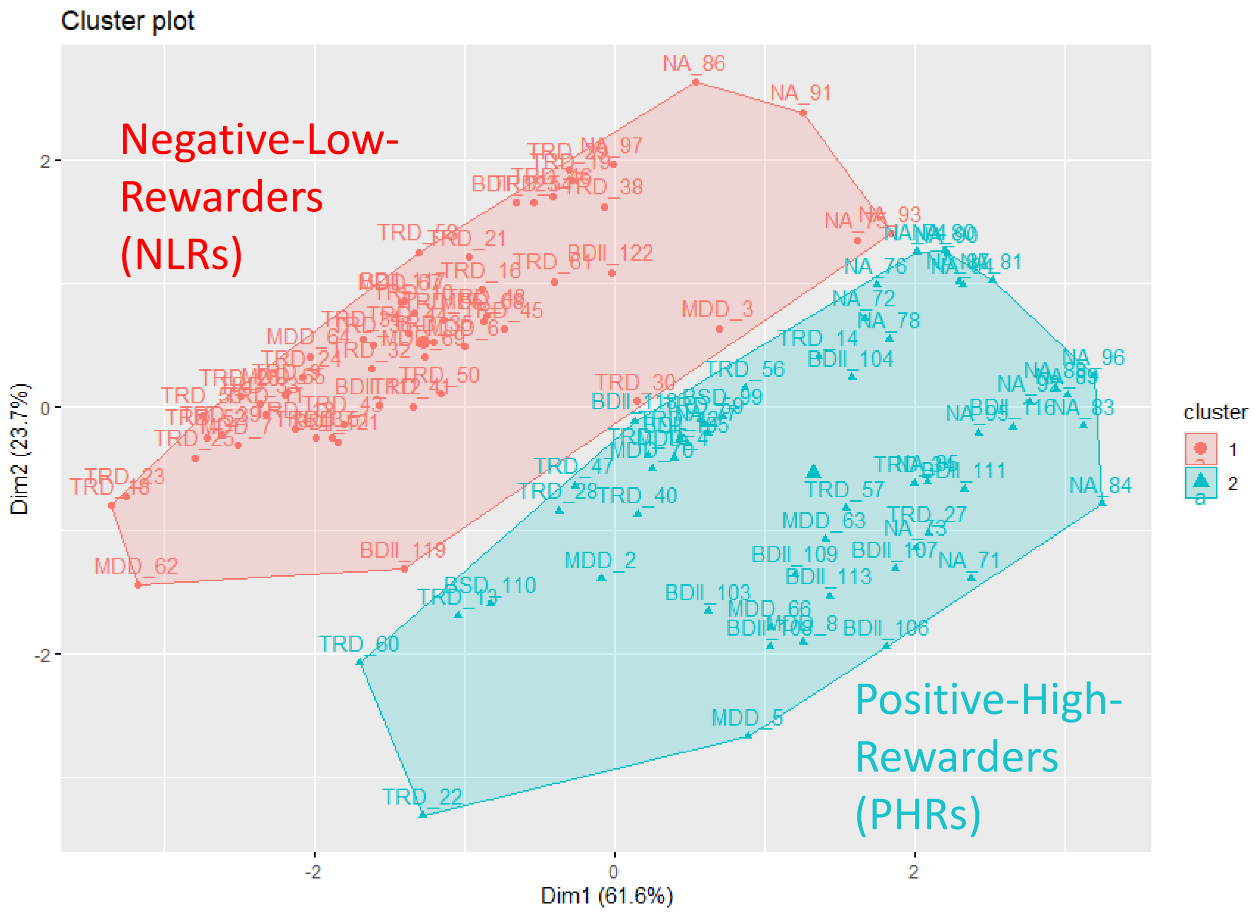
Those in **Cluster 2** had:

- Higher reward anticipation
- Lower negative encoding
- Higher positive encoding
- Less negative memory bias

We proceeded to test the significance of these differences →

Amarnath Nair et al. (2025, *in preparation*)

Results – Assessing Cluster Differences



	n	MDD (n, % grp)	BDII/BSD (n, % grp)	HC (n, %)	Age (M)	Gender (% male)	MADRS (M)	Reward Anticipation (M)	Positive Encoding (M)	Negative Encoding (M)	Memory Bias (M)
Group 1	56	45 (80)	6 (11)	5 (9)	39.82	34	27.36	12.28	7.63	10.34	.52
Group 2	53	20 (37)	13 (25)	20 (37)	36.26	37	18.15	57.45	12.89	7.21	.30

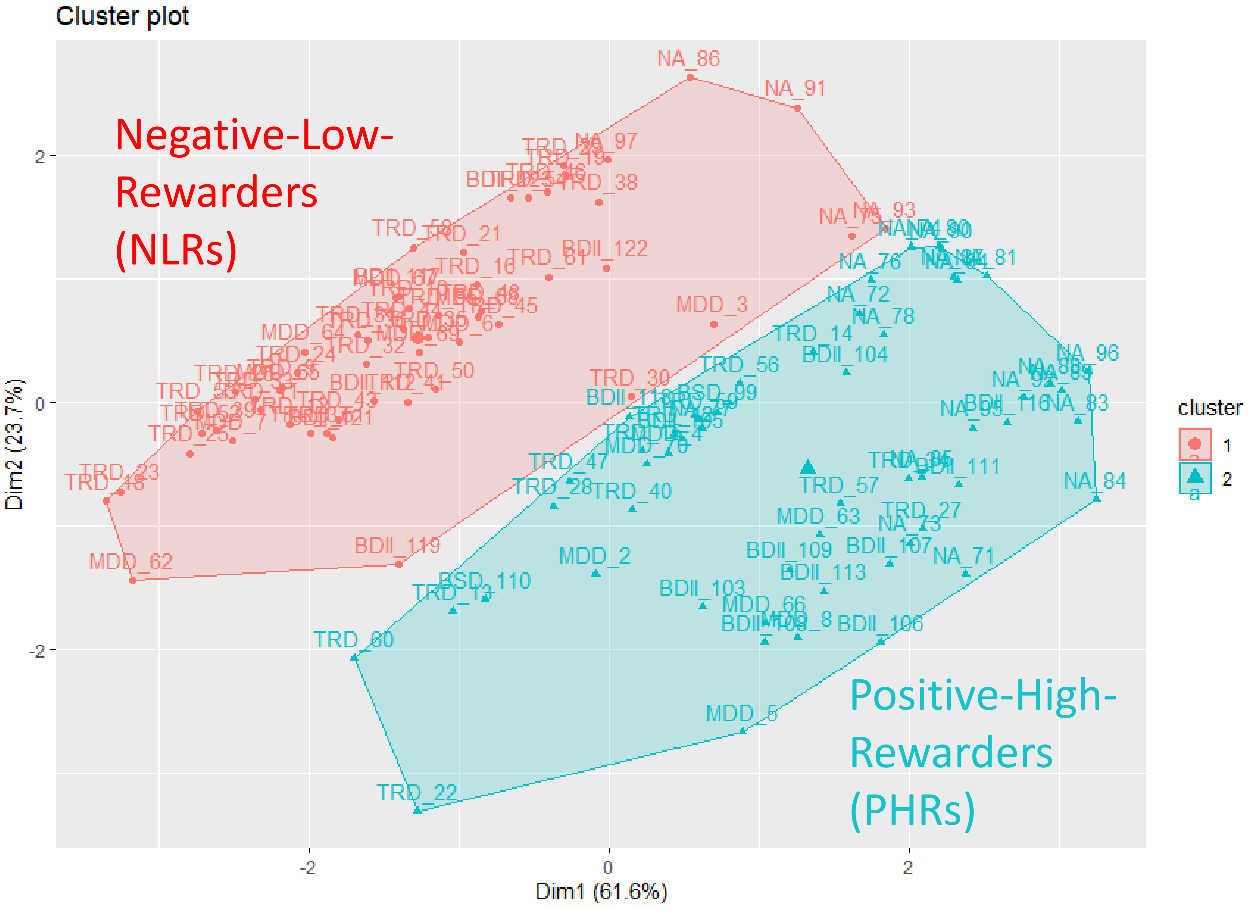
Significance testing revealed:

- Group 1 had significantly <u>lower</u> anticipatory reward sensitivity (F = 413.470, p<.001) and positive self-referential encoding (F = 35.291, p<.001) as well as significantly <u>higher</u> negative self-referential coding (F = 9.950, p<.002) and negative memory bias (F = 14.134, p<.001), compared to Group 2.
- Accordingly, we named:
  - Group 1: "Negative-Low-Rewarders" (NLRs)
  - Group 2: "Positive-High-Rewarders" (PHRs)

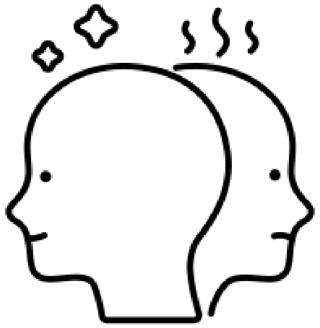
As well, MADRS score amongst patients did not differ significantly in both groups.

