Interpretation Training in Individuals with GSAD:
A Randomized Controlled Trial

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Disclosures

- **Charles Taylor**
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- **Nader Amir:**
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  - Dr. Amir has financial interest in Cognitive Retraining Technologies Incorporated which has licensed elements of the technology described in this study for commercial purposes.
Interpretation Bias in Social Anxiety

- Social information is often ambiguous
- Open to multiple interpretations
- Social anxiety characterized by:
  - Negative interpretation bias
  - Lack of benign bias

Amir et al. (1998); Constans et al. (1999); Hirsch & Mathews (2000); Huppert et al. (2003); Moser et al., (2008); Stopa & Clark (2000);
Cognitive Models of SAD

Negative beliefs → Social situation → Interpretation Bias → Biased Judgments → Anxiety → Safety/avoidance behaviors

- I am unlikable
- Co-worker glances at watch during conversation
- He/she is bored
- He/she doesn't want to be late for a meeting
- End conversation

My co-worker doesn't like me
Interpretation Bias in Social Anxiety

- One factor that may perpetuate social anxiety
- Can interpretations be modified?
- Does modifying interpretation bias reduce social anxiety?
- Computerized Cognitive Bias Modification (CBM)
Word Sentence Association Paradigm
(WSAP; Beard & Amir, 2009)

- Threat or benign word precedes ambiguous sentence

- Task goal: Decide whether the word and sentence are related

- Dependent outcomes:
  - Endorsement rates
  - Response latencies
embarrassing
People laugh after something you said
Was the word related to the sentence?

- Endorse Threat
- Reject Threat

Related (#1)  Not related (#3)
funny
People laugh after something you said
Was the word related to the sentence?

- Endorse Benign
- Reject Benign

Related (#1)  Not related (#3)
Interpretation Bias in Social Anxiety: WSAP

Social anxiety characterized by:

- Greater endorsement of threat interpretations
- Lower endorsement of benign interpretations
- Slower response latencies to:
  - Reject threat
  - Endorse benign

Can interpretations be modified using the WSAP?

Beard & Amir (2009)
embarrassing
People laugh after something you said
Was the word related to the sentence?

- Related (#1)
- Not related (#3)
You are incorrect
embarrassing
People laugh after something you said
Was the word related to the sentence?

Related (#1)  Not related (#3)
You are correct!
funny
People laugh after something you said
Was the word related to the sentence?

Related (#1)  Not related (#3)
You are correct!
Efficacy of CBM-I: WSAP

- Modifies target interpretation biases
  - ↓ threat
  - ↑ benign

- Reduces self-report social anxiety and state/trait anxiety

  - Analogue samples (Beard & Amir, 2008)
  - Combined regimens (CBM-I + CBM-A; Beard et al., 2011; Brosan et al., 2011)
Current Study Aims

Extend previous CBM-I studies to:

- Clinical sample (GSAD)
- Clinician-rated outcomes
- Larger $n$
- Pure CBM-I
- Follow-up data
Study Overview

- **Participants:**
  - N=49 GSAD (LSAS; \(M = 79.7, SD = 18.5\))
  - Moderate depression (BDI-II; \(M = 24.1, SD = 12.4\))
  - Past treatment for SAD = 50%
  - Current mediation use = 28%

- **Sites:**
  - UGA (\(n=10\)); SDSU (\(n=39\))

- **Design:**
  - 2 (Group: IMP, ICC) x 2 (Time: pre, post)

- **Follow-up:**
  - IMP group at 3-months post-treatment
Interventions

- **Conditions:**
  - Interpretation Modification Program (IMP; n=23)
  - Interpretation Control Condition (ICC; n=26)

- **Parameters:**
  - 110 trials x 2 blocks per session (~20 minutes)
    - 76 social
    - 34 non-social
  - 12 sessions
  - Completed twice weekly
Dependent Measures

