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## Exploring the Relationship Between Emotion Recognition, Autistic Traits, and Alexithymia Traits in College Students

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EXPLORING THE RELATIONSHIP BETWEEN EMOTION RECOGNITION, AUTISTIC  
TRAITS, AND ALEXITHYMIA TRAITS IN COLLEGE STUDENTS

A Thesis

by

LUIS E. SANCHEZ

Submitted to the Graduate College of  
The University of Texas Rio Grande Valley  
In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2021

Major Subject: Experimental Psychology



EXPLORING THE RELATIONSHIP BETWEEN EMOTION RECOGNITION, AUTISTIC  
TRAITS, AND ALEXITHYMIA TRAITS IN COLLEGE STUDENTS

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May 2021



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## ABSTRACT

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Accurately recognizing and interpreting the emotions of others face, voice, and body language is a crucial component for successfully building good social skills with peers. This study explores emotional recognition in individuals with autistic traits, measured by the Autism Spectrum Quotient (AQ), and individuals with alexithymia traits, measured by Toronto Alexithymia Scale-20 (TAS-20). Individuals are presented with various complex emotions using Geneva Emotion Recognition Short version (GERT-S). This present study examines the relationship between AQ and TAS-20 and determine if there is any interaction between them for emotional recognition. The researcher found that there was a negative correlation between autistic traits and emotional recognition abilities. The results also indicate that there was a positive correlation between autistic traits and alexithymia traits, but they did not interact with each other for emotional recognition.



## DEDICATION

The completion of my master's degree would have not been possible with the love and support of my family. My mother, Yolanda Sanchez, my father Salome Sanchez, my brother, Jorge Sanchez, and my sister, Vanessa Sanchez, wholeheartedly inspired, motivated, and supported me to accomplish this degree. Thank you for your love and patience.



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## CHAPTER I

### INTRODUCTION

Emotion recognition among individuals is critical when it comes to having good social interaction. Therefore, having a deficit in emotion recognition leads to social distancing toward other individuals. (Brewer et al., 2015). Research by Carver and Dawson., (2005). Emotion recognition is distinguished in infants and continues to expand its understanding through childhood and adolescence due to interaction one may have in social stimuli. Individual's at an early childhood start building social interaction with other peers and understanding emotion body language is the start of building a relationship with other's. Human's perception of how to interact and approach peers can be visualized through understanding body language of others. If a person can be seen as a cheerful person one may want to approach them to interact with them, but if one is seen as defiant and anti-social then one may want to avoid that person as he might want to be left alone. Understanding facial emotion recognition is an important aspect when having good emotion recognition in studies that imply pictures or videos of facial emotion expressions and suggest abnormalities in emotion recognition that are associated with social difficulties in ASD (Clark et al., 2015). Having good social cues another person may give can be an important part when first interacting with a peer. Having the ability to discriminate and identify emotions can lead to having good social skills as it comes naturally to developing (TD)

individual, but emotion recognition can be a deficit in individuals with autism spectrum disorder (ASD) and alexithymia may face (Brewer et al., 2015).

Previous research has been study in individual's age difference to try to determine if it plays an important role in emotional recognition. Lawrence et al. (2015) focus his research on the development of emotion recognition in TD individuals that focus his research on children between the age 6 and 16 years old. Their findings showed a significant similarity of children 6 years were highly accurate to near adult level in recognizing basic emotions such as happy, surprise, fear, and disgust. In addition, previous research done by Lozier et al., (2014) mentioned that IQ scores does not contribute with emotional recognition but instead age did show to have an increase deficit, such that adults showed a larger impairment than children and adolescents. Also, an important factor that should be point out is that individual in this study focus on basic emotions. Research done by Rump et al., (2009) have been done regarding different roles of intensity in different emotions where participants ranging from different ages with and without ASD were showed face processing between neutral to emotional faces with different intensity in emotions being displayed. The results showed that individuals in the ASD group were less accurate than TD group ranging from age 5-7 years old when intense emotions such as fearful, angry, and disgust were showed. However, in younger age group the overall score did not differ in overall performance meaning that when neutral face emotions were displayed the ASD group perform better to average out the scores. Research by O'Conner et al., (2005) mentioned that in his research overall performance in emotional recognition did improve with age in the TD group as opposed to the ASD group that showed no improvement with age. Emotion recognition in TD can come naturally in young children's as they can distinguish between different social cues but one in the ASD or alexithymia group may find it complex.

Research by (Poqerusse et al., 2018) claimed that individuals with ASD or alexithymia struggle with having good social communication because it involves being able to understand people's emotions by their facial expression as it helps build social relationships with peers. Being able to discriminate between facial expressions could help individuals with communication, as it is vital in social understanding and interaction. Good emotion recognition is not just understanding verbal language, but also comprehending another person's nonverbal expression in facial expression, tone of voice, or body language (Schlegel et al., 2014). Having a good sense of understanding emotion recognition is a key ability in social interaction, as it can serve as a prerequisite for understanding, antedate, and knowing how to proceed appropriately to another person's behaviors (Schlegel et al., 2014). Making friends is not an easy step for anyone sometimes even TD individuals struggle with social anxiety when it comes to first interacting with new peers. However, having a good sense of understanding emotional recognition can put one in a good position to know who to interact with and when. In contrast, Individuals with ASD or alexithymia may not have the same knowledge a TD may have when it comes to understanding good social cues in emotion recognition. Even individuals who are not diagnosed with ASD or alexithymia but may have autistic-like-traits or alexithymia-like traits can also deal with challenges one may have in emotional recognition and dealing with the same problems when it comes to having good social skills.

ASD is a complex developmental condition that leads to different challenges when it comes to social interaction, speech, and nonverbal communication, and restricted/repetitive behaviors (American Psychiatric Association, 2013). Also, it is identified as an emotional understanding deficit in both the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013) and the International Statistical Classification of

Diseases and Related Health Problems, (ICD-10, World Health Organization 2004). Unlike ASD, alexithymia is not a diagnosed or does it have a steady classification in the psychiatric nosography (Poquerusse et al., 2018). On the other hand, alexithymia is a condition that involves having difficulty with identifying one's own's emotions, not being able to communicate his feelings, and discriminating emotions in other's facial expressions or body language. (Fujiwara, 2018). One of the common traits that individuals with alexithymia have is not having the ability to verbalize their emotions which can be due to their unawareness or confusion they to their own emotions.

A high volume of past research has been conducted to determine the relationship between autism spectrum disorder (ASD) and alexithymia. However, most answers have been ambiguous. Interestingly, ASD and alexithymia are not from the same class of diagnosis, nor have any uniqueness to each other. Still, alexithymia is highly common in ASD, as approximately half of the population of individuals with ASD share a co-occurrence of ASD and alexithymia (Poquerusse et al., 2018). Individuals with co-occurrence of ASD and alexithymia share a deficit in emotion recognition due to attention to emotions. Attention to emotion is when an individual can attend and monitor his feelings to others. (Vermeulen et al., 2006; Cook et al., 2013). Having the ability to attend to emotions can one of the reasons that individuals with ASD and alexithymia have a deficit in recognizing between different emotions. Over time the co-occurrence of alexithymia and ASD have gained the attention of researchers that aimed to investigate the relationship between them. ASD and emotional recognition impairments have been insufficient due to some individuals who are diagnosed with ASD showed no deficit in emotion recognition (Dawson et al., 2002). Therefore, the co-occurrence of alexithymia in ASD may explain the inconsistency in previous research relating to emotion recognition.

