Labeling facial affect in TBI

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Our Project

Overview

1. Review of importance of emotion recognition research for people with TBI
2. Issues with current emotion recognition research
3. How we studied emotion recognition in TBI
4. What does it mean?
Brain Storm

• Why is it important to see someone’s face while speaking to them?
• What happens if you can’t?

TBI and Emotion Recognition

• People with TBI have difficulty with affect recognition\(^3, 8, 55\).
• Negative effect on social life\(^3\) and may be treatable.\(^{51, 67}\)
• Evaluation of affect recognition is important to neurorehabilitation.
Issues with Current Research

• 1. No context to the emotion
• 2. Respondents given multiple choice
• 3. Other *categories* of emotion not addressed
Issue #1 - No Context

- Often involves face in isolation
- Is this real life?
  ★ Probably not.  

Why do you need context?

• Faces alone may **OVERESTIMATE** or **UNDERESTIMATE** real-life performance.

• If context is used, it has been **ARTIFICIAL**.
Our Solution

• Photographs of NATURAL SCENES
Issue #2: Multiple Choice

Q: Do you get multiple choice in real life?

• A: Absolutely! You don’t?
• B: Sometimes.
• C: If only that were true!
Our Solution

• Free—choice responses
Issue #3: Only 6 emotions in the world?

• Are there more emotions than the ones pictured below?

Classifying Emotions

• Basic emotions
  • Happy, sad, surprised, angry, disgusted, afraid

• Social emotions\textsuperscript{14, 38, 43}
  • Jealous, playful

• Cognitive state terms\textsuperscript{2}
  • Focused, alert, cautious
Our Solution

• Participants not restricted to 6 emotions
• Emotion responses classified as:
  • Social
  • Basic
  • Cognitive State
  • Attributes
The Gap

Multiple choice + Face with no context = Realistic?
Study 1
- Undergrad students
- Label isolated and in-context faces
- Open response

Study 2
- People with TBI
- Same stimuli as Study 1
- Responses coded with scheme from Study 1
Study One

• Participants
  • 148 undergrads

• Emotion in Context (EIC) Task
  • 50 photographs from LIFE Magazine
  • Face in Context (FC) or Face Only (FO)
EIC Image - Face in Context
Study One

• Procedures
  • Completed study online
  • Asked “what emotion is this person showing?”
  • Participants typed responses

• Scoring
  • Responses assigned to categories: basic, social, cognitive state, attribute, none
<table>
<thead>
<tr>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic emotions</td>
<td>28.16</td>
</tr>
<tr>
<td>Basic emotion synonyms</td>
<td>9.20</td>
</tr>
<tr>
<td>Social emotions</td>
<td>32.70</td>
</tr>
<tr>
<td>Cognitive states</td>
<td>5.97</td>
</tr>
<tr>
<td>Appraisals</td>
<td>21.81</td>
</tr>
<tr>
<td>Other</td>
<td>2.15</td>
</tr>
</tbody>
</table>

N = 7400 responses
### Percent Responses - Context vs No Context

<table>
<thead>
<tr>
<th>Category</th>
<th>Face Only</th>
<th>Face in Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic emotions or basic emotion synonyms</td>
<td>42.76</td>
<td>35.04</td>
</tr>
<tr>
<td>Other categories</td>
<td>57.24</td>
<td>64.96</td>
</tr>
</tbody>
</table>

N - 7240 responses
Examples of Emotion Descriptions

Key:
C = cognitive state
A = appraisal

• ”Amusement” [C]
• “Determination” [C]
• “Cautious” [A]
• “Honorable” [A]
• ”Bored” [C]
• “Awkward” [A]
• ”Sexy” [A]

• “Dreamy” [A]
• “Jaded” [A]
• “Cozy” [A]
• “Wow, who knows” [N]
Summary of Study 1 Results

- Context didn’t affect much
- *Most emotions described were NOT the six basic multiple choice emotions*
Study 2

- Participants
  - 5 males, moderate-to-severe TBI

- Emotion in Context (EIC) Task
  - Research assistant wrote down responses
## Participant Demographics

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age (Yrs;Mos)</th>
<th>Time Post Injury (Yrs;Mos)</th>
<th>Education (Yrs)</th>
<th>Admission GCS Score</th>
<th>CLVT Long Delay</th>
<th>Trails B</th>
<th>WAIS PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26;3</td>
<td>6;7</td>
<td>12</td>
<td>3T</td>
<td>-3</td>
<td>1.06</td>
<td>97</td>
</tr>
<tr>
<td>2</td>
<td>24;0</td>
<td>1;6</td>
<td>16</td>
<td>a</td>
<td>-1.5</td>
<td>0.58</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>26;11</td>
<td>8;7</td>
<td>20</td>
<td>6T</td>
<td>-1.5</td>
<td>-3.86</td>
<td>76</td>
</tr>
<tr>
<td>4</td>
<td>27;0</td>
<td>10;9</td>
<td>16</td>
<td>6</td>
<td>-1.5</td>
<td>-4.85</td>
<td>76</td>
</tr>
<tr>
<td>5</td>
<td>23;0</td>
<td>4;0</td>
<td>18</td>
<td>3</td>
<td>-1.5</td>
<td>-4.98</td>
<td>94</td>
</tr>
</tbody>
</table>
Study 2

• Procedure
• Scoring
  • Words repeated from Study 1 assigned accordingly
## Percent Responses by Category

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>Basic emotions</td>
<td>22.04</td>
</tr>
<tr>
<td>Basic emotion synonyms</td>
<td>6.94</td>
</tr>
<tr>
<td>Social emotions</td>
<td>13.88</td>
</tr>
<tr>
<td>Cognitive states</td>
<td>31.43</td>
</tr>
<tr>
<td>Appraisals</td>
<td>13.88</td>
</tr>
<tr>
<td>Other</td>
<td>11.84</td>
</tr>
</tbody>
</table>

N = 245
What It Means: Context Effects

- Both groups attributed personal or social context
- Emotion cues are complex and dynamic
What It Means: Multiple Choice

• More than 6 emotions emerged when forced choice removed
• Open-ended tasks can reveal other errors in communication of people with TBI
Why This is Important to Healthcare Providers

• Emotion recognition impaired in multiple disorders\textsuperscript{15, 32, 34, 48, 79}

• Need good standardized tests

• Are the tests we use now good enough?
Limitations/Future Directions

• 1. No existing “scoring system” for emotions
• 2. Participants had *unlimited response time*
Conclusions

• Important to study expressions in REAL LIFE CONTEXT
• Forced choice = not realistic
• Real images, open ended = likely better understanding of emotion recognition in TBI
Special Thanks to the NIH

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• The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
Questions?


References


References


• 36. Limbrecht-Ecklundt, K., Scheck, A., Jerg-Bretzke,
References