- **Social anxiety:**
  - Liebowitz Social Anxiety Scale (LSAS)
  - Social Phobia and Anxiety Inventory (SPAI)

- **Functional Impairment:**
  - Sheehan Disability Scale (SDS)

- **Depression:**
  - Beck Depression Inventory II (BDI-II)

- **Diagnostic status:**
  - SCID
**Dependent Measures**

- **Computerized Interpretation Assessment (WSAP):**

<table>
<thead>
<tr>
<th></th>
<th>Threat word</th>
<th>Benign word</th>
<th>Ambiguous sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social</strong></td>
<td>Criticize</td>
<td>Praise</td>
<td>Your boss wants to meet with you.</td>
</tr>
<tr>
<td><strong>Non-social</strong></td>
<td>Tumor</td>
<td>Height</td>
<td>The doctor examined your growth.</td>
</tr>
</tbody>
</table>

- Threat endorsement (%)
- Benign endorsement (%)
Preliminary Analyses

- **Attrition:**
  - 6 non-completers (12%): IMP ($n=3$); ICC ($n=3$)
  - ITT and completer analyses yielded similar outcomes
  - Follow-up ($n=15$; 75%)

- **Site differences:**
  - Age and gender
  - Site did *not* interact with main outcomes
Change in Social Interpretations

$d = 0.92$

$d = 1.30$
Change in Non-Social Interpretations

\[ d = 1.29 \]

\[ d = 1.22 \]
Change in LSAS

\[ d = 1.05 \]
Change in SPAI

\[ \Delta = 0.17 \]
Change in Functional Impairment

\[ d = 0.80 \]
Change in Depression

$* \ d = 0.83$
## Responder Status

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
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</thead>
<tbody>
<tr>
<td><strong>Loss of GSAD diagnosis</strong></td>
<td>IMP 65%</td>
</tr>
<tr>
<td></td>
<td>ICC 13%</td>
</tr>
<tr>
<td></td>
<td>$\chi^2$</td>
</tr>
<tr>
<td></td>
<td>$p &lt; .001$</td>
</tr>
<tr>
<td><strong>Clinically significant change</strong></td>
<td>IMP 30%</td>
</tr>
<tr>
<td></td>
<td>ICC 13%</td>
</tr>
<tr>
<td></td>
<td>$p = .17$</td>
</tr>
</tbody>
</table>
Mediation Analysis

Condition (IMP, ICC) → ∆ LSAS

- ∆ Social Threat Interpretations
- ∆ Social Benign Interpretations
- ∆ Non-Social Threat Interpretations
- ∆ Non-Social Benign Interpretations

Preacher & Hayes (2008)
Mediation Analysis: Results

Δ Social Threat Interpretations

Δ Social Benign Interpretations

Δ Non-Social Threat Interpretations

Δ Non-Social Benign Interpretations

Condition (IMP, ICC) → Δ LSAS

axb (.1133, 1.3452)*

Preacher & Hayes (2008)
# Condition Assignment Awareness

<table>
<thead>
<tr>
<th>Condition</th>
<th>Guess</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Not active</td>
</tr>
<tr>
<td>IMP</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>ICC</td>
<td>29%</td>
<td>71%</td>
</tr>
</tbody>
</table>

\[ \chi^2(1) = 0.081, \ p = 0.78 \]
Summary

- IMP was effective in modifying interpretations
  - ↓ threat and ↑ benign
  - Social and non-social

- IMP was associated with reductions in...
  - Social anxiety symptoms
  - Functional impairment
  - Depression
Conclusions

- IMP associated with large treatment effects
- Effects comparable to previous clinical trials
- Extends previous CBM-A and CBM-A/I studies
- IMP may be an efficacious treatment option for GSAD
- May increase accessibility of efficacious treatments
Future Directions

- Large clinical trial
  - Active comparison condition
  - Combination treatments
- Moderators of response
- Optimal dose and method of delivery
- Dismantle
  - Threat vs. benign
  - Social vs. non-social
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