

## Exploring Autistic Traits in Young Adults: Association with Attachment Dimensions and Empathy

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### ABSTRACT

Expression of Autistic Traits was studied to understand the nature of its association with attachment and empathy within a non-clinical sample. The present study aims to gain an understanding of Autistic Traits (ATs) among the general population in association with Attachment and Empathy as well as investigate the mediating role of empathy between the remaining two variables. The study used convenience sampling and snowballing to recruit young adults between the age of 18-30 who haven't been clinically diagnosed with ASD. (N=222). Self-report measures were used for all variables. Correlational and mediation analysis design was used. The results point towards a significant correlation of Autistic Traits individually with Attachment Avoidance, Attachment Anxiety and Empathy. It was also found that people with more presence of autistic traits exhibited higher levels of attachment avoidance and anxiety in comparison to people with less autistic traits. Finally, it was found that empathy mediated the relationship between Autistic traits for the dimension of Attachment anxiety, but not for avoidance. The results of this study expand our understanding of these less explored variables in an Indian population and open avenues for future research.

**Keywords:** *Autistic Traits, Empathy, Attachment Avoidance, Attachment Anxiety, Young adults*

**A**utism Spectrum Disorder (ASD), a highly heterogeneous neurodevelopmental disorder characterized by, but not limited to marked developmental delays, restricted and narrow interests, neurodivergent areas and following challenges/dysfunction in social, educational, occupational, affective spheres of life. While there are certain common clusters of symptoms, there is high variability seen in the behavioural/neurodevelopmental challenges and abilities seen across person to person under the spectrum, which makes diagnosis and treatment formulation that much more complex.

Autistic Traits (ATs) can be conceptualized as the prominent traits exhibited in ASD and have in recent times postulated to exist on a continuum with ASD on the upper end of a

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constellation of challenges in the social and communication areas. There have been studies showing that the phenotypes for ASD are not based on categorical diagnosis and are not restricted by the conventional threshold but rather these ATs have been continuously distributed in the general population. (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001). These phenotypes in the general population with mild to more highly elevated ATs can also be described as the Broader Autism Phenotype, a term used to describe mild traits which do not meet the clinical diagnostic criteria for autism but is a subthreshold expression of autistic symptoms. The symptoms and traits for BAP are qualitatively similar to but milder than the symptoms of ASD. (Constantino & Todd, 2003; Lundin, Kosidou & Dalman, 2019). The reconceptualization of autism on a continuum has not only helped better understand the traits and symptoms which characterize autistic phenotypes but it has also opened up a path for understanding these traits in association with constructs like sensory sensitivity, attachment, social skills, empathy etc. in general populations as well. The present study exploring variables of ATs among the general population relies on a reconceptualization of autism from a black or white categorical approach to a dimensional classification that includes non-clinical and neurodivergent variants of ASD.

“The concept of attachment represents the natural proclivity towards seeking proximity, emotional connections and bonding with significant figures in one’s life” (Bowlby, 1977). An individual’s attachment bonds usually originate in regards with their significant primary caregivers and these patterns manifest themselves throughout the lifespan in adult relationships too in terms of attachment styles. Adult attachment dimensions in this study can be understood through the Internal Working Model of attachment. This model postulates that the mental representations formed during childhood influences how the child interacts, builds and adapts in relationships with others while growing up (Bowlby, 1969; Fraley, 2019). Children internalize their attachment process with caregivers and use this relationship base to form prototypes that influence adult relationships. (Ainsworth, 1978; Hazan & Shaver, 1987). Disruptions in these child-caregiver dyad have the ability to affect the pattern of bonding and lead to development of insecure attachments characterized by attachment anxiety and attachment avoidance which form two main dimensions in adult attachments. (Brennan, Clark, & Shaver, 1998). ‘Attachment anxiety, to some extent, reflects experience of inconsistent parenting in infancy, and is characterized by a negative view of self but a positive model of others, hypersensitivity to rejection, difficulty trusting others in a relationship and exaggerated reactions to distress. Attachment avoidance is characterized by a negative model of others. Specifically, individuals who avoid attachment tend to think that others are untrustworthy, consequently value autonomy and independence, and even demonstrate social isolation and withdrawal” (Pietromonaco & Barrett, 2000).