Amarnath Nair et al. (2025, *in preparation*)

Results – Assessing Proportions



More MDD participants were **NLRs** vs. PHRs (χ^2=9.615, p=.002)

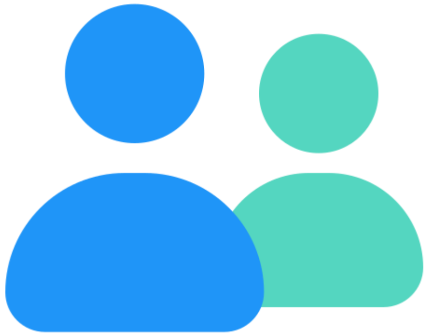


There was **no significant difference** in **BSD** participants who were NLRs vs. PHRs (χ^2=2.579, p = .108)

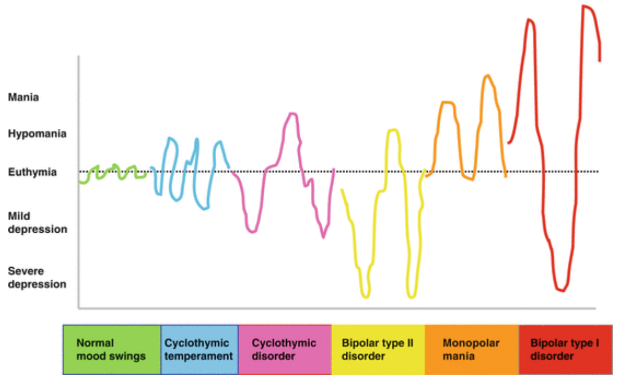
More HC participants were **PHRs** vs. NLRs (χ^2=9.000,p=.003)

Amarnath Nair et al. (2025, *in preparation*)

Conclusions and Implications



NLRs and PHRs represent distinct cognitive-affective processing subgroups.

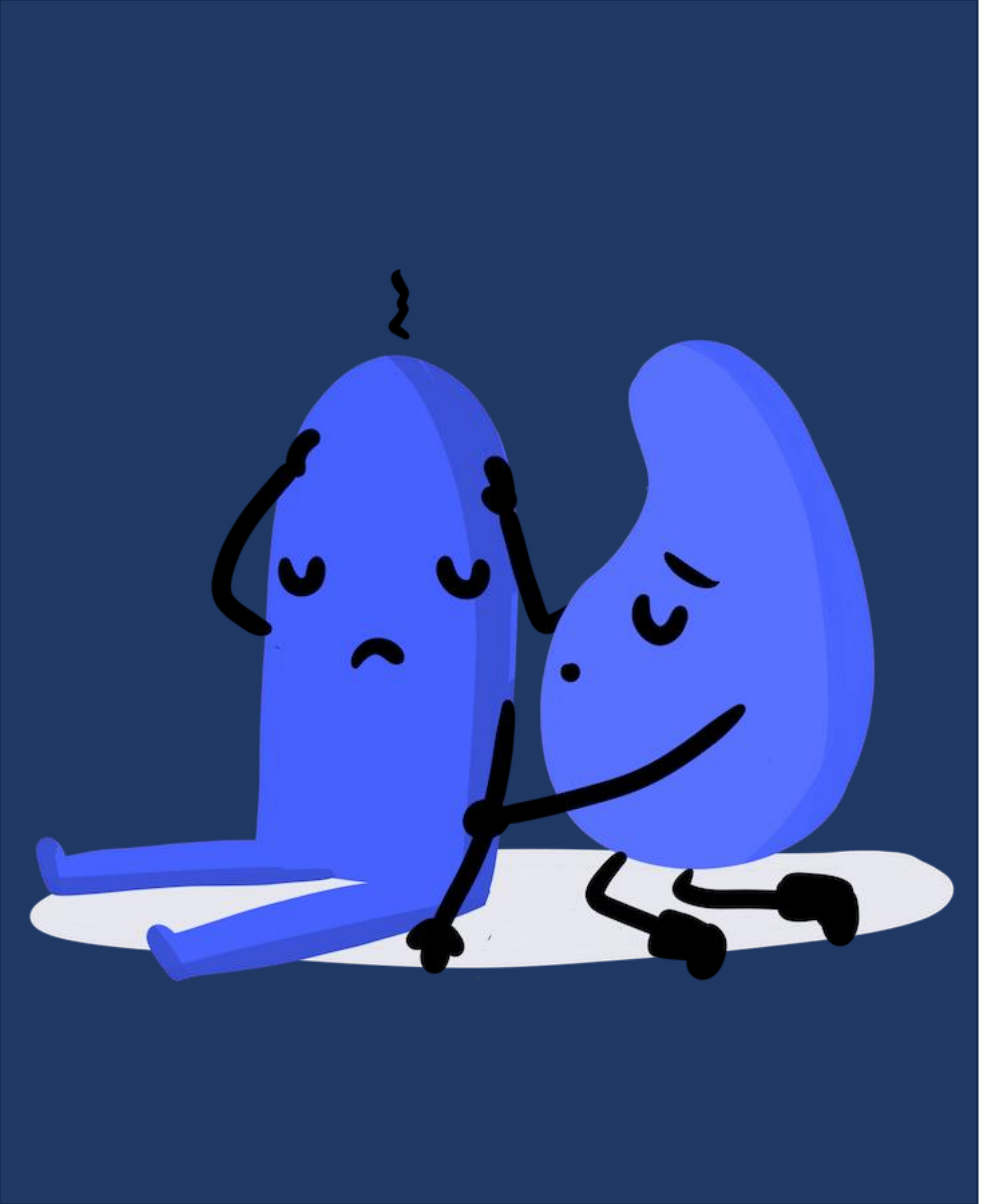


There is heterogeneity in cognitive-affective processes across the mood spectrum

Some patients (MDD, BSD) cluster together with most healthy controls.

Personalized treatment approaches are important.

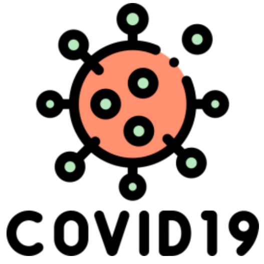
Amarnath Nair et al. (2025, *in preparation*)



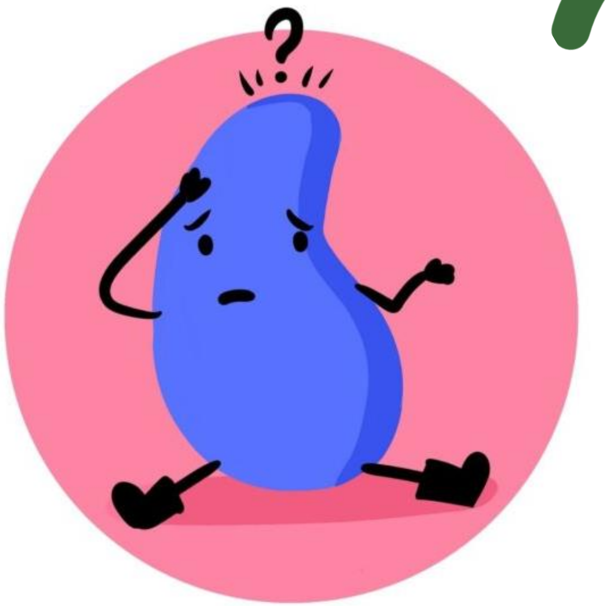
Investigating Attentional Biases and the Fear-Avoidance Model in Adults with Persistent Post-Concussion Symptoms

A little thought experiment to start….

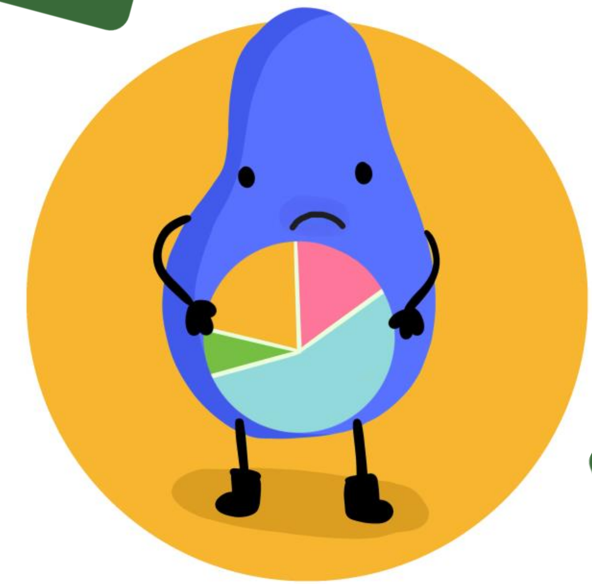
Think back to March 2020, when it all went down



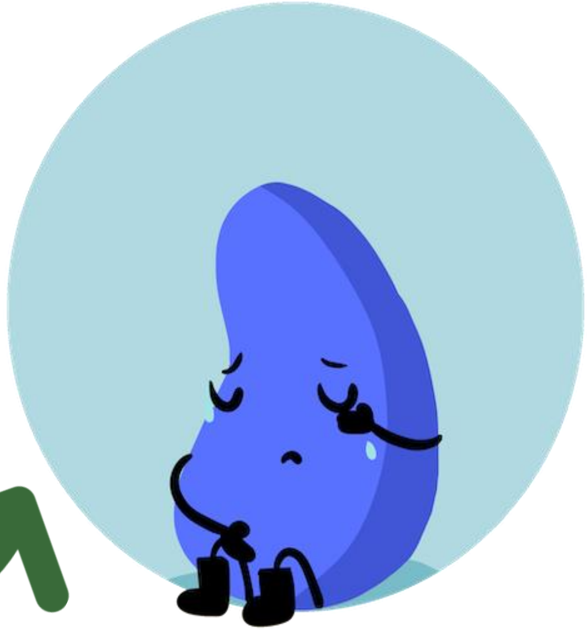
Concussion & Persistent Post-Concussion Symptoms (PPCS)



Worldwide, more than 30 million individuals sustain a concussion each year



18-31% of those who sustain a concussion experience persisting symptoms (PPCS), lasting months to even years



PPCS has a significant impact on overall wellbeing and quality of life

(Lefevre-Dognin et al., 2021; Cancelliere et al., 2023; Voormolen et al., 2019; Pollinder et al., 2018)

Why do some people develop PPCS, but others don't?

Injury-Related Characteristics (e.g., GCS score, duration of PTA, LOC, significant imaging findings, etc.)

Psychosocial Factors (e.g., preinjury mental health concerns, anxiety sensitivity, low social support, etc.)

