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## Social anxiety and trustworthiness judgments of dynamic facial expressions of emotion



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### ABSTRACT

**Background and objectives:** Perception of trustworthiness in other people is essential for successful social interaction. Facial expressions—as conveyers of feelings and intentions—are an important source of this information. We investigated how social anxiety is related to biases in the judgment of faces towards untrustworthiness depending on type of emotional expression and expressive intensity.

**Methods:** Undergraduates with clinical levels of social anxiety and low-anxiety controls were presented with 1-s video-clips displaying facial happiness, anger, fear, sadness, disgust, surprise, or neutrality, at various levels of emotional intensity. Participants judged how trustworthy the expressers looked like.

**Results:** Social anxiety was associated with enhanced distrust towards angry and disgusted expressions, and this occurred at lower intensity thresholds, relative to non-anxious controls. There was no effect for other negative expressions (sadness and fear), basically ambiguous expressions (surprise and neutral), or happy faces.

**Limitations:** The social anxiety and the control groups consisted of more females than males, although this gender disproportion was the same in both groups. Also, the expressive speed rate was different for the various intensity conditions, although such differences were equated for all the expressions and for both groups.

**Conclusions:** Individuals with high social anxiety overestimate perceived social danger even from subtle facial cues, thus exhibiting a threat-related interpretative bias in the form of untrustworthiness judgments. Such a bias is, nevertheless, limited to facial expressions conveying direct threat such as hostility and rejection.

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### 1. Introduction

Social anxiety and social phobia (or social anxiety disorder, SAD) are characterized by persistent and excessive fear and avoidance of situations involving scrutiny and possible negative evaluation by other people (American Psychiatric Association, 2013; Heimberg, Brozovich, & Rapee, 2014; Skocic, Jackson, & Hulbert, 2015). According to cognitive-behavioral models, such symptoms are due to biases towards threat-related interpretations of ambiguous social cues (Clark, 2001; Heimberg et al., 2014; Hofmann, 2007), and even of positive social events (e.g., Alden, Taylor, Mellings, & Laposa, 2008; Weeks & Howell, 2012). Prior research has found support

for this proposal: When presented with descriptions of ambiguous social scenes, socially anxious individuals interpret them in a more negative or a less positive manner, relative to non-anxious individuals (for a review, see Mobini, Reynolds, & Mackintosh, 2013). During social interaction, facial expressions represent an important source of information about the feelings and intentions of other people, such as the liking and approval expressed by happy faces, the hostility of angry faces, and the rejection conveyed by disgusted faces. Accordingly, given the nature of social anxiety, and that facial expressions in social settings are frequently ambiguous (Calvo, Gutiérrez-García, Fernández-Martín, & Nummenmaa, 2014), we could predict that social anxiety is likely to bias the recognition of negatively valenced expressions.

Against this prediction, however, there is no clear empirical support for an interpretative bias in facial expression categorization (for a review, see Staugaard, 2010; also, Gilboa-Schechtman & Shachar-Lavie, 2013). Social anxiety is not generally associated

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with recognition in/accuracy for *basic* emotional expressions (e.g., anger, etc.). There is, nevertheless, some—albeit limited—evidence that socially anxious individuals tend to interpret *ambiguous*, morphed or blended, expressions in a more negative way (as angry: Bell et al., 2011; Yoon, Yang, Chong, & Oh, 2014; or as contemptuous: Heuer, Lange, Isaac, Rinck, & Becker, 2010) or in a less benign fashion (as less happy: Gutiérrez-García & Calvo, 2014), relative to non-anxious individuals. But, even for ambiguous expressions, there have been failures to find any differences as a function of social anxiety (e.g., Button, Lewis, Penton-Voak, & Munafò, 2013) and SAD (e.g., Jusyte & Schönenberg, 2014). Accordingly, it is possible that socially anxious and non-anxious individuals decode emotional facial expressions similarly in explicit recognition tasks.

Nonetheless, faces and facial expressions convey multiple information, and observers routinely make not only state inferences about transitory emotions of other people (e.g., angry), but also trait inferences about relatively stable personality characteristics (e.g., aggressive) upon meeting unfamiliar people (see Said, Haxby, & Todorov, 2011; Todorov, Said, Engell, & Oosterhof, 2008). Furthermore, trait inferences are influenced by expressive facial cues, according to the emotion overgeneralization hypothesis (Franklin & Zebrowitz, 2013). One of such trait judgments involves un/trustworthiness evaluation (i.e., how much someone seems trustworthy for a satisfactory or, rather, a potentially harmful personal or professional engagement), which is particularly relevant in practical terms for successful social behavior. Importantly for the aims of the current study, trustworthiness judgments presumably entail a directly relevant component of social anxiety, as it involves fear and avoidance of interaction with people from whom disapproval or negative evaluation is anticipated; and indeed trustworthiness judgments implicate approach or avoidance in social interaction (van't Wout & Sanfey, 2008). Accordingly, social anxiety might drive *untrustworthiness* judgments (or curtail trustworthiness) as a preventive, self-protecting mechanism: To avoid feared negative evaluation, anxious individuals could be alert to subtle facial cues indicative of untrustworthiness, or to over-interpret ambiguous cues as signs of untrustworthiness. Furthermore, this would be especially likely to occur for facial cues of anger and disgust—even if subtle—because they are associated with hostility and rejection.

