Evidence-based Treatment Approaches for Teaching Emotion Recognition after Brain Injury

Dawn Neumann, PhD, FACRM
University of South Florida
Department of Neurosurgery and Brain Repair

USF Health
UNIVERSITY of SOUTH FLORIDA

Faculty/Presenter Disclosure

- Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the funding agencies:
- National Institute on Disability, Independent Living, and Rehabilitation Research (Grant# 90DPTB0002; H133G080043)
- App: FACES Intervention by Obex Technologies (free)

Learning Objectives

At the conclusion of this activity, participants will be able to describe:

1. evidence of an emotion recognition training program
2. the treatment approaches for training emotion recognition after brain injury and how to access the free treatment App
3. new research efforts to improve emotion recognition and empathy after brain injury

University at Buffalo

Doctoral Program in Rehabilitation Science
2002-2008

University at Buffalo

Jacobs Schoo

Department of Psychiatry

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Psychiatry › About › Faces and Voices › Barry Willer, PhD

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Barry Willer, PhD

Barry Willer is helping people with brain injury reintegrate into society.

Barry Willer is helping reintegrate people with brain injury into society.

Compassion for Brain Injuries

Barry: “What do you want to work on for your dissertation?”

Dawn: “I don’t know! Any ideas?”

Barry: “I do. Emotion regulation after TBI. It’s a problem. I think part of the problem is not being able to read other people’s feelings”

Recognizing emotions after a brain injury

“How do you think she feels?”

- “Indifferent”
- “Confused”
- “I don’t know”
- “Angry”

“She’s actually sad.”

“She’s sad? You mean I can’t read emotions? And all this time, I thought my wife no longer cared about me”


It's a dissertation topic!

Brain Injury, July 2007; 21(8): 807–816

informa
healthcare

REVIEW

Overview of impaired facial affect recognition in persons with traumatic brain injury

DAWN RADICE-NEUMANN[1], BARBRA ZUPAN[2], DUNCAN R. BABBAGE[3], & BARRY WILLER[4]

[1]*Department of Rehabilitation Science, State University of New York at Buffalo, Buffalo, NY, USA,* [2]*Department of Applied Linguistics, Brock University, St. Catharines, Ontario, Canada,* [3]*School of Psychology, Massey University, Wellington, New Zealand, and* [4]*Departments of Psychiatry and Rehabilitation Medicine, School of Medicine, State University of New York at Buffalo, Buffalo, NY, USA*

(Received 18 April 2007; accepted 11 June 2007)

Abstract

Primary objective: To review the literature of affect recognition for persons with traumatic brain injury (TBI). It is suggested that impairment of affect recognition could be a significant problem for the TBI population and treatment strategies are recommended based on research for persons with autism.

Main outcomes and results: Research demonstrates that persons with TBI often have difficulty determining emotion from facial expressions. Studies show that poor interpersonal skills, which are associated with impaired affect recognition, are linked to a variety of negative outcomes. Theories suggest that facial affect recognition is achieved by interpreting important facial features and processing one's own emotions. These skills are often affected by TBI, depending on the areas damaged. Affect recognition impairments have also been identified in persons with autism. Successful interventions have already been developed for the autism population. Comparable neuroanatomical and behavioural findings between TBI and autism suggest that treatment approaches for autism may also benefit those with TBI.

Conclusions: Impaired facial affect recognition appears to be a significant problem for persons with TBI. Theories of affect recognition, strategies used in autism and teaching techniques commonly used in TBI need to be considered when developing treatments to improve affect recognition in persons with brain injury.

Neuropsychology
2011, Vol. 25, No. 3, 277–285

0894-4105/11/$12.00 DOI: 10.1037/a0021908

Meta-Analysis of Facial Affect Recognition Difficulties After Traumatic Brain Injury

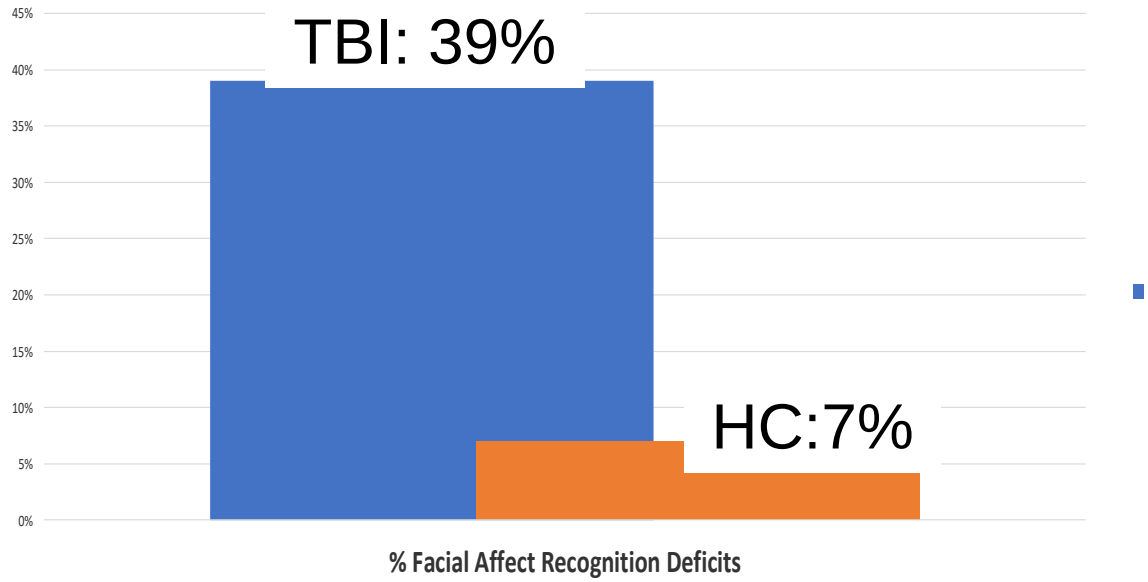
Duncan R. Babbage and Jackki Yim
Massey University

Barbra Zupan
Brock University

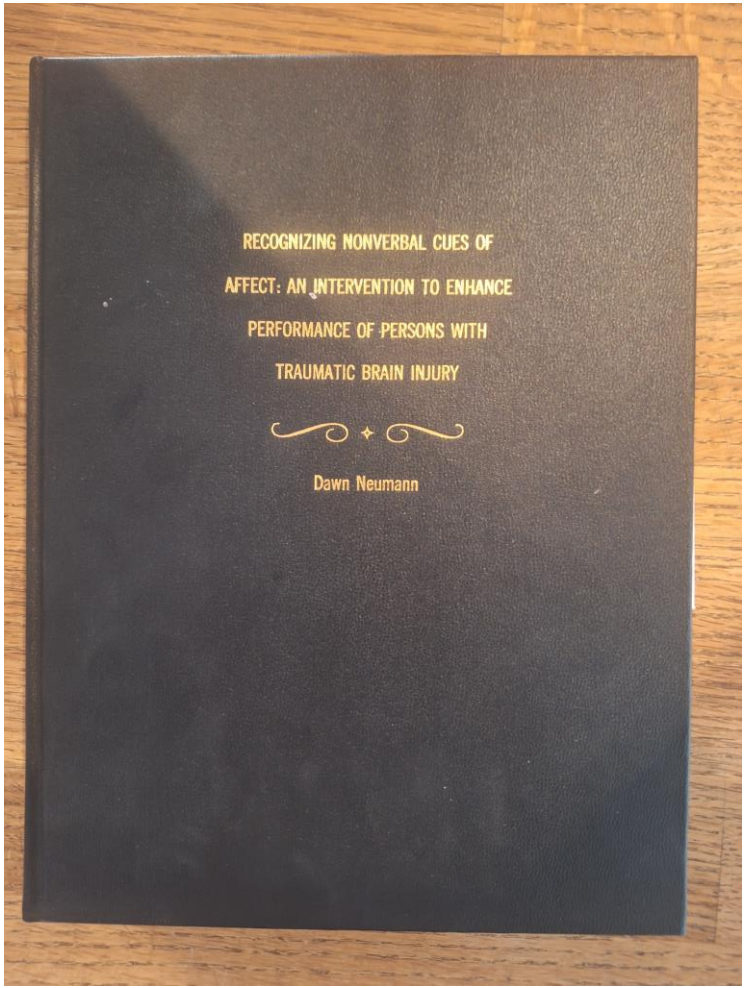
Dawn Neumann
Indiana University

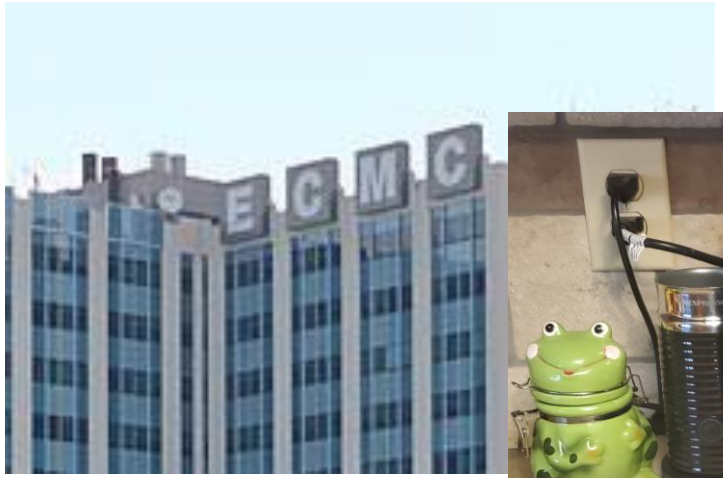
Machiko R. Tomita and Barry Willer
State University of New York at Buffalo

- 13 studies
- 296 adults mod-severe TBI & HC



The Dissertation


RECOGNIZING NONVERBAL CUES OF
AFFECT: AN INTERVENTION TO ENHANCE
PERFORMANCE OF PERSONS WITH
TRAUMATIC BRAIN INJURY
Dawn Neumann



BRAIN INJURY ASSOCIATION OF FORT ERIE

Emotions Alter Relationships after Brain Injury

https://www.brainline.org/article/emotions-alter-relationships-after-brain-injury

The woman in my office was clearly a very successful woman, who for the most part, usually had it together. But now it appeared she could fall apart at any second. She was there to talk to me about her husband who had a traumatic brain injury (TBI). She told me that since the accident, he had made terrific strides learning to walk again, improving his balance, and regaining most of his thinking skills. Despite these monumental improvements, there was still a terrific strain in their relationship. She no longer felt "connected" with her husband. The wife was frustrated and perplexed. Prior to the injury, which was just months before they were married, he was an extremely compassionate person always in tune to her emotions. Now he was oblivious to her needs. He never comforted her in times of sadness or worry. He was unresponsive to her frustrations. He never participated in her joys, not even when their first child was born. Was this because he didn't care? Most people would assume so, but as you read on, you will see that this is because he just couldn't tell how she was feeling.

