Affect Identification of Social and Nonsocial Stimuli in Williams Syndrome

R. Ng1, K.J. Hill2, A.M. Järven-Paslay3, & U. Bellugi2

1University of California, San Diego, 2The Salk Institute for Biological Studies

Introduction

Williams syndrome (WS) is a rare genetic disorder characterized by mild to moderate mental retardation. Traditionally, other individuals with a similar degree of cognitive impairment have been found to be social, however, those with WS present social traits (i.e., approach strangers, initiate interactions, express emotions) to a greater extent and intensity than typically developmentally delayed (DD) individuals (similar in IQ range to the WS group). Other studies also suggest WS individuals have similar performance in affect identification compared to other with similar cognitive abilities (Gagliardi et al., 2003). Yet, WS individuals are found to have a heightened emotion recognition ability for social stimuli, suggesting their affect-identification performance compared to controls may be influenced by the type of stimuli presented (Järven-Paslay et al., 2004). The study suggests that cognitive ability may contribute to the affect-identification performance of WS individuals. The enhanced performance in emotion recognition of social stimuli by WS individuals suggests they may have a greater social bias than cognitively-matched controls.

The present study was designed to examine the differences in affective facial identification performance between social and nonsocial stimuli in developmentally delayed (DD) individuals (similar in IQ range to the WS group), typically developing (TD) controls, and WS individuals. It is hypothesized that individuals with WS will perform better than TD in discriminating emotions across both positive and negative valence of social and nonsocial items. Williams Syndrome Syndrome individuals are predicted to have greater performance in affective identification for social stimuli than the developmentally delayed group, but worse than the typically developing group.

Methods

Participants

A total of 40 individuals between the ages of 15 to 35 years were recruited for this study. Inclusion criteria were:

- Normal range in visual and auditory assessment.
- WS participants were confirmed using fluorescent in situ hybridization (FISH) genetic tests for elastin (Zwart et al., 1993).
- DD participants were confirmed with clinical diagnosis of DD.
- All participants had complete clinical assessment of DD.
- Individuals with mild to moderate mental retardation (IQ range of 50-70) and DD diagnoses were categorized into the DD group.

Stimuli

Facial stimuli were obtained from a database of emotional facial expressions. All stimuli were presented equally: facial stimuli were adapted from Diman and Friessen (1975). Inverted facial images represented non-social stimuli while upright faces denoted social stimuli. For the social stimuli, happy, sad, afraid, angry, surprised, and disgusted were each expressed 12 times; neutral emotion was presented 20 times. For the inverted stimuli, positive-valenced emotions were expressed 12 times, neutral emotion was expressed 20 times, while happy, sad, angry, and disgusted negative-valenced emotions were each expressed 12 times.

The WS group was instructed by the experimenter to attentively look at the stimulus presented to the computer screen. Images were presented sequentially for duration of 1s using LabArt. The study was approved by the institutional Review Board.

Procedure

The participants were told to "decide how the person is feeling" and to verbally indicate which emotion was represented. The post-hoc test revealed that DD groups had significantly better performance in the recognition of social and nonsocial stimuli. Overall, the DD group identified emotions with greater accuracy than WS and TD groups. These findings provide support for the emotion-specificity hypothesis, indicating that cognitive ability affects emotion-recognition ability (Rogers, Rubel, & Schneider, 1993). Cognitive ability may contribute to the performance differences in emotion recognition between WS and TD individuals. Although WS individuals, similarly to DD participants, scores were significantly lower in overall emotion recognition relative to TD group, WS participants did not have the affect-identification performance similar to DD participants in the negative-valenced, upright faces. Yet, WS individuals performed equally well in both upright and inverted conditions for positive-valenced faces. This finding shows WS individuals have an emotion recognition ability that differs from that of DD and TD depending on the face-orientation and the emotion expressed. The present findings suggest WS individuals may process positive and negative emotions in faces supports the hypothesis that WS individuals process facial emotions differently than normal healthy individuals (Haas et al., 2010).

All groups identified positive-valence emotions significantly better than negative-valenced emotions for upright faces. The post-hoc test found no significant difference in the recognition of positive-valence emotions in inverted faces. However, TD group significantly better than DD participants, p < .05. All three groups exhibited a greater accuracy in identifying positive valence relative to negative valence in inverted faces. The post-hoc test revealed that DD groups performed significantly better in the recognition of negative valence of inverted faces than both DD and WS, p < .01. There was no significant difference observed between DD and WS for this valence.

Conclusion

Overall, the TD group identified emotions with greater accuracy than DD and WS groups. These findings provide support for the emotion-specificity hypothesis, indicating that cognitive ability affects emotion-recognition ability (Rogers, Rubel, & Schneider, 1993). Cognitive ability may contribute to the performance differences in emotion recognition between WS and TD individuals. Although WS group, similarly to DD participants, scores were significantly lower in overall emotion recognition relative to TD group, WS participants did not have the affect-identification performance similar to DD participants in the negative-valenced, upright faces. Yet, WS individuals performed equally well in both upright and inverted conditions for positive-valenced faces. This finding shows WS individuals have an emotion recognition ability that differs from that of DD and TD depending on the face-orientation and the emotion expressed. The present findings suggest WS individuals may process positive and negative emotions in faces supports the hypothesis that WS individuals process facial emotions differently than normal healthy individuals (Haas et al., 2010).

Affective identification of facial expressions has been widely studied in WS. Studies suggest that emotion recognition ability is typically better than Developmentally Delayed (DD) individuals (similar in IQ range to the WS group). However, the study suggests that other individuals with WS may have a heightened emotion recognition ability for social stimuli. The findings of this study further support the hypothesis that WS individuals may have a heightened emotion recognition ability for social stimuli. However, cognitive ability may contribute to the performance differences in emotion recognition between WS and TD individuals. Although WS groups, similarly to DD participants, scores were significantly lower in overall emotion recognition relative to TD group, WS participants did not have the affect-identification performance similar to DD participants in the negative-valenced, upright faces. Yet, WS participants performed equally well in both upright and inverted conditions for positive-valenced faces. This finding shows WS individuals have an emotion recognition ability that differs from that of DD and TD depending on the face-orientation and the emotion expressed. The present findings suggest WS individuals may process positive and negative emotions in faces supports the hypothesis that WS individuals process facial emotions differently than normal healthy individuals (Haas et al., 2010).