## CHAPTER II

### LITERATURE REVIEW

#### **Autism Spectrum Disorder and Alexithymia and their connection**

Autism spectrum disorder (ASD) is commonly known for the impairment in social and communication skills, as well as seeing repetitive behaviors and by noticing lack of interest in others. However, there is more to individuals in the spectrum, people diagnosed with autism also experience severe behavioral and affective impairments while having a speech disorder along with attention deficit and compulsive behaviors (Poqerusse, Pastore, Dellantonio, & Esposito, 2018). ASD interferes with how individuals act around others, they might not be able to communicate efficiently or be able to make eye contact with another individual. ASD can correctly distinguish emotional language however, they are not able to explain themselves when it comes to their choices and emotions (Poqerusse et al., 2018). Even though emotional language is comprehended, their divergent memory and attention patterns has an impact in the way they process the emotional content being displayed to them.

Individuals with alexithymia have a deficiency when dealing with the expression of emotions and moods (Poqerusse et al., 2018). When an individual is asked to express their feelings, it is challenging for the individual considering how they are not aware of their emotions which leads them to struggle in verbalizing emotions. According to Poqerusse et al. (2018) individuals tend to express their emotions and experiences through the somatic sensations they

encounter, the inability to be able to express their emotions leads the individual to have a narrative style of speaking when talking about emotions while showing a lack of interest on the topic. Individuals with alexithymia do not only have difficulty expressing their own emotions but have difficulty being able to perceive facial expressions and the tone of voice of other's as well, resulting in not being able to fully consider another individual's point of view.

Even though alexithymia and autism are two different topics there has been multiple research studies linking them together. Previous research emphasizes that it difficult in identifying and describing one's own emotions when dealing with the subclinical trait of alexithymia (Brewer et al., 2015). Therefore, not being able to recognize emotions in oneself could affect moral decisions, which is in line with the dual-process theory of morality (Greene et al., 2001; Greene et al., 2004). Moreover, it has also been reported that individuals with autism also have a deficit when being able to identify their own emotions, but other studies have said otherwise (GInleichgerrcht et al., 2013; Moran et al., 2011; Schneider et al., 2013; Zalla, Barlassina et al., 2011). However, this inconsistency could be explained by the co-occurring of alexithymia in ASD. In fact, 10% of the typical population is characterized with alexithymia and is in 50% of the population in ASD. (Berthoz & Hill, 2005). It was previously mentioned how individuals diagnosed with ASD lack interest in others just how individuals with alexithymia have difficulty interpreting others point of views, feelings, and mood thus leading to a connection with difficulties in the social aspect and emotional competence. Even though ASD has various traits of alexithymia on the study conducted it was acknowledged how alexithymia is responsible for the difficulty that individuals face while trying to discriminate interoceptive signals which might be the cause for their deficit in comprehending emotions as well as others (Poquerusse et al. 2018).

### **Facial Emotion Recognition in typical developing (TD) individuals**

Emotion recognition in everyday environment is crucial for good engagement with other individuals. Being able to have good communication one must be able to distinguish between emotions which means to attend to people's facial expressions. Research done by Zang and Parmley (2014) focused on emotion attention and the accuracy in recognizing emotional facial expressions between two different groups. In their study they were measuring between two different groups that were in groups of two between TD close friends and TD acquaintances. In this study, Zang and Parmley (2014) measured for emotions such as happy, sadness, and angry. The results were that individuals who scored high on emotion attention were more accurate than those who score low when identifying between emotions within their group. An interesting outcome was that acquaintance group and close friends group had similar results when identifying emotions between happy and sadness, but the acquaintance group were more accurate than the close friend group in being able to read their partners angry expressions. Having good attentive to people's faces is beneficial to discriminate between different emotions, but the spatial spread of attention in a TD individual is critical for emotional recognition. Previous research, done by Srinivasan and Gupta (2010) stated how they "wanted to explore the recognition memory for emotional distractors especially as a function of focused attention and distributed attention by manipulating load and the spatial spread of attention" (p.207). Having a good attention to detail such as the target and distractors and lead to an individual having a better attention to emotion (Srinivasan and Gupta, 2010). When attention is more spatially focused, sad faces were recognized better than happy faces. In conclusion, Srinivasan, and Gupta (2010) results, supported that emotions do interact with attention, and that the interaction is also dependent on the type of emotional expression stimuli that is presented

## **Social Emotion Recognition in Typical Developing (TD)**

When people walk in an environmental setting they observe and recognize a range of social information that should play a part of what socially appropriate behaviors be acceptable. Picture databased has often been used in experiments to measure individuals measure between different emotional expression to establish if they have a deficit in emotional recognition (Teh, Yap, & Lion, 2018). Using a picture database that consist of having more contextual information regarding emotional social context have a greater benefit in identifying emotional recognition in individuals (Teh, Yap, & Lion, 2018). Identifying emotions by using more than just facial expressions but by adding social scene context can help distinguish what kind of setting the picture may display, which helps one recognize emotions more accurately. Teh and his colleagues (2008) focused his research in using a picture databased that is concentrated in social engagement by presenting pictures that consisted of different “social context and emotional scenes with norms for emotional valence, intensity, and social engagement” (p.1793). As a result, Teh et al. (2018) methods did showed significant linear and quadratic relationships between valence and social engagement ratings, indicating that emotionally charged social scenes were perceived as more engaging than emotionally neutral social scenes (Teh et al., 2018). To create a social bond with other individuals being able to perceive and process contextual cues are required to build a connection with peers.

## **Facial Emotion Recognition in Autism Spectrum Disorder**

One of the main deficits in individuals with ASD is impaired social interaction and communication. An important aspect of having good social interaction is having the ability to discriminate between facial emotion recognition (FER). In a study done by Liu et al. (2019) focused in comparing FER abilities and emotional interference in individual with low and high

functioning ASD traits by performing a facial emotion recognition task (FERT). In the FERT it included being able to identify facial emotions which consist of six different emotions which are: happiness, sadness, disgust, fear, anger, and surprise. A reason for Liu et al. (2019) focusing on these emotions is due to a previous study stating that individuals with ASD could have a deficit in FER when identifying negative facial expressions. Therefore, Liu et al. (2019) extended the research done in individuals with ASD and measure negative facial expression by using FERT and the results to his study showed that individuals with ASD performed less accurate than non-ASD groups on facial emotions differentiation. Also, research by Rump et al. (2009), addressed that individuals in ASD group perform less accurate when emotions were more intense such as fear, angry, and disgust. In addition, Luyster et al. (2019) did a study where they “explore the role of age, emotion type, and emotion intensity in face recognition for individuals with and without ASD” (p.128). The reason for Luyster research is due to a mixture of proven theories, for example it was stated that in recent meta-analyses and reviews have generally concluded that there is a deficit associated with facial emotion recognition in ASD (Harms et al., 2010; Lozier et al., 2014; Uljarevic and Hamilton, 2013) but you can also see reviews by (Jamel et al., 2016; and Nuske et al., 2013) for contrasting conclusions. Luyster et al. (2019) extended the research on individuals with ASD and their emotion type, emotion intensity, and age in emotional face processing by using two different factors simultaneously which were through ERP and a behavioral task. For this reason, Luyster et al. (2019) results showed that there was an “interaction between group age for the P1 latency, such that although it decreased between 12 years old and 18-22 years old in the TD group, no such difference was observed in the ASD group” (p.128). Emotional recognition has been inconsistent in previous research when measured with ASD groups with TD groups.