J Head Trauma Rehabil
Vol. 24, No. 5, pp. 313–323

Training Emotional Processing in Persons With Brain Injury

Dawn Radice-Neumann, PhD; Barbra Zupan, PhD; Machiko Tomita, PhD; Barry Willer, PhD

Aims: To determine the effectiveness of 2 interventions for different aspects of emotion-processing deficits in adults with acquired brain injury (ABI). **Participants:** Nineteen participants with ABI (minimum 1 year postinjury) from Western New York and Southern Ontario, Canada. **Interventions:** (1) Emotion processing from faces ("facial affect recognition" or FAR) and (2) emotion processing from written context by using "stories of emotional inference" (SEI). Ten randomly assigned participants received the FAR intervention, and 9 received the SEI protocol. Both interventions were administered 1 hour per day, 3 times per week, and completed in 6 to 9 sessions, and both incorporated participants' personal emotional experiences into training. **Outcome Measures:** (1) Facial affect, (2) vocal affect, (3) affect from videos, (4) emotional inference from context, and (5) emotional behavior. There were 2 pretests, a posttest, and a 2-week follow-up. **Results:** FAR participants showed significantly improved emotion recognition from faces, ability to infer emotions from context, and socioemotional behavior, while the SEI group members exhibited significantly improved ability to infer how they would feel in a given context. **Conclusion:** Training can improve emotion perception in persons with ABI. Although further research is needed, the interventions are clinically practical and show promise for the population with ABI. **Keywords:** *affect recognition, brain injury, emotion perception, emotion processing, intervention, rehabilitation*

What about Bob?

J Head Trauma Rehabil
Vol. 30, No. 3, pp. E12–E23

A Randomized Controlled Trial of Emotion Recognition Training After Traumatic Brain Injury

Dawn Neumann, PhD; Duncan R. Babbage, PhD; Barbra Zupan, PhD; Barry Willer, PhD

Objective: To examine the effectiveness of 2 affect recognition interventions (Faces and Stories) in people with a traumatic brain injury. **Setting:** Postacute rehabilitation facilities. **Participants:** A total of 203 participants with moderate to severe traumatic brain injury were screened; 71 were eligible and randomized to the Faces ($n = 24$), Stories ($n = 23$), and Control interventions ($n = 24$). Participants were an average of 39.8 years of age and 10.3 years postinjury; 74% of participants were male. **Design:** Randomized controlled trial with immediate, 3-month, and 6-month follow-up posttests. Interventions were 9 hours of computer-based training with a therapist. **Measures:** Diagnostic Assessment of Nonverbal Accuracy 2-Adult Faces; Emotional Inference From Stories Test; Empathy (Interpersonal Reactivity Index); and Irritability and Aggression (Neuropsychiatric Inventory). **Results:** The Faces Intervention did significantly better than the Control Intervention on the Diagnostic Assessment of Nonverbal Accuracy 2-Adult Faces ($P = .031$) posttreatment; no time effect or group interaction was observed. No other significant differences were noted for the Faces Intervention. No significant differences were observed between the Stories and the Control Interventions; however, a significant time effect was found for the Emotional Inference From Stories Test. **Conclusion:** The Faces Intervention effectively improved facial affect recognition in participants with chronic post–traumatic brain injury, and changes were maintained for 6 months. Future work should focus on generalizing this skill to functional behaviors. **Key words:** *affect*, *emotion recognition*, *randomized controlled trial*, *traumatic brain injury*, *treatment*

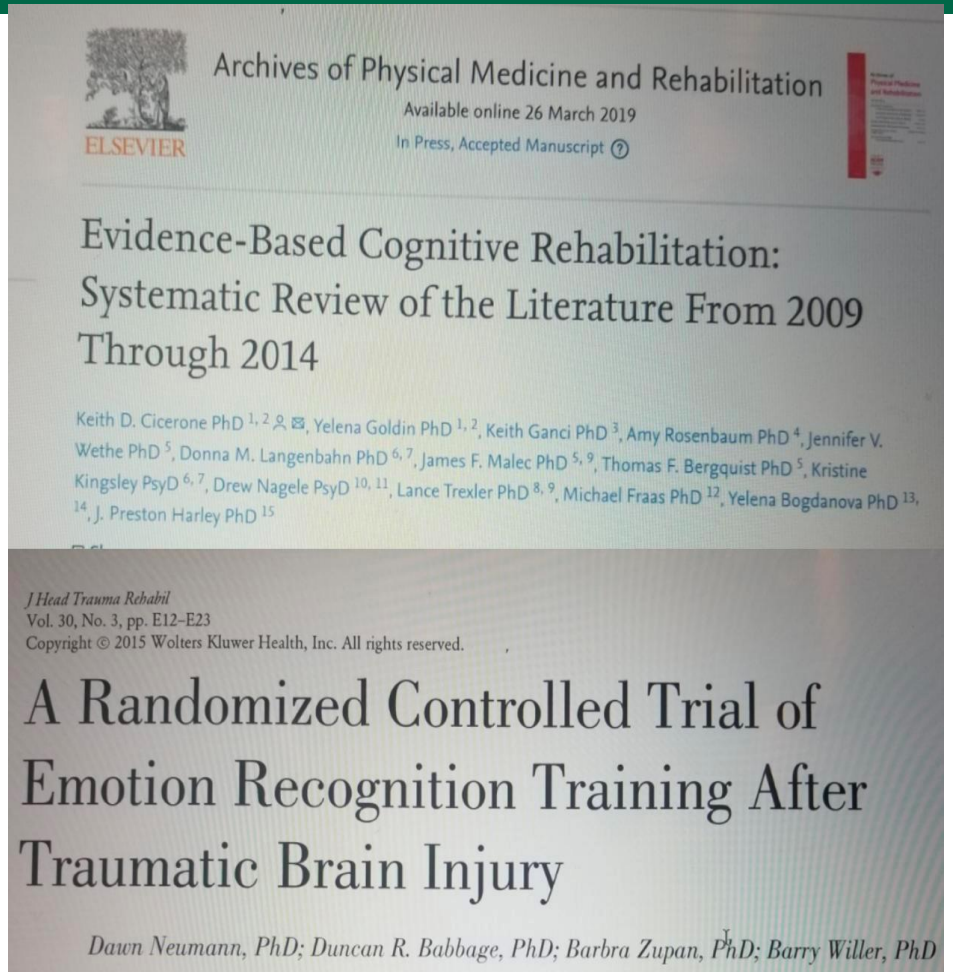
Funded by: National Institute on Disability, Independent Living, and Rehabilitation Research (H133G080043)

What did we find?

(Interpersonal Reactivity Index); and Irritability and Aggression (Neuropsychiatric Inventory). **Results:** The Faces Intervention did significantly better than the Control Intervention on the Diagnostic Assessment of Nonverbal Accuracy 2-Adult Faces ($P = .031$) posttreatment; no time effect or group interaction was observed. No other significant differences were noted for the Faces Intervention. No significant differences were observed between the Stories and the Control Interventions; however, a significant time effect was found for the Emotional Inference From Stories Test. **Conclusion:** The Faces Intervention effectively improved facial affect recognition in participants with chronic post–traumatic brain injury, and changes were maintained for 6 months. Future work should focus on generalizing this skill to functional behaviors. **Key words:** *affect*, *emotion recognition*, *randomized controlled trial*, *traumatic brain injury*, *treatment*

BI-ISIG Cognitive Rehab TF with ACRM conducted SR of EB practices:

"1 Class I & 1 Class III study suggest that specific intervention to improve the recognition of emotions from facial expressions may be effectively incorporated as a component of the Practice Standard for treating functional communication deficits after TBI"



Archives of Physical Medicine and Rehabilitation
Available online 26 March 2019
In Press, Accepted Manuscript

Evidence-Based Cognitive Rehabilitation: Systematic Review of the Literature From 2009 Through 2014

Keith D. Cicerone PhD [1, 2], Yelena Goldin PhD [1, 2], Keith Ganci PhD [3], Amy Rosenbaum PhD [4], Jennifer V. Wethe PhD [5], Donna M. Langenbahn PhD [6, 7], James F. Malec PhD [5, 9], Thomas F. Bergquist PhD [5], Kristine Kingsley PsyD [6, 7], Drew Nagele PsyD [10, 11], Lance Trexler PhD [8, 9], Michael Fraas PhD [12], Yelena Bogdanova PhD [13, 14], J. Preston Harley PhD [15]

J Head Trauma Rehabil
Vol. 30, No. 3, pp. E12–E23

A Randomized Controlled Trial of Emotion Recognition Training After Traumatic Brain Injury

Dawn Neumann, PhD; Duncan R. Babbage, PhD; Barbra Zupan, PhD; Barry Willer, PhD

FACES Intervention for Treating Facial Affect Recognition Deficits after BI

USF Health
UNIVERSITY of SOUTH FLORIDA

Facial Affect Recognition Intervention Targets

Visual-perceptual

Features & Holistic

Replication & Experience

Conceptualization

Associative Knowledge

Therapeutic Techniques

- Training → Electronic App to deliver exerices
- Repetition
- Easy to Difficult (obvious → subtle)
- Vanishing cues
- Personalize
- Targeted multiple facial affect recognition mechanisms

Stimuli

- 40 static faces
- Happy, sad, angry, fearful.
- Ethnicity, sex, intensity.

Penn Emotion Recognition Task (PERT)
Gur, Ruben C., et al. "A method for obtaining 3-dimensional facial expressions and its standardization for use in neurocognitive studies." *Journal of neuroscience methods* 115.2 (2002): 137-143.