Empathy has been defined as a personality trait as well as a sustainable ability which affects various aspects of an individual’s life. Empathy allows an individual to perceive people’s intentions, predict their behaviour and help the individual build connections through experience and expression of emotions in reciprocity. (Baron-Cohen & Wheelwright, 2004). Empathizing is a qualitative trait involving understanding other’s mental and emotional state as well as responding to it with accurate reciprocal emotions. (Chakrabarti, Bullmore & Baron-Cohen, 2006). In the present study, empathy is conceptualized as a trait based and multifaceted construct, continuously distributed across the population.

***Theoretical overview and Review of Literature***

***ATs and attachment dimensions.*** Since the very first time the syndrome of autism was described, attachment as a concept has been very crucial to understanding many symptoms of autism. Autism was described as a failure to develop typical attachment behaviours, indicating that traits which prominently characterize autism exhibit a relation to disrupted/insecure attachment behaviours. Severity of ATs may affect the prevalence of attachment security versus insecurity in a multi-layered manner (Capps, Sigman & Mundy, 1994). Lack of attachment and struggle in bonding have been closely connected to autistic phenotypes. An overlap has also been hypothesized and seen between autistic symptoms and attachment difficulties to an extent of presence of high comorbidity of ASD and attachment disorders in people. (McKenzie & Dallos, 2017). Children with ASD are less likely to form secure attachment to significant others including their caregiver due to emotionally restricted rapport and communication difficulties. These relations with caregivers as well as with other people while growing up form the root for adult attachment patterns. (Teague et al., 2017). Based on the internal working model of attachment, these children who grow up with a negative model of self or others due to experience of prominent ATs like deficient/hindered social skills and communication, interpersonal and emotional difficulties, emotional regulation deficits, negative external experiences then consequently exhibit insecure patterns of attachment, especially during early adulthood. (Chandler & Dissanayake, 2013; Mazefsky et al., 2014). A meta-analysis revealed impairments in reciprocal social interactions and display of attachment security in autistic populations (Rutgers et al., 2004).

General population with the presence of prominently higher ATs experience many of the similar attachment difficulties which an individual diagnosed with ASD faces (Lampert, 2011). Study findings have shown significant negative correlation between ATs and secure attachment as well as a significant positive correlation between ATs and anxious attachment. It was also seen that people with high AQ scores scored lower in comparison to people with low AQ scores in regards with scores on the secure subscale whereas High AQ scorers scored higher in comparison to the Low AQ scorers on the anxiety as well as avoidance subscales, further corroborating evidence for association between presence of ATs and insecure attachments among the general population. (Takahashi, Tamaki & Yamawaki, 2013). A study indicated a significant relationship between ATs and attachment avoidance, although not between ATs and dimension of attachment anxiety (Gallitto & Leth-Steensen, 2015). There have been studies which show reduced relationship satisfaction, loneliness among people with many ATs in comparison to people with fewer ATs indicating the presence of markers contributing to attachment difficulties. (Pollmann et al., 2009; Jobe & White, 2007).

***ATs and Empathy.*** Empathetic impairments have been a hallmark of ASD since the very beginning. Often ASD conditions are described as disorders of impaired empathy. Majority of the studies report a significant negative correlation among ASD conditions and self-reported as well as performance-based measures of cognitive empathy. (Grove et al., 2014; Mathersul et al., 2013). The most common explanation is that reduced ability among ASD individuals to recognize, perceive and comprehend emotional cues when it comes to emotions of others as well as their own. (Sucksmith et al., 2013). One more study showed that reduced interoceptive accuracy and exaggerated interoceptive sensibility correlated with deficits in emotion sensitivity and affective symptoms among individuals with ASD. (Garfinkel et al., 2015).

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Studies have suggested individuals in the general population too with mild to high level of ATs have difficulties with multiple facets of empathy. (Baron-Cohen et al., 2001; Hoogenhout, 2016). Rawa Jamil (2016) reported weaker empathy skills among participants with more features of Broad Autism Phenotype. A study done by Lamont (2017) found evidence that high scores on the Autism Quotient (AQ) scale predicted low cognitive and affective empathy. High AQ scores were also found to be negatively associated with global, cognitive and affective empathy (Baron-Cohen & Wheelwright, 2004).