## **Social Emotion Recognition in Autism Spectrum Disorder**

Social skill impairments, communication, receptive behaviors, attention to others and much more are correlated to ASD; and it is also beneficial to have good social engagement with other individuals. Dickter et al. (2018) research focused on examining attention and emotion processing task on individuals with autistic traits and social anxiety. The interest in their study was to determine if ASD would co-morbid with traits of social anxiety and if it would affect social cognitive processes related to communication. Therefore, as stated by Dickter et al. (2018) their goal for this study was to have a better understanding of the unique contribution of both autistic traits and social anxiety traits when it involves the processing of social stimuli and if it also allows manipulation for attention demands. Dickter et al. (2018) did two studies, study one included participants to complete a flanker task which was used to assess the control for attention, then study two required the students to perform a visual search task. Both tasks were modified to test for emotional processing and the stimulus were changed to facial emotions stimuli. The results to study one showed that those individuals with autistic traits performed more slowly on the flanker task when the stimuli were showing complex emotions. Then in study two, participants with social anxiety traits show a lower percentage in accuracy when all the stimuli would show complex emotions. The results to Dickter et al. (2018) show that individuals with ASD do have trouble in processing between different emotions and leads to having a deficit in good social engagement.

## **Facial Emotion Recognition in Alexithymia**

Individuals with alexithymia have a deficit when having the ability to identify, differentiate, and describe other people feelings, and even their own. According to Fujiwara (2018) mentioned that the problem when it comes to identifying emotions comes from an

“ambiguous blend of emotions in faces and their underlying visual attention patterns” (Fujiwara, 2018, p.571). Individuals with high alexithymia are expected to be less accurate in being able to identify facial emotions, especially those with ambiguous blends (as cited in Brewer, Cook, et., 2011). In addition, individuals with high alexithymia would have similar results as those individuals with low alexithymia (Fujiwara. 2018). In the previous study, Fujiwara used eye-tracking to measure for visual attention during facial emotion processing to identify if looking at the eyes would increase performance, and her results showed that “individuals with high or low levels of alexithymia were equally able to judge facial emotion blends” (Fujiwara. 2018, p.572). Also, the group with high alexithymia attended the eye region of facial stimuli less than low alexithymia group. One of the reasons was particularly for ambiguous blends containing similar proportions of two emotions. Looking at the eyes of the blended target faces did not improve performance in the high alexithymia group but increased their judgement errors.

### **Social Emotion Recognition in Alexithymia**

Alexithymia is describe as having a deficit in identifying one’s own emotions and other people’s emotions. When looking at facial expression’s alexithymia has been linked to not being able to accurately identify the emotions that are displayed. Yet being able to identify the social context cues could help determine what socially behaviors would be appropriate in the current setting. The perception of social information could help an individual with alexithymia distinguished if the environment is either a playful or aggressive setting. For example, if a group of kids are running around a playground, then an individual may not know how they are feeling but pairing playground as fun could help in identifying the kid’s emotions as fun, as compared to watching two people arguing at a boxing match. An individual with alexithymia may not know

the emotions that are being expressed, but they could pair the language they are using with boxing and condition that with the emotion anger.

### **Age and Gender in Emotional Recognition**

Women have shown to be able to identify emotions more accurately when compared to men using two meta-analyses (Thompson & Voyer, 2014), and have shown to be able to identify between different emotions faster than men (Sasson et al., 2010). In addition, Schlegel et al. (2014) reported that women had a slighter significant change advantage than men when identifying between different emotions. A research team aims to examine if women are more precise when distinguishing between processing auditory, visual, and audiovisual emotions. The results state that females were quicker to respond to emotions that were portrayed by a female rather than a male. Also, women were faster at processing facial and multisensory expressions (University of Montreal, 2009). In addition, it was reported that emotional recognition may also decrease with age as previous research found a negative correlation between age and emotional recognition using GERT (Schlegel et al., 2014). Several studies focus only on one modality and a few basic emotions which might determine the reason for this negative correlation of ERA and age (Schlegel, Fontaine, & Scherer, 2017). The research of Schlegel, Fontaine, and Scherer (2017) mentioned that even after presenting a study using more complex emotions their findings were consistent with previous research demonstrating that ERA declines with age. Also research by O'Conner et al. (2005) focused on emotional recognition and age with ASD and TD group, and his conclusion results were that individuals in the TD group did improve with age as opposed to individuals in the ASD group whose overall performance did not improve. His research supports previous research that individuals in the ASD group are more than likely to continue to have a deficit in emotion recognition.

## Current Study

In this thesis the purpose of the study was to measure if there is a negative correlation in autistic like traits and emotion recognition. Another purpose was to determine if there is a negative correlation in alexithymia like traits and emotion recognition. Finally, the last purpose was to measure if autism and alexithymia share a connection in emotion recognition.

Then for the research question is to first identify if there is a negative correlation between lower emotion recognition abilities and individuals with higher autistic-like-traits. The second research question was to identify if there was a negative correlation between lower emotion recognition abilities and individuals with higher alexithymia-like-traits. Then, the third question was to examine if there's an exact relationship between autistic-like-traits and alexithymia-like-traits in emotion recognition (i.e., if there was some interaction between both autistic-like-traits and alexithymia-like-traits).

There are three hypotheses in this study, for the first hypothesis, I predicted a negative correlation between the Autism Quotient (AQ) and Genova Emotion Recognition Test – Short Version (GERT-S). College students with higher autistic traits will have a lower emotion recognition ability. Then, for the second hypothesis, I expected a negative correlation between Toronto Alexithymia Scale 20 (TAS-20) questionnaire and GERT, in other words college students with higher alexithymia traits will have lower emotion recognition abilities. Then for the third hypothesis, I expected that there might be a positive correlation between autistic traits and alexithymia traits, there should be no interaction between them in emotion recognition.

## CHAPTER III

### METHODOLOGY AND FINDINGS

#### Participants

The original sample (N=374) ages from 17-45 years of age undergraduate students from the psychology department of the University of Texas Rio Grande Valley (UTRGV), were recruited for this study by using sona system. A total of 246 participants (179 males, 67 females) ranging from 17-41 years of age. Online informed consent was obtained from each participant prior to the online study and they were granted two course credit for their participation. The UTRGV Institutional Review Board (IRB) approved all procedures used in this study. Exclusionary criteria included, uncooperative to complete all task procedures in one sitting.

Table 1.

