Exploring the Predictive Signal in Clinical Psychiatric Notes

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Research Domain Criteria (RDoC)

- Developed by the National Institute of Mental Health
- Research framework for investigating psychiatric disorders
- Develop new ways of classifying mental disorders based on behavioral dimensions and neurobiological measures
<table>
<thead>
<tr>
<th>Category</th>
<th>Systems</th>
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<tbody>
<tr>
<td><strong>Negative Valence Systems</strong></td>
<td>Fear</td>
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<td></td>
<td>Anxiety</td>
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<td>Loss</td>
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<td>Frustrative non-reward</td>
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<td><strong>Positive Valence Systems</strong></td>
<td>Reward learning</td>
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<td>Reward valuation</td>
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<td>Habits</td>
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<td><strong>Cognitive Systems</strong></td>
<td>Attention</td>
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<td>Perception</td>
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<td>Declarative memory</td>
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<td>Working memory</td>
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<td>Cognitive control</td>
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<td><strong>Systems for Social Processes</strong></td>
<td>Attachment formation</td>
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<td>Social communication</td>
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<td>Perception of self</td>
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<td>Perception of others</td>
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<td><strong>Arousal/Modulatory Systems</strong></td>
<td>Arousal</td>
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<td>Circadian rhythm</td>
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<td>Sleep and wakefulness</td>
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Domain Examples

Negative Valence:

Cognitive Systems:

Research Question

If you extract these 5 symptom dimensions from clinical psychiatric notes, can they be used to predict patient outcomes?
How Does This Work?

Token Map

- Negative Valence
- Aggression
- Agitated
- Attack
- Guilt
- Fatigue
- Panic
- Outburst
- Posttraumatic
- Tearful
- Worthlessness
Ms. Jones is a 59 y/o female with MDD. She reports more fatigue this week, and an increasing sense of worthlessness. Yesterday, had a tearful outburst at the grocery store and decided to come in for admission...
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Clinical Note

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• Does not factor in the order of the words

• Does not capture negation
  – “Denies fatigue, sense of worthlessness”
Replication at Duke

- 8,884 patient encounters across 5,627 unique patients
- Demographic data
- 1.8 million previous diagnoses (ICD-9 and ICD-10)
  - Charlson Comorbidity Index
- All psychiatric admission and discharge notes
Next Steps

• NLP team building model to predict:
  – Hospital LOS
  – Time to readmission
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Thank You!

• Jessie Tenenbaum
• Ed Hammond, Vivian West, and Pegeen Ryan-Murray
• Clinical Informatics Cohort