CREMS Webinar Series: Welcome!

2016 PROGRAM

18TH AUGUST, 2016
Assessing with efficiency: Advances in the measurement of mental and substance use disorders
DR MATTHEW SUNDERLAND

1ST SEPTEMBER, 2016: Positive Choices webinar
The maturing adolescent brain: Implications for the prevention of drug and alcohol problems
DR LOUISE MEWTON

NOVEMBER, 2016
Behavioural activation for the treatment of depression among substance users
DR JOANNE ROSS

Full details available at:
http://comorbidity.edu.au/training/webinars
Join our mailing list to receive updates about upcoming webinars.

CREMS Webinars: Available on Demand

Available on demand:
Friendship networks in adolescence: how do they evolve and how do they influence mental health and substance use?
PROF T.M. GLIDE

Available on demand:
Exploring predictors and patterns of long-term mental health and heroin dependence
DR CHRISTINA BAIERS

November 5, 2013: Impact
Locating free resources to support evidence-based practice
DR DANIEL CROWE

Available on demand:
Using eHealth to treat co-occurring mental health and substance use disorders in youth
DR JOHN DEAN

Available on demand:
Co-occurring mental health and substance use disorders: how do they affect young people?
DR GEOFF DAWSON

Available on demand:
Drug and alcohol use among young people: What can parents and schools do to prevent the harm?
DR NICOLA NIGRINI and DR LEONNE SYMONS

Available on demand:
Using peer-led to prevent drug and alcohol use among young people
DR HELEN BISHOP and DR BILL YOUNG

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What is CREMS?

CREMS aims to significantly improve

- understanding
- prevention
- treatment

of comorbid mental health disorders and substance use

NHMRC Centre of Research Excellence in Mental Health and Substance Use (CREMS)

CREMS Team

NHMRC Centre of Research Excellence in Mental Health and Substance Use (CREMS)

Directed by Prof Maree Teesson
Overview

1. Brief introduction to Item Response Theory (IRT)
2. Item banks and common metrics
3. Brief screening scale development
4. Computerised adaptive testing (CAT)
Overview

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1. Introduction

In IRT, ability scores are considered test independent
We take into consideration the individual item properties rather than a focus on total scores
Items and ability scores are linked on a common scale
1. Example: Item Response Theory

<table>
<thead>
<tr>
<th>Test items</th>
<th>Severity scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: Feeling sad</td>
<td>-3</td>
</tr>
<tr>
<td>Q2: Loss of interest</td>
<td>-2</td>
</tr>
<tr>
<td>Q3: Hopelessness</td>
<td>-1</td>
</tr>
<tr>
<td>Q4: Severe guilt</td>
<td>0</td>
</tr>
<tr>
<td>Q5: Psychomotor disturbance</td>
<td>1</td>
</tr>
<tr>
<td>Q6: Suicidal behaviour</td>
<td>2</td>
</tr>
</tbody>
</table>

Resources

Overview

1. Brief introduction to Item Response Theory (IRT)
2. Item banks and common metrics
3. Brief screening scale development
4. Computerised adaptive testing (CAT)

2. Item banking
2. Steps to develop an item bank

1. Systematic literature searches
2. Item refinement and standardisation
3. Consumer and expert feedback
4. Item reduction
5. Assumption testing
6. Final reduction
7. Calibration

2. Common metrics and linking

Severity scores

-3
-2
-1
0
1
2
3

BDI

CES-D

Development and community-based validation of eight item banks to assess mental health

Severity scores
2. Common metrics and linking

Severity scores

BDI

CES-D
2. Studies in scale linking

- Choi et al., (2014). Establishing a common metric for depression symptoms: linking the BDI-II, CES-D, and PHQ-9 to PROMIS depression. [www.common-metrics.org](http://www.common-metrics.org)
3. Screening scales

Severity scores

-3
-2
-1
0
1
2
3
3. Screening scales

- PROMIS initiative short scales
  - [www.assessmentcenter.net](http://www.assessmentcenter.net)
- SIAS-6 and SPS-6
- Short scales derived from new item banks for mental health and substance use
  - Example of panic disorder

### 3. Correlations

<table>
<thead>
<tr>
<th></th>
<th>PADIS</th>
<th>Full form IRT score (n=19 items)</th>
<th>Short form IRT score (n=4 items)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADIS</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full form IRT score</td>
<td>0.78</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Short form IRT score</td>
<td>0.80</td>
<td>0.93</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Overview

1. Brief introduction to Item Response Theory (IRT)
2. Item banks and common metrics
3. Brief screening scale development
4. Computerised adaptive testing (CAT)

4. How CAT works

Severity scores

-3  -2  -1  0  1  2  3
4. How CAT works

Severity scores

4. Example

- Mood and anxiety disorders are highly comorbid
- Indicates the presence of a single factor that accounts for the relationships between all disorders
  - Internalising psychopathology
- How can we measure this broad domain using as fewer items as possible?
4. Example

- Calibrated 133 items using a bi-factor model
  - Focus on “internalising” common factor
- Scored individuals using an adaptive algorithm
- Examined correlations between internalizing CAT scores and other short screening scales & DSM-5 diagnosis
4. Example

- An average of 28 items (79% reduction).
  - Precision was high (reliability = 0.86).
  - Correlation with full bank = 0.93
  - Correlations with existing brief screening scales ranged between 0.50 and 0.82.
  - Internalising CAT scores were able to significantly differentiate between cases and non-cases for all five disorders.

Wrapping up

- IRT has great potential to improve the validity, efficiency, and precision when measuring mental health or substance use disorders.
- We hope to continue to develop instruments that measure broad levels of comorbidity using IRT.
- The next step is to assist researchers and clinicians use these measures by developing online measurement portals and apps.
Thank you

Feel free to drop me an email: matthews@unsw.edu.au

Any questions or comments?
Thanks for being part of the CREMS Webinar Series.

Video recording and handouts of this and our past webinars are available at: comorbidity.edu.au/training/webinars
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