***Empathy and Attachment Dimensions.*** Healthier interpersonal functioning, well-being and satisfaction are found to be positively correlated to secure attachment styles contrary to its negative correlation with insecure attachment styles (Berry, Barrowclough & Alison, 2008) One of most prominent contributors to these associations is the facet of empathy (Davis, 1983) Literature evidence supported the presence of a significant positive correlation between empathy and attachment security and a negative correlation between empathy and attachment anxiety. Individuals who form more secure attachments exhibited enhanced empathetic concern as well as perspective taking (Joireman et al., 2002; Stern & Cassidy, 2017). Individuals who exhibited an insecure dismissive attachment style reported lower levels of affective empathy. This indicated an association between empathy and attachment avoidance guided through negative models of others. (Troyer & Greitemeyer, 2017, Williams et al., 2015). A study found an association between lower empathic concern and heightened attachment insecurity (Pelloquin, 2011). Despite this, findings have been mixed when it comes to prediction power of empathy for attachment avoidance and attachment anxiety.

***Empathy as the Mediator.*** The connection between these variables individually points towards an interaction framework. Genetic correlation analysis has shown negative and positive correlations of autism respectively with empathy and relationship/friendship satisfaction (Warrier, 2018). Furthermore, a study done by Lamport (2011) found support for the hypothesis that empathy is a key component that mediates the relationship between autistic like characteristics and attachment. Since empathy is a construct capable of influencing social skills and relationships, a highly prominent impairment domain of ATs, it can be conceptualized to act as the mediator variable which in turn affects patterns of attachments. A study showed deficits in cognitive empathy associated with ASD and low-quality insecure relationships in people with low impaired cognitive empathy. (Bauminger et al. 2008). A study done by Jamil (2017) found that participants who exhibited higher BAP traits had less interest in bonding (avoidance behaviors), had shorter durations of friendships and this impact was mediated by empathy. People with high scores on ATs and lower empathy scores are seen to exhibit higher levels of attachment avoidance due to aloofness, rigidity and sense of inadequacy. (Lamport & Turner, 2014). A study done by Ameli (2019) further showed evidence pointing towards this interaction hypothesis, where they found that empathy mediates the relationship between ATs and attachment avoidance as well as attachment anxiety.

***Objective of the study.*** Based on the large number of documented findings for attachment patterns and empathy among ASD individuals but the scarcity of these studies among BAP individuals as well as the non-clinical samples studies point towards a need for the present study to investigate attachment difficulties and empathy with ATs among the general population. Research literature on possible impact of prominent empathy deficits associated with ATs on different components of attachment insecurity has been very less researched and led to mixed findings. The current study will help understand in-depth the correlational

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nature of these three constructs and extent of mediating role of empathy for two different components of attachment insecurity.

Furthermore, ATs present in the general population with different levels of intensity across different cultures, yet have not been explored much in Indian samples. (Carruthers et al, 2018). Behaviours associated with ATs were reported to a greater extent in the Eastern Culture than the Western Culture (Freeth et al, 2013) leading to a personal interest in studying the nature of ATs and relevant constructs among the Indian population. Thus, the present study is an attempt to cover these gaps in literature by examining ATs in young Indian adults, while considering empathy as a possible mediator in the hypothesized association between ATs and attachment behaviours.

### MATERIALS AND METHOD

#### *Aim of the study*

The present study aims to gain an understanding of Autistic Traits (ATs) among the general population in association with Attachment and Empathy as well as investigate the mediating role of empathy between the remaining two variables.

#### *Hypotheses*

- Hypothesis 1.** Autistic Traits are positively correlated with Attachment Avoidance.
- Hypothesis 2.** Autistic Traits are positively correlated with Attachment Anxiety
- Hypothesis 3.** Autistic Traits are negatively correlated with Empathy.
- Hypothesis 4.** Participants with more Autistic traits (as measured by scores on AQ scale) exhibit higher levels of Attachment Avoidance in comparison with to those with less Autistic Traits, i.e., the mean scores on dimension of Attachment Avoidance would be higher for high AQ scorers in comparison to Low AQ scorers.
- Hypothesis 5.** Participants with more Autistic traits (as measured by scores on AQ scale) exhibit higher levels of Attachment Anxiety in comparison with to those with less Autistic Traits, i.e., the mean scores on dimension of Attachment Anxiety would be higher for high AQ scorers in comparison to Low AQ scorers.
- Hypothesis 6.** Empathy would mediate the relationship between Autistic Traits and Attachment Avoidance.
- Hypothesis 7.** Empathy would mediate the relationship between Autistic Traits and Attachment Anxiety.

