Facial expressions and empathy: Acute stressful situations facilitate empathic response.

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Introduction

- Empathy is a cognitive and affective process (Decety & Lam, 2011) that includes comprehension of the emotional situation, accurate labeling of another's emotional experience, and affectively experiencing matched feelings with those observed (Feshbach, et al., 1974; Batson et al., 2009).
- Situations involving the plight of another (or others) can elicit empathic emotion (Batson et al., 2009).
- Facial expressions may provide clues to a person's emotional experience during and after an evocative emotional stimulus (Ekman, 1983; 1987, 2011).
- Emotional facial expressions reflect the interplay of many factors, including one's internal emotional state (Hager & Ekman, 1983) and emotional power of the situation (Rosenberg, Ekman, & Blumenthal, 1998).
- An individual's reactive facial expression may be obvious, subtle, a brief macro-expressions (1-4 seconds in duration), or a very brief micro-expressions (lasting 1/15th to 1/25th of a second) (Ekman and Friesen, 1969; Ekman, 2009; Shen, Wu and Fu, 2014).
- Few studies explore the relationship between an individual's experienced empathic emotion and external manifest facial expression.

Hypothesis: Participants' negative facial expressions during a negative empathically evocative video will relate to self-reported situational negative emotions and to generally measured empathic responsiveness.

Methods

Participants

- Thirty-seven women, aged 18-22 and not taking hormones, were recruited from Intro to Psychology classes at a small, private university in Southern California. Participants were primarily Caucasian (62%; Asian/Pacific Island American 16.2%; Hispanic/Latino 13.5%; and 2 or more Other 3%), Freshmen (60%; sophomore 27%; junior 8%, senior 5%), and 19 years of age (43%; 18 years 27%; 20-22 years 32%, NA 5%).

Procedures

- All Participants arrived individually at the clinic/lab and were ushered by one of 3 male Research Assistants (RA) into a 2 way-mirrored clinic consultation room featuring a sofa, large video monitor, laptop computer, and chin rest device. Brief and signatory Informed Consent documents were given with additional AV permissions included.
- Participants completed empathy measures online prior to coming into the lab:
  - Toronto Empathy Questionnaire (TEQ);
  - Interpersonal Reactivity Index (IRI-EC) - Empathic Concern
  - Interpersonal Reactivity Index (IRI-PT) -Perspective Taking
  - Personal Empathic Response & Regulation Scale (PERRS)
- Participants assigned to watch one of two videos:
  - Experimental (E): Male surgeon performing & narrating circumcision of crying infant
  - Control (C): Male performing & narrating a shower tiling
- The Positive and Negative Affect Schedule (PANAS) and within situation affective response measures were administered directly following video stimulus exposure.

Behavioral Observation via 2-way mirror

- Research Assistants (RA) all completed Ekman METT/SETT Facial Coding Training program
- Facial behavior expressions were recorded using hand held devices with !Observe Prime software by *Psychsoft, Inc.*. Observers utilized YES/NO key touch to tabulate the *number of target behaviors* as well as *behavior duration* across 4 minutes participant was viewing the video.
- Each RA coded only one target behavior: Positive Face, Negative Face, or Eye Gaze
  - Negative Face included expressions of Sadness, Disgust, Anger, Contempt, and/or Fear
- RA Neg-Face Live Coding correlated with Video Fine-Coding $r = .629, p = .001$; Live Coding and Neg-Eyes correlation was higher ($r = .727, p = .0001$) supporting RAs preferential attending to upper face/eyes.
- Inter-Rater Reliability: Live, Video-Fine, & Video yielded satisfactory, but varying inter-correlations.

Results

- Participants viewing the circumcision reported significantly greater PANAS negative affect than Controls [$F(1,34)=8.12, p=.007$] and more intense negative specific feelings of sadness, distress, agitation & anger.
- E's also displayed significantly more *macro-, micro-*, and continued negative facial expressions including furrowed brows (*corrugator supercilli+pars medialis*), whether Live Coded ($M = 46.3$ secs. vs. $M = 0.27$ secs.;[$F(1,24) = 9.57, p = .005$]) or Video-FC ($M = 59.5$ secs. vs. $M =11.5$ secs.; [$F(1,33) = 7.39, p = .01$]).
- Among E participants, negative facial expressiveness positively correlated with self-reported empathy as measured by PERRS-3 ($r = .674, p = .006$) and TEQ ($r = .508, p = .053$) as well as situational affective measures (PANAS-Neg, $r = .652, p = .0001$; and "How are you feeling?" -5 to +5, $r = -.66, p = .0001$)
- While all measures of negative facial expressiveness and all measures of empathy were highly inter-correlated within domain, across E & C videos, there were no significant relationships between negative facial behavior and self-reported general empathic responsiveness (PERRS-3, TEQ, IRI-EC, or IRI-PT) ($r = .237, r = .201; r = .127, p = -.022$).
- Though correlations were highly significant between Live-Coded facial behavior and within-situation self-reported feelings ($r=0.48$ to $r= -0.66$), only 23%-30% of the variance in facial expressiveness is explained.

Discussion

- Higher levels of general empathic responsiveness as measured by the TEQ and PERRS-3 were associated with significantly increased negative facial expressions while viewing a negative empathically evocative stimulus (here, an infant circumcision). The IRI-EC approached significance; the IRI-PT was NS.
- E Participants self-reported significantly greater, more intense negative emotion and displayed more negative facial expressions while watching the male infant circumcision.
- The intensity of the infant's cries and specific surgeon's actions, such as scissors cutting the infant's foreskin, appeared to elicit participants' acute increased distress as revealed and positively correlated with negative facial expressions.
- Notably, TEQ and PERRS-3 both include more emotional focused questions than the IRI-PT, thus supporting the importance of emotion in an empathic response (Batson et al., 2009; Feshbach, et al., 1974) as evidenced in facial expressions.
- Emotional empathy, beyond cognition, with/for another's plight might be a driving force behind empathic caring (Decety, 2015) and altruistic helping behavior (Batson et al., 2009).
- Therefore, if an important emotional component of empathy can be inferred from facial expressiveness, then perhaps we may gain insight to and better predict helping behavior from individual's observable facial reactions.
- The universality of facial expressions indicating an individual's own anger, disgust, fear, happiness, sadness, or surprise (Ekman & Friesen, 1969; Ekman, 2001) may also communicate concern for other's feelings in empathic contexts. Perhaps matching feelings and expressions engenders mutual trust and bonding.
- Hrdy (2011) proposes empathy and caregiving are essential for our *Survival of the Species*. Empathy can be increased with in-group/out-group expectation violation training (Hein & Englemann, 2016), thus offering a mechanism toward peace.

Limitations and Future Directions

- Relationships presented are correlational precluding causation
- Ekman METT/SETT training includes differentiation of sad, angry, disgust, fearful, and contempt distinctive features, but coding here expeditiously combined all into negative vs. positive. The simple polarization served a purpose worthy of exploring.
- Additional analysis should explore the mediating effect of emotion, emotional regulation, empathic responsiveness and facial expressiveness in social, prosocial and helping behavior.

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Negative Facial Expression Behavior, General, and Situational Empathic Responsiveness - Spearman rho (N=37)