*Characteristics of the study population N = 246*

	<b>Min</b>	<b>Max</b>	<b>M</b>	<b>SD</b>
TAS-20	22.00	88.00	53.46	13.42
AQ	1.00	50.00	31.16	6.96
GERT-S	.00	36.00	22.88	5.72

Note: Min = Minimum; Max = Maximum; M = Mean; SD = Standard Deviation; TAS-20 = Toronto Alexithymia Scale; AQ = Autism Quotient; GERT-S = Genova Emotion Recognition Test – Short Version.

## **Procedures**

Each subject completed a consent form, Geneva Emotion Recognition Test short version (GERT-S), the Autism Quotient (AQ), and Toronto Alexithymia Scale (TAS-20). Researchers measure the dependent variable of emotion recognition using GERT-S to determine the relationship with autism by measuring individuals who have autistic-like traits and using the AQ questionnaire. In addition, using GERT was also measured with alexithymia to determine what relationship it has when using TAS-20 questionnaire. Then, researchers justify if AQ and TAS-20 are interacting with each other when measuring for emotion recognition. Next, each questionnaire is divided into subscales and were each measured individually to determine if any specific subscales have a negative correlation towards the significant outcome. Lastly, previous research stated that women are often found to perform better than men when identifying between different emotions (Hall, 1978) this research examined the relationship it has with GERT-S to determine if there is a relationship with gender and age regarding emotion recognition.

## **Measures**

### **Geneva Emotion Recognition Test**

The GERT has two different tests one consists of 83 short video clips and the short version consists of 42 short video clips. In this present study, the Geneva Emotion Recognition Test short version (GERT-S) was used for the purpose that they have both shown to have good reliability and validity. Each video clip contains sounds (duration 1-3 s), in which actors express different emotions, such as (joy, amusement, pride, pleasure, relief, interest, anger, fear, despair, irritation, anxiety, sadness, disgust, and surprise) equaling to 14 different emotions. Participants were given the definition of each emotion before starting the study. Providing the participants

with the definition to each emotion would help participants with any doubt of each emotion before starting the study. For example, “Joy” is defined as “Feeling excited by a fabulous thing that occurred unexpectedly”; secondly, “Amusement” is defined “Laughing at something is very funny”; third, “Pride” is defined as “Feeling of triumph following a success or a personal achievement”; fourth, “Pleasure” is defined as “Experiencing a feeling of well-being and sensual delight”; fifth, “Relief” is defined as “Feeling reassured at the end or resolution of an uncomfortable, unpleasant, or even dangerous situation; sixth, “Interest” is defined as “Being fascinated or having one’s attention captured by a person or thing”; seven, “Anger” is defined as “Extreme displeasure caused by someone’s unfair or hostile action”; eighth, “Fear” is defined as “Being faced with an imminent danger that threatens our physical well-being”; ninth, “Despair” is defined as “Distress at a life problem with no solution, together with an unwilling to accept the situation”; tenth, “Irritation” is defined as “Experiencing displeasure at something or someone while still remaining calm”; eleventh, “Anxiety” is defined as “Fear of or worry about the consequences of a situation that could be unfavorable for oneself or someone close”; twelfth, “Sadness” is defined as “Feeling down after the loss of a person, place, or thing”; thirteenth, “Disgust” is defined as “Revulsion caused by an unpleasant object or environment”; and lastly, number fourteenth “Surprise” is defined as “Being faced with an unexpected and unusual even (without positive or negative connotation)” (GEMEP, Banziger et al., 2011). The video clips were taken from the Geneva Multimodal Emotion Portrayals database (GEMEP, Banziger et al., 2011). After each participant were each given a clear definition of each emotions, they were then directed to a wheel that displayed each emotion and they were given a practice trial video before actually starting the study to clear any confusion.

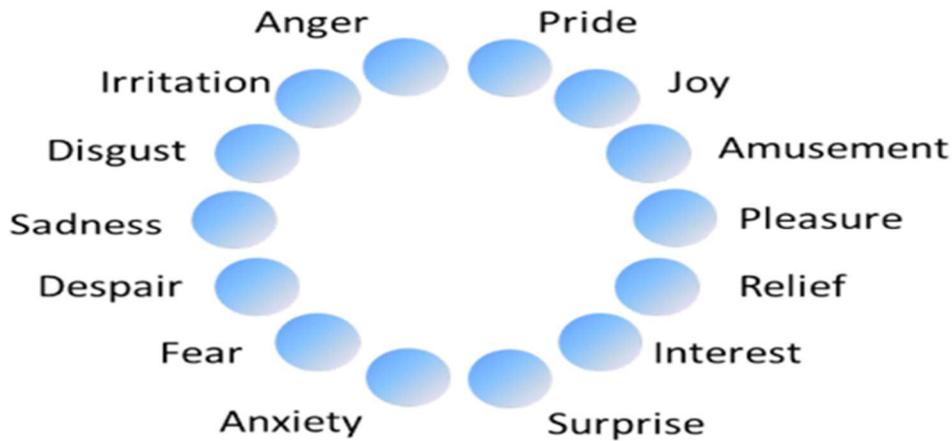


Figure. 1 (Wheel of Emotions) Emotions being displayed for participants to select which emotion the actor is expressing in the video clip. Emotions are arranged in a circle to facilitate the study for test takers, so they select the best possible answer choice with ease (adapted from the Genova Emotion Wheel instrument; Scherer, Shuman, Fontaine, & Soriano, 2013).

In previous research Schlegel and Scherer (2016) stated that the people in this video clips consists of 10 professional French-Swiss actors (five male, five female) and that after each video clip, participants were asked to select which of the 14 emotions best demonstrates the emotions the actor is expressing. The research done by Schlegel and Scherer (2016) mentioned that 12 emotions had been selected to cover the four emotional valence-arousal levels evenly. Each arousal level consisted of three different emotions: joy, amusement, pride – high arousal/positive valence; pleasure, relief, interest – low arousal/positive valence; anger, fear, despair – high arousal negative valence; irritation, anxiety, sadness – low arousal/negative valence equally to 12 emotions. Then, emotions such as disgust and surprise were added to the test since they are usually displayed in other emotion recognition test. During each video clip, the actors were shown only above their torso level and pronounce a sentence of made up

syllables that had no meaning. Each participant had to predict what emotional expression was being expressed by “conveying facial and postural/gestural emotional cues” that the actor would demonstrate in each of the short video clips. (Schlegel and Scherer 2016, p.1386). Each response was scored by either a correct (1) and incorrect (0), which would give a total average GERT-S score that can be range from 0 to 1 (Schlegel and Scherer 2016). The GERT-S helps individuals recognize emotions by reading a person body language and tone of voice, and not by what one might verbally say.

