A Pilot Study of Emotion Recognition Impairment in Older People with Early Dementia

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Research Background
Method
Results
Discussion & Conclusion
Q & A
People with Alzheimer disease (AD) have impaired social functioning.

- Emotion recognition
  - part of social functioning
  - has been shown to be impaired in early AD
  - Impairment associated with abnormalities in the related brain circuitry on functional MRI
- Impaired facial emotion recognition associated with neuropsychiatric symptoms in AD
Awareness of this impairment by family caregivers may

- Promote empathy
- Improve communication by training family caregivers in emotional expression

Emotion recognition in AD may be trainable as in autistic children and people with schizophrenia
Studies in emotion recognition in AD have been limited to recognition of facial expression in still photographs or cartoon drawings. Clues from the context, body language, prosody and verbal contents are assumed to contribute to emotion recognition and need be studied in a more naturalistic manner. Research hypothesis: The elderly with dementia has impairment on emotion recognition.
Pilot study

✧ Sample size: N=17 elderly with dementia
✧ Recruited from a dementia service centre
✧ Study period: October 2012
✧ Methodology: Face-to-face interview
  ✧ Length of interview: 8 minutes
Method

♢ Inclusion criteria
   ♦ 60 years old or above
   ♦ MMSE score being 10 or above
   ♦ Functional Assessment Staging being 3 or above
   ♦ Absence of significant aphasia, significant hearing or visual loss
Method

✧ Exclusion criteria

✧ Those who failed to pass the screening test
  ✧ Four pairs of photos from Paul Ekman’s JACFEE and JACNeuf toolkit
  ✧ Each pair was with two facial expressions of the same actor
    ✧ One photo being a neutral facial expression
    ✧ One photo expressing one of the four major emotions: happiness, sadness, anger, fright
  ✧ Passing criteria: Able to correctly distinguish (point out) the photo with facial expression from the neutral facial expression
Method

Illustration based on Ekman toolkit
Method

Procedure

- Participants were shown four videos
- Each video demonstrated one scenario depicting one emotion (happiness, sadness, anger, fright)
- Four showcards of facial expressions were presented to the participants, each with the emotion named (emotion photo)
- Participants were asked to point to the card which showed the same emotion as in the video
- Each video was broadcast twice, once with sound, and once without sound (randomized order)
Method
Method

Illustration based on Ekman toolkit
Method

- Participants needed to point out the correct emotion photo, within 30 seconds upon being asked to point out the emotion, so as to be qualified as “correctly identify”
- Total full score was 8 (4 emotion recognition in sounded condition, 4 emotion recognition in soundless condition)
## Demographic characteristics

<table>
<thead>
<tr>
<th>Demographic feature</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Range: 64 years to 95 years</td>
</tr>
<tr>
<td></td>
<td>Mean age: 81 years</td>
</tr>
<tr>
<td>Gender</td>
<td>Male: n=5 (29%)</td>
</tr>
<tr>
<td></td>
<td>Female: n=12 (71%)</td>
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<tr>
<td>MMSE score</td>
<td>Range: 15 to 29</td>
</tr>
<tr>
<td></td>
<td>Mean MMSE score: 22/30</td>
</tr>
<tr>
<td>Functional Assessment</td>
<td>Range: 3 to 5</td>
</tr>
<tr>
<td>Staging (FAST)</td>
<td>Median: 4</td>
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<tr>
<td>Education</td>
<td>College or above: n=1 (6%)</td>
</tr>
<tr>
<td></td>
<td>Secondary: n=3 (18%)</td>
</tr>
<tr>
<td></td>
<td>Primary: n=10 (59%)</td>
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<tr>
<td></td>
<td>Illiterate: n=3 (18%)</td>
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</tbody>
</table>
Results

- Emotion recognition
  - Average composite score: 4.88 out of 8, S.D. 1.32

- Practice effect
  - Wilcoxon Signed Ranks Test showed borderline significant difference in scores in favour of the second video conditions ($Z = -0.58$, $p = 0.057$)
Results

- Emotion recognition without sound
  - All subjects were able to correctly identify at least one emotion among the investigated four emotions
  - Majority of subjects (47%) correctly identified three emotions in the environment with no sound

- Emotion recognition with sound
  - All subjects were able to correctly identify at least one emotion among the investigated four emotions
  - Majority of subjects (41%) correctly identified three emotions in the environment with sound
Results

✧ Environment with sound vs. without sound
  ✧ Wilcoxon Signed Ranks Test showed no statistically significant difference \((Z = -.58, p = .57)\),
  ✧ Sound does not cast significance on emotion recognition
Results

✧ Happiness

✧ All but one subjects (94%) correctly identified “happiness” regardless sound effect

✧ Among the wrong mentions, happiness was identified as “sadness” (n=1 response) and “anger” (n=1 response)

<table>
<thead>
<tr>
<th>Number of correct mention of emotion [Happiness (with/without sound)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<tr>
<td>-------</td>
</tr>
<tr>
<td>Valid</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Results

✧ Fright
 ✧ 77% of subjects were able to correctly identify the emotion at least once
 ✧ Among the wrong, fright was identified as “anger” (n=5 responses), “sadness” (n=4 responses), and “happiness” (n=4 responses)

<table>
<thead>
<tr>
<th>Number of correct mention of emotion [Fright (with/without sound)]</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<tbody>
<tr>
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<td>0</td>
<td>4</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
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<tr>
<td>1</td>
<td>5</td>
<td>29.4</td>
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<td>52.9</td>
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<td>2</td>
<td>8</td>
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<tr>
<td>Total</td>
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<td>100.0</td>
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</tr>
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</table>
Results

✧ Sadness

✧ 65% of subjects were able to correctly identify the emotion at least once
✧ Among the wrong, sadness was identified as “anger” (n=10 responses) and “fright” (n=8 responses) (n=2; no response)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<td>6</td>
<td>35.3</td>
<td>35.3</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>47.1</td>
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<td>Total</td>
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</table>
Results

- **Anger**
  - 59% of subjects were able to correctly identify the emotion at least once
  - Among the wrong, anger was identified as “sadness” (n=10 responses), “fright” (n=7 responses), and “happiness” (n=1 response)

<table>
<thead>
<tr>
<th>Number of correct mention of emotion [Anger (with/without sound)]</th>
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<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<tr>
<td>Total</td>
<td>17</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Results

- Positive vs. Negative emotions
  - Wilcoxon Signed Ranks Test showed a significant difference between:
    - Emotion recognition of happiness vs. sadness ($Z = -3.11, p < .01$)
    - Happiness vs. anger ($Z = -2.81, p < .01$)
    - Happiness vs. fright ($Z = -2.37, p < .05$)
    - Happiness vs. sadness, anger, fright together as a group named “negative emotion” ($Z = -3.20, p = .001$)
People with dementia have impairment in emotion recognition
Happiness was the most frequently identified, while anger was the least likely to be identified
Positive emotion was more likely to be recognized than negative emotions (sadness, anger, fright)
Effect of sound in emotion recognition was minimal
Implication

- Family caregivers should be aware of the loved ones’ limited ability to recognize negative emotions.
- They should probably need to be more expressive about negative emotions if they want them to be recognized.
- People with dementia remain appreciative of happy expressions in their caregivers.
Discussion

• Limitation
  – Video stimuli was originally not designed for demented subjects

• Future study
  – Better design videos for older adults
  – Separate tests for recognition of
    • Dynamic facial expression alone
    • Facial expression + body language
    • Above + contextual clue + prosody
    • Verbal expression
  – Add neutral emotion as an option for answers
  – Longer separation time between video with and without sound to minimize practice effect
Thank You