#### *Participants*

The sample for this study consisted of 222 young adults between ages 18 and 30. The sample consisted of 124 females (55.9%) and 98 males (44.1%). Majority of the participants were in the age range of 21-23. The exclusion criteria of the study consisted of any individuals clinically diagnosed with ASD during their lifespan.

#### *Measures*

The variables of Autistic traits, Empathy and Attachment were measured through scores on the Autism Quotient-Short (AQ-S), Empathy Quotient Short (EQ-S) and Revised Adult Attachment Scale (RAAS) respectively.

- 1. Autism-Quotient Short (AQ-Short: Hoekstra et al., 2011).** It is an abridged version of the self-report Autism-spectrum quotient, which is a 50-item scale assessing autistic traits (Simon Baron-Cohen et al., 2001; Hoekstra et al.2011). AQ-

S items assigned to five defined factors which assess: 1) deficiency of social skills, 2) a preference for routine, 3) imagination difficulties, 4) difficulties with attention switching, 5) a fascination for numbers/patterns. Different studies examining the psychometric properties of AQ-S found good validity and reliability (Lau et al.2013). Items were rated on a 4-point Likert scale ranging from 1 to 4, where 1 stands for “Definitely Agree” and 4 stands for “Definitely Disagree”. Higher scores on the scale indicate more presence of autistic traits. AQ-S, just like AQ was designed to assist in quick screening for autism-like conditions in research contexts among the general population.

- 2. Revised Adult Attachment Scale (RAAS; Collins and Read,1996).** It is an 18-item self-report revised version of the questionnaire Adult Attachment Scale (AAS)(Collins & Read,1990) designed to assess attachment patterns. Participants rate each item on a five-point Likert rating scale based on how they generally feel about the close relationships in their life with 1 standing for "Not at all characteristic of me" and 5 standing for " Very characteristic of me". In this study, the RAAS was used to assess attachment through scoring of participants on dimensions of attachment anxiety and attachment avoidance. (Collins,2008). Cronbach's alpha for the anxiety and avoidance subscale was found to be 0.83 and 0.76 respectively as found in a study. (Shevlin et al. 2014)
- 3. The Empathy Quotient-Short (EQ-S; Wakabayashi et al., 2006).** It is designed to measure one's ability to relate to the emotions of others. For the purposes of this study, it serves as a brief measure of overall empathy. The EQ-S was developed from the 60 items Empathy Quotient Scale. (Baron-Cohen & Wheelwright,2004). Items are rated on a Likert scale from 1-4 where 1=Strongly agree and 4 =strongly disagree. Cronbach's alpha for this instrument was calculated at .87 suggesting good internal reliability and consistency.

### **Data Collection**

The sample was collected through convenience sampling. In accordance with ethical guidelines, a google form was used to carry out the collection of data. The data collection commenced after the right of the participants to withdraw from the study at any given time is communicated to them through an Informed Consent form. The data collection was done through administration of the Autism Quotient Scale- Abridged version (AQ-Short), Revised Adult Attachment Scale (RAAS), Empathy Quotient-short (EQ-Short) along with a small form collecting socio-demographic information in the start which helped filter invalid responses based on predetermined inclusion criteria as well as collect basic demographic information in regards with gender, age, educational qualification and occupation.

## **RESULTS**

All the underlying assumptions for the statistical techniques were checked before running any of the analyses. The assumption of normality was investigated individually for the set of scores on the Autistic Quotient (AQ-Short), Empathy Quotient (EQ-Short), Attachment Avoidance as well as Attachment Anxiety through the Shapiro-Wilk tests of normality and 3 graphical methods (Box-plot, Steam and Leaf test and QQ- Plots). After analysis of these it was found that the assumption of normality was met for these sets of data.

**Table 1. Correlations of Variables between Autistic Traits and Empathy, Autistic Traits and Attachment Avoidance, Autistic Traits and Attachment Anxiety, Empathy and Attachment Avoidance as well as Empathy and Attachment Anxiety.**

1. Autistic Traits (AQ-S scores)	Pearson Correlation Sig(1-Tailed)				
2. Empathy (EQ-S scores)	Pearson Correlation Sig(1-Tailed)	-0.276972 1.422e-05***			
3. Attachment Avoidance	Pearson Correlation Sig(1-Tailed)	0.3850698 1.465e-09***	-1.1815147 0.003346**		
4. Attachment Anxiety	Pearson Correlation Sig(1-Tailed)	0.1568735 0.009676**	-0.1416576 0.01746*		

