



Social anxiety disorder women easily recognize fearful, sad and happy faces: The influence of gender

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ABSTRACT

Background: It has been suggested that individuals with social anxiety disorder (SAD) are exaggeratedly concerned about approval and disapproval by others. Therefore, we assessed the recognition of facial expressions by individuals with SAD, in an attempt to overcome the limitations of previous studies.

Methods: The sample was formed by 231 individuals (78 SAD patients and 153 healthy controls). All individuals were treatment naïve, aged 18–30 years and with similar socioeconomic level. Participants judged which emotion (happiness, sadness, disgust, anger, fear, and surprise) was presented in the facial expression of stimuli displayed on a computer screen. The stimuli were manipulated in order to depict different emotional intensities, with the initial image being a neutral face (0%) and, as the individual moved on across images, the expressions increased their emotional intensity until reaching the total emotion (100%). The time, accuracy, and intensity necessary to perform judgments were evaluated.

Results: The groups did not show statistically significant differences in respect to the number of correct judgments or to the time necessary to respond. However, women with SAD required less emotional intensity to recognize faces displaying fear ($p = 0.002$), sadness ($p = 0.033$) and happiness ($p = 0.002$), with no significant differences for the other emotions or men with SAD.

Conclusions: The findings suggest that women with SAD are hypersensitive to threat-related and approval-related social cues. Future studies investigating the neural basis of the impaired processing of facial emotion in SAD using functional neuroimaging would be desirable and opportune.

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1. Introduction

Social phobia, also known as social anxiety disorder (SAD), is characterized by the excessive fear of humiliation or embarrassment in social or performance situations. The generalized form of the disorder is frequently a chronic, disabling condition (Davidson, 1993) marked by the phobic avoidance of most interaction situations, causing social, educational, professional and personal impairment (Schneier et al., 1994; Filho et al., 2009). The 12-month and lifetime DSM-IV prevalence rate of this disorder is high, of about 7.1% and 12.1%, respectively (Kessler et al., 2005; Ruscio et al., 2008). SAD is also associated with high rates of psychiatric

comorbidities, the most common being depression and substance abuse, among other anxiety disorders (Filho et al., 2009).

One of the major aspects of SAD is the excessive fear of negative evaluation and criticism. Cognitive theories of this anxiety disorder (Beck et al., 1985; Clark and Wells, 1995; Rapee and Heimberg, 1997; Ito et al., 2008) suggest that the patient in the feared social situation, feel negatively evaluated by others to an exaggerated unrealistic extent, expecting to be negatively evaluated and hence conjuring rejection. Thus, they tend to focus their attention toward themselves, which interferes with normal processing of external social cues. This could lead to attentional and interpretational biases in detecting social threat, resulting in hypervigilance toward negative emotions (Leber et al., 2009).

The adequate social functioning is related to the capacity to extract environmental information that is relevant to social outcome (Garner et al., 2006). In this process of evaluating and responding to environmental contingencies, the processing of facial expressions represent an important source of interpersonal information about positive or negative evaluations by others.

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Among the first systematic studies about the facial expression of emotions are the old reports by Charles Darwin (1872). In his work, Darwin demonstrated the evolutionary importance and communicative value of facial expressions. Research in the area has gone a long way since then, dedicating great attention, especially after the 1970s, to the relation between mental disorders and the processing of facial information and particularly emotion. Thus, authors as Beck (1976) and Eysenck (1997) arrived at the concise proposition that the impaired ability to process emotional information from faces plays an important role in the etiology and maintenance of several mental conditions.

In respect to the recognition of facial emotions by people with social anxiety, recent evidence suggests that a bias exist in the facial processing abilities of these individuals in the sense of a greater accuracy for recognition of facial expressions of negative emotions and more frequent wrong judgments of faces as negative (Winton et al., 1995; Lundh and Ost, 1996; Veljaca and Rapee, 1998; Mohlman et al., 2007; Yoon and Zinbarg, 2007, 2008). Also, people with social anxiety seem to take longer to recognize facial displays of happiness (Silvia et al., 2006), at the same that they require less emotional intensity to recognize angry (Joormann and Gotlib, 2006; Leber et al., 2009), sad (Leber et al., 2009), fear (Leber et al., 2009) and disgusted expressions (Montagne et al., 2006). In contrast, Philippot and Douilliez (2005) and Campbell et al. (2009) found no evidence of biased facial emotion recognition in individuals with SAD, and Hunter et al. (2009) reported that people with social phobia have a greater accuracy in the recognition of facial expressions in general, regardless of their emotional valence.