(Silverberg et al., 2015; Cnossen et al., 2018; Iverson et al., 2017)

The Fear-Avoidance Model of Concussion

Disuse; Deconditioning; Depressive Symptoms

Post-concussion like symptoms

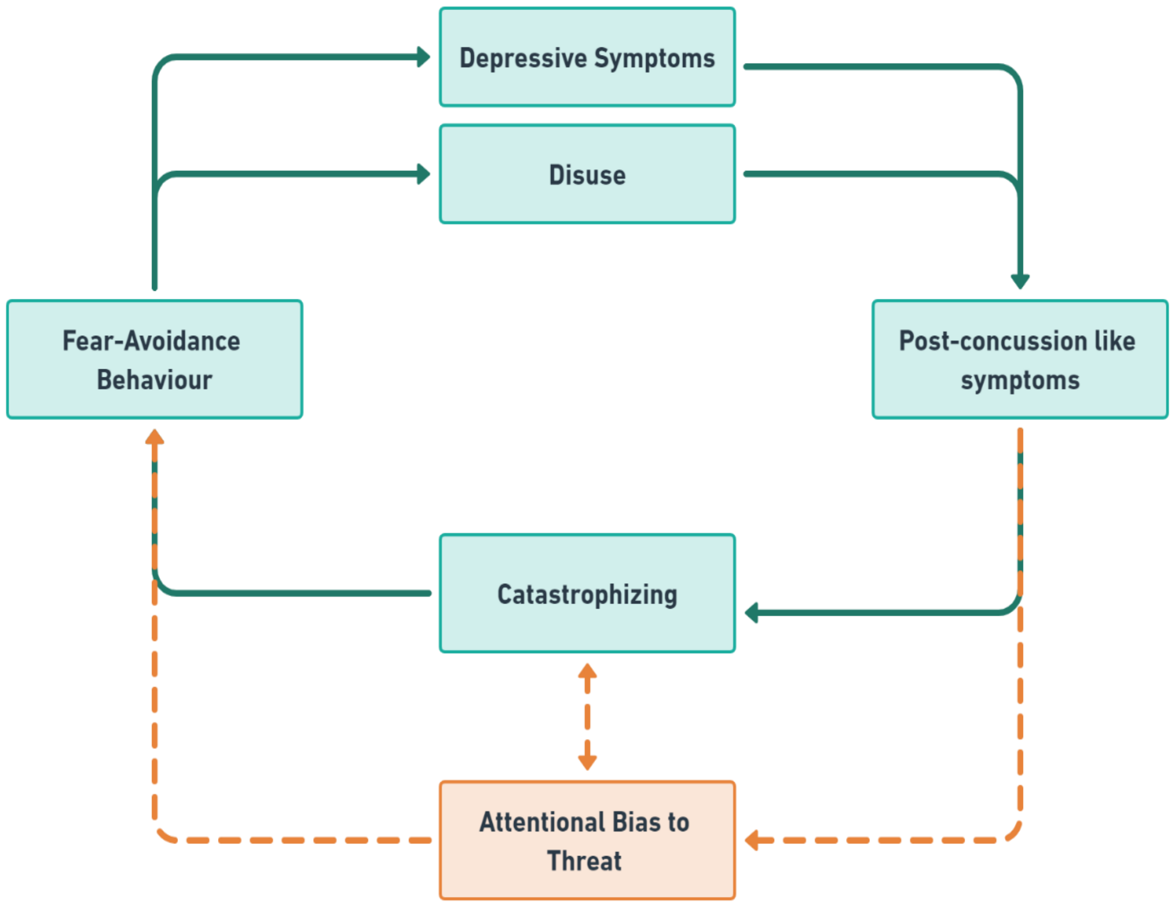
Catastrophizing

Fear-Avoidance Behaviour

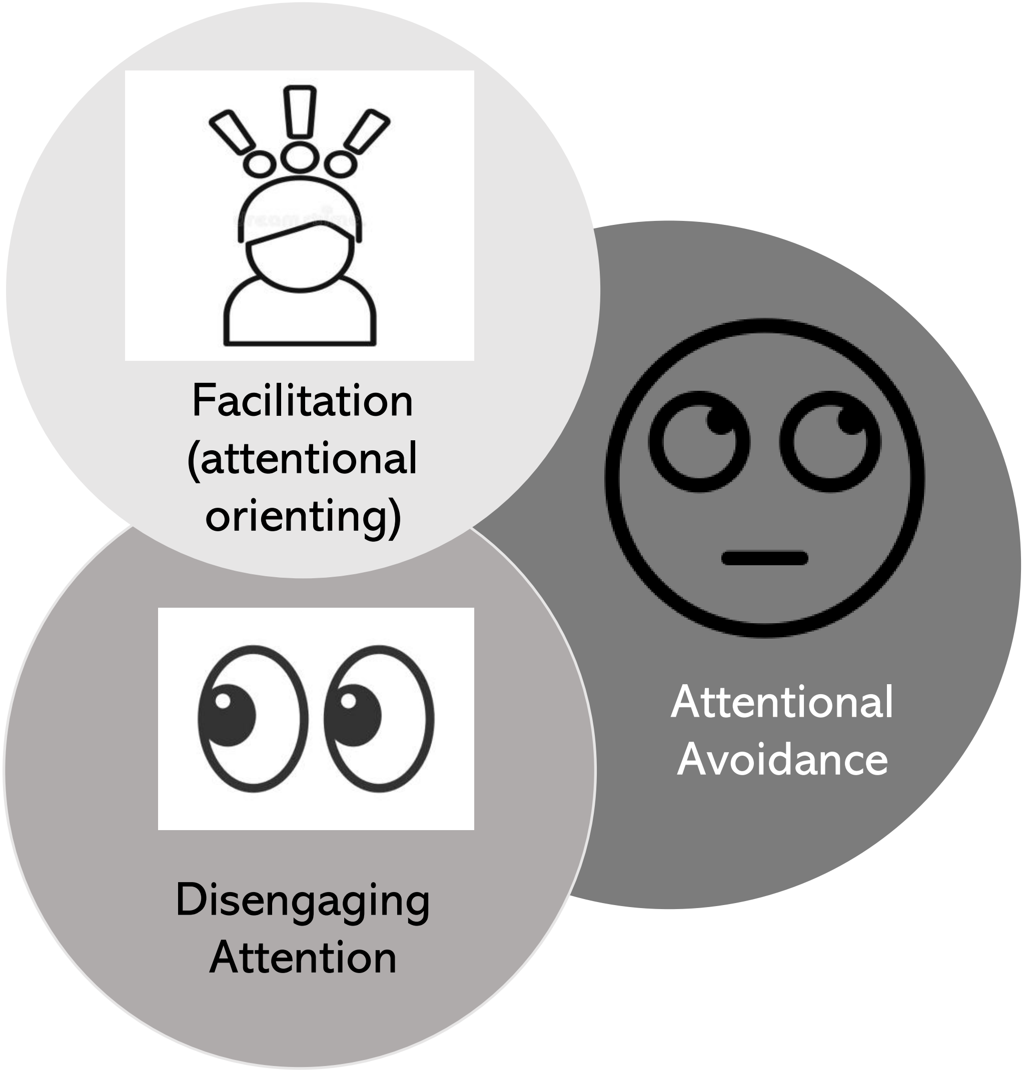
(Wijenberg et al., 2017; Silverberg et al., 2018)

Is there a role of attentional bias?

- Attentional bias could be one cognitive process which underlies the maladaptive thought patterns and behaviours in the FAM
- In the FAM of chronic pain, associations between FAM constructs and attentional biases have been identified.
- No studies have yet explored the connection between attentional biases and FAM constructs in PPCS.



What are attentional biases, anyways?

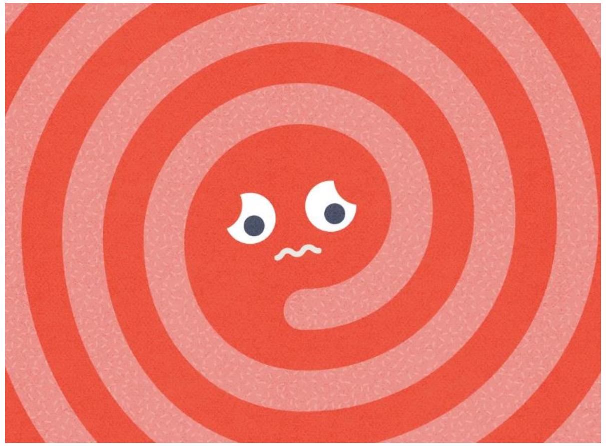


(Petrini & Arendt-Nielson, 2020; Fox et al., 2001; Cisler & Koster, 2010)

The potential for the role of attentional bias…

relationships between attentional bias and:

Symptom Severity



Pain Catastrophizing

Fear-Avoidance Behaviour

(Schoth et al., 2012; Roelofs et al., 2002; McGowan et al., 2009; Todd et al., 2015; VanDamme et al., 2002; Lee et al., 2018; Crombez et al., 2015; Hughes et al., 2017)

Measuring Attentional Biases

There are several experimental tasks which can measure attentional biases…

emotional stroop tasks

★ gaze/eye-tracking tasks

spatial cueing tasks

dot probe tasks

visual search tasks

★ attentional blink tasks

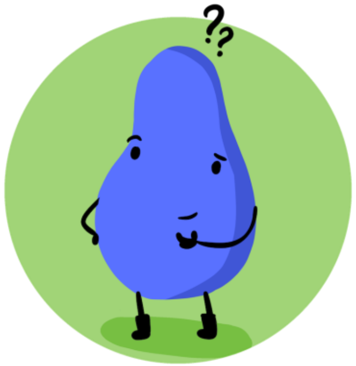
… each of which can measure different types of attentional biases and have varying levels of robustness and reliability.