Correlation-Pearson product moment correlation was conducted to investigate the first and second hypothesis about expected positive correlation between ATs and Attachment Avoidance as well as with Attachment Anxiety and then the third hypothesis regarding ATs and Empathy. A significant positive correlation was found between ATs and Attachment Avoidance ( $r(220) = 0.386, p < 0.001$ ) as well as between ATs and Attachment Anxiety ( $r(220) = 0.157, p < 0.01$ ). A significant negative correlation was found between variables of ATs and Empathy ( $r(220) = -0.277, p < 0.001$ ). (Table 1). Thus, considering the correlation results so far, hypothesis 1, 2 and 3 were supported.

**Table 2. Calculation of Mean and U value for High AQ group versus Low AQ group on total scores for the dimension of Attachment Avoidance and Attachment Anxiety**

		N	Mean	U- value	p-value
Attachment Avoidance	High AQ group	157	39.42	7305	2.081e-07***
	Low AQ group	65	33.58		
Attachment Anxiety	High AQ group	157	20.38	6014	0.01811*
	Low AQ group	65	18.29		

In order to further examine the characteristics of adult attachment in people with elevated autistic traits, the participants were divided into two groups of High AQ scorers and Low AQ scorers. This classification by adopting a cut-off score on AQ total scores proposed during the construction of the AQ-Short scale. A cut-off score of 70 was proposed with sensitivity and specificity of 0.91 and 0.94 respectively. (Hoekstra et al., 2011)

The more stringent cut-off score of 70 on the AQ- Short measure was used to differentiate between a group of High AQ scorers (N=65, Mean=74.12) from a group of Low AQ scorers. (N=157, Mean=66). (Table 2). This classification was done with the aim of assessing if there are differences in attachment patterns of avoidance and anxiety between the two groups i.e to test the 4th and 5th hypothesis that High AQ scorers will exhibit significantly higher levels of Attachment Anxiety and Attachment Avoidance in comparison to the group of Low AQ scorers. The normality assumption was not met for the variables under analysis; thus, the Mann-Whitney U test was used to study if there is a significant difference between the group means. The Mann-Whitney U test compared the mean scores of High AQ group versus the Low AQ group on the dimension of Attachment Avoidance and significant W-

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value of 7305 was found with p-value than 0.01 indicating support for hypothesis 4 of high AQ scorers exhibiting higher levels of attachment avoidance in comparison to the Low AQ scorers ( $W=7305$ ,  $p<0.05$ ). The same analysis was done here as well between the two groups on the dimension of attachment anxiety to test the fifth hypothesis. High AQ scorers scored higher on the dimension of attachment anxiety with a significant W value and a p-value less than 0.05 showing support for this hypothesis as well. ( $W=6014$ ,  $p<0.05$ ). (Table 2)

**Table 3. Model Fit indices for all models.**

Models	Chi-Square	Df	Sig.	RMSEA	GFI	AGFI
Original Model	29.684	2	0.000	0.250	<b>0.941</b>	0.704
Model (After Modifications)	<b>3.406</b>	1	0.065 (n. s)	<b>0.104</b>	<b>0.992</b>	<b>0.924</b>

**Table 4. Path estimates for Autistic Traits and Empathy, Autistic Traits and Attachment Avoidance, Empathy and Attachment Avoidance (for the original model as well as after the modification) and Empathy and Attachment Avoidance.**

	Estimates	p-value
<b>Autistic Traits to Empathy</b>	-0.277	$p<0.001$ ***
<b>Autistic Traits to Attachment Avoidance</b>	0.323	$p<0.001$ ***
<b>Empathy to Attachment Avoidance (Before)</b>	-0.182	0.006*
<b>Empathy to Attachment Avoidance (After)</b>	-0.094	0.147(n.s)
<b>Empathy to Attachment Anxiety</b>	-0.142	0.033*