### **Autism Quotient (AQ)**

The Autism Quotient (AQ) measured if an individual with a normal intellectual ability has autistic like traits by using a 50 item self-report questionnaire. It consists of questions reflecting in behavioral tendencies and preferences by phrasing each item rather than symptoms or impairments. Participants must respond to statements like (e.g., “I find it hard to make new friends”; “I tend to notice details that others do not”). The participants are asked to respond by using a four-point scale (1=definitely agree, 2=slightly agree, 3=definitely disagree, 4= slightly disagree). The AQ is worded in a way so participants can response to either a “agree” or “disagree” response. Some items are phrased in a forward direction where choosing strongly agreed suggest higher levels of autistic traits, and some are sorted out in a way where strongly disagree means higher levels of autistic traits (Murray et al. 2017). Previous studies have narrowed down the 4-point scale to a “0” versus “1” scoring scheme, meaning that if subjects select “slightly disagree” or “definitely disagree”, then he or she scored 1 point in the question. By contrast, if the subject selects “definitely agree” or “slightly agree”, then he or she would get 0 points on the question. The AQ is arranged into five subscales focusing on: Social Skills, Attention Switching, Attention to Detail, Communication, and Imagination. Research by Baron-

Cohen et al. (2001) mentioned that each subscale was designed to have 10 questions to focus on each of the subscales. “Social Skills” consists of questions (1,11,13,15,22,36,44,45,47,48), and it is a skill that allows people to interact appropriately given any social context one may find themselves in. Then, questions (2,4,10,16,25,32,34,37,43,46); fall under “Attention Switching” which is an executive function that involves having the ability to shift one attention between different task. Next, questions (5,6,9,12,19,23,28,29,30,49); focused on “Attention to Detail” which means that one person feels determined to finish one task covering every area, no matter how small each task may be they need to focus their attention to every detail. Furthermore, questions (7,17,18,26,27,31,33,35,38,39); focused on “Communication” meaning being able to transfer information from either a video clip or from one person or group to another. Lastly, questions (3,8,14,20,21,24,10,41,42,and 50) focused on “Imagination” which means being able to create or form new ideas that are not currently present but by using the ability of the mind (Cohen et al. 2001 p.6).

### **Toronto Alexithymia Scale (TAS-20)**

In this current study the participants with alexithymia traits were assessed by using Toronto-Alexithymia Scale (TAS-20) (Bagby, Parker, & Taylor., 1994). The TAS-20 is a questionnaire that consist of 20 self-descriptive items that is used to measure individual’s ability to identify and describe their own emotions and is separated in different domain subscales. The TAS-20 is modified by using a 5-point Likert scale which measures each item giving you a maximum score of 100. The TAS-20 has anchors 1=strongly disagree, and 5=strongly agree. For the individuals that got a high score on the TAS-20 indicated high levels of alexithymia traits. The 20 descriptive items in the TAS-20 is added up by the 3-factor structure that measured for different domains in emotional recognition. The first subscale is stated as “Difficulty describing

feeling” which consist of (five items 2, 4, 11, 12, 17), and it measures individual’s difficulty in describing emotions (DIF, e.g. “I am often confused about what emotion I am feeling”). Then, the second subscale is stated as “Difficulty identifying feelings” which consists of (seven-items 1, 3, 6, 7, 9, 13, 14), and it measures the difficulty of an individual identifying between emotions (DDF, e.g. “I am often confused about what emotion I am feeling”). Finally, we have the third subscale which is known as externally-orientated thinking also known as attention and it consist of the final (eight items -5, 8, 10, 15, 16, 18, 19, 20), it measured the tendency of an individual ability to focus their attention externally (EOT, e.g. “ I prefer to analyze problems rather than just describe them”). TAS-20 has demonstrated good reliability and validity (Bagby, Parker, & Taylor, 1994), and is considered to be the best existing measuring when it comes to measuring individuals who may have high alexithymia traits.

### **Data Analysis**

Data analyses in SPSS using Hierarchical and Pearson regressions<sup>1</sup> were used to examined GERT-S total score and all other measures. Hierarchical regression was conducted to determine whether individuals with alexithymia or ASD traits had a significant negative correlation regarding emotional recognition abilities. The overall goal is to use several predictors variables to predict a single outcome. Using a hierarchical regression analysis helped the researcher determined what each variable that is being control adds to the overall outcome of the dependent variable when using GERT-S scores to measure for emotion recognition.

First the researcher used a linear regression analysis to determine the relationship each predictor had with the dependent variable in determining emotion recognition. A linear regression model

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The level of statistical significance in the hierarchical regression analysis was set at (\*p < .05 \*\* p < .01 \*\*\* p < .001); meanwhile in Pearson’s correlational analysis was set at two asteroids representing a correlation is significant at the 0.01 level 2-tailed, and one asteroid representing that a correlation is significant at the 0.05 level 2-tailed.

was used to find out the correlation age, gender, TAS-20, and AQ had towards the dependent variable in measuring for emotion recognition. Next, the researcher used a linear regression model to determine if any subscale within both TAS-20 and AQ subscales had a negative correlation with emotion recognition. Then, a multiple regression analysis was used with the hierarchical regression model to look at the relationship between TAS-20 and AQ to determine if they would functionally independent on each other or if they would depend on each other in recognizing emotions. In addition, the researcher also used a multiple regression model to determine if there was a correlation in between subscales in measuring for GERT-S scores. Using a multiple regression model helped the researcher find out how much variance each variable had in predicting emotion recognition. First, the researcher controls TAS-20 and AQ as the predictor variables and determined if there is a negative correlation towards predicting low scores in GERT-S using predictor variables. Then, the researcher examined the variables TAS-20 and AQ and measured if the two interacted with each other. It was necessary to measure these two variables as they both been linked to having a deficit in emotional recognition. Furthermore, both questionnaires are divided in subscales, TAS-20 has three different subscales Describing Feelings, Identifying Emotions, and Attention Externally; meanwhile AQ has five different subscales Social Skills, Attention Switching, Attention to Detail, Communication, and Imagination. The researcher controlled each subscale as predictor variable to determine if all or if one subscale alone resulted in a significant negative correlation towards predicting low GERT-S scores in emotional recognition. In addition, if subscales from TAS-20 or AQ did produced a negative correlation towards GERT-S scores, then those subscales were controlled to measure if there is some interaction between the ones that resulted in having a significant negative correlation. Lastly, age and gender were controlled as predictors to extend previous research

regarding woman producing more accurate responses than men and determined if there is a significant correlation outcome towards the dependent variable. Then, the researcher used Pearson's correlational analysis and examined the dependent variable with each predictor and determine if there is a significant correlation with high autistic or alexithymia traits and looking at the relationship it might have in predicting low scores in emotional recognition. The reason for performing a Pearson's correlation analysis is due to my hypothesis to determine if one variable was associated with another variable and determined is there was a positive correlation or a negative correlation with emotion recognition using GERT-S. In this research case, the researcher decided to measure the relationship among autistic-like traits and alexithymia-like-traits in determine if there is a relationship in predicting low emotion recognition scores.

## **Results**

### **Correlation among TAS-20, AQ, and GERT-S**

The relationship of each questionnaire (Tas-20 and AQ) was measured by using Pearson's correlation analysis to determine if there was a positive or negative correlation in determining low scores in emotional recognition using GERT-S. Both TAS-20 and AQ demonstrated a significant negative correlation in predicting low scores of emotion recognition with GERT-S measure. Results showed that TAS-20 individuals with alexithymia-like-traits and AQ individuals with autism-like-traits had significantly positive correlation,  $r = .281, p < .001$ . Furthermore, when looking at relationship between individuals with alexithymia-like-traits using TAS-20 and emotion recognition using measure GERT-S the results showed a negative correlation that is significant at with,  $r = -.223, p < .05$ . Moreover, there was a significant negative correlation between AQ autism-like-traits and GERT-S emotion recognition scores,  $r =$

-.284,  $p < .001$ . The results supported the research hypothesis, that even though both TAS-20 and AQ both had a positive correlation between autistic traits and alexithymia traits, there is no interaction between them in predicting GERT-S scores.

