Designing a Digital Interactive Emotion Measure (DIEM) for Digital Media: Theoretical Foundations and Validation Protocols

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I. DIGITAL MEASURES OF EMOTION

Awareness of emotions is often a treatment target in psychotherapy, but it is difficult to assess emotions due to ambiguity in measurement or scale design. Lack of clarity in scale design may increase risk that participant interpretations of scale items may not align with emotion constructs those scales were designed to capture. Furthermore, emphasis on verbal or written cues leads to low scientific representation of patients who cannot read emotion scales (e.g., low literacy). Touch-screen applications provide a unique opportunity to create a visual emotion measure which has low barriers but can be used to assess a high level of generalizability across cultures and psychology subdisciplines

II. AN INTERACTIVE VISUAL MEASURE: DIEM

The Digital Interactive Emotion Measure (DIEM) is a brief, fully visual measure that is designed for administration on virtual interfaces. It was developed using Unity Software so that it may be intergrated into any existing mental health application, website, or platform.

A. Development: Content and Construction

Construction of DIEM included a literature review broadly organized into three categories: user interface design, emotion representation, and color science. Interface and icon design studies were used to determine visual cues to communicate scale prompts (e.g., instructions, clear or confirm selection, proceed to next screen); these studies included basic design principles (Ma et al., 2009; Zender, 2006), interpretation of icons across cultures (Shen et al., 2020; Stinson et al., 2006), and use of visual icons among individuals who cannot speak (van der Merwe & Alant, 2004). Existing pain and distress thermometers were used to determine the content and screen progression (Hawker et al., 2011; Mitchell et al., 2010).
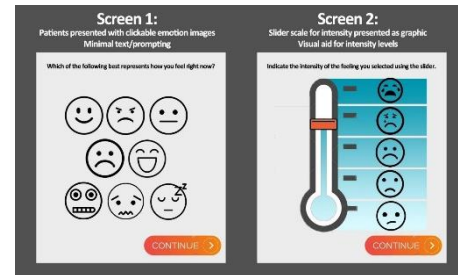

Fig. 1.   First mock-up of DIEM

Emotion representation studies on the unversality of basic emotions and stimulus images were used to design 2-dimensional (2D) illustrations of emotions (Ekman, 1999). The color of the 2D illustrations were determined through systemic review of emotion-color perceptions across cultures (Hanada, 2018; Lin et al., 2018; Ou et al., 2018; Thorstenson et al., 2018).
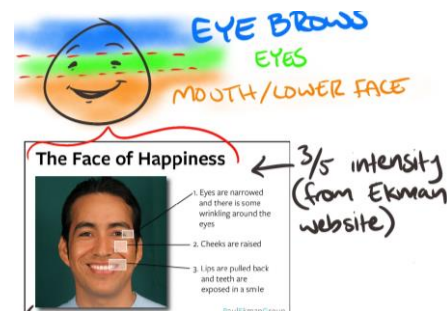

Fig. 2.   Reference image from Paul Ekman's work and 2D illustration design direction

B. Valdity Testing

The next phase of testing involves confirmatory and discriminatory validity testing. Participants will give assessments of DIEM's emotion icons and compare DIEM icons to existing sadness, fear, anger, happiness, and disgust scales.

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