Note.  $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$

In regards to the mediation framework hypotheses between the variables with empathy as the mediating variable, path analysis using structural equation modelling was employed. In order to run this mediation analysis to study the proposed model in the study, the underlying assumptions of normality, reasonable sample size, no missing data and underlying correlations were checked for and seen to be met in regards to the data obtained. SEM was used to do path analysis on AMOS Version 24 to assess the fitness of model exploring the mediating role of empathy between ATs and Attachment insecurity (measured on dimensions of Attachment Avoidance and Attachment Anxiety) as well as variances between these individual parameters. (Figure 1) The Chi-Square index, The Goodness of Fit Index (CFI) and The Root Mean Square Error of Approximation (RMSEA) were used to evaluate the fitness of the model mentioned above. As reported in Table 3, the Chi-Square value of Absolute fit was found to be 29.684 with  $df=2$  and significant p value less than 0.001 indicating that the chi square value indicated that the proposed model isn't an absolute fit to the dataset. The RMSEA value, another descriptive measure to evaluate fit was found to be 0.25 which further supports the weak fit of the model. However, the GFI value was found to be 0.94 and values greater than 0.90 have been found to indicate well-fitting model. This indicates that the model is close to replicating the observed matrix. (Hooper et al, 2008).

The good GFI value indicated a need to run the model again after modifications. Often one can improve the model fit by accounting for any major meaningful/significantly associated paths and the same was done in this analysis as well. Modification indices pointed towards



the significant prediction relationship between the exogenous variable of AT and observed variable of Attachment Avoidance. An individual linear regression analysis between these two variables suggested that ATs directly and significantly predicted Attachment Avoidance. ( $b = 0.385$ ,  $t(220) = 6.18$ ,  $p < 0.001$ ). A direct path was drawn for the relationship between ATs and Attachment Avoidance and the model was tested again. (Figure 2). The results of this analysis found a Chi Square value of 3.406 with  $df=1$  and a non-significant  $p$ -value of 0.065. This Chi-Square value suggests an absolute fit for the current model with the data set. The GFI index was found to be 0.99, which suggests a well fitted model. The RMSEA index was found to be 0.10 which suggests a better and fair fit of the proposed model. (Table 3).

Maximum Likelihood estimates further assisted in testing the hypotheses. As seen in Table 4, Autistic traits as measured by AQ scores predicted empathy significantly, where higher scores on AQ predicted lower scores on the measure of empathy. ( $b = -0.28$ ,  $p < 0.001$ ), and then variances in Empathy scores were seen to significantly predict variance in scores on the dimension of Attachment Anxiety, higher scores on the variable of empathy predicted lower scores on the dimension of Attachment Anxiety ( $b = -0.14$ ,  $p < 0.05$ ) (Figure 2). The model fit and estimation parameters suggest support for the model conceptualization that ATs are associated with Attachment Anxiety and this relationship is mediated by the endogenous variable of empathy.

As seen before Autistic traits as measured by AQ scores predicted empathy significantly, where higher scores on AQ predicted lower scores on the measure of empathy. ( $b = -0.28$ ,  $p < 0.001$ ). A non-significant trend was found between empathy and attachment avoidance ( $b = -0.09$ ,  $p = n.s$ ) in contrast to the significant and more prominent association found during the original model ( $b = -0.18$ ,  $p < 0.05$ ) (Table 4). The estimates for the direct path association between Autistic Traits and Attachment Avoidance pointed towards a direct significant effect of the exogenous predictor of Autistic Traits on Attachment Avoidance ( $b = 0.32$ ,  $p < 0.001$ ) (Figure 2). Taking into account all the outputs of this analysis consisting of the strong direct effect of ATs on Attachment Avoidance, the non-significant and reduced prediction value of Empathy on Attachment Avoidance after a direct path was drawn and the good model fit indexes for this model, it was understood that there was an association between ATs and Attachment Avoidance but this relationship was not mediated by variances in the variable of empathy. Thus, support was found for the mediation role of empathy between ATs and Attachment Avoidance (Hypothesis 6) but not for the relationship between ATs and avoidance (Hypothesis 7).

## DISCUSSION

The study examined the hypothesized association of ATs with variables of attachment and empathy in the context of young adults in the Indian context. The conclusive findings are stated with some certainty.

As expected, a positive correlation was found between ATs and attachment insecurity indicating that individuals with higher presence of ATs will display heightened avoidance behaviours like demonstrating social isolation, aloofness and withdrawal, valuing autonomy and independence rather than emotionally dependence and heightened anxious attachment patterns of difficulty depending on others, hypersensitivity as well as heightened fear of rejection or being hurt/abandoned. (Pietromonaco & Barrett, 2000). The findings go in line with findings of previous studies. (Takahashi et al., 2013; Gallitto & Leth-Stenson, 2015). In the present study though, a small correlation was found between ATs and Attachment

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