Table 2.

*The Pearson Correlation among TAS-20, AQ, and GERT-S*

	1.	2.	3.
TAS-20	-	-	-
AQ	.281**	-	-
GERT-S	-.223**	-.284**	-

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

### **Regression Interaction between TAS-20 and AQ (moderation effect)**

Following the Pearson's correlation analysis the researcher used a hierarchical multiple linear regression was calculated to predict emotional recognition scores using GERT-S based on both questionnaire TAS-20 and AQ, and a significant regression equation was found  $F(2, 243) = 13.923, p < .05$ , with the  $R^2$  of .103. Both TAS-20 and AQ were significant predictors of emotional recognition. The first step of the regression consisted of TAS-20 and AQ, interaction between both TAS-20 and AQ were then added as the second step. After controlling both main effects of TAS-20 and AQ, the interaction between them was not significant,  $F(1, 242) = 1.125, p = .290$ . For the main effects of TAS-20 and AQ, both TAS-20 and AQ significantly had a negative correlation in predicting emotion recognition (TAS-20:  $\beta = -.156, p < .05$ ; AQ:  $\beta = -.240, p < .001$ ), indicating that individuals with higher TAS-20 and AQ traits showed lower

emotion recognition test scores. Interestingly, both TAS-20 and AQ both had a significant correlation in predicting GERT-S scores, however there is no interaction between alexithymia-like-traits and autism-like-traits in predicting GERT-S scores in emotion recognition.

Table 3.

*Analysis of Interaction among TAS-20, AQ, and GERT-S*

	GERT-S	
	$\Delta R^2$	$\beta$
<i>Step 1</i>	.095	
TAS-20		-.156*
AQ		-.240***
<i>Step 2</i>	.096	
TAS-20		-.168**
AQ		-.217**
TAS-20 X AQ		-.068
Step 1 Total $R^2$	.103	
Step 2 Total $R^2$	.107	
<i>N</i>	246	

N= 246 \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Note:  $\Delta R^2$  = Adjusted R Square;  $\beta$  = Beta

It was hypothesized that age and gender would not have a significant result in predicting low GERT-S scores in emotional recognition. Hierarchical multiple regression analysis was conducted to measure if age and gender could predict a significant negative correlation in low

GERT-S scores relating emotional recognition. In the multiple regression analysis consisted of age, gender, TAS-20, and AQ. Age, gender, TAS-20, and AQ predicted approximately 1.2% of the variance in emotion recognition,  $F(2, 240) = 15.007, p < .001$  showing that there is a significant negative correlation in predicting lower scores in emotional recognition. Looking at the contribution of the predictors, age ( $\beta = -.120, p = .053$ ), and gender ( $\beta = -.067, p = .266$ ), demonstrated that it has no significant correlation outcome towards measuring emotion recognition. However, TAS-20 ( $\beta = -.179, p < .01$ ), and AQ ( $\beta = -.236, p < .001$ ), do reveal a significant negative correlation in predicting low GERT-S scores in emotional recognition.

Table 4

*The Multiple Linear Regression of Age, Gender TAS-20, AQ and GERT*

	GERT-S		
	<i>B</i>	<i>SE</i>	$\beta$
Age	-.158	.081	-.120
Gender	.865	.777	.067
TAS-20	-.076**	.027	-.179**
AQ	-.194***	.052	-.236***
$R^2$	.011		
<i>Adj R</i> <sup>2</sup>	.003		
<i>F</i>	1.404		
<i>df</i>	(2, 242)		

N = 246 \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Note: B Unstandardized Beta; SE = Std. Error;  $\beta$  = Beta

## Follow Up Data Analysis

### The relationship among factors of each questionnaire (Tas-20 and AQ)

The researcher extended his findings by testing each predictor using a hierarchical regression analysis to conduct the effect of each subscale to significantly predict if low scores on GERT-S had a significant negative correlation with subscales of either TAS-20 or AQ. The first step consisted of TAS-20 subscales (describing emotions, identifying emotions, and attention), then AQ subscales (social, switching, detail, communication, and imagination) were added to the second step. TAS-20 subscales predicted approximately 8.8% of the variance in emotion recognition,  $F(3, 242) = 7.775, p < .001$ . After testing each subscale in TAS-20 two subscales “describing emotions” ( $\beta = -.034, p = .698$ ), and “identifying emotions” ( $\beta = -.076, p = .497$ ) was not significant in emotional recognition. However, “Attention” does have a significant negative correlation with emotion recognition as the results showed ( $\beta = -.276, p < .001$ ). Indicating that individuals who score high on TAS-20 subscale “attention” showed lower scores in GERT-S scores in emotional recognition. Then the researcher second step of the regression consisted of AQ subscales and four of them do not have a significant correlation to emotional recognition “social skills” ( $\beta = -.074, p = .298$ ), “attention switching” ( $\beta = -.123, p = .090$ ), “attention to detail” ( $\beta = -.156, p = .054$ ), “imagination” ( $\beta = -.056, p = .460$ ), as opposed to “communication” ( $\beta = -.196, p < .05$ ) indicating that individuals who score high in AQ subscale communication showed lower scores in GERT-S. This suggest that in TAS-20 subscale “attention” and AQ subscale “communication” reveal a negative correlation recognizing emotions reflecting lower GERT-S scores. The research question was not proven as not all subscales had a significant negative correlation but instead this study contributed significantly by justifying which subscales from each questionnaire reveals a negative correlation. Giving the

researcher a follow up analysis to determine if both subscales interact with each other in having a significant negative correlation in predicting GERT-S scores.

Table 5.

*The Multiple Liner Regression subscales TAS-20 and GERT-S*

	GERT-S		
	<i>B</i>	<i>SE</i>	$\beta$
Describing Emotions	30.234	.103	.034
Identifying Emotions	-.062	.071	-.076
Attention	-.345	.084	-.276***
$R^2$	.088		
<i>Adj R</i> <sup>2</sup>	.077		
<i>F</i>	7.775		
<i>df</i>	(3, 242)		

N = 246 \* p < .05 \*\* p < .01 \*\*\* p < .001

Note: B Unstandardized Beta; SE = Std. Error;  $\beta$  = Beta

Table 6.

*The Multiple Liner Regression subscales AQ and GERT-S*

	GERT-S		
	<i>B</i>	<i>SE</i>	$\beta$
Social	-.250	.240	-.074
Switching	.408	.239	.123
Detail	-.422	.218	-.156
Communication	-.607	.244	-.196*
Imagination	-.163	.220	-.056
$R^2$	.117		
<i>Adj R</i> <sup>2</sup>	.099		
<i>F</i>	6.358		

*df*

(5, 240)

N = 246 \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Note: B Unstandardized Beta; SE = Std. Error;  $\beta$  = Beta

Table 7.