(McNally et al., 2019; Dresler et al., 2012; Caudek et al., 2017)

Aims

1

To establish whether or not attentional biases exist in PPCS



a. To investigate if attentional biases, in terms of difficulty disengaging from pain-related stimuli, exist in individuals with PPCS, using an attentional blink task

b. To investigate if attentional biases, in terms of preferential looking towards symptom-relevant stimuli, exist in individuals with PPCS, using a mouse-movement task which simulates eye-tracking, Mouseview.js.

Hypotheses

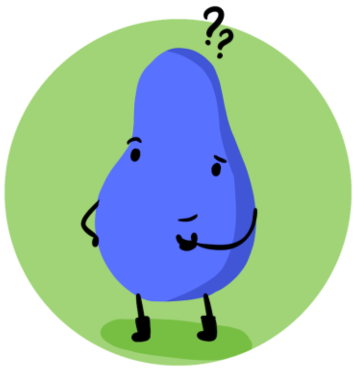
1a. Participants with PPCS will show greater difficulty disengaging attention pain faces versus neutral faces, compared to those who have recovered from their concussion.

1b. Participants with PPCS will demonstrate longer dwell time on symptom relevant images (i.e., images expressing general threat and illness threat), compared to those who have recovered from their concussion.

Aims

2

To describe correlations between attentional biases and fear-avoidance model constructs (i.e., fear-avoidance behaviour, pain-catastrophizing, and increased post-concussion symptoms).



a. To describe correlations between attentional biases as measured on the attentional blink task (in terms of difficulty disengaging from pain-related stimuli), and fear-avoidance model constructs.

b. To describe correlations between attentional biases as measured on the gaze-time task (in terms of preferential looking towards symptom-relevant stimuli), and fear-avoidance model constructs.

Hypotheses

2a. Participants who demonstrate greater attentional biases in difficulty disengaging attention from pain-related stimuli will also report greater severity of the fear-avoidance model constructs (i.e., symptom severity, pain-catastrophizing, and fear-avoidance behaviour).

2b. Participants who spend more time fixating attention on symptom-relevant stimuli will also report greater severity of the fear-avoidance model constructs (i.e., symptom severity, pain-catastrophizing, and fear-avoidance behaviour).

METHODS

Participants

- Two groups:
  - Persistent Post-Concussion Symptoms (PPCS) group
  - Recovered group
- Recruited through undergraduate research recruitment pool at Simon Fraser University (SFU)

Inclusion Criteria

PPCS Group:

- Aged between 18-50 years
- Sustained a self-reported concussion at least one month ago
- RPQ score with 2 or more symptoms with moderate severity or higher

Recovered Group:

- Aged between 18-50 years
- Sustained a self-reported concussion at least one month ago
- RPQ score with 1 or fewer symptoms with moderate severity or higher

Exclusion Criteria

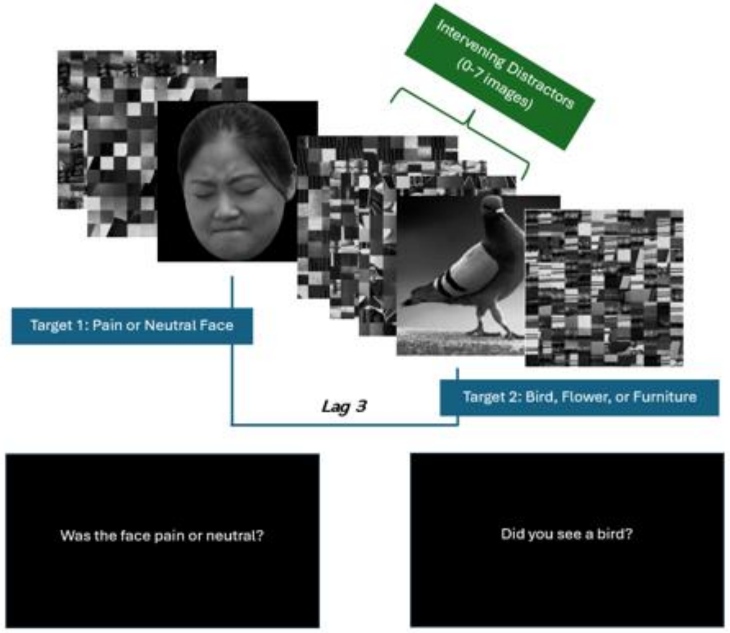
- Have a severe or unstable physical health condition (e.g., non-concussion related chronic pain)
- Not fluent in English
- No access to a computer with Internet connection for the duration of the study

METHODS

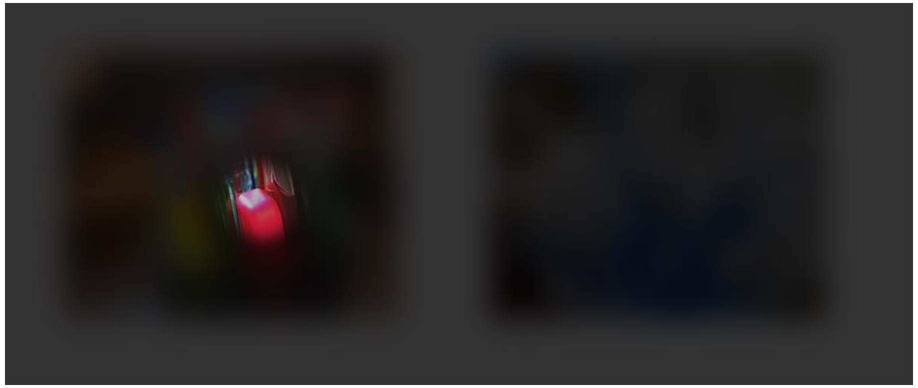
Study Flow

order counterbalanced

Attentional Bias Experimental Tasks



Attentional Blink Task



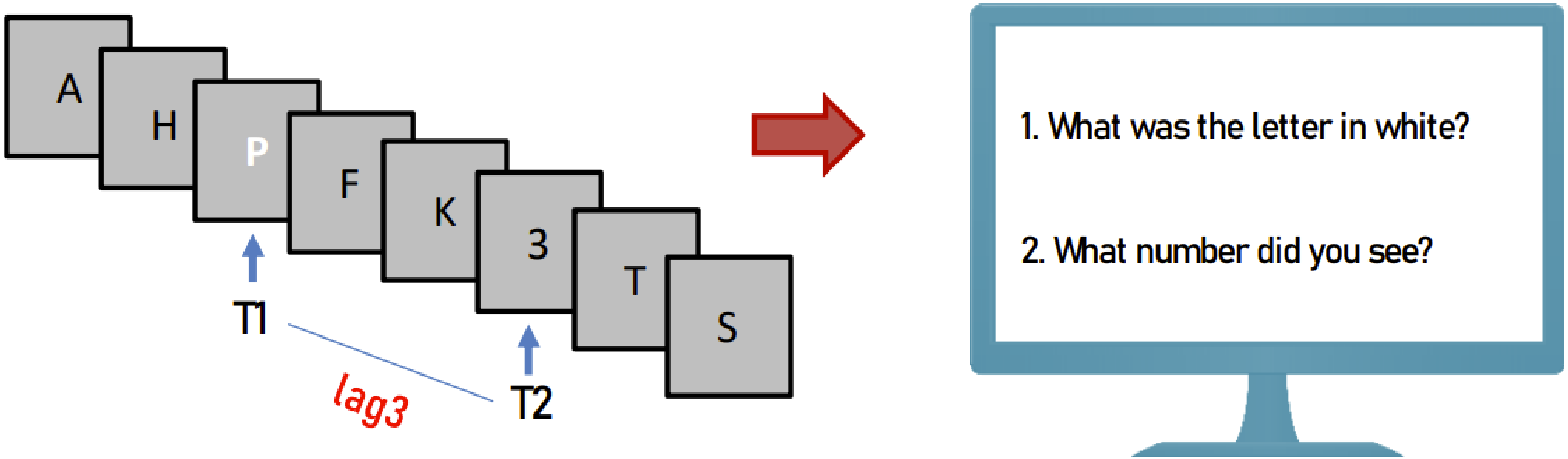
Dwell/Gaze-Time Task

order counterbalanced

Questionnaires

- Rivermead Post-Concussion Symptom Questionnaire (RPQ)
- Pain-Catastrophizing Scale (PCS)
- Fear-Avoidance Behaviour after Traumatic Brain Injury (FAB-TBI)
- Generalized Anxiety Disorder – 7 (GAD-7)
- Patient Health Questionnaire – 9 (PHQ – 9)

