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Invited review

Facial affect processing in social anxiety: Tasks and stimuli

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ABSTRACT

Social anxiety (SA) has as its main feature the fear of social situations, being characterized as social phobia or social anxiety disorder when functional impairment emerges as a result of that fear. Although the recognition of the condition has increased in recent years, it is believed that many patients and physicians still take the symptoms of the disorder for personality traits with no need for treatment. There is evidence that people with SA display abnormal patterns of facial emotion processing that could account for the onset and maintenance of the disorder. The objective of this review is to describe, compare, and discuss the methods used to study facial emotion processing in SA with an emphasis on the tasks and stimuli employed. Articles were searched for on online scientific databases. Forty research articles were selected according to the inclusion and exclusion criteria established. The articles were read and information from them was gathered on a comparative table for analysis. Evidence available to date suggests that SA individuals have abnormal patterns of facial information processing characterized by a bias for negative emotions. The results of the articles analyzed have a high degree of concordance, in spite of the variety of tasks and stimuli employed. The similarity between results from non-clinical samples with SA and patients affected by social phobia speaks in favor of the current view that SA occurs as a continuum of severity, rather than a clearly circumscribed nosological entity.

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1. Introduction

The latest years have witnessed a steady growth in the number of publications related to social anxiety (SA) in general and to its pathological manifestation, social phobia (SP) or social anxiety disorder (SAD). One reason that could account for this is the greatest

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comprehension of the condition by doctors and sufferers fostered by recent behavioral, neuroimaging, and psychopharmacological evidence. This development has shed light over pathological manifestations that were long thought of as personality traits that required no specific treatment.

The core feature of SA is the fear of being negatively evaluated by others. According to the DSM-IV, the pathological manifestation of SA can be divided into two forms according to the number of social or performance situations that generate anxiety: generalized SP and specific (or circumscribed) SP. The generalized form of the disorder is frequently a chronic, disabling condition (Davidson et al., 1993) marked by the phobic avoidance of most interaction situations and leading to social, educational, professional and personal impairment (Schneier et al., 1994). The specific subtype of the disorder is characterized by the fear or avoidance of a single situation (e.g., speaking in public) and is normally less disabling than the generalized subtype.

In addition to the problems brought about by the condition itself (interpersonal relationships, academic and professional performance, etc.), individuals suffering from SP tend to have comorbid conditions that not seldom constitute the main complaint when these people seek for help (Mathew et al., 2001). The most common comorbid conditions in SP are depression, generalized anxiety disorder (GAD), and alcohol and drug abuse, the latter believed to occur as self-medication attempts.

Since SA is rooted in the fear of negative evaluation by others, social cues in the environment are the best candidates for processing biases by affected individuals (Foa et al., 2000). Among such social cues, the human face is prominent due to its capacity to convey a number of different emotional contexts, functioning as the "traffic signs" of social interaction.

The cognitive ability to adequately decode information from human faces has been investigated in the context of many psychiatric disorders, such as schizophrenia, autism, depression, GAD, and post-traumatic stress disorder (PTSD). The first studies on the processing of facial information by people with SA date back to the mid 1990s and have increased in number and variety on a yearly basis since then.

There is evidence that people with SA tend to avoid eye-to-eye contact (Marks et al., 1969; Öhman, 1986; Greist, 1995). According to Horley and colleagues (2003), this could be an indicator of "exacerbated social sensitivity". Visual scanpath studies have provided objective data concerning the way that affected people interact with pictures of emotional faces and other emotional stimuli (Horley et al., 2004). While GAD patients present a conventional pattern to scan pictures with potential social threat (Freeman et al., 2000), SP patients display a pattern that has been called hypervigilance/avoidance. According to this pattern, SP patients present a first stage characterized by enhanced attention to negative displays of emotion, such as disgusted and angry faces (Sousa et al., 2006), followed by avoidance of the aversive stimuli (Horley et al., 2003).

Studies involving healthy volunteers have shown that angry faces are more quickly detected among neutral faces than a friendly expression (happy face) presented in the same conditions (Ohman et al., 2001). However, SP patients appear to be even quicker in detecting angry faces than healthy controls (Aronoff et al., 1988).

Different theoretical models try to elucidate the emotional processing alterations in SP. Clark and Wells (1995), for instance, suggest that people with SP confronted with the feared situations tend to direct attention toward themselves, disregarding emotional information available in the environment. Conversely, other cognitive models state that people with SP allocate greater attentional resources to threatening information (Mogg and Bradley, 1998; Mathews and Mackintosh, 1998).

Although most studies support the notion of a negative interpretative bias in SA, some authors and groups failed to find any differences between people with SA and healthy controls in regard to the processing of facial information. D'Argembeau and colleagues (2003), investigating the influence of emotion in the memory for facial identity and expression in people with high and low social anxiety, found no evidence to support that SA is related to processing biases for negative *or* positive faces. Another group (Juth et al., 2005) found evidence supporting that the purported differences between socially anxious individuals and healthy controls only emerge in the presence of a social stressor, such as the necessity to deliver a speech after the task. Also, Philippot and Douilliez (2005) failed to find differences between patients with generalized SP and healthy controls in the labeling of emotions and judgment of emotional intensity of facial stimuli.

The importance of comprehending the pathogenesis of SA and SP in an effort to overcome the impact of these conditions on the life of affected people is the thread that links all studies related to the topic. It was with the purpose of gathering the knowledge available in the field and indicating possible elements that could account for discrepant findings that this review was designed. Thus, the following pages will attempt to provide the reader with an up-to-date panorama of the study on facial emotion processing in SA and SP, highlighting the specificities of the tasks and stimuli used and their possible influence in the conclusions of the different studies performed in the area to date.

2. Materials and methods

2.1. Article search and selection

In order to review the scientific literature on facial emotion processing in SA, we performed a search on the *Medline, PubMed, SciElo, Web of Science, Scopus,* and *PsycInfo* online databases. The search terms used were *social phobia, social anxiety disorder, face, facial, emotion,* and *expression*.

We included articles published in English, Portuguese, and Spanish describing research involving samples of socially anxious individuals and facial emotion processing tasks. Investigations with non-human samples, and studies focused on psychiatric conditions other than SA were excluded from the analysis. Also, we opted not to include articles describing neuroimaging findings, whether accompanied or not by task performance data. This decision was taken in view of the recent publication of a specific review article on the topic (Freitas-Ferrari et al., 2010) and in order to keep the number of articles to be reviewed within a feasible limit.

According to the inclusion and exclusion criteria described above, a total of 40 articles published between 1995 and 2009 were selected for the review.

2.2. Analysis

In order to systematize the information contained in the 40 selected publications, a table was created with the headings: *Authors*, *Year of publication*, *Objective*, *Population* (e.g., university students, patients seeking for treatment), *Characterization/diagnostic instruments*, *SA subjects*, *Additional samples* (subjects with other psychiatric conditions), *Gender—experimental groups*, *Controls*, *Gender—controls*, *Tasks*, *Stimuli*, and *Main results*.

In addition to these, three columns were created with numeric codes assigned to each characterization/diagnostic instrument, task, and stimuli set. These codes were used for the quantitative analysis and the definition of groups according to the characteristics of tasks and stimuli.

Any additional information that did not fit any of the categories but was still regarded as important for the analysis was entered in an additional column named *Remarks*.