Interactive Sensual Evaluation Instrument

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Abstract

When designing and evaluating for emotions, a common approach is to methodically map emotional states onto spectrums as quantitative data. However, recent research criticize these methods, arguing that interpreting and experiencing emotions in full complexity is needed to reach a useful level of understanding affect. A recent study proposes the Sensual Evaluation Toolkit (SEI), consisting of different shapes, meant to allow for nonverbal communication of affect. This study aims to build upon that research, introducing vibration and shape forming to the toolkit - calling it the Interactive Sensual Evaluation Toolkit (ISEI). This study shows that the added modalities expand the nonverbal expressiveness of the toolkit, and that the ISEI has the ability to transfer information about emotional states between users nonverbally.

Background

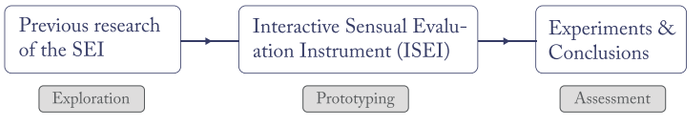
P. Dourish and colleagues argue in their study [1] that researchers should move from the old model of emotions as objectively measurable in favor of a model where emotions are seen as interactionally constructed and subjectively experienced. The paper shows that there are multiple ways to conceive the nature of emotions, and so there are multiple ways to approach it usefully in practice.


Fig. 1 The SEI set of shapes

One such approach is the Sensual Evaluation Instrument (SEI) [2] (fig. 1), which is a set of 8 different shapes modeled to be mapped over a valence/arousal spectrum. Several studies [2, 3, 7, 8], in which participants associated various shapes with different emotions, concur in shapes with sharp edges tend to be associated with negative feelings. In contrast, rounded shapes were associated with positivity. A study [9] found vibration, heat, and color to be an expressive modularities that varies in emotional range.

Goals

This study aims to build upon previous research of the SEI [2], by introducing vibration and shape forming abilities. Evaluating this interactive variation of the SEI, which we have chosen to call the Interactive Sensual Evaluation Instrument (ISEI), the study further aims to assess whether emotional states can be evaluated, expressed and interpreted nonverbally.



Method

ISEI Modular One base unit accompanied by different shape modules used to form a complete shape (fig. 4).

Shape modules

After an explorative session with the original SEI toolkit (fig.2), three shapes were chosen based on their affordances to work as shape modules (fig. 3).

The base unit and shapes were first modelled using Zbrush (2018 Pixologic, Inc)(fig. 4), and later 3d-printed using a Ultimaker B.V. (fig. 5).

Fig. 2 The chosen SEI shapes

Fig. 3 The attachable shapes

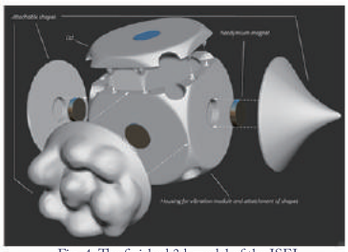


Fig. 4 The finished 3d-model of the ISEI


Fig. 5 The 3d-printed and assembled ISEI

Vibration module

The vibration module was provided by the authors supervisors. It is added inside of the basic unit (fig. 5).

Emotional Stimuli

The stimuli was sourced from another study and is meant to evoke a specific emotional state.

Experiment Framework

An experiment was designed where one participant was configuring the ISEI while being exposed to stimuli (fig. 6).

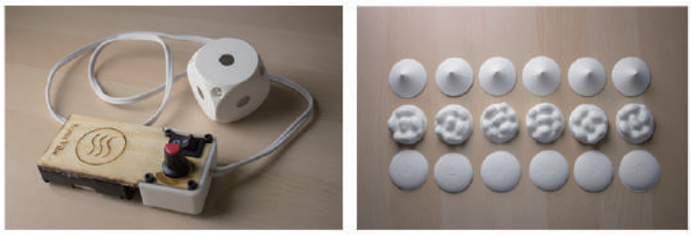


Fig. 6 The material provided to the participant before starting the test

When the participant is done configuring the ISEI, an interview was held to gather qualitative data, and then a second participant got to interpret the configured ISEI without any prior knowledge. If both participants evaluation and interpretation of the ISEI correlated, then that would point to the affordance of the ISEI as a tool for nonverbal communication of emotional states. Two different sessions of this experiment was repeated for this study.

Results

In the both sessions, participants were exposed to video clips meant to convey an emotional state of happiness.

Experiment I

Form the ISEI

The participant in the first session formed the ISEI with round and bubbly shapes along with mild vibration to convey this emotion, but one side got a spiky shape since the participant felt embarrassment over a particular part in a clip (fig.7).

Fig. 7 the ISEI as configured by participant 1

Interpret the ISEI

The participant tasked to interpret this ISEI concluded that the vibration and majority of shapes expressed calmness, and that the spike expressed pain.

Experiment II

In the second session the participant tasked with shaping the ISEI formed a mildly vibrating sphere, stating that the vibration was what most strongly conveyed happiness (fig.8).


Fig. 8 the ISEI as configured by participant 3

The participant tasked with interpreting this ISEI had a hard time verbalising the sensations.

Conclusions

Participants found it difficult to verbalize the reasoning behind the choices they made during the shaping process. This strengthens the observation made by related studies about the difficulty to translate emotions into language [1]. When comparing interpretations between creating and receiving participants, a clear correlation was found.

All participants report shape forming to be more effective than vibration as to express emotion through the ISEI. From the discussion held at the end of both parts of the experiment, participants declared to feel comfortable using the evaluation tool as means of nonverbal communication of emotional states.

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