

On the perception of facial expressions in affective disorders and potential technological uses

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Abstract. Facial expressions are inherently linked to emotions and are a visual tool to communicate emotions to the surrounding world. A number of studies have evaluated the aptitude of different portions of the population in recognizing specific facial expressions. It is known that certain differences in the ability to correctly identify or assess the intensity of a facial expression can be attributed to psychological disorders. In particular, specific disorders seem to affect the processing of a particular emotion and the perception and interpretation of its associated facial expression. This work aims to summarize existing findings in literature on the topic and provide an outlook for potential technological use-cases, which can be applicable in the field of psychotherapy.

Keywords. Facial expressions, Affective disorders, eHealth

1. Introduction

Affective disorders have been associated with disturbances in the processing and perception of facial expressions (cf [[1]–[3]]). Research in the social sciences as well as neuropsychology have identified that specific disorders influence the way facial expressions are perceived and in turn – interpreted. More specifically, there seems to be a distinct link between particular affective disorders, and a disturbance or dysregulation in particular emotions. In turn, this effect carries over also to the perception of facial expressions related to those particular emotions. In this work, we attempt to provide a literature review pertaining to what those distortions are, what are their characteristics and provide an outline for potential use-cases in technological tools, which can be used in the field of psychotherapy. Finally, we conclude with suggestions on what potential applications, which use facial expressions look like and what considerations need to be made, when designing such systems for vulnerable populations.

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2. Method

In order to obtain a good balanced picture of what the discrepancies in perceiving facial expression for people suffering from affective disorders are, we have focused on existing works in the literature and meta-analysis. For search terms, we have used the terms *facial expression(s)*, *happiness*, *sadness*, *neutral*, *anger*, *fear* and derivatives pertaining to facial expressions of interest; *perception*, *attention*, *bias* were the search terms to define the relation between facial expressions and the respective disorders. *Affective disorders*, *mood disorders*, *depression*, *anxiety*, *bipolar disorder* and the respective medical terminology are the final keywords used in order to identify articles of interest.

3. Results

The results from the literature outline two characteristics related to a skewed perception of facial expressions. Those are i) a bias in the attribution of an emotion to the associated facial expression (cf [1], [4], [5]), ii) an attentional bias where depressed subjects respond significantly slower to happy facial expression (cf. [6]) and are quicker in identifying sad facial expressions (cf. [7], [8]).

In particular, people suffering from affective disorders exhibit a bias expressed as an over- or underestimation of facial expressions (cf. [9]). This is the case for ambiguous looking expressions, where depressed patients interpret them as sad looking. For expressions of happiness, in a comparison with healthy controls, they rate the level of happiness as lower. Those results are observed consistently in multiple experiments. Some literature also suggest that the level of depression is correlated to the level of underestimation of happy expressions (cf. [10]).

Similarly, people suffering from anxiety were more prone to interpret ambiguous facial expressions as threatening (cf. [11], [12]). Interestingly, those observations are isolated to the facial expressions in question and do not translate equally to a bias in the interpretation of other facial expressions (cf. [13]).

4. Discussion

This leads to the conclusion that there is a consistent presence of this effect and can be used in technological solutions, which incorporate facial-expressions in varying schemes. The predictability of the established biases in the perception of facial expressions in relation to particular affective disorders should be taken into account when considering using facial expressions in tools targeting such populations. In particular, potential uses for facial-expression based technology can be for mood-assessment, mood visualization or goal-setting scenarios.

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