



## Impairment of Emotional expression detection

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Citation: Baudry M (2021) Impairment of Emotional expression detection. J Neurosci Clin Res. Vol.6 No.5.

Received date: September 7, 2021; Accepted date: September 21, 2021; Published date: September 28, 2021

### Introduction

Detecting emotional facial expressions is an initial and indispensable component of face-to-face communication. Neuropsychological studies on the neural substrates of this process have shown that bilateral amygdala lesions impaired the detection of emotional facial expressions. The participants were asked to detect normal facial expressions of anger and happiness, and artificially created anti-expressions, among a crowd with neutral expressions. Reaction times for the detection of normal expressions versus anti-expressions were shorter when the target faces were presented to the visual field contralateral to the intact hemisphere (i.e., stimulation of the intact hemisphere; e.g., right visual field for patients with right hemispheric resection) compared with the visual field contralateral to the resected hemisphere (i.e., stimulation of the resected hemisphere). Our findings imply that the medial temporal lobe structures, including the amygdala, play an essential role in the detection of emotional facial expressions, according to the emotional significance of the expressions. Detecting emotional facial expressions is an initial and indispensable component of conscious emotional communication. Appropriate detection of others' emotional expressions allows us to understand their emotional states, and thus regulates social behavior and promotes the creation and maintenance of social relationships.

A few previous neuropsychological studies have examined the neural substrates of this process, and found that a bilateral amygdala lesion impaired the detection of emotional facial expressions in visual-search tasks. That study tested a bilateral amygdala-damaged patient and healthy controls using a visual-search task, in which participants detected a fear expression among a crowd with neutral expressions, or a neutral expression among a crowd with different neutral expressions. Both the patient and the controls detected fearful expressions more rapidly than neutral ones. These results imply that amygdala lesions may not impair the detection of emotional facial expressions. One plausible explanation for the inconsistent findings is the small sample size of the studies, which tested only one or two bilateral amygdala-damaged patients. Because such small samples do not provide reliable findings, investigating this issue in a group of patients is warranted. The study was approved by the Ethical Committee of the Department of Psychology and Educational Science of the University of Bologna. The experimental procedure was illustrated to the teachers, students and their parents in a presentation session. Parents gave their written consent and the children were freely allowed to participate in, or abstain from, the research.

Participants were tested individually in a quiet room that was arranged for the experimental procedure. To assure a correct understanding of the task, the procedure was explained first to all participants in their classrooms and then once again to each participant individually by means of the presentation of two pictures. Participants were tested in a randomized order. They sat approximately one meter from the computer screen on which the pictures were presented. To complete the emotion recognition task, participants were asked to select one of six emotion labels (i.e., anger, sadness, happiness, fear, disgust, or neutral) that best described the emotional expression they had just seen. The labels were shown on an answer sheet, and participants made their responses by drawing a cross on the emotion label. The order of the labels varied from item to item and was randomized for each participant, to reduce the tendency to select some labels more than others simply because of primacy.