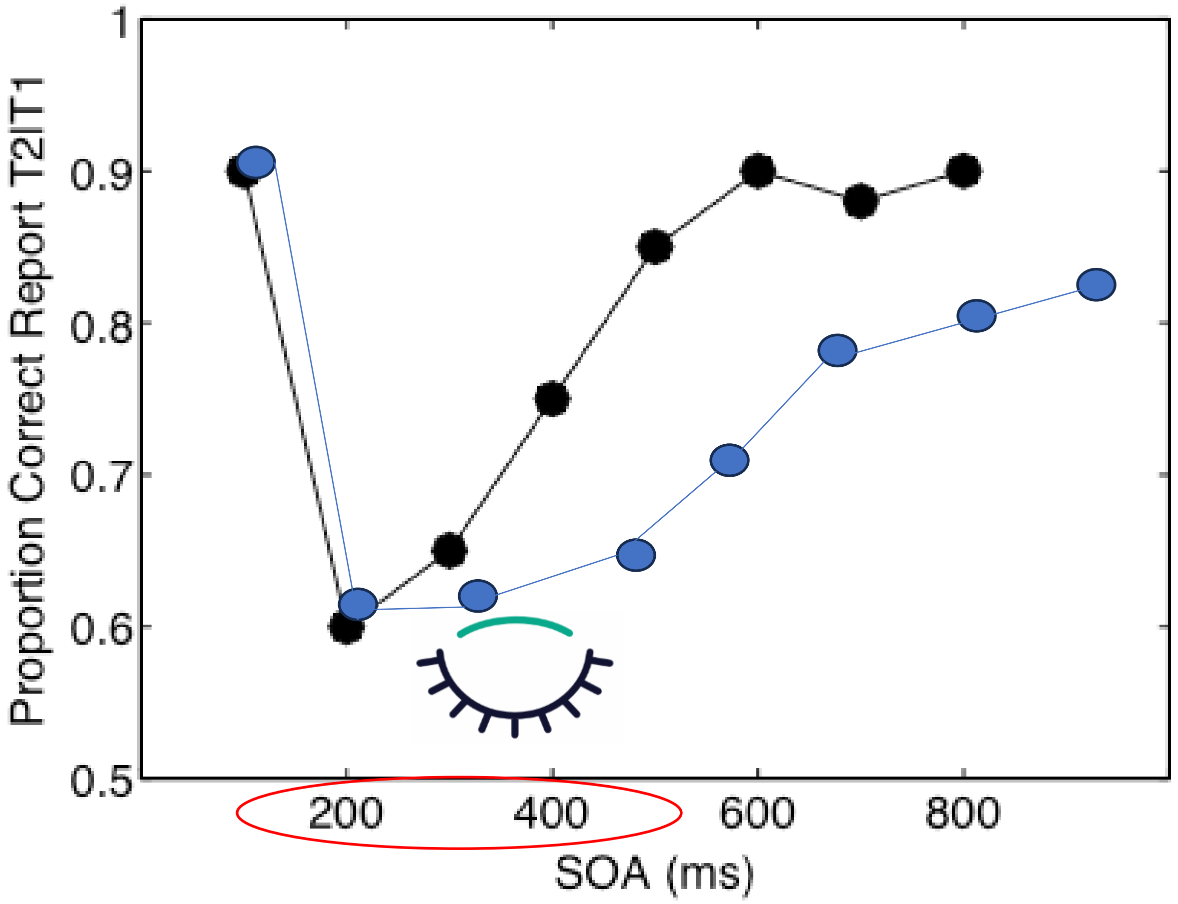
The Attentional Blink Task



- **RSVP** stream = **R**apid **S**erial **V**isual **P**resentation stream
- **Target 1 (T1):** Letter in white that participant needs to identify
- **Target 2 (T2):** Number that participant needs to identify
- **Distractors:** Letters between targets
- **Lag:** Distance between targets

METHODS

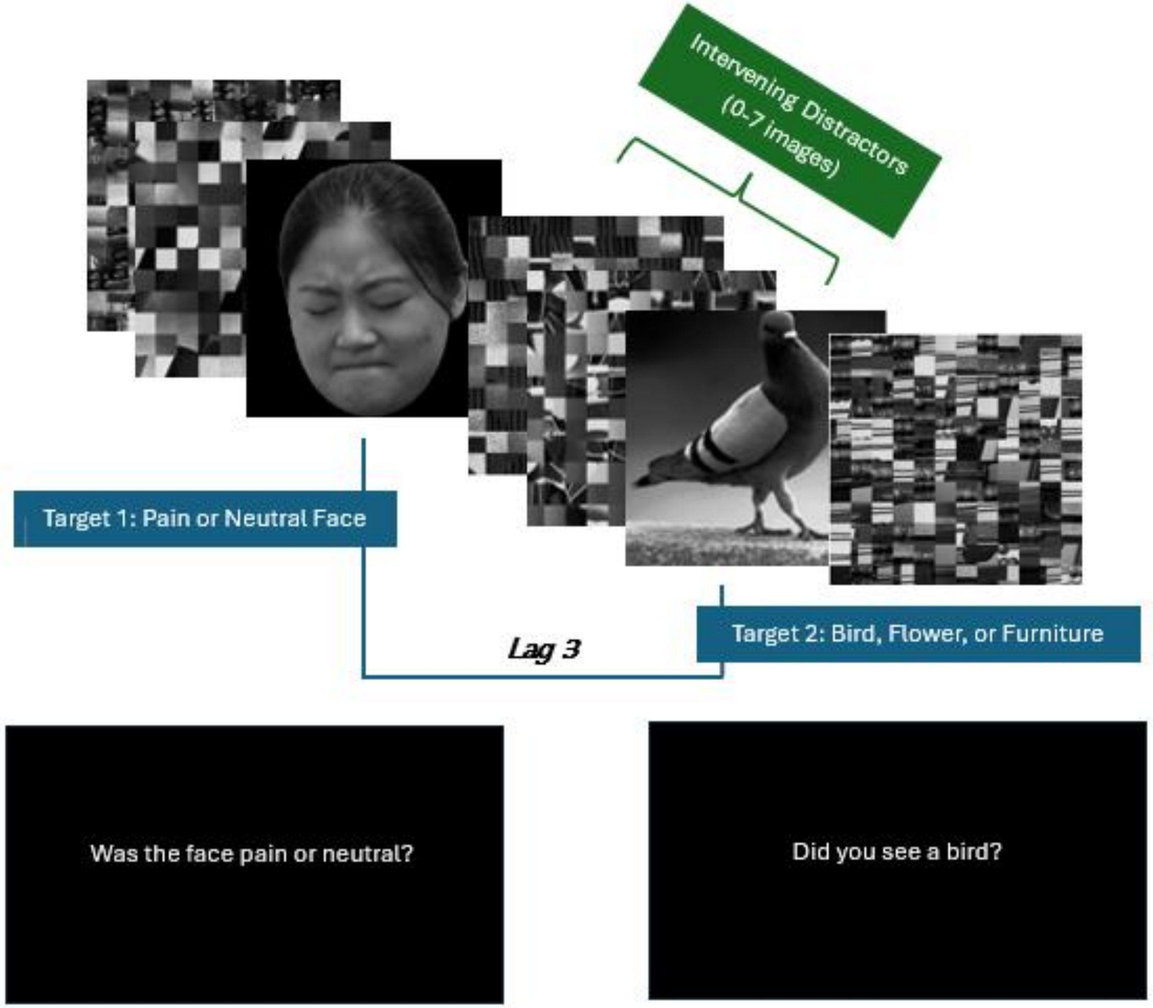
The Attentional Blink Task (cont'd.)



"Greater difficulty disengaging"

The Attentional Blink Task

- **RSVP** stream = **R**apid **S**erial **V**isual **P**resentation stream
- **Target 1 (T1):** First picture that participant needs to identify
  - Pain or Neutral Face
- **Target 2 (T2):** Second picture that participant needs to identify
  - Bird, Flower or Furniture
- **Distractors:** Images between targets
  - Scrambled images of objects
- **Lag:** distance between images
  - Lag 3 and 7 examined



METHODS

Gaze-Time Task (mouseview.js)

- Simulates eye-tracking tasks with mouse movement
- Side-by-side images with overlay
    - Neutral-Neutral
    - General Threat – Neutral
    - Concussion Threat – Neutral
- Gaze Time = time spent viewing each image (amount of time mouse within image coordinates)

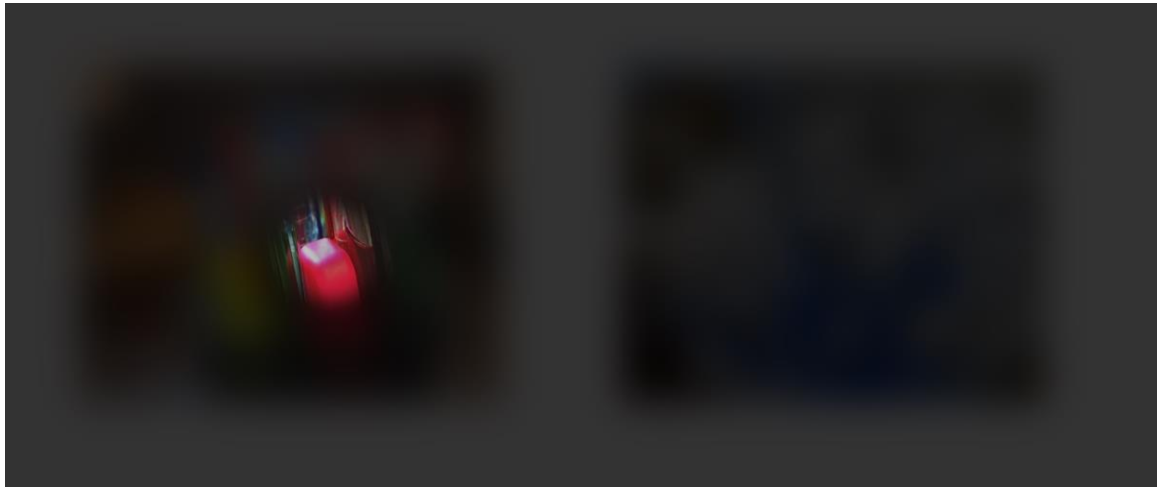


Image Examples


Neutral


General Threat


Concussion-Threat

Participant Flow

n = 201 completed the survey

n = 11 excluded due to non-completion of questionnaire data

n = 19 excluded due to failed attention checks or worse than chance task performance

n = 46 excluded due to reported injury date < 30 days prior to participation in the study

n = 106 included in the analyses

n = 50 in PPCS group

n = 56 in recovered group

Sample Characteristics

Selected Demographic and Injury Characteristic Descriptive Statistics

	Total Sample	PPCS Group	Recovered Group
Age [M, (SD)]	19.5 (2.1)	19.5 (2.2)	19.6 (2.1)
Gender (n, % women)	72 (67.9)	39 (78.0)	34 (60.7)
Time Since Injury [months - M, (SD)]	23.7 (31.5)	25.3 (35.7)	22.2 (29.1)
Mechanism of Injury, n (%)			
Sports and Recreation	72 (67.29)	36 (72.0)	36 (64.2)
MVA	14 (13.2)	5 (10.0)	9 (16.1)
Fall	13 (12.2)	4 (8.0)	9 (16.1)
Workplace Injury	2 (1.9)	1 (2.0)	1 (1.8)
Other	5 (4.7)	4 (8.0)	1 (1.8)

Our sample was relatively young…

…and predominantly female…

…consisting mostly of people who had concussions a long time ago…

...mainly resulting from sports.