FACES intervention 4+

Emotional recognition therapy

Obex Technologies Ltd

Designed for iPad

Free

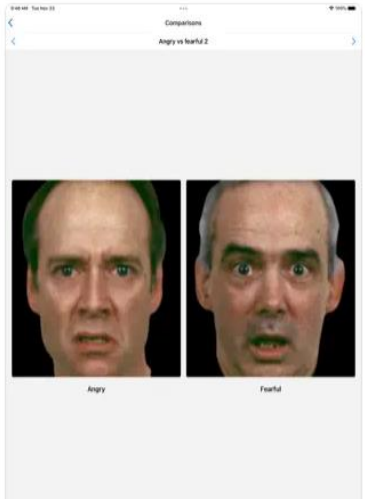
View in Mac App Store ↗

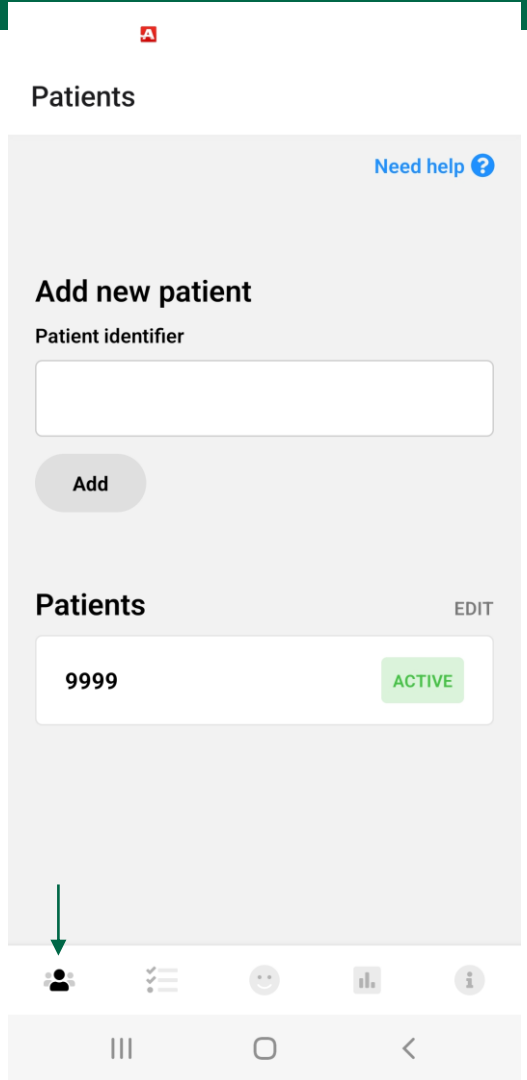
Obex Technologies

Apple

Google Play

Screenshots iPad iPhone




Patients
Need help
Add new patient
Patient identifier
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Patients
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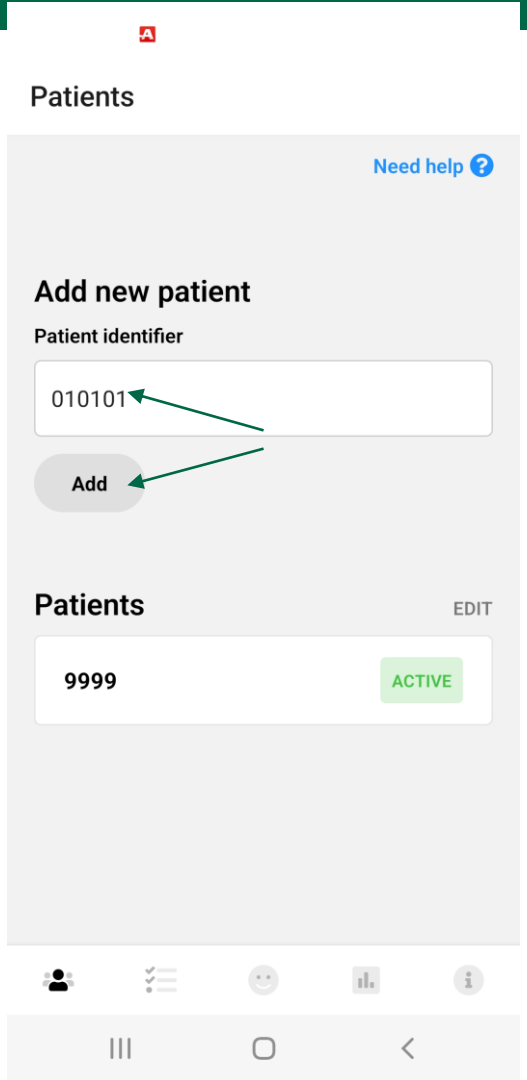
ACTIVE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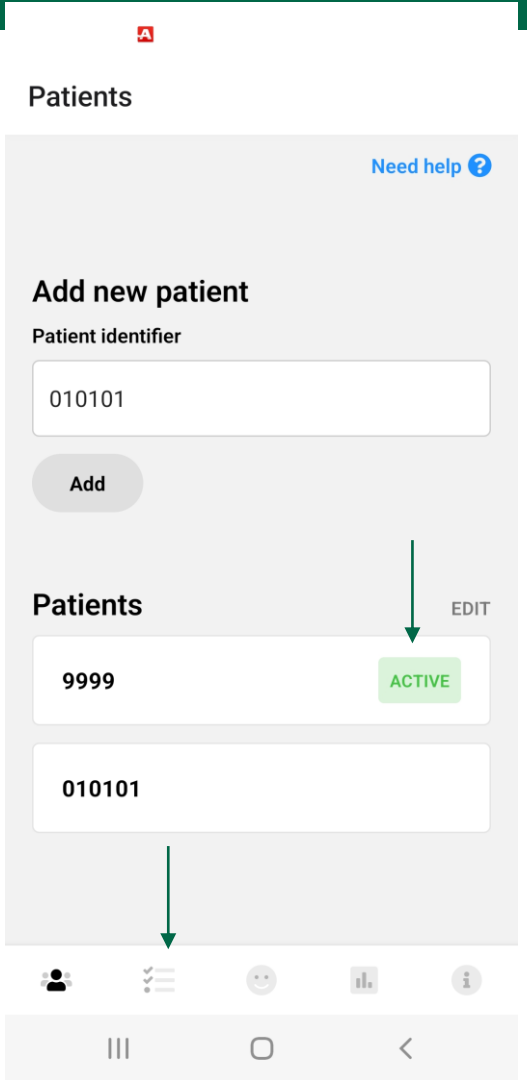
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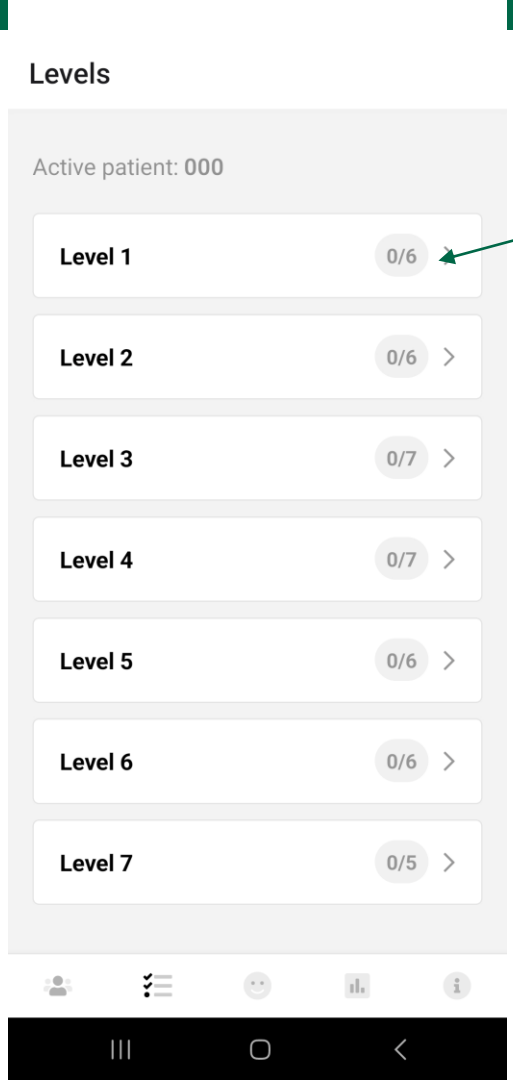
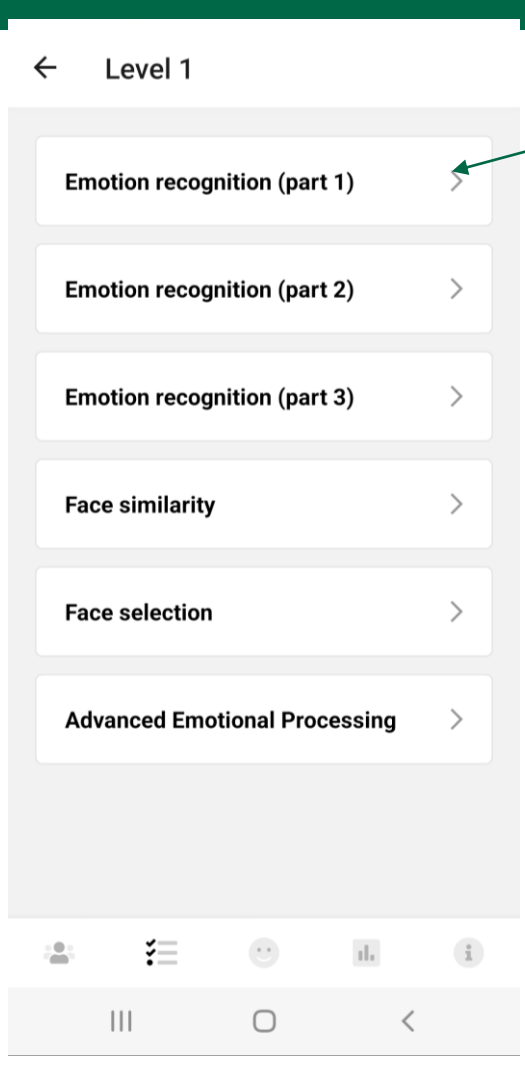
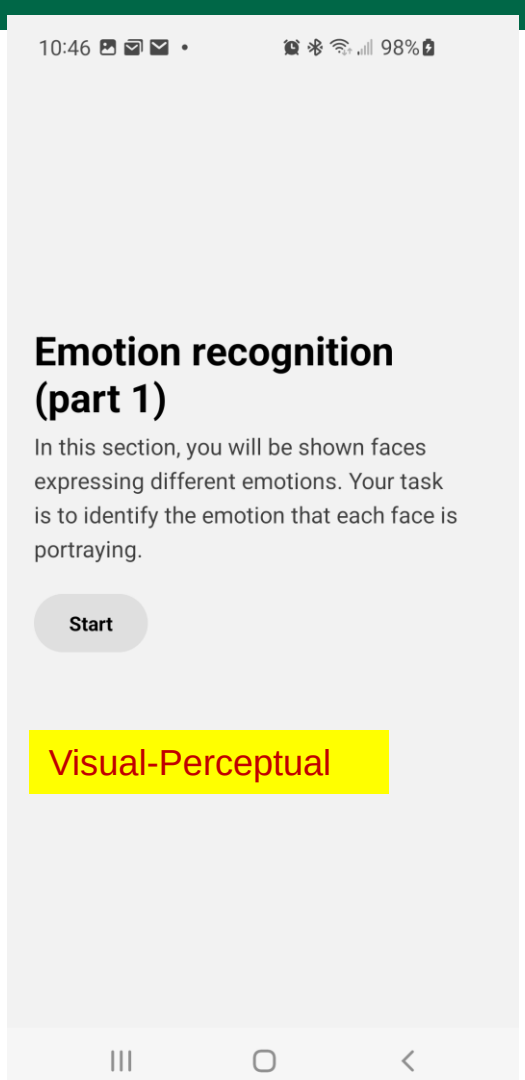

Levels
Active patient: 000
Level 1 0/6
Level 2 0/6
Level 3 0/7
Level 4 0/7
Level 5 0/6
Level 6 0/6
Level 7 0/5


Level 1
Emotion recognition (part 1)
Emotion recognition (part 2)
Emotion recognition (part 3)
Face similarity
Face selection
Advanced Emotional Processing


10:46
98%
Emotion recognition (part 1)
In this section, you will be shown faces expressing different emotions. Your task is to identify the emotion that each face is portraying.
Start
Visual-Perceptual

Question 1 of 9

How does this person feel?