Thus, although the majority of the studies suggest that people with SAD have an impaired capacity to recognize facial expressions of emotion; the reported conflicting findings may be due to the fact that most of them included small samples ranging from 12 to 29 subjects included in the experimental group, with most of patients selected from tertiary services (Lundh and Ost, 1996; Foa et al., 2000; Pérez-López and Woody, 2001; Mogg et al., 2004; Horley et al., 2004; Coles and Heimberg, 2005; Philippot and Douilliez, 2005; Joormann and Gotlib, 2006; Montagne et al., 2006; Mohlman et al., 2007; Gilboa-Schechtman et al., 2008; Campbell et al., 2009; Garner et al., 2009). Also, those studies do not report procedures to prevent the inclusion of patients with psychiatric comorbidities and on medication (Anderson et al., 2007; Arnone et al., 2009; Keresztes et al., 2009), which might have influenced the results obtained. Moreover, another important caveat of the former studies was that most of them did not take gender into account and there is evidence suggesting that gender-related differences exist in the recognition of facial expressions (Cellerino et al., 2004). Therefore, we assessed the recognition of facial expressions of the six basic emotions (happiness, sadness, disgust, anger, fear, and surprise) by individuals with SAD, in an attempt to overcome the limitations of previous studies.

2. Method

2.1. Participants

The sample consisted of 78 patients with generalized SAD (30 men and 48 women; mean age 22.33 ± 5.11 years; mean education 13.03 ± 0.97 years; 79.70% participants reported their ethnicity as Caucasian, 18.05% as African descendant, 2.26% as Asian) in the experimental group and 153 healthy volunteers (53 men and 100 women, mean age 21.43 ± 3.63 years; mean education 12.95 ± 0.94 ; 78.04% participants reported their ethnicity as Caucasian, 13.55% as African descendant, 8.41% as Asian) enrolled in the control group (Table 1).

All the subjects were recruited from the sample of an epidemiologic survey in which 2.319 university students completed self-

Table 1

Clinical and demographic characteristics of the SAD and healthy controls groups.

	SAD (n = 78)	Controls (n = 153)	p
Male/female	30/48	53/100	0.32
Age (years)	22.33 (± 5.11)	21.43 (± 3.63)	0.052
Ethnicity (%)	79.70 ^a /18.05 ^b / 2.26 ^c	78.04 ^a /13.55 ^b / 8.41 ^c	0.98
Education (years)	13.03 (± 0.97)	12.95 (± 0.94)	0.32
SPIN (\pm SD)	35.18 (± 13.18)	17.35 (± 13.35)	<0.0001*
BSPS (\pm SD)	33.36 (± 12.77)	14.78 (± 10.92)	<0.0001*
DPS current	8.63 (± 6.65)	4.92 (± 6.79)	<0.0001*
LSRDS lifetime	13.30 (± 7.34)	6.79 (± 6.77)	<0.0001*
PHQ-2 (\pm SD)	2.24 (± 1.75)	1.15 (± 1.31)	<0.0001*
Age of SAD onset (years)	11.17 (± 4.37)	–	–

SD, standard deviation; SPIN, Social Phobia Inventory; BSPS, Brief Social Phobia Scale; DPS, Disability Profile Scale; LSRDS, Liebowitz Self-Rated Disability Scale; PHQ-2, Reduced Version of Patient Health Questionnaire.

* Significant difference ($p < 0.05$).

^a Caucasian.

^b African descendant.

^c Asian.

assessment diagnostic instruments (Osório et al., 2007; Crippa et al., 2007, 2008). Out of those, 474 were selected and ascribed to two groups: (i) 237 individuals with a probable SAD diagnosis who, screened with the reduced version of the Social Phobia Inventory (MINI-SPIN – Connor, 2001), had a score of at least six points in the three items; and (ii) 237 volunteers with similar sociodemographic characteristics who scored zero in the three items of the MINI-SPIN.

Afterwards, all 474 subjects were contacted by telephone and completed the Portuguese version (Del-Ben et al., 2001) of the anxiety mode of the Structured Clinical Interview for DSM-IV, clinical version (SCID-CV – First, 1997). Following the completion of the interview, the subjects were again distributed in two groups: (i) an experimental group composed by individuals with SAD; and (ii) a control group formed by health individuals. Finally, the full version of the SCID-CV was used for diagnostic confirmation and exclusion of comorbid conditions (Crippa et al., 2008).

The Brief Social Phobia Scale (BSPS) was used to assess SAD severity and the SPIN to rate SAD-related physiological symptoms of fear and avoidance. The Disability Profile Scale (DPS; Schneier et al., 1994) and the Liebowitz Self-Rated Disability Scale (LSRDS; Schneier et al., 1994), instruments designed to provide clinician- and patient-rated descriptive measures of current and lifetime functional impairment related to SAD. The reduced version of the Patient Health Questionnaire (PHQ-2), a brief self-administered scale, was used to assess the frequency of depressed mood and anhedonia symptoms over the two weeks prior to evaluation (Kroenke et al., 2003).

Subjects were excluded from the sample who presented other psychiatric disorders, except for previous depressive episode, since it is a frequently comorbid condition with SAD (Stein and Stein, 2008; Filho et al., 2009). Additionally, we excluded individuals in treatment with psychotropic medication or in use of psychoactive substances, and the ones who presented with a general medical condition or who had received previous treatment for SAD (either pharmacological or psychotherapy). The research protocol was approved by the local ethics committee and all volunteers gave their signed informed consent to participate.

2.2. Material

2.2.1. Facial emotion recognition task

We used a computerized task built with stimuli from the series *Pictures of Facial Affect* (Ekman and Friesen, 1976) depicting six basic emotions – happiness, sadness, fear, disgust, anger, surprise

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