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RESULTS

Questionnaires

Questionnaire and Task Performance Descriptive Statistics

	Scale Range	Total Sample	PPCS Group	Recovered Group
Symptom Severity (RPQ) [M, (SD)]	0-52	17.2 (13.3)	27.0 (11.6)	8.5 (7.2)
Pain Catastrophizing Scale (PCS) [M, (SD)]	0-52	13.8 (12.3)	18.6 (13.3)	9.5 (9.6)
Fear-Avoidance Behaviour after Traumatic Brain Injury (FAB-TBI) [M, (SD)]	0-64	17.2 (6.0)	19.5 (5.1)	15.2 (6.1)
Depression (PHQ-9) [M, (SD)]	0-27	8.2 (5.2)	10.6 (5.0)	6.0 (4.5)
Anxiety (GAD-7) [M, (SD)]	0-21	7.5 (4.9)	9.4 (5.1)	5.8 (4.2)

Overall, both our PPCS group and our recovered group demonstrated **low levels of fear-avoidance model constructs**, including:

Symptom Severity

Pain Catastrophizing

Fear-Avoidance Behaviour

Depression

Anxiety

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RESULTS

Task Performance

Task Performance Descriptive Statistics

	Total Sample	PPCS Group	Recovered Group
Attentional Blink Task – Lag 3 Accuracy [M %, (SD)]			
Pain Faces	64.1 (16.2)	63.6 (15.2)	64.6 (17.1)
Neutral Faces	68.5 (13.4)	68.2 (14.0)	68.7 (12.9)
Attentional Blink Task – Lag 7 Accuracy [M %, (SD)]			
Pain Faces	64.1 (16.2)	63.6 (15.2)	64.6 (17.1)
Neutral Faces	68.5 (13.4)	68.2 (14.0)	68.7 (12.9)
Gaze Time Task – Gaze Time (ms) [M, (SD)]			
Neutral	3172.9 (682.9)	3314.2 (672.9)	3046.8 (672.7)
Concussion Threat	3724.2 (977.7)	3821.5 (955.9)	3637.4 (997.3)
General Threat	3748.3 (980.2)	3814.8 (992.7)	3688.9 (973.)

RESULTS

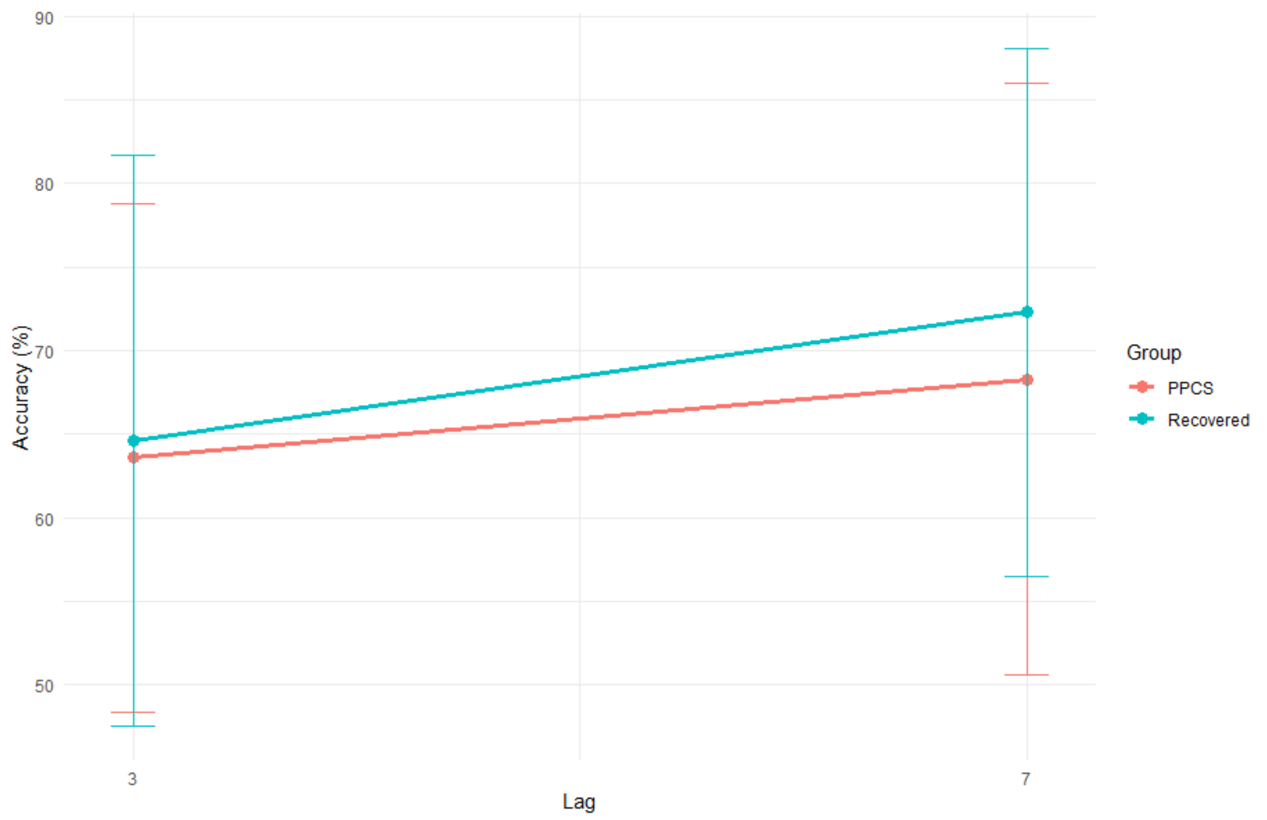
Results

1a

Group Differences in Attentional Blink Task Performance

Neutral Faces

- Significant main effect of lag ($F = 20.270$, $p = <.001$, $\eta_p^2 = .159$) on accuracy of detecting the T2 image when the image at T1 was a neutral face
- No main effect of group ($F = .239$, $p = .626$, $\eta_p^2 = .002$).
- There was no group x lag interaction ($F = .458$, $p = .500$, $\eta_p^2 = .004$)



As expected, we saw the attentional blink phenomenon in both the PPCS group and recovered group for neutral faces.

And, as expected, we did not see that there was any differences in attentional blink between the two groups for neutral faces.

We did not see differences between the PPCS and recovered group in difficulty disengaging attention from neutral faces.

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RESULTS

Results

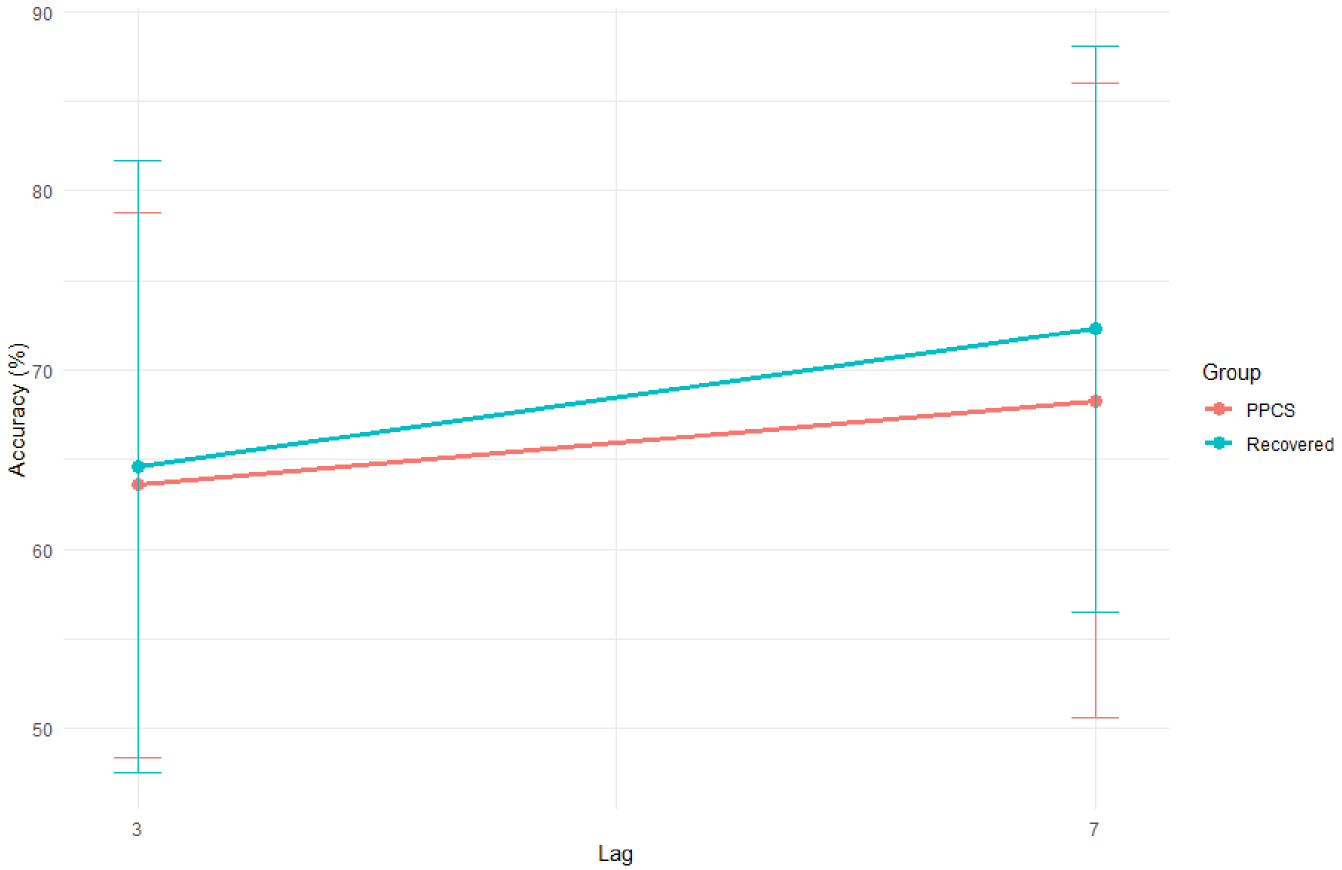
Group Differences in Attentional Blink Task Performance

<u>Pain Faces</u>

- Significant main effect of lag ($F = 22.580$, $p = <.001$, $\eta_p^2 = .174$) on accuracy of detecting the T2 image when the image at T1 was a pain face
- No main effect of group ($F = .741$, $p = .391$, $\eta_p^2 = .007$).
- There was no group x lag interaction ($F = 1.091$, $p = .299$, $\eta_p^2 = .010$)

As expected, we saw the attentional blink phenomenon in both the PPCS group and recovered group for pain faces.