Hint: look at their eyes and mouth

Happy | Sad

Angry | Fearful

• Eyebrows are raised and eyes are wide open.

• Jaw is dropped, mouth is slack.

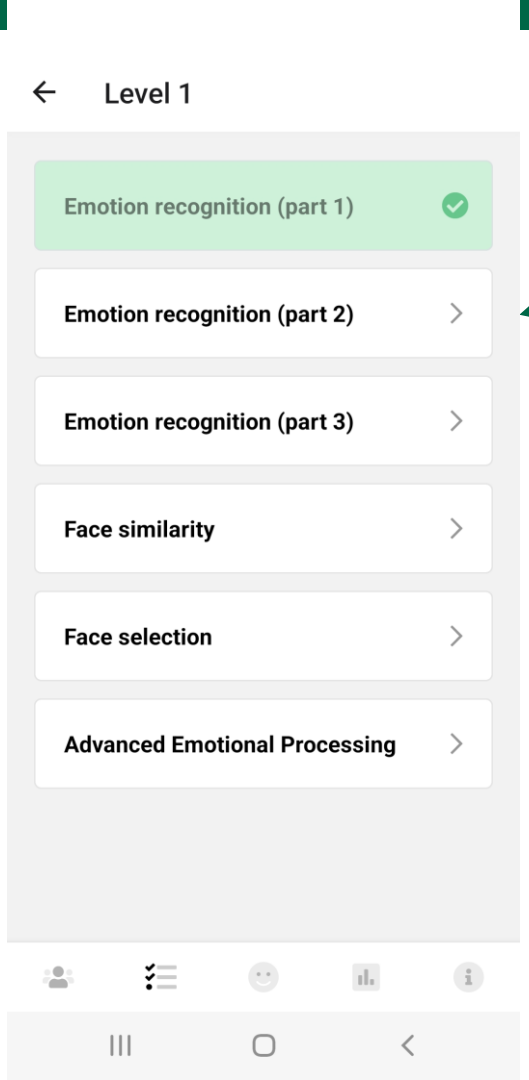
• Overall: no tension. Face appears open.

• This person is **fearful**.

Proceed

Section complete

Return to main menu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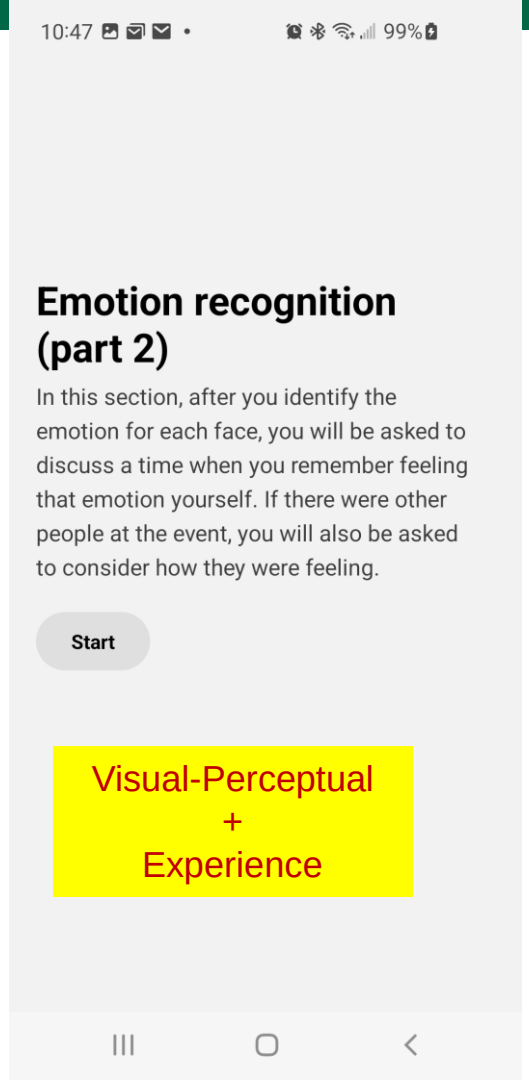
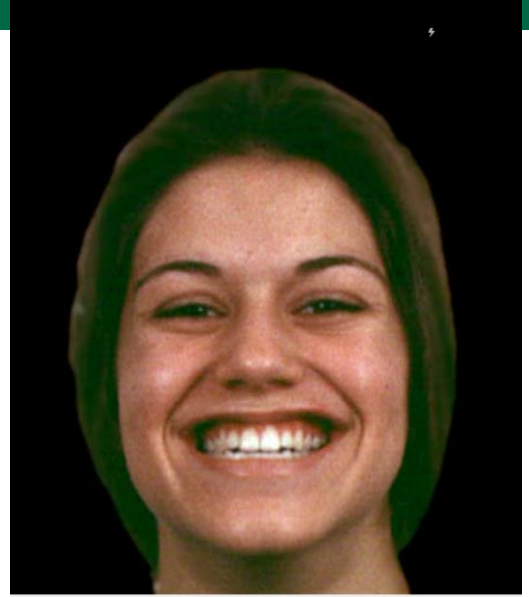

10:47
99%
Emotion recognition (part 2)
In this section, after you identify the emotion for each face, you will be asked to discuss a time when you remember feeling that emotion yourself. If there were other people at the event, you will also be asked to consider how they were feeling.
Start
Visual-Perceptual
+
Experience



Question 3 of 9

How does this person feel?

Hint: look at their eyes and mouth

Happy | Sad

Angry | Fearful

10:47 100%

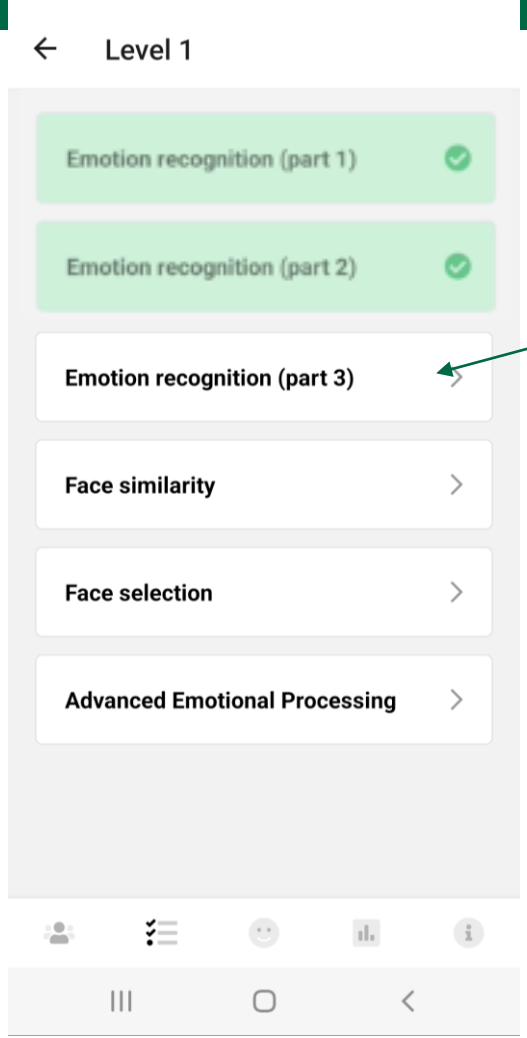
Happy

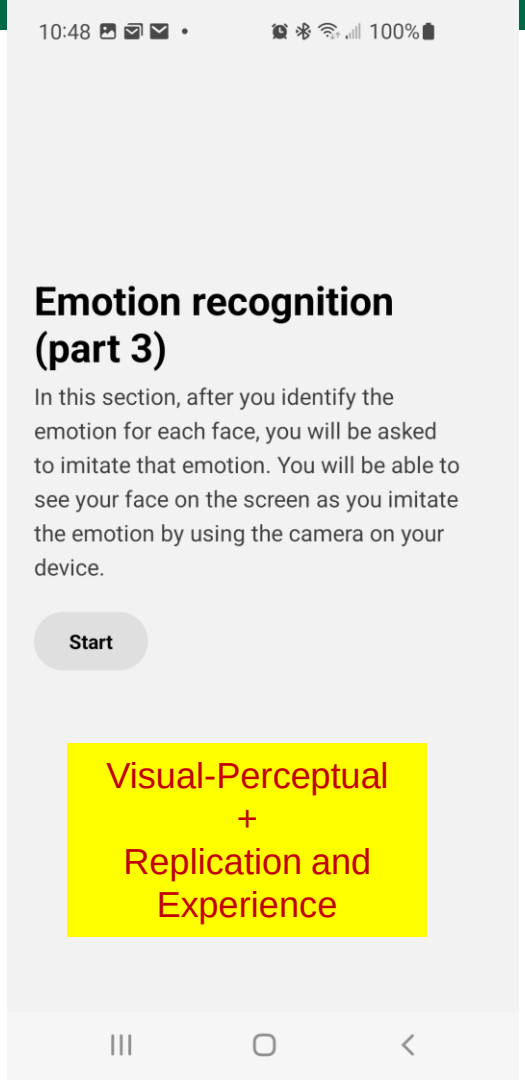
Now, think about something that happened in your life that made you feel this same emotion. Were there other people at this event and if so how do you think they felt?

Proceed

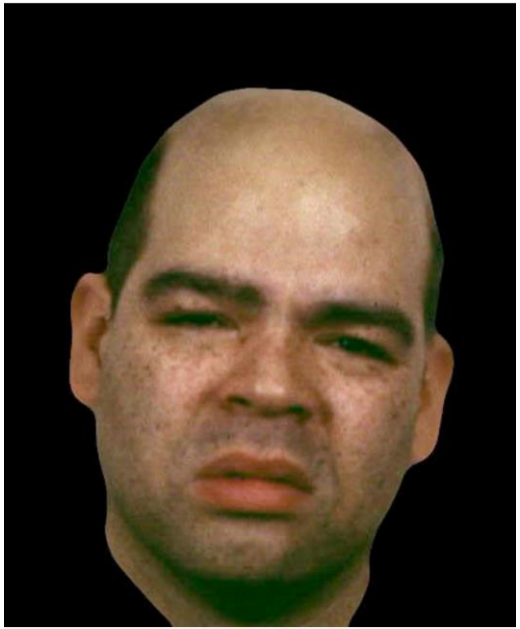
Section complete

Return to main menu





Visual-Perceptual
+
Replication and Experience



Question 1 of 9

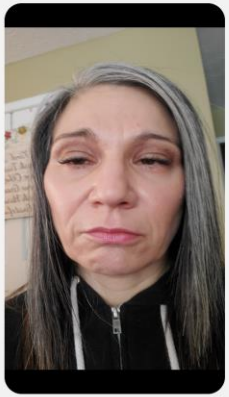
How does this person feel?

