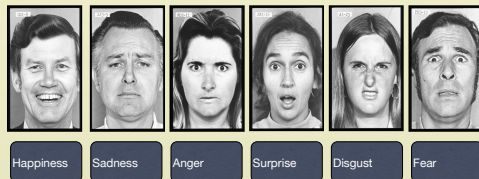


# Assessing the Validity of FaceReader Using Facial Electromyography

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## Background:

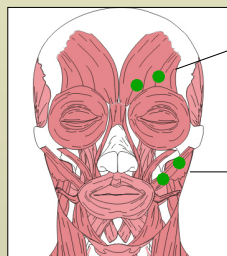
FaceReader 4 is a software program intended to analyze facial expressions. Specifically, it identifies the six discrete emotional expressions illustrated below:



From Ekman and Friesen's *Pictures of Facial Affect* (1976)

Our goal was to test the validity of FaceReader by comparing it to facial electromyography (EMG), which measures the activity of specific muscles.

We measured the activity of the muscles illustrated below:



*corrugator supercilli*  
(i.e., brow muscle),  
which plays a critical  
role in frowning

*zygomaticus major*  
(i.e., cheek muscle),  
which plays critical  
role in smiling

Terzis et al. (2010) found that observers' judgments of happy expressions and FaceReader's measures were most closely related (90% agreement). Therefore, we decided to start by measuring happy expressions.

## Hypothesis:

We hypothesized that FaceReader's assessment of happy facial expressions would be positively correlated with activity of the *zygomaticus major* (i.e., cheek muscle).

Furthermore, to establish discriminant validity, we hypothesized that FaceReader's assessment of happy facial expressions would not be correlated with activity of the *corrugator supercilli* (i.e., brow muscle).

## Method:

Participants were instructed to mimic ten happy and ten angry facial expressions (from Ekman & Friesen, 1976) they saw on a computer screen. While participants were doing this:

- FaceReader was measuring how much each emotional expression was being displayed (see a sample image to the right)
- Facial EMG was measuring activity of the *corrugator supercilli* and *zygomaticus major* (see a sample image to the lower right)

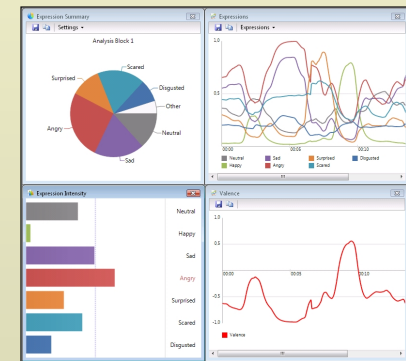
## Results:

So far, data from 22 participants mimicking happy facial expressions have been analyzed. Across those participants, FaceReader's assessment of happy facial expressions had a median correlation of:

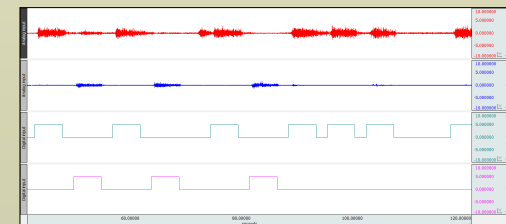
- $r = .79$  with *zygomaticus supercilli* (i.e., cheek muscle)
- $r = -.12$  with *corrugator supercilli* (i.e., brow muscle)

## Discussion:

Facial EMG is a well-validated measure; however, it has limitations. For one, it is difficult to use outside of a laboratory setting. Second, it requires substantial training to use correctly. FaceReader avoids both of these limitations and our data suggest that it is a valid measure of happy facial expressions.



Sample image of data generated from FaceReader



Sample image of data generated from facial EMG