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Alexithymia and perception of facial expressions of emotion

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ABSTRACT

The goal was to provide a clear test of deficits in perception of emotion in alexithymia by investigating the ability to detect and rate the intensity of facial expressions of emotion. Alexithymia was assessed by the 20-item Toronto alexithymia scale (TAS 20). In the first study, using signal detection methods, alexithymia was found to be associated with difficulties in detection of anger, sadness, and fear in a sample of 128 students. In the second study, there was a marked reduction of ratings of the intensity of the expression of fear among a sample of 43 students scoring high or low on the TAS 20. Characterization of the perceptual deficit was provided by its correlation with Externally-Oriented Thinking. The emotion perception deficit would make it difficult negotiating the socio-emotional world, potentially leading to avoidable stress and conflict.

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Alexithymia is the term applied to a clinical condition and a trait characterized by difficulties processing emotion (Sifneos, 1973; Taylor, Bagby, & Parker, 1997). People described as alexithymic have difficulty finding words for feelings and show associated deficits in communicating emotions to others (McDonald & Prkachin, 1990). Several investigators have found people with alexithymic characteristics to be less accurate in recognition of emotional expressions (Jessimer & Markham, 1997; Lane et al., 1996; Lane, Sechrest, & Reidel, 2000; Parker, Prkachin, & Prkachin, 2005; Parker, Taylor, & Bagby, 1993).

A number of paradigms make it possible to dissociate decoding and language deficits in perceptual mechanisms underlying facial recognition. The availability of a standardized set of facial expressions of emotion (Ekman & Friesen, 1976) has enabled the development of procedures in which perceptual, memory, attention and cognitive processes involved in facial affect can be assessed. Both signal detection (Prkachin, 2003) and reaction time paradigms (Calder, Young, Keane, & Dean, 2000) are sensitive to subtle differences in the perception of emotional expressions. These studies of the perception of facial expressions provide indirect evidence of a dissociation of the language requirement from perceptual processing (Prkachin, 2003).

General models of perception, cognition, memory, language and emotion highlight the notion that there is an interactive component to these processes. This raises questions about the impact of emotion processing on detection as opposed to recognition of emotional signals. This study used a paradigm that minimizes recognition and language requirements and is sensitive to difficulties in perceiving facial expressions of emotion (Prkachin, 2003). It was designed to be a clearer test of the hypothesis that alexithymics are deficient in processing facial affective information.

1. Study 1

1.1. Method

1.1.1. Participants

One hundred twenty-eight undergraduates (45 males and 83 females), all right-handed, participated in exchange for course credit. They ranged in age from 17–55 with an average age of 22.5 years.

1.1.2. Measures

The 20-item Toronto alexithymia scale (TAS-20) is a reliable self-report scale with confirmed concurrent validity and the most widely-used measure of alexithymia. The 20 items are rated on five-category scales ranging from "totally disagree" to "totally agree" yielding a possible total score of 100. A cut-off score of 61 has been proposed to categorize respondents as alexithymic (Taylor, 1994). Total scores on the TAS-20 and its three factor analytically derived components Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally-Oriented Thinking were determined. Three groups were formed based on total TAS score. Low TAS (TAS <51, $n = 22$ males, 38 females), Intermediate TAS (TAS >51, <61, $n = 18$ males, 29 females), High TAS (TAS >61, $n = 5$ males, 16 females).

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1.1.3. Materials

A 32 cm × 42 cm monitor and VCR player were used to present the video taped stimuli. Four videotapes of 90 faces were composed from Ekman and Friesen (1976) pictures of facial affect. The pictures were digitized and arranged on video tape with video editing equipment. A sample of an expression of emotion (the target expression) was presented for 5 s. The sample was followed by a test series consisting of the 90 different faces. Each test image was presented as a single frame (33 ms) with a 2 s interval between each face. The faces of 15 different people posing six expressions of emotion (happiness, sadness, anger, disgust, surprise, fear) were selected and arranged in 15 sets for a total of 90 faces. Each of the six expressions appeared once within each of the 15 sets. The order was random and ensured that the six expressions were distributed across the 90 faces in the test series. A voice, recorded on the videotape, stated the trial image number (sequentially from 1 to 90) immediately prior to the presentation of each face. The faces were 23 cm × 18 cm (approximate actual head size) on the monitor.

The video tape presented the six target expression samples and six test series. The same 90 faces were included in each of the six versions of the test series; however, the order of the 15 sets of the six expressions was changed for each. Target expressions and test series were presented in four different orders. Happiness as the target expression was always presented first and surprise last. The other expressions (anger, disgust, sadness and fear as target expressions) were presented as either the second, third, fourth or fifth target expression.

1.1.4. Procedure

Participants adjusted their chairs for comfortable viewing of the video. They were told that after a sample expression was presented the test series would follow. They were to say "yes" if the face they saw depicted the target emotion and to remain silent if it did not. This procedure was repeated for each of the six target expressions, beginning with happiness and ending with surprise. The participants were allowed approximately 2 min of rest between presentations of each of the target expressions. The entire experiment lasted between 45 and 60 min.