Empirical evidence regarding the relationship between social anxiety and facial trustworthiness judgments is scarce. To our knowledge, only two studies have directly addressed this issue (Cooper et al., 2014; Meconi, Luria, & Sessa, 2014), and another one has considered trait anxiety (Willis, Dodd, & Palermo, 2013). In spite of the conceptual link that we have just proposed between trustworthiness and social anxiety, the results of these studies are not convergent. Willis et al. (2013) found a negative relationship between trait anxiety and trustworthiness judgments. Individuals with higher levels of trait anxiety perceived affectively neutral faces as less trustworthy than those with lower anxiety. Meconi et al. (2014) found that differences in SPCN (an electrocortical correlate of visual working memory processing) between trustworthy and untrustworthy—albeit not explicitly emotional—faces correlated with social anxiety. Untrustworthy faces enhanced SPCN amplitudes especially in anxious participants, who encoded untrustworthy faces in working memory better than non-anxious participants. In contrast, however, Cooper et al. (2014) reported that the magnitude of the relationship between social anxiety and trustworthiness judgments was not significant, also using non-

emotional expressions. The limited evidence thus suggests that the influence of social anxiety on trustworthiness deserves further investigation with complementary approaches.<sup>1</sup>

To this end, we aimed to extend prior research in various respects. First, we used *emotional* (happiness, anger, fear, disgust, sadness, and surprise) rather than neutral facial expressions as stimuli. This allowed us to determine (a) whether social anxiety is related to biased trustworthiness judgments generally, regardless of positive or negative emotional expression, or (b) such a relationship involves all the negative expressions, or (c) it only involves those conveying direct threat (anger) or rejection (disgust). Second, assuming ambiguity is a critical condition for interpretative biases, we varied the *intensity* of each expression from a neutral to a full-blown emotion. As ambiguity increases at low intensities, we were particularly interested in those ranging from 10 to 50%. This manipulation has been performed in some studies on social anxiety and expression *recognition* (e.g., Bell et al., 2011; Button et al., 2013). We extended it to establish *trustworthiness* thresholds for each emotion relative to neutral expressions. Third, we used *dynamic* displays by means of video-clips. This was aimed at increasing ecological validity, given that facial behavior in real life is dynamic; and also at increasing sensitivity, as dynamic displays improve recognition, particularly for ambiguous and subtle expressions (see Krumhuber, Kappas, & Manstead, 2013). Fourth, beyond the prior studies on trustworthiness as a function of trait anxiety or pre-clinical social anxiety, we included participants reaching *clinical* cut-off scores in self-report scales (albeit not patients). Given the continuum between sub-clinical social anxiety and clinical levels of social phobia (García-López, Beidel, Muela-Martínez, & Espinosa-Fernández, in press; Rapee & Heimberg, 1997; see Morrison & Heimberg, 2013), our approach is presumably relevant to social anxiety disorder.

This approach was implemented in an experiment investigating whether and how social anxiety was related to trustworthiness evaluation of faces depending on type of emotional expression and expressive intensity. Undergraduates with high or low social anxiety were selected as participants. They were presented with 1-s video-clips displaying facial expressions at various levels of emotional intensity (from 0% or neutral to 100% or full-blown). The task involved judging how trustworthy the person showing each expression looked like. We predict that high social anxiety will be associated with (a) reduced trustworthiness (or increased untrustworthiness) evaluation of negative expressions related to hostility and disapproval (i.e., angry and disgusted), but (b) will *not* be related to trustworthiness processing of negative expressions not conveying any direct threat (sad and fearful), nor (c) those that are merely ambiguous (surprised and neutral), with no explicit positive or negative cue, or (d) positive (happy) expressions. These predictions are concerned, respectively, with what we label as the (a) threat, (b) negativity, (c) ambiguity, and (d) positivity hypotheses. In addition, we predict that trustworthiness *thresholds* will be especially affected for angry and disgusted expressions: Such expressions will be perceived as conveying greater *untrustworthiness* at *lower intensities* than the other expressions for socially anxious participants than for non-anxious controls.

## 2. Methods

### 2.1. Participants

Forty-eight undergraduates (32 female) took part in the experiment for course credit, after informed consent. The mean age of participants was 21.5 years (range 19–25 years). All of them were of the same ethnic background (white Caucasian of Spanish origin). They were selected from a pool of 349 students, on the basis of their

<sup>1</sup> As suggested by a reviewer, constructs such as “how evaluating” or “how disapproving” the faces seem to socially anxious individuals could help to specify the meaning and nature of un/trustworthiness judgments, and thus would be worthy of investigation.

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