*Analysis of Interaction between TAS Attention and AQ Communication*

	GERT-S	
	$\Delta R^2$	$\beta$
<i>Step 1</i>	.126***	
TAS-Attention		-.223***
AQ-Communication		-.230***
<i>Step 2</i>	.124	
TAS-Attention		-.230***
AQ-Communication		-.213**
TAS-Att X AQ-Com		-.042
Total $R^2$	.73***	
<i>N</i>	150	

N = 246 \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Note:  $\Delta R^2$  = Adjusted  $R$  Square;  $\beta$  = Beta

**Interaction between TAS Attention and AQ Communication (Modulation Effect)**

Since we found out attention and communication are significantly predicted emotion recognition ability, there is another follow up analysis. Do attention in alexithymia traits and communication in autistic like traits be independently predicted GERT-s? Do they interact with each other? Furthermore, after revealing that both TAS-20 and AQ have one subscale with a significant negative correlation in emotional recognition using GERT-S. The researcher examined each subscale in both TAS-20 and AQ to observe if “attention” and “communication” showed a significant negative correlation. It is hypothesized that even though both subscales

reveal a significant negative correlation with low GERT-S scores that they would not be any significant interaction between the two subscales. To test this hypothesis, multiple hierarchical regression analysis was conducted, and the first step of the regression consisted of TAS-20 “attention” and AQ “communication”, then interaction between the both subscales were added to the second step. Attention and communication predicted approximately 12.6% of the variance in step one in emotion recognition  $F(2, 243) = 18.623, p < .001$ . After controlling both main effects of “attention” and “communication” their interaction between the two was not significant  $F(1, 242) = .407, p = .524$ . When introducing attention and communication to the variance in step one shows TAS-10 subscale “attention” revealed ( $\beta = -.223, p < .001$ ), and AQ subscale “communication” demonstrated ( $\beta = -.230, p < .001$ ), revealed a significant negative correlation towards predicting low GERT-S scores. Then, in model 2 the predictors consist of TAS-20 “attention” ( $\beta = -.230, p < .001$ ), and AQ communication ( $\beta = -.230, p < .001$ ), revealed a significant negative correlation between the two; but when determining if the two subscales have interaction with one another TAS-20 attention and AQ communication reveal ( $\beta = -.042, p = .524$ ), whereas information seeking has no significant interaction between the two. Each subscale illustrates similar variance in emotional recognition but when comparing both subscales there is no significant effect. The results support the follow up analysis hypothesis stating that there is no interaction between TAS-20 attention and AQ communication meaning each questionnaire is functional independent.

## CHAPTER IV

### DISCUSSION

The study aimed to investigate the relationship between TAS-20 and AQ traits and emotion recognition. The conclusion to my research question in it being hypothesized that individuals who have high scores of either alexithymia or autism traits will likely score lower on GERT-S scores in emotional recognition. The results showed that TAS-20 and AQ can predict individuals who will score lower in emotional recognition when compared to individuals who have low alexithymia or autism traits. Also, the researcher examined the interaction between both TAS-20 and AQ and determine if there was interaction and the results revealed that they are functional independent. TAS-20 and AQ can both significant predict low scores in emotional recognition but they do not rely on each other. Moreover, the researcher examined each subscale in questionnaire TAS-20 and AQ to determine that they both have at least one subscale that has a significant negative correlation TAS-20 subscale “attention” and AQ subscale “communication. The researcher further examined if they had interaction between the two, but the results showed that they are different from one another and did not show any interaction between the two. Thus findings, support the researcher hypothesis in determining that individuals with high alexithymia or autism traits will score lower on GERT-S scores regarding emotional recognition. Next, the researcher examines whether TAS-20 and AQ can significantly predicted emotion recognition even after controlling age and gender. Results reveal that age and gender did not have a significant correlation in predicting low scores in GERT-S. However, even after controlling for

age and gender TAS-20 and AQ still had a significant negative correlation in predicting low GERT-S scores. These findings extend previous research determining that individuals who score high on either TAS-20 or AQ will score lower on test measuring for emotional recognition. Previous research states that individuals with ASD tends to be inconsistent when recognizing emotions and suggest that emotional recognition may not be an impairment in ASD but individuals who co-morbid with alexithymia (Cook et al., 2013, p.725). The results to this study are significant because it shows that higher scores of alexithymia or ASD traits will likely score lower in emotional recognition than individuals who show low traits of alexithymia or ASD. Then, the researcher justified if there is any interaction between TAS-20 and AQ and determined that even though they both produce similar results there is no interaction between TAS-20 and AQ. Individuals with alexithymia traits will more likely produced similar results as those with ASD traits, but there is no significant interaction between the two regarding variance outcome. Future research could extend on this study by observing individuals who score high on alexithymia traits but low ASD traits and (vise-versa) and determine if the results will have a negative correlation towards the emotional recognition. The limitation to this study is that continuous measure was used to collect data to gather a bigger sample size.

### **Limitation and Future Directions**

There are several limitations to our studies. One limitation is that data consisted of 176 males and 67 females. Having a more even ratio would result in supporting previous data. One of the limitations is that the researcher did not include in the consent form if participants have previously been diagnosed with autism or alexithymia. If participants have previously been diagnosed with autism or alexithymia, then they would not be able to participate in this study as

it should had been included in the exclusionary criteria to keep reliability. During this current study, participants would conduct this experiment online which resulted in having data without responses in some questions, so incomplete data had to be excluded from this study. Also, another limitation is that the study was formatted in a way where once participants resume the study, they had to complete the whole study at once. Many participants started the study to take a look at it and then tried to resume later which did not allowed them to do so and resulting in losing data. In was instructed in the consent page that participants were not allowed to exit after reaching the consent page but many still decided to log out. Another, limitation is that participants were instructed to use a mouse cursor in order to participate in my study which resulted in many participants not participating due to not having access one.

Future research on the GERT-S should focus in investing the construct validity with the GERT long version to examine to what extent both tests complement each other. Also, providing a clear definition at the bottom of each video would also be beneficial for the participants in the future due to some subjects not being able to remember what some emotions were defined as since it was only presented at the beginning of the test. Also, GERT-S is available in many languages so including multiple tests in different language, and then comparing the results to determine if some participants had different outcomes. Future studies could have subjects conduct this experiment in a school campus with a researcher being present to assist participants with any concern in regard to the study. Future research could include various studies that measure emotion recognition instead of only relying on GERT-S to measure for your dependent variable.

