



Emotional decoding in facial expression, scripts and videos: A comparison between normal, autistic and Asperger children

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ARTICLE INFO

Article history:

Received 18 April 2011

Accepted 21 April 2011

Available online 18 May 2011

Keywords:

Autism
Asperger
Emotions
Face
Script
Video

ABSTRACT

ASD subjects are described as showing particular difficulty in decoding emotional patterns. This paper explored linguistic and conceptual skills in response to emotional stimuli presented as emotional faces, scripts (pictures) and interactive situations (videos). Participants with autism, Asperger syndrome and control participants were shown facial, pictorial and video representation of six basic emotions (happiness, anger, fear, sadness, surprise, disgust). They were asked to identify the emotion and to individuate possible causes of the emotional state. A semantic analysis was applied to verbal reports, focusing on labeling and conceptualization. Log-linear analyses showed different representations across the participants as a function of emotion, pathology and presentation modality. Autistic participants were able to correctly decode primary emotions while showing difficulties with surprise. In contrast, Asperger participants performance was more similar to control subjects'. Finally, when situational correlates were provided, it was evident a "facilitation effect" for the representation of emotions.

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1. Introduction

Autistic children generally present a dysfunction in the emotional domain, evidenced by the lack of visual contact and attention to the human face. Human face is considered a communicative vehicle which allows individuals to express emotional states and attitudes (Balconi, 2008). Within relational contexts, the ability to correctly and fast decode the emotional expressions of other people might serve the fundamental function of attuning one's own behavior with regards to contextual requirements. In other words, facial expressions represent basic communicative signals with high interpersonal value and adaptive function. Therefore, the inability of autistic children to use face as a social cue to decode emotional dimensions could be ascribed within the frame of their general impairment in social cognition processes (Balconi & Carrera, 2007). In particular, the ability to recognize emotional patterns in face is the result of a selective adaptive process and neural maturation process leading to the creation of specific and specialized neural network for decoding emotional configurations (De Haan, Pascalis, & Johnson, 2002). However, experience also plays a fundamental role in emotional decoding development. In fact, when emotions are not considered as the expression of distinct neural programs, as accounted for by categorial models (Ekman, 1982; Keltner & Ekman, 2003) but more as interrelated constructs differing on the base of dimensions such as arousal or hedonic valence (Russell, 1997), the decoding of emotions becomes also a function of appraisal processes. Thus far, neural maturation, together with the function that experience has in the selection of cognitive and behavioral responses, contributes to the identification of separated emotional dimensions.

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Furthermore, it is necessary to differentiate between *recognition* and *labeling*. Developmental studies, in fact, showed that in some cases children are able to recognize and differentiate between emotional expressions, whereas their performance is poor when asked to specifically label emotional correlates (Balconi & Carrera, 2007; Widen & Russell, 2003). Individuals with autism show a severe impairment of the ability to understand emotional dimension, especially when expressed through mimic facial patterns (Balconi & Carrera, 2006, 2007). Indeed, several studies have found that, for autistic children, facial emotions have a weak salience, if compared with other non-emotional cues (Celani, Battacchi, & Arcidiacono, 1999). They tend to ignore emotional expressions, unless they are explicitly required to do it. However, the extent of the deficit in facial expression understanding varies (Gepner, de Gelder, & de Schonen, 1996) with the level of cognitive functioning (Rojahn, Lederer, & Tassè, 1995) with low-functioning subjects showing severe impairment of emotional decoding and high-functioning subjects giving performances comparable to normal.

Another factor modulating autistic performance in emotions decoding is the *type of emotion* they are asked to recognize. Several empirical findings indicate that the ability to recognize simple emotional configuration, like happiness or anger, is less impaired in comparison to the competence to recognize complex or secondary emotions, like surprise or embarrassment, respectively (Balconi & Lucchiari, 2005; Capps, Yirmiya, & Sigman, 1992). The difficulties in those last cases might be due to the complex relation existing between emotional expression and causal antecedents (Hillier & Allinson, 2002) which, in order to be reconstructed, require preserved mentalization and meta-representational functions (Baron-Cohen, Spitz, & Cross, 1993). This difficulty may be partially overcome by making contextual relations more salient, as it happens when emotional correlates are presented in a specific context.

Indeed, another variable which should be taken into consideration is the *contextual domain* where the emotions take place. Since emotional comprehension entails appraisal process and emotional expression does not usually happens in the void, contextual information might determine a consistent part of emotional expression meaning (Fridlund, 1991). In this light, the meaning of facial display is a function of how the facial features are related to other features of the context. The perception of emotion is a contingent rather than a necessarily automatic mechanism. In other words, it relies upon the ability to decode facial structural patterns and to integrate them with contextual and relational information. Therefore, emotions are recognized through the development and generalization of emotional scripts. These scripts include not only facial expressions, but also the representation of causal factors, physic and social context, actions and their consequences, as well as the subjective experience and the cognitive appraisal of the situation (Bullock & Russell, 1986; Russell & Widen, 2002). Among these cues, the representation of causal bonds, that is a set of causal events and of their behavioral consequences, has a remarkable significance, because they constitute the more explicative elements of the emotional experience (Want & Harris, 2001). In fact, if facial cues per se are fundamental to infer emotions, it also holds true that facial expressions always occur within interactive contexts (Russell & Widen, 2002). In a recent study (Balconi & Carrera, 2007) comparing the performance of autistic and normal children to an emotion detection task, using both facial representations and emotional scripts, it was shown that emotional scripts facilitated the conceptualization of emotions in autistic children. The situational component contained in scripts seems to have allowed the activation of a more complex contextual representation, which takes into account the context in which the emotional event happens, the emotional causes, the sequence of actions and their consequences (Bullock & Russell, 1986). The presence of interactional features that characterize the emotional experience constitutes a facilitation element for emotion comprehension, also producing a better description in the emotion labeling.

The present study aims to investigate the lexicalization and conceptualization of emotions taking into account the complexity of emotional correlates and the role of situational elements. Specifically we compared the performance of normal, low-functioning (autistic) and high-functioning (Asperger) children in decoding emotional correlates presented in different modalities: facial expressions, script and video.

2. Materials and methods

2.1. Main aims and hypotheses

In this study we investigated the way a group of participants diagnosed with autism and Asperger syndrome could verbalize and conceptualize emotional correlates. “Verbalization” concerned the ability to use a verbal label correctly (labeling), whereas “conceptualization” referred to the wider semantic-conceptual system used to describe the emotional representation. It could be considered a marker of the acquired ability of discriminating among different emotional correlates. Moreover, “conceptualization” concerned also conceptual features referring to the wider situational context, comprising the identification of causal bonds or emotional antecedents of an emotional event. Main aims of the study were therefore to compare participants' performance in verbalizing and conceptualizing emotional correlates, differing as a function of their complexity. In particular, we expected Asperger participants and especially autistic participants to show general difficulties to label and conceptualize emotional correlates, increasing with the level of emotion's complexity. That is, we expected severe impairments in relation to complex emotions such as disgust or surprise, while we attended a more preserved competence in recognizing simple emotions like joy or fear. Specifically we expected autistic and Asperger participants to focus more on visual-perceptive elements rather than “mental”, symbolic or emotional attributes when they describe the emotional cue (Balconi & Carrera, 2006). With regards to the presentation modalities of the emotional correlates, we suppose that scripts and videos might facilitate emotional recognition by making causal bonds and relevant

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