Happy | Sad

Angry | Fearful

Sad

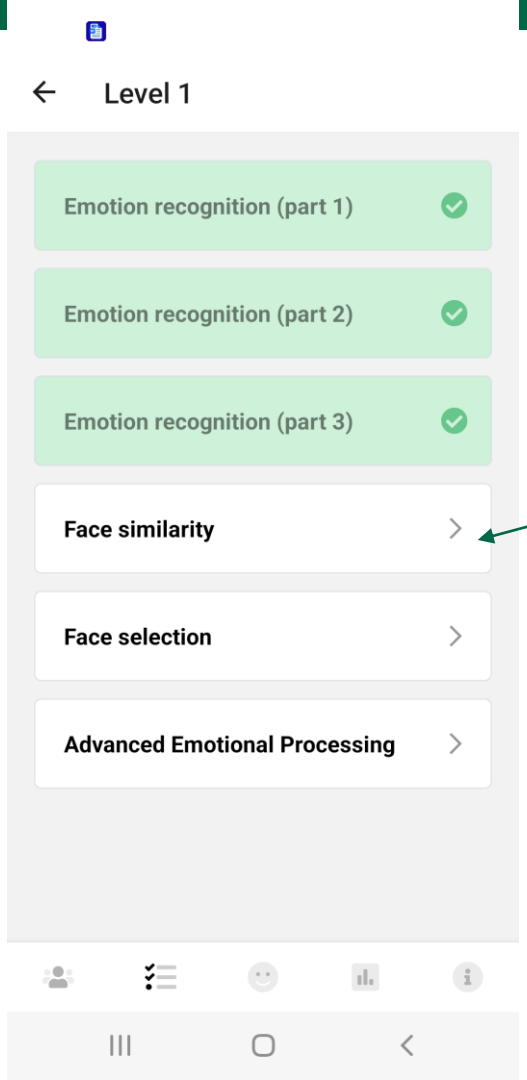
Now imitate the emotion being expressed. You can use the camera to see your expression. As you do this, think about something that made you feel the emotion you are trying to mimic.



Proceed

Section complete

Return to main menu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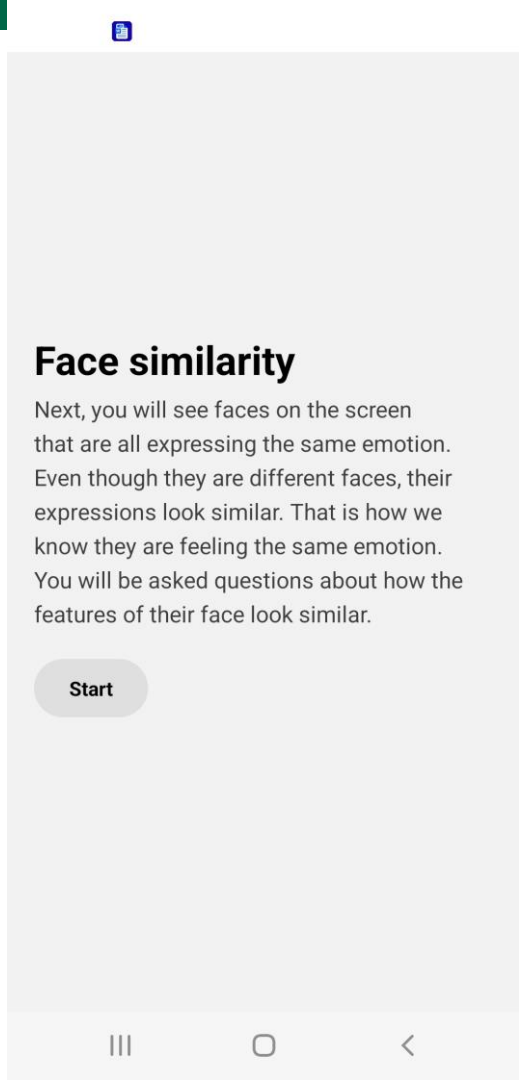
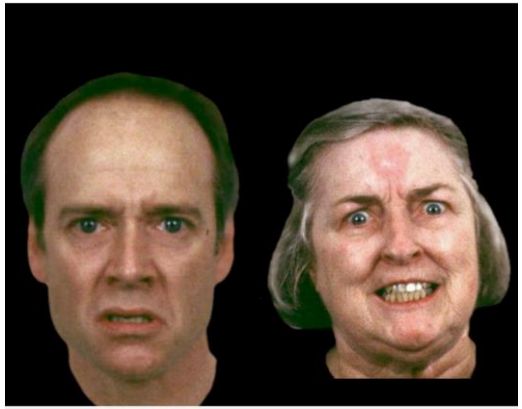
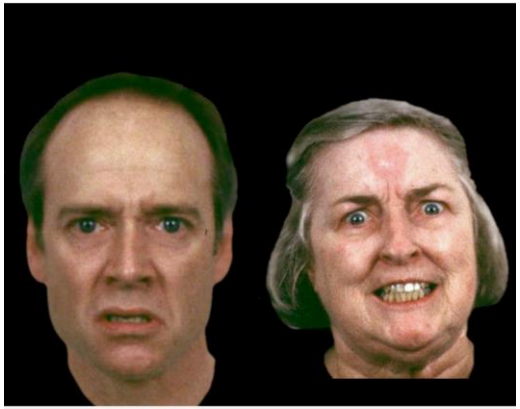

Face similarity
Next, you will see faces on the screen that are all expressing the same emotion. Even though they are different faces, their expressions look similar. That is how we know they are feeling the same emotion. You will be asked questions about how the features of their face look similar.
Start



Question 2 of 8

These people are angry. What feature of the eyebrows do these faces have in common?

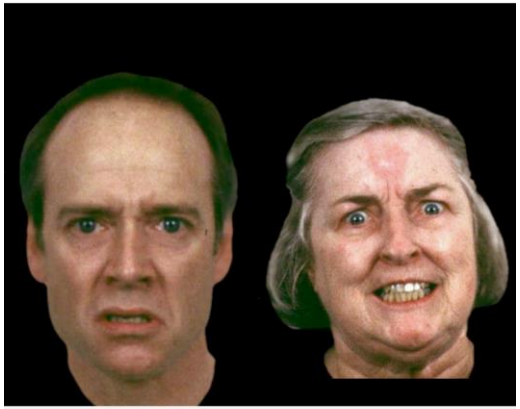
- Relaxed
- Wide apart
- Scrunched together



Correct answer

Their eyebrows are scrunched together.

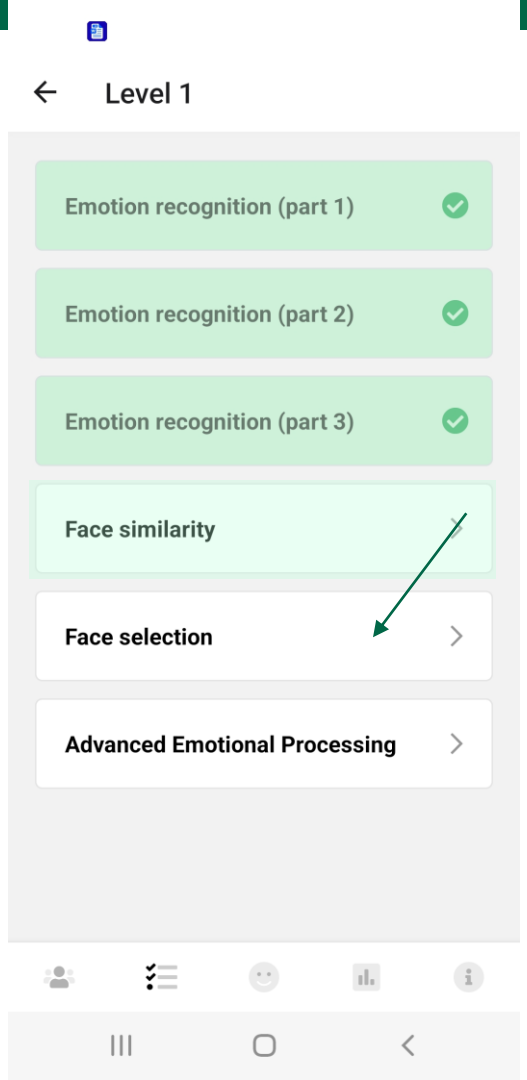
- Proceed



Question 3 of 8

These people are angry. What feature of the mouth do these faces have in common?