The experimenter recorded the number of each trial on which the participant said "yes". Half the participants completed the TAS-20 before the detection task, half after. Data reduction. Participants' ability to detect the targeted expression was evaluated by signal detection methods. Signal detection methods separate the individual's perceptual sensitivity to, or ability to discriminate, emotion states from their bias toward saying, or not saying, that an emotion is present, based on hit and false alarm probabilities. The frequency of hits and false alarms was determined for each of the six target expressions. A hit (H) was defined as saying the target emotion was present when it was (i.e., saying "yes" following the presentation of a happy face when the target expression was happiness). A false alarm (FA) was defined as saying the target emotion was present when it was not (i.e., when sadness, anger, disgust, surprise or fear were presented and happiness was the target emotion). The frequencies of hits and false alarms were converted to probabilities (PH, PFA). The ability to detect the target expression was indexed by *A*' and bias by *B*" (Snodgrass & Corwin, 1988). *A*' is an estimate of the area under the receiver-operating-characteristic curve defined by a single pair of hit and false alarm probabilities. When hit probabilities exceed false alarm probabilities, *A*' is defined as $0.5 + ((H-FA)(1 + PH-PFA))/((4H)(1-FA))$. When false alarm probabilities exceed hit probabilities, $A' = 0.5-(FA-H)(1 + FA-H))/(4\ FA(1-H))$ and $B'' = (H(1-H)-FA(1-FA))/(H(1-H)+FA(1-FA))$.

1.2. Results

A' values were entered into a 3 (groups) × 2 (sex) × 2 (order: TAS taken before or after the detection task) × 4 (order of target emotions) × 6 (emotions) analysis of variance (ANOVA), with repeated measures on the last factor. The Greenhouse-Geisser adjustment to degrees of freedom was used to evaluate the statistical significance of effects involving the repeated measures factor. A priori *t*-tests were used to compare the *A*' values between the three groups of TAS-20 defined participants. In addition, a univariate *F*-test was conducted to allow the inclusion of eta squared (μ^2) for the contrasts of each of the different emotional expressions. Pearson correlations were also calculated between the total TAS-20 score and the signal-detection measures.

Neither test order nor order of presentation of the expressions had statistically reliable effects on participants' ability to detect the expressions of emotion, nor did these variables result in significant interactions with any other variable. The main effect of emotional expression was statistically significant, $F(5, 289) = 161.6$, $p < .001$, $\mu^2 = .57$. There were also statistically reliable effects of TAS group, $F(2, 122) = 7.7$, $p < .01$, $\mu^2 = .11$, and sex, $F(1, 122) = 15.2$, $p < .001$, $\mu^2 = .11$. There were also reliable emotional expression × TAS group, $F(10, 289) = 2.6$, $p < .05$, $\mu^2 = .04$, and emotional expression × sex, $F(5, 289) = 3.4$, $p < .05$, $\mu^2 = .03$ interactions. These effects can clearly be seen in Fig. 1a and b, where average *A*' values for detection of each of the expressions of emotion are presented for each of the three TAS groups by sex.

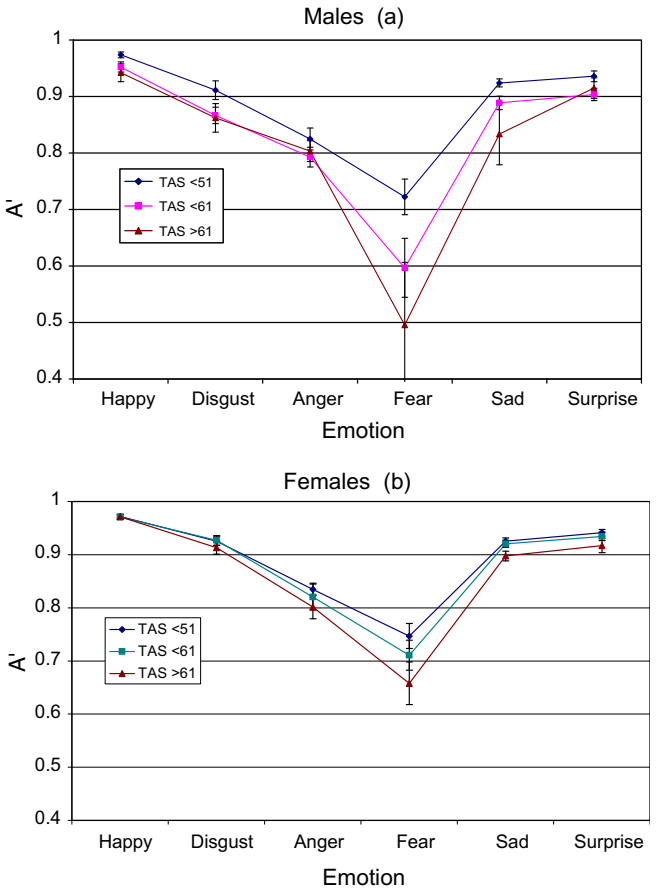

Fig. 1. Sensitivity to facial expressions of six emotions by TAS group for male (a) and female (b) participants.

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