However, against what we were expecting, we did not see that there was any differences in attentional blink between the two groups for pain faces.



We did not see differences between the PPCS and recovered group in difficulty disengaging attention from pain faces.

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RESULTS

Results

2 a+b

Correlations between Experimental Task Performance and Fear-Avoidance Model Constructs

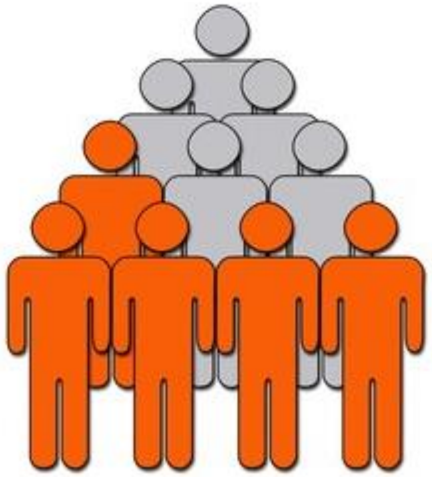
- In the full sample, a weak positive correlation between anxiety and time spent viewing concussion images was identified (r = .23, *p* = .019).
- No correlations between attentional biases to pain stimuli on the attentional blink task (i.e., quantified by Pain-Neutral Difference Score: lag 7 pain accuracy – lag 7 neutral accuracy) and fear-avoidance model constructs were identified.

Greater anxiety was associated with more time spent viewing concussion-threat images.

RESULTS

Sensitivity Analysis

We saw that a small number of people (n = 4) in our Recovered group had a high amount of fear-avoidance behaviour…



…and a substantial subset in our PPCS group (n = 36) had fear-avoidance behaviour below the 50^{th} percentile…

…so we re-ran our analyses, grouping by fear-avoidance behaviour instead of symptom persistence.

FAB-TBI Cutoff: 22.5
High Avoidance: n = 34
Low Avoidance: n = 72

RESULTS

Results

Sensitivity Analyses – What did we find?

Like in the primary analyses,

Attentional Blink Task

- There was no significant group x lag interaction for the neutral images ($F = .341$, $p = .561$, $\eta_p^2 = .003$)
- There was no significant group x lag interaction for the pain images ($F = 1.649$, $p = .202$, $\eta_p^2 = .016$)

Gaze-Time Task

- There was no significant group x image type interaction ($F = 1.616$, $p = .204$, $\eta_p^2 = .030$)

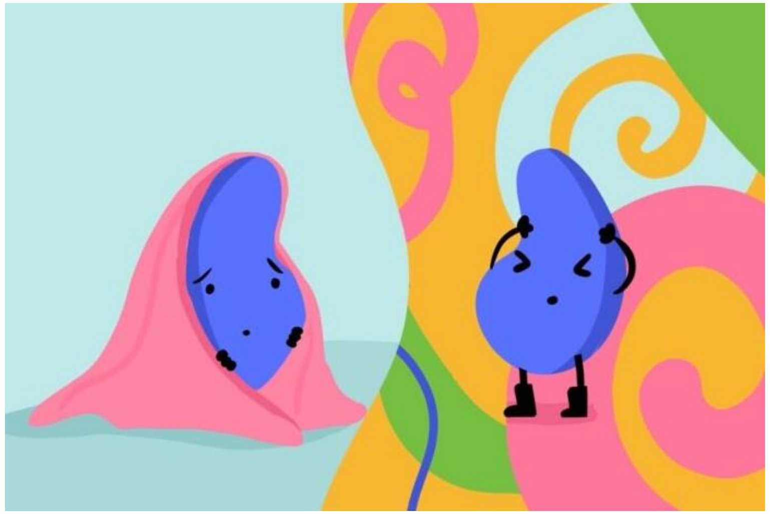
Ultimately, the sensitivity analysis did not reveal that grouping participants by fear-avoidance behaviour instead of symptom persistence impacted our results in any way.

So, what does it all mean?

Individuals with PPCS in our sample didn't demonstrate attentional biases towards symptom relevant stimuli.

BUT THIS WASN'T WHAT WE WERE EXPECTING, SO WHY?

The attentional blink task may not be sensitive enough to detect the group differences.



Pain faces may not have been a full representation of symptom relevant stimuli in the attentional blink task.

The concussion images we chose may not adequately threatening enough.

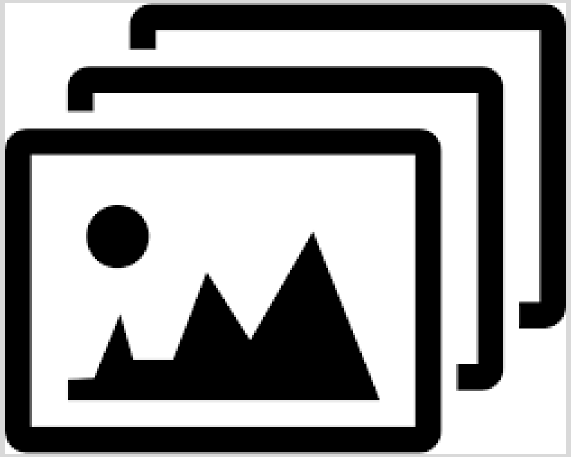
Our sample consisted of participants who were 1) quite removed from their injury, and 2) did not endorse high levels of FAM constructs

There may be more complex attentional engagement and avoidance processes at play.

DISCUSSION

DISCUSSION

Limitations



Experimental Tasks & Stimuli Used

- No pre-existing concussion threat image stimuli
- Robustness of emotional variation of attentional blink task

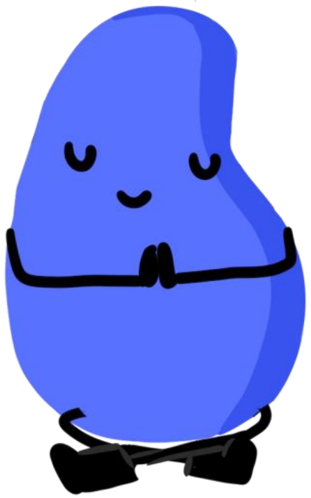
Participant Characteristics

- Largely undergraduate sample
- Non-treatment-seeking
- Lower overall levels of fear-avoidance model constructs
- Large variation in time since injury
- Mostly sports-related concussion

Power

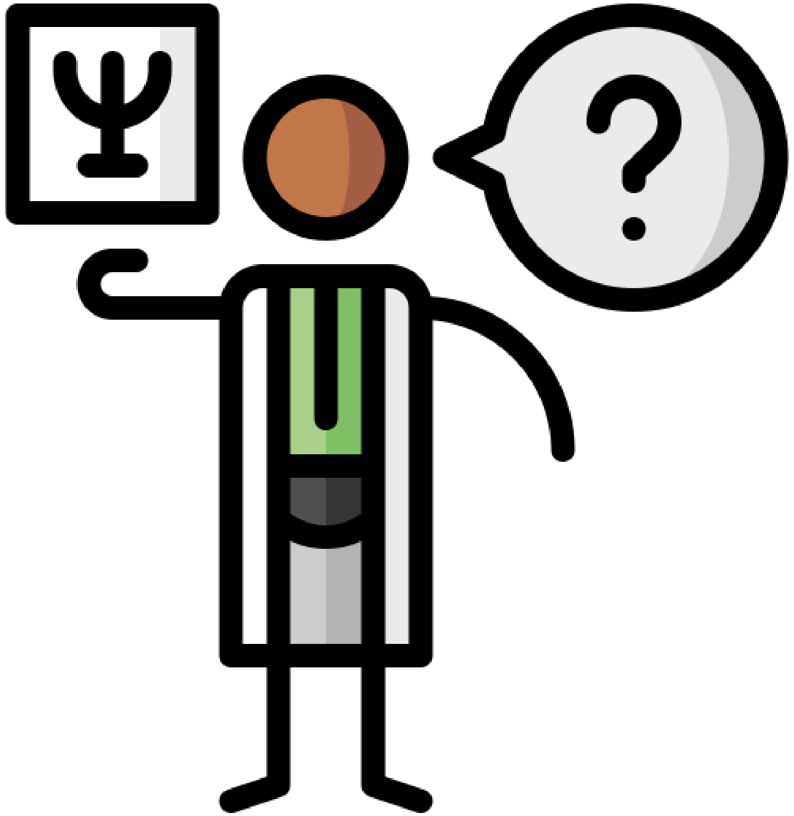
- Significantly underpowered for correlational analyses performed

Implications and Possible Next Steps



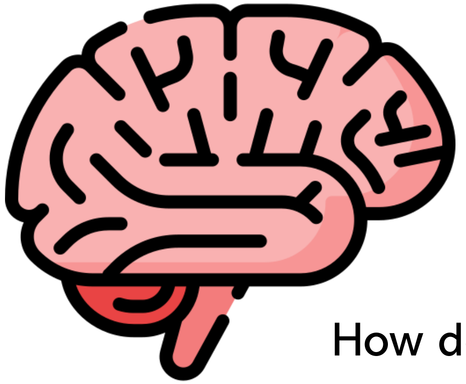
Those with persisting symptoms but more removed from their concussion and experiencing lower fear-avoidance model constructs do not appear to demonstrate heightened attentional biases compared to those who have recovered fully from their concussion

Assessing a more fear-avoidant sample

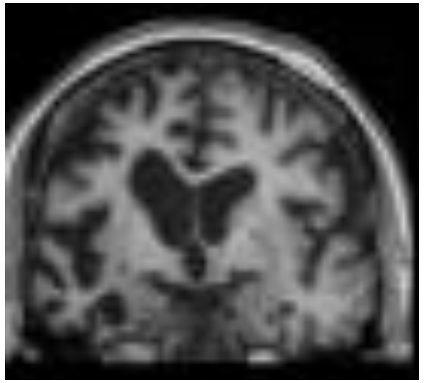


A little aside on clinical neuropsychology....