- Tense, exposing teeth or in a flat line
- Relaxed, exposing teeth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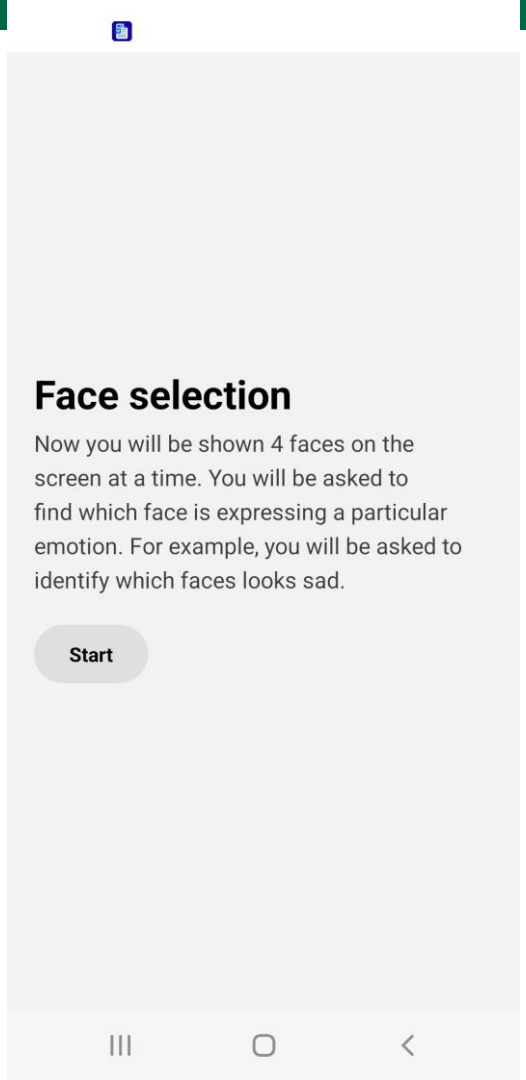
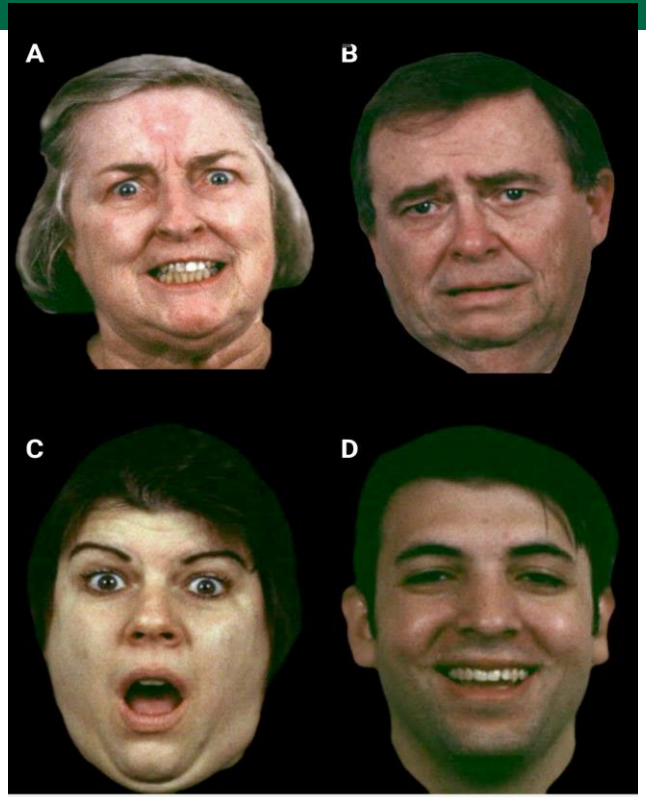
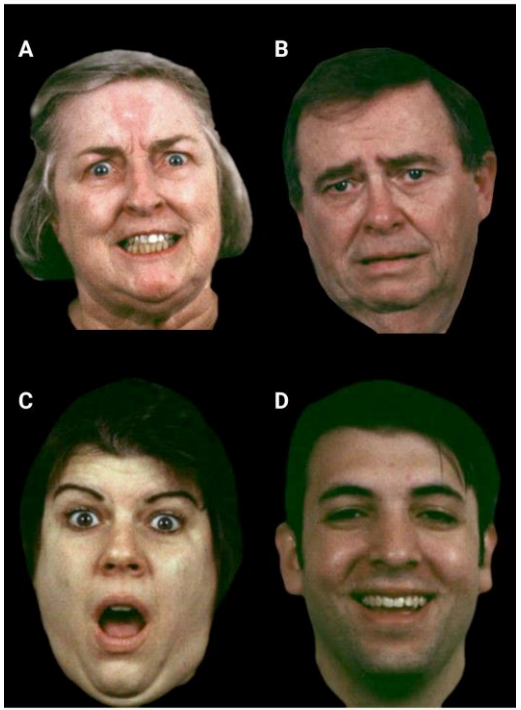

Face selection
Now you will be shown 4 faces on the screen at a time. You will be asked to find which face is expressing a particular emotion. For example, you will be asked to identify which faces looks sad.
Start



Question 1 of 4

Which face is happy, and why?

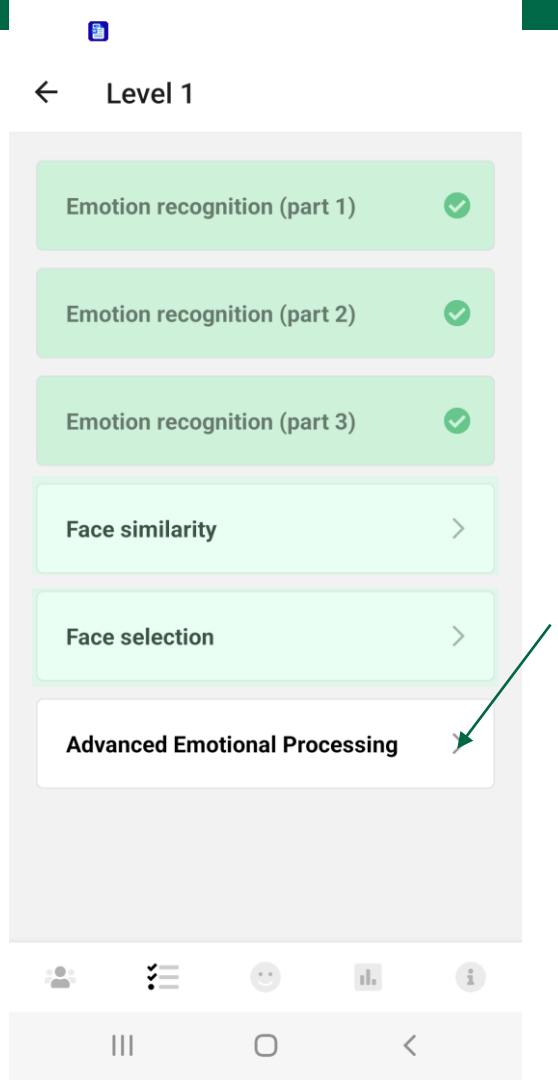
A B C D



Correct answer

D is happy.

Proceed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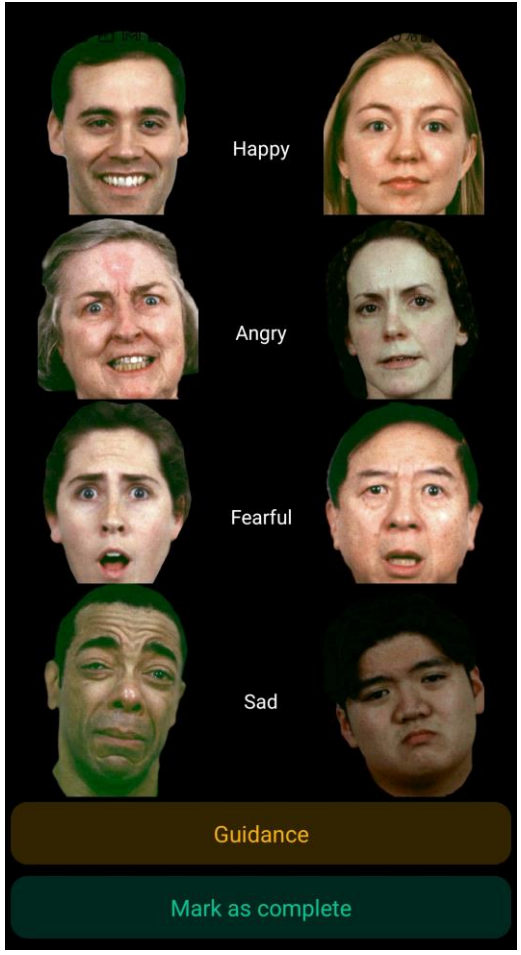
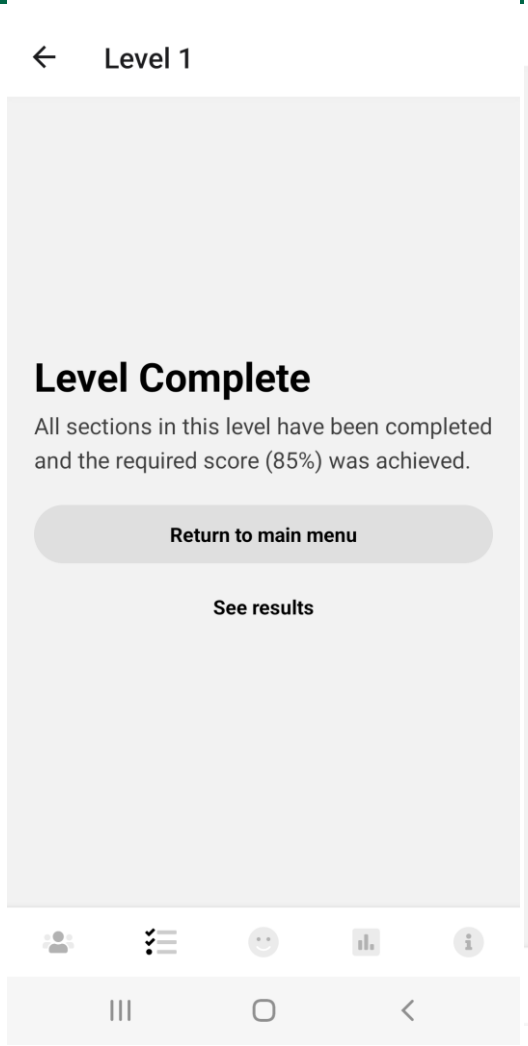
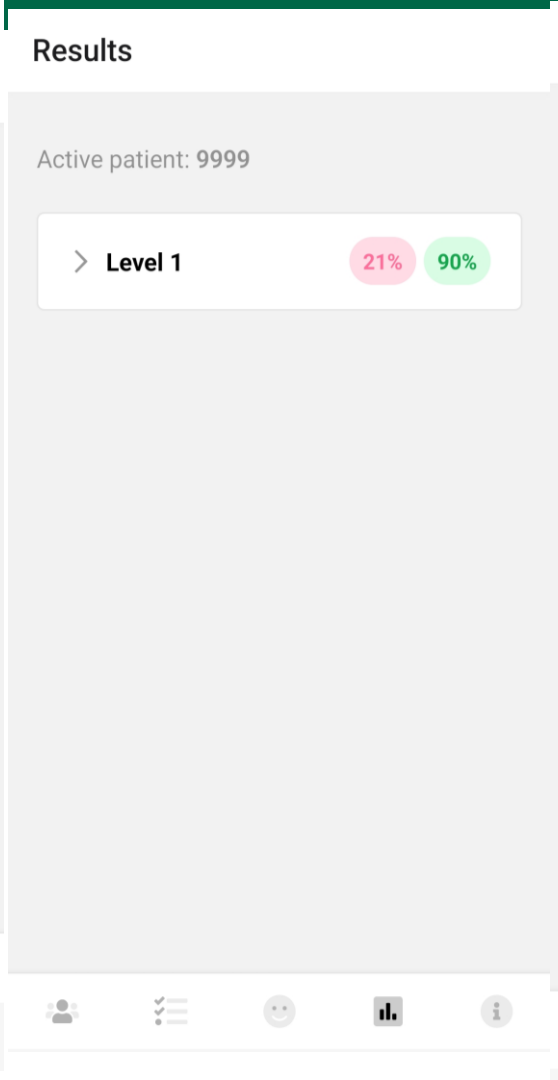


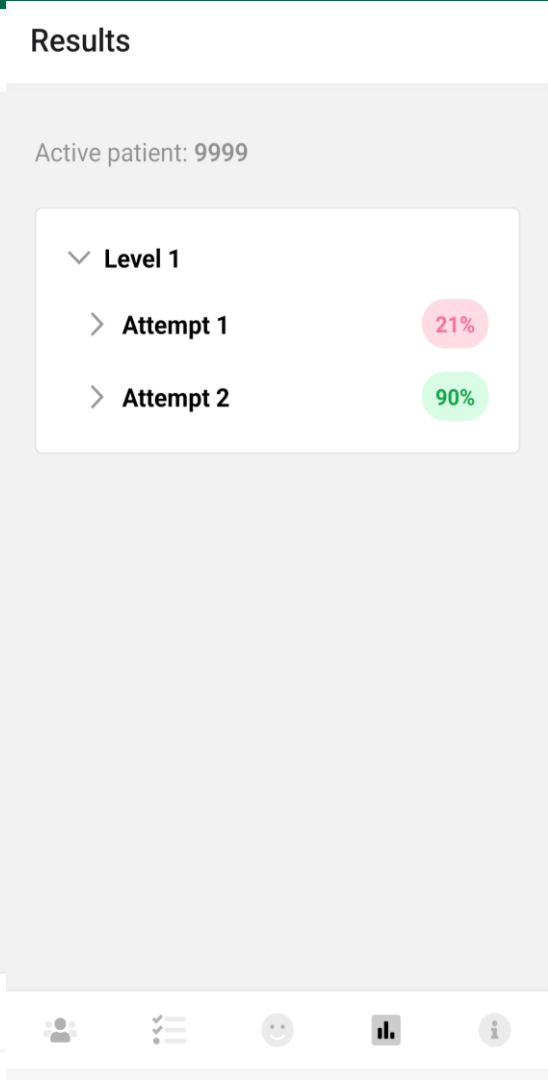
Your Emotional Event "Earlier we discussed …(situation)".
Emotion that it was associated with earlier: _____

.

