Validation of a dynamic facial emotion stimulus set and English version of the “Face Puzzle” emotion recognition task

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Introduction
Faces provide rich dynamic information about internal emotional states of others. Facial emotion recognition tasks are often limited by lack of complex emotions and static instead of dynamic stimuli (Montagne et al., 2007). “Face Puzzle” addressed limitations with high internal/external validity, sensitive to subtle difficulties in Autism (Rosenblau et al., 2020). Limited applicability: only in German with narrow ethnic stimulus diversity.

Overall research goal:
Select a validated more ethnically diverse stimulus set and validate an English version of the Face Puzzle task.

Aims of this study:
1. Validate arousal, valence, and believability of stimuli
2. Improve task internal consistency
3. Assess task external validity with other socio-cognitive tasks
4. Assess the sensitivity of the task to atypical social cognition

→ four preregistered studies at OSF (https://osf.io/gvrx4/)

Methods

Face Puzzle
25 trials - target emotional expression video, four emotion labels

Three distractor labels: same valence similar arousal levels, same valence dissimilar arousal levels, opposite valence

Participants
Study 1: n = 120; 53 female, age = 35.4 (7.1), MTurk
Study 2: n = 76; 43 female, age = 36.2 (7.3), MTurk
Study 3: n = 47; 31 female, age = 21.1 (6.4)
Study 4: NT: n = 18; 9 female, age = 27.7 (7.9)

ASD: n = 18; 9 female, age = 27.7 (7.9)

External social cognitive measures (Studies 3 & 4)
Emotion inference from eye regions - RMET (Baron-Cohen et al., 2001)
Emotion inference from videos - BLERT (Bell et al., 1997)
Emotion inference from face pictures - ER40 (Kohler et al., 2003)
Alexithymia self-report - TAS (Bagby et al., 1994)
Levels of autistic symptoms - AQ (Baron-Cohen et al., 2001)
Intellectual functioning - KBIT (Kaufman et al., 2004)

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Study 1: Stimulus validation
Do valence/arousal ratings confirm the intended stimulus categories?
Are expressions of emotions believable?
→ 3 rounds of iterations with 3 samples (n = 40)

Final set of selected stimuli: 14 actors (6 male); 13 new videos

Compassionate, Bored, Wistful, Surprised, Relieved, Envious, Furious, Worried, Enthusiastic, Expectant, Disgusted, Angry, Happy, Forgiving, Doubtful, Content, Embarrassed, Touched, Disappointed, Interested, Feared, Confident, Apologetic, Contemptuous, Amused

Study 2: Improve internal consistency

Item Accuracy

25 items: Cronbach’s alpha = .61
20 items: Cronbach’s alpha = .65 (excluded: angry, expectant, happy, interested, envious)
< 50% accuracy: Expectant (43), Apologetic (46), Worried (46), Forgiving (46)

Study 3: Task performance

Item Accuracy

Study 3: External validity

RMET
BLERT
TAS

AQ, KBIT, ER40: all p > .15

Study 4: Sensitivity to atypical social cognition

Task Accuracy

Composite score

Bayesian ANCOVAs (covariates = age, verbal IQ)

RMET
AQ
ER40

TAS (p = .08), KBIT verbal (p = .90), BLERT (p = .10)

Internal Consistency (NT n = 47, ASD n = 18)
25 items: Cronbach’s alpha = .46
20 items: Cronbach’s alpha = .58 (excluded: angry, contempt, happy, envious, worried)

Conclusion
Validated English version of Face Puzzle with validated facial stimuli shows acceptable internal consistency and sensitivity to atypical facial emotion recognition.

Future Directions
Assess external validity with different (more ecologically valid) measures and larger more diverse samples including other psychopathologies (e.g., schizophrenia or anxiety)