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## APPENDIX A

APPENDIX A

**The Adult Autism Spectrum Quotient (AQ)**

**Ages 18+**

**SPECIMEN, FOR RESEARCH USE ONLY.**

**For full details, please see:**

S. Baron-Cohen, S. Wheelwright, R. Skinner, J. Martin and E. Clubley, (2001)  
[The Autism Spectrum Quotient \(AQ\) : Evidence from Asperger Syndrome/High Functioning Autism, Males and Females, Scientists and Mathematicians](#)  
Journal of Autism and Developmental Disorders 31:5-17

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ID number: \_\_\_\_\_ Sex: \_\_\_\_\_

Date of birth: \_\_\_\_\_ Date : \_\_\_\_\_

**How to fill out the questionnaire**

*Beneath is a list of statement examples demonstrating how to answer the questionnaire. Please read each statement cautiously and rate how strongly you agree or disagree with the statement based on your personal preference or experiences.*

**DO NOT MISS ANY STATEMENT OUT.**

*Examples*

Example 1. I am willing to take risks.	definitely agree	slightly agree	slightly disagree	definitely disagree
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Example 2. I like playing board games.	definitely agree	slightly agree	slightly disagree	definitely disagree
Example 3. I find learning to play musical instruments easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
Example 4. I am fascinated by other cultures.	definitely agree	slightly agree	slightly disagree	definitely disagree

1.	I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2.	I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3.	If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4.	I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5.	I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
6.	I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7.	Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree
8.	When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9.	I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10.	In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11.	I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12.	I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree

13.	I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree
14.	I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15.	I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16.	I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree
17.	I enjoy social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
18.	When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree	slightly agree	slightly disagree	definitely disagree
19.	I am fascinated by numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
20.	When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
21.	I don't particularly enjoy reading fiction.	definitely agree	slightly agree	slightly disagree	definitely disagree
22.	I find it hard to make new friends.	definitely agree	slightly agree	slightly disagree	definitely disagree
23.	I notice patterns in things all the time.	definitely agree	slightly agree	slightly disagree	definitely disagree
24.	I would rather go to the theatre than a museum.	definitely agree	slightly agree	slightly disagree	definitely disagree
25.	It does not upset me if my daily routine is disturbed.	definitely agree	slightly agree	slightly disagree	definitely disagree
26.	I frequently find that I don't know how to keep a conversation going.	definitely agree	slightly agree	slightly disagree	definitely disagree
27.	I find it easy to "read between the lines" when someone is talking to me.	definitely agree	slightly agree	slightly disagree	definitely disagree

28.	I usually concentrate more on the whole picture, rather than the small details.	definitely agree	slightly agree	slightly disagree	definitely disagree
29.	I am not very good at remembering phone numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
30.	I don't usually notice small changes in a situation, or a person's appearance.	definitely agree	slightly agree	slightly disagree	definitely disagree
31.	I know how to tell if someone listening to me is getting bored.	definitely agree	slightly agree	slightly disagree	definitely disagree
32.	I find it easy to do more than one thing at once.	definitely agree	slightly agree	slightly disagree	definitely disagree
33.	When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree	slightly agree	slightly disagree	definitely disagree
34.	I enjoy doing things spontaneously.	definitely agree	slightly agree	slightly disagree	definitely disagree
35.	I am often the last to understand the point of a joke.	definitely agree	slightly agree	slightly disagree	definitely disagree
36.	I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree	slightly agree	slightly disagree	definitely disagree
37.	If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree	slightly agree	slightly disagree	definitely disagree
38.	I am good at social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
39.	People often tell me that I keep going on and on about the same thing.	definitely agree	slightly agree	slightly disagree	definitely disagree
40.	When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree	slightly agree	slightly disagree	definitely disagree
41.	I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).	definitely agree	slightly agree	slightly disagree	definitely disagree
42.	I find it difficult to imagine what it would be like to be someone else.	definitely agree	slightly agree	slightly disagree	definitely disagree

43.	I like to plan any activities I participate in carefully.	definitely agree	slightly agree	slightly disagree	definitely disagree
44.	I enjoy social occasions.	definitely agree	slightly agree	slightly disagree	definitely disagree
45.	I find it difficult to work out people's intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
46.	New situations make me anxious.	definitely agree	slightly agree	slightly disagree	definitely disagree
47.	I enjoy meeting new people.	definitely agree	slightly agree	slightly disagree	definitely disagree
48.	I am a good diplomat.	definitely agree	slightly agree	slightly disagree	definitely disagree
49.	I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50.	I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

## APPENDIX B

APPENDIX B

**Toronto Alexithymia Scale - 20**

Sex: M / F      Age:      Date:      ID #: \_\_\_\_\_

TAS-20

Using the scale provided below as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Participants are expected to only circle one answer for each statement.

Circle 1 if you STRONGLY DISAGREE

Circle 2 if you MODERATELY DISAGREE

Circle 3 if you NEITHER DISAGREE NOR AGREE

Circle 4 if you MODERATELY AGREE

Circle 5 if you STRONGLY AGREE

Strongly    Moderately    Neither    Strongly    Disagree

Disagree    Disagree                      Agree    Agree

\_\_\_\_\_ Or Agree \_\_\_\_\_

1. I am often confused about what emotion    1            2            3            4            5

I am feeling.

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2. It is difficult for me to find the right words for my feelings.                            | 1 | 2 | 3 | 4 | 5 |
| 3. I have a physical sensation that even doctors don't understand.                            | 1 | 2 | 3 | 4 | 5 |
| 4. I am able to describe my feelings easily.  | 1 | 2 | 3 | 4 | 5 |
| 5. I prefer to analyze problems rather than just describe them                                | 1 | 2 | 3 | 4 | 5 |
| 6. When I am upset, I don't know if I am sad, frightened, or angry.                           | 1 | 2 | 3 | 4 | 5 |
| 7. I am often puzzled by sensations in my body.   | 1 | 2 | 3 | 4 | 5 |
| 8. I prefer to just let things happen rather than to understand why they turned out that way. | 1 | 2 | 3 | 4 | 5 |
| 9. I have feelings that I can't quite Identify.   | 1 | 2 | 3 | 4 | 5 |
| 10. Being in touch with emotions is essential.  | 1 | 2 | 3 | 4 | 5 |
| 11. I find it hard to describe how I feel about people.                                       | 1 | 2 | 3 | 4 | 5 |
| 12. People tell me to describe my feelings more.  | 1 | 2 | 3 | 4 | 5 |
| 13. I don't know what's going on inside me.   | 1 | 2 | 3 | 4 | 5 |

14. I often don't know why I am angry.	1	2	3	4	5
15. I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16. I prefer to watch "light" entertainment shows rather than psychological dramas	1	2	3	4	5
17. It is difficult for me to reveal my innermost feelings. Even to close friends.	1	2	3	4	5
18. I can feel close to someone, even in moment of silence.	1	2	3	4	5
19. I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20. Looking for hidden meanings in movies or Plays distracts me from their enjoyment.	1	2	3	4	5

## BIOGRAPHICAL SKETCH

Luis Sanchez, the author, was born and raised in Rio Grande City, Texas, where he attended primary education, middle and high school. After graduating high school in 2012, Luis decided to advance his education by attending South Texas College, where he received his associate of arts in psychology in May 2014. Pushing himself to keep striving for success, Luis then attended the University of Texas Rio Grande Valley, where he would graduate with his bachelor of science in psychology in May 2017. Following his bachelor's degree, Luis continued working hard to fulfill his goals, graduated with his Master's of Science in Experimental Psychology, and received his credential program in applied behavioral analysis in May 2021.

Luis gained interest in applied behavior analysis after he decided to volunteer and help individuals with autism during different charity events. His passion was always putting smiles on people's faces and doing anything to help others, no matter how small or big the task was. Luis is filled with happiness as he gets to put smiles on people's faces every day. Soon after graduating with his master's degree, he will be taking his behavior analyst certification board exam to become a board-certified behavior analyst. He will continue being able to put a smile on people's faces.

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