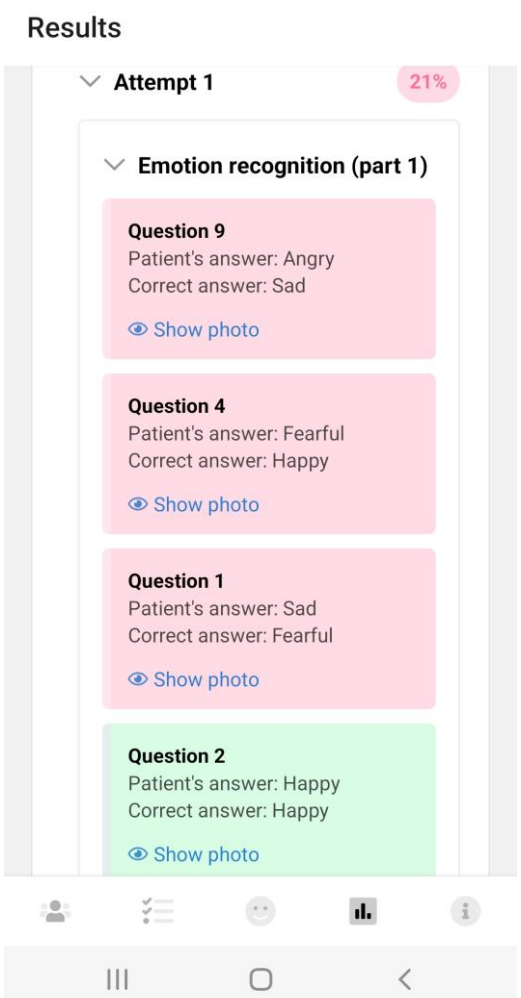
- ☐ What was the strongest emotion you were feeling when this happened? Which face best depicts how you were feeling at the time? Any other emotions you felt?
- ☐ Why do you think you felt these emotions?
- ☐ What did it *feel* like? Where there any signals in your body/ physiological cues or sensations that accompanied the emotional experience?– e.g. increase heart rate, tense muscles, sweating, etc. Where did you feel these signals in your body? (See below)
- ☐ Was anybody with you at the time? Who?
- ☐ Do you think they knew how you felt? Why? What cues do you think they had as to how you were feeling? Facial expression, tone of voice, body language, behavior?
- ☐ How do you think they were feeling at the time? Why? What cues did you have that makes you think that? What was their facial expression?

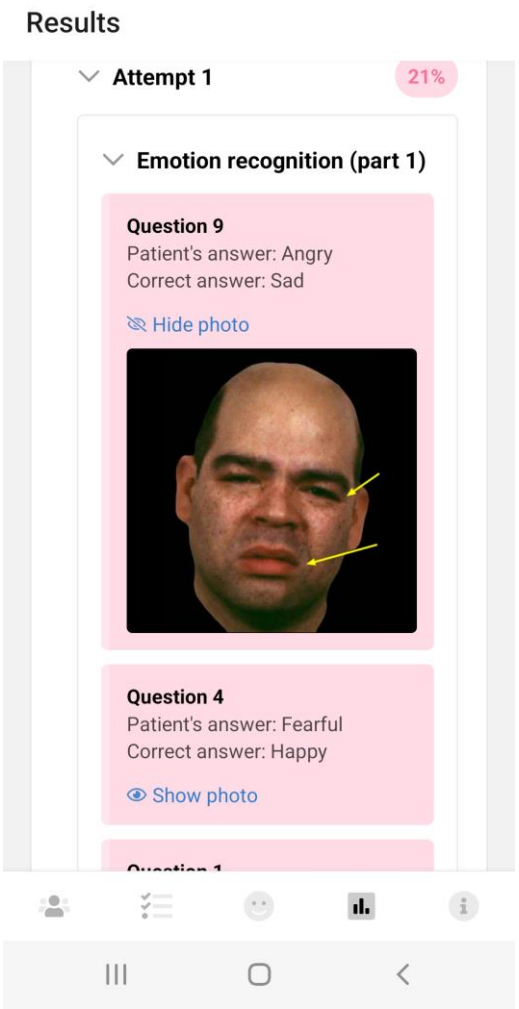

Level 1
Level Complete
All sections in this level have been completed and the required score (85%) was achieved.
Return to main menu
See results


Results
Active patient: 9999
Level 1
21%
90%

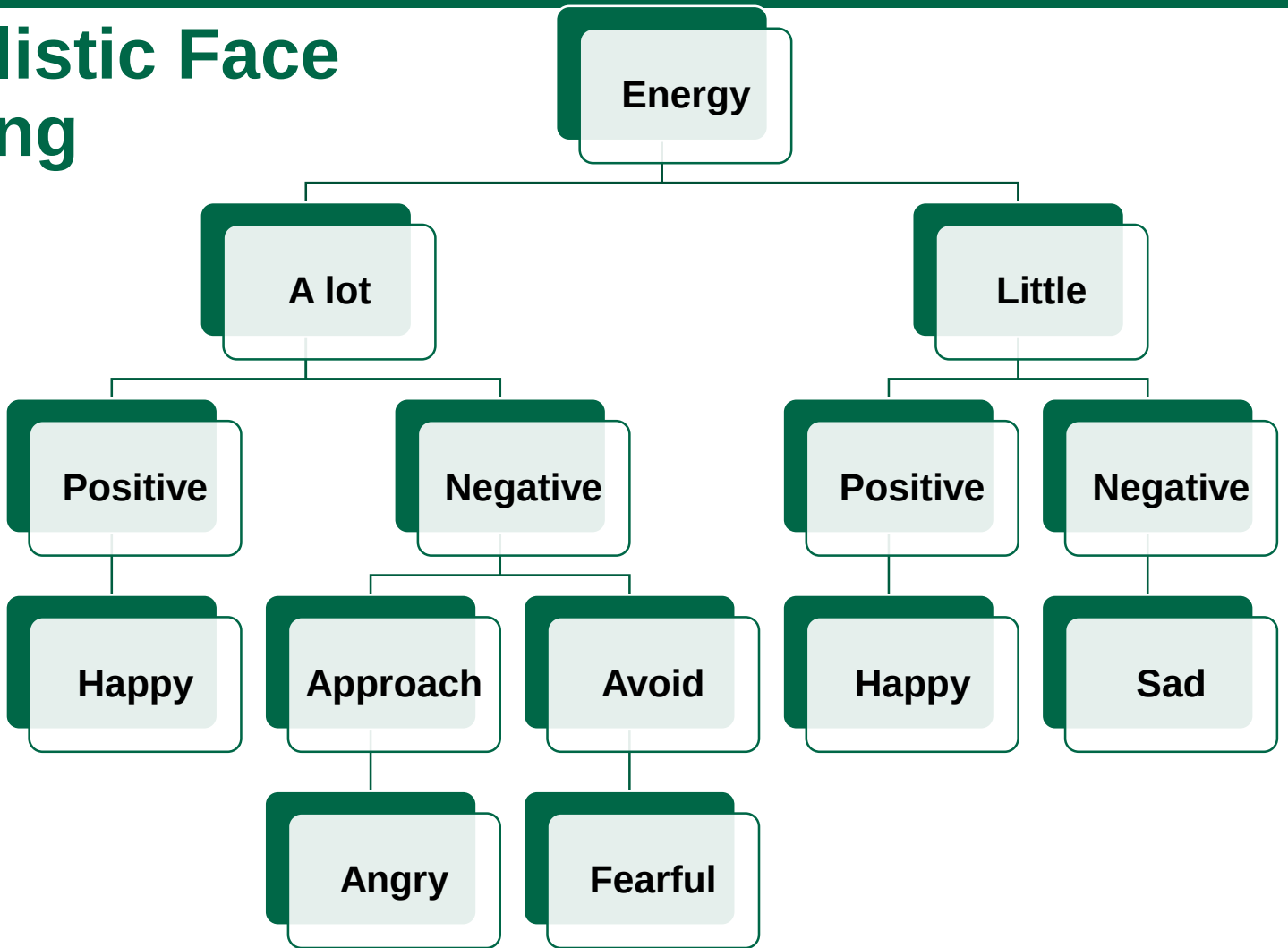

Results
Active patient: 9999
Level 1
Attempt 1
21%
Attempt 2
90%

Results

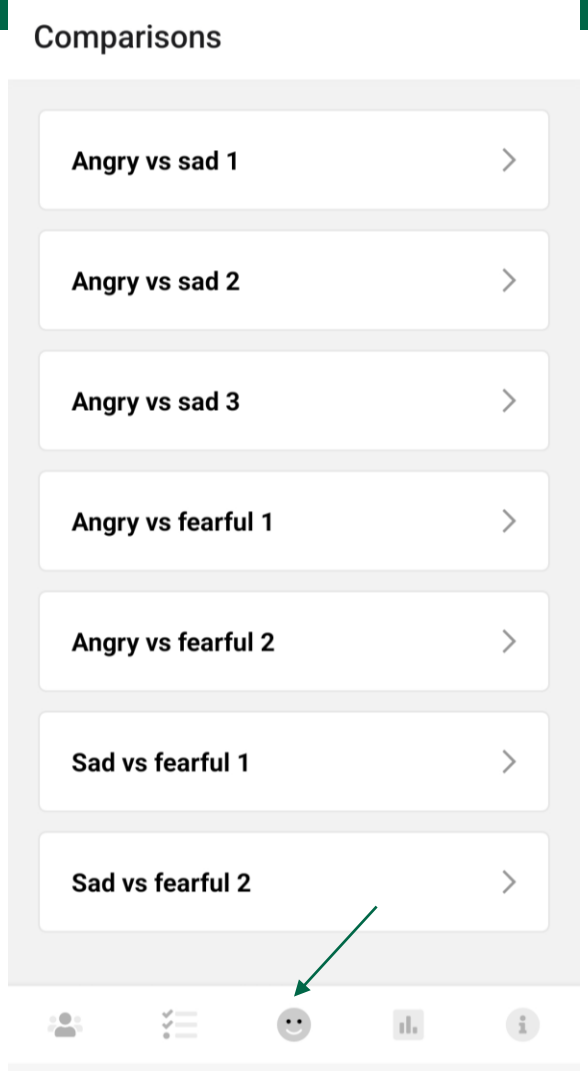

Results
Attempt 1
21%
Emotion recognition (part 1)
Question 9
Patient's answer: Angry
Correct answer: Sad
Show photo
Question 4
Patient's answer: Fearful
Correct answer: Happy
Show photo
Question 1
Patient's answer: Sad
Correct answer: Fearful
Show photo
Question 2
Patient's answer: Happy
Correct answer: Happy
Show photo