What's Clinical Neuropsychology?



How does brain influence behaviour, and vice versa?



A Collection of Different Fields…

Behavioural Neurology

- Aspects of behaviour are hardwired into the nervous system

Neuropsychiatry

- There exist psychiatric manifestations of neurological disease

Neuropsychology

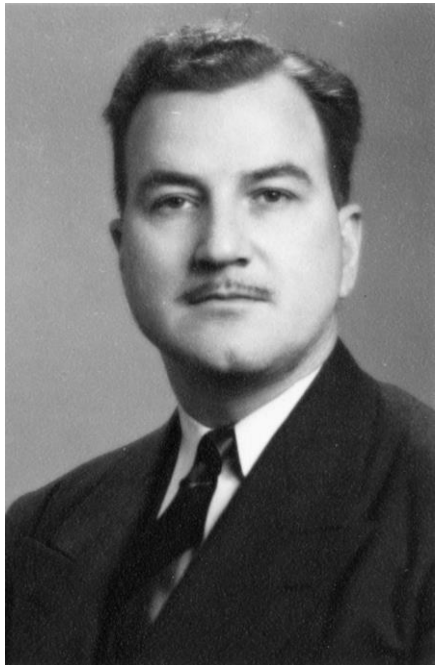
- We can use psychological tests to characterize the nature of neurological disease

…all with an emphasis on the relationship between brain and behaviour

"where an individual scientist falls on this spectrum is often an accident of training rather than a result of knowledge, skills, or interest"

(Stuss & Levine, 2002)

Alfred Binet
(1857-1911)



Ward C. Halstead
(1908-1968)

Ralph M. Reitan
(1922-2014)

Alexander R. Luria
(1902-1977)

William Milberg

A brief history of clinical neuropsychology…and how cognitive neuroscience has come to play a growing role in our field

From the Early Days to Present Day…

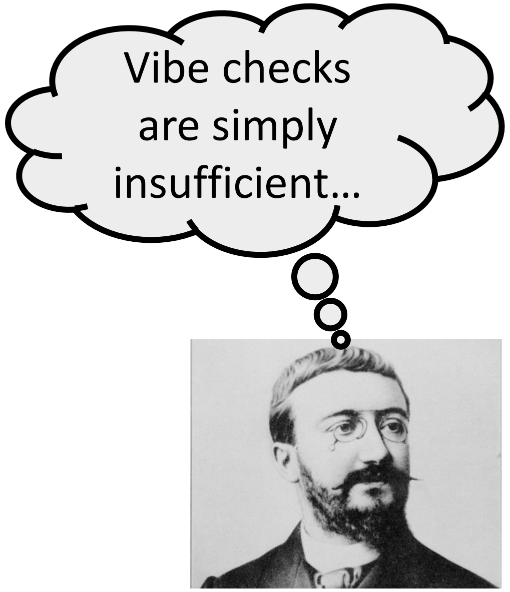
- In the early days, things were more dichotomous:
  - Either your brain was "normal" or it was "abnormal", based on the clinician's clinical judgment

- Then came **Binet** who emphasized three things in testing & test development:

objective

standardized

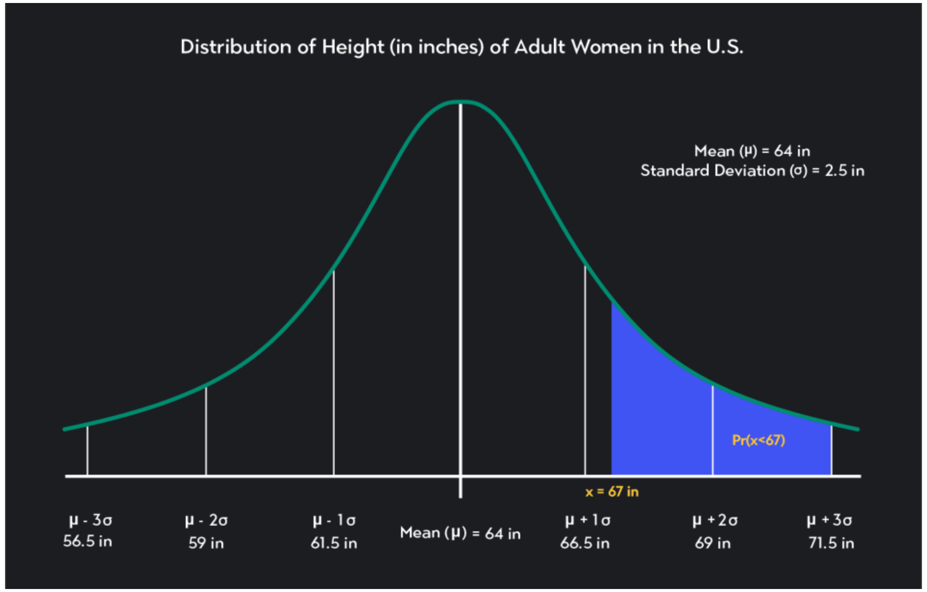
useful



From the Early Days to Present Day…

- **Halstead** took this work further, emphasizing the use of a **test battery** with different **categories** of potential kinds of brain damage.

- **Reitan** introduced the concept of **norms**



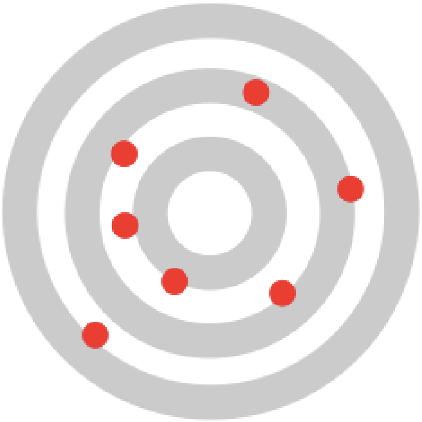
Then came along Luria…

- He emphasized sensitivity to **individual differences** (e.g., age, sex, handedness, patient's history/background, location of lesion)
- He also emphasized a more **flexible or adaptable** approach to testing
  - e.g., using the same battery of tests for everyone vs. performing a rapid general screen and then focusing on the most salient problems, adding in or removing certain tests as necessary
- There was criticism for more standardization towards this more clinical approach (e.g., standardizing the process which we record and observe qualitative observations, symptoms, etc.)
- There was also a push for understanding not just the final answer someone came to, but *how* they did it.
  - This approach is now also known as the **process approach** in neuropsychology

The Role of Cognitive Neuroscience in Clinical Neuropsychology

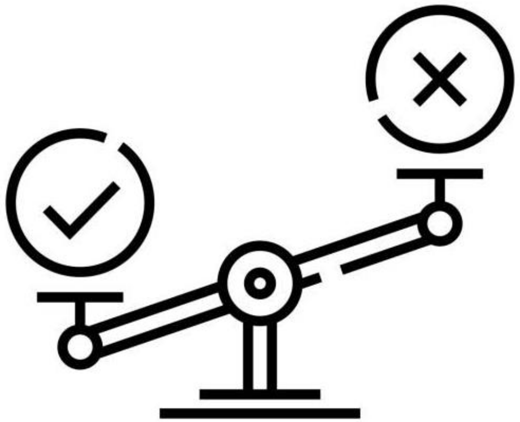
- The emphasis on standardization, norms, psychometric criteria etc. tells us a lot about how one individual might be different from the rest
- But it doesn’t tell us much about the conceptual, fundamental, theoretical underpinnings of what we’re measuring with our tests
- Cognitive Neuroscience elucidates the mechanisms and theories behind the clinical syndromes we assess for and treat in clinical neuropsychology
- We also often draw from tasks & paradigms developed in cognitive neuroscience research and use them in clinical research and practice

Barriers to the Implementation of New Cognitive Paradigms into Clinical Practice



psychometric properties

does it measure XYZ well? for who?



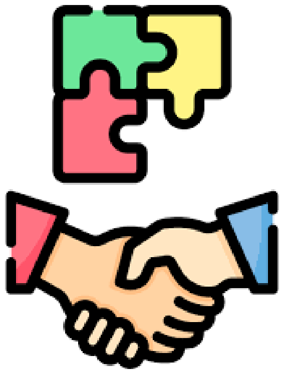
determining relative utility

does it measure XYZ better than an existing tool?

discriminant and predictive validity

Can it predict a person's prognosis?

Does it help us tell apart different disorders?



cooperation across fields

Who do we need to make it happen?

Thank you

Email: maa182@sfu.ca