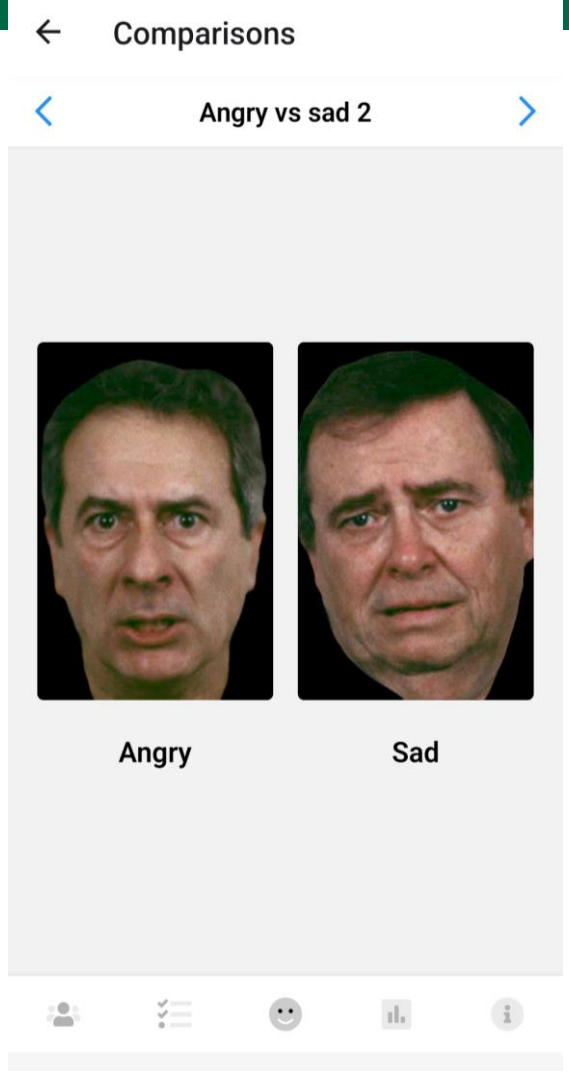

Results
Attempt 1
21%
Emotion recognition (part 1)
Question 9
Patient's answer: Angry
Correct answer: Sad
Hide photo
Question 4
Patient's answer: Fearful
Correct answer: Happy
Show photo

Tips– Holistic Face Processing



Tips – Confusing 2 emotions





But wait, what about empathy?

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Effectiveness of a Treatment for Impairments in Social Cognition and Emotion Regulation (T-ScEmo) After Traumatic Brain Injury: A Randomized Controlled Trial

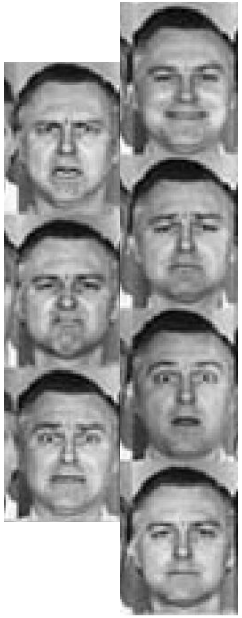
Herma J. Westerhof-Evers, MSc; Annemarie C. Visser-Keizer, PhD; Luciano Fasotti, PhD; Marleen C. Schönherr, MD, PhD; Martie Vink, MSc; Joukje van der Naalt, MD,PhD; Jacoba M. Spikman, PhD

Objective: To evaluate the effects of a multifaceted Treatment for Social cognition and Emotion regulation (T-ScEmo) in patients with a traumatic brain injury. **Participants:** Sixty-one patients with moderate to severe traumatic brain injury randomly assigned to an experimental T-ScEmo intervention or a Cogniplus control condition. **Interventions:** T-ScEmo is a compensatory strategy training for impairments in emotion recognition, theory of mind, and social behavioral skills. Cogniplus is a computerized cognitive function training. Both interventions were given in 16 to 20 weekly 1-hour sessions. **Main Measures:** Social cognition tests and questionnaires for social behavior (self- and proxy-rated) administered at baseline, immediately posttreatment, and at 3 to 5 months of follow-up. **Results:** Compared with the Cogniplus group, the T-ScEmo group improved significantly on facial affect recognition, theory of mind, proxy-rated empathic behavior, societal participation, and treatment goal attainment, which lasted up to 5 months after treatment. At follow-up, the T-ScEmo group also reported higher quality of life and their life partners rated relationship quality to be higher than the Cogniplus group. **Conclusion:** This study shows that impairments in social cognition can be effectively dealt with by using a comprehensive treatment protocol, leading to improvements in everyday life social functioning. **Key words:** *affect recognition*, *emotion perception*, *social behavior*, *social cognition*, *social skills*, *TBI*, *ToM*

Key Treatment Strategies

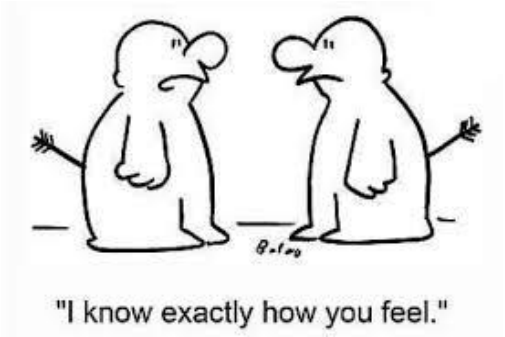
Rationale	Treatment aims	Treatment ingredients
1. Adequate emotion recognition is a basic part of social information processing	Improve emotion recognition	Facial feature processing Mimicry Personal emotional experiences Bodily language
2. Understanding and interpretation of social information precede adequate social behavior	Improve theory of mind and perspective taking	Perspective taking Thoughts—Feelings–Behavior triangle (self, other) Ask others about their thoughts and feelings Attend to feelings of others
3. Correct understanding of social input precedes adequate social behavior, besides that, social behavior and consequences of one's behavior can be addressed directly as well	Improve awareness and inhibition of undesired social behavior Improve socially desired behavior	Basic social skills training: personal space, listening, reflection of feelings (education, role-play) Specific social skills training: registration of behavior, irritability and anger management, coping with conflicts, social reasoning, positive social behavior (role-play, feedback counseling)

Results- Improved….



Facial Affect Recognition

THEORY OF MIND
CARTOON ONLY (not TASIT)



EMPATHY

Social Participation & Relationship Quality

But wait, it’s in Dutch?
Now what?

Intervention to Change Affect Recognition & Empathy (ICARE)

ICARE

- Clinical trial of ICARE delivered via teletherapy to 40 participants with TBI and their Care-partners funded by NIDILRR (TBIMS Local study for Indiana University)
- Facial affect training + new empathy module
  - Facial affect training: Seven 1:1 sessions
  - Empathy module: 5 sessions with participant and CP

Goals: Empathy Module Session 1

- ICARE Empathy mantra
- Elements of empathy
- Empathy after a TBI
- Understanding others
  - TFB triangle
  - Observe social cues to understand others

Goals: Empathy Module Session 2

- Perspective-taking to understand others' TFB
- Examining the T-F-B triangle in yourself and in others

Goals: Empathy Module Session 3

- Expressing empathy
  - Communication (sender)
    - Behaviors
    - Phrases
  - Expressing empathy exercises
  - Role-play how to respond empathically

Goals: Empathy Module Session 4

- Learn about empathic communication-- receiver
  - Active Listening
- Role-play effective communication – sender and receiver
- Empathy pitfalls

Goals: Empathy Module Session 5

- Review concepts learned
- Putting it all together: Empathic role-playing
  - by understanding the others' thoughts, feelings, behavior,
  - taking their perspective,
  - and engaging in active listening

ICARE Mantra:

Because ICARE about *others/[my ICARE partner]:*

- ✓ ICARE about *others'/ [my ICARE partner's]* feelings
- ✓ ICARE about what *others are/[my ICARE partner* is] thinking
- ✓ ICARE about understanding & respecting *others'/ [my ICARE partner's]* perspective
- ✓ ICARE about emotionally supporting *others/ [my ICARE partner]*

Feedback- participant with TBI

- It made me think of things I don't normally think of myself. I brushed up on some things.
- Learned things and started to integrate into life
- Liked that wife was in separate sessions and that the personal sessions stayed private and weren't shared
- Being able to better communicate, Being able to better focus on my empathy
- Course provided processes / things to think about, assess, and implement when interacting with others. Very practical and intuitive ("made sense") when trying to improve relationships
- Me and my wife are talking like husband and wife / friends again and I really like that
- I liked the sessions with my care-partner I think it was good.
- Being able to interact with my son, so when I wasn't doing a stellar job at doing what I learned he could point out the cues.

Feedback: Care-partner

- It was a good way to see his side of things (therapeutic)
- I really liked the role-playing. I thought it was going to be stupid but I was shocked to realize it was very helpful.
- relevant exercises for my brother
- It was easy to understand. Was very unique way to look at things, we already knew it was something he needed to look at, but breaking it down was very helpful for understanding it more.
- That I could learn things as well, we both benefited. Spending the time with him with that third-party person kind of helping us out with communication
- I liked the role playing. I liked the exercises. I like the perspective aspect of it was strong and made me think a lot. Learning about the pitfalls made a big impression on me
- I like that we did the lessons together. I like that it provided homework to reinforce what we learned and gave us an opportunity to talk and discuss what we learned.

Thank you!

Questions?

- Contact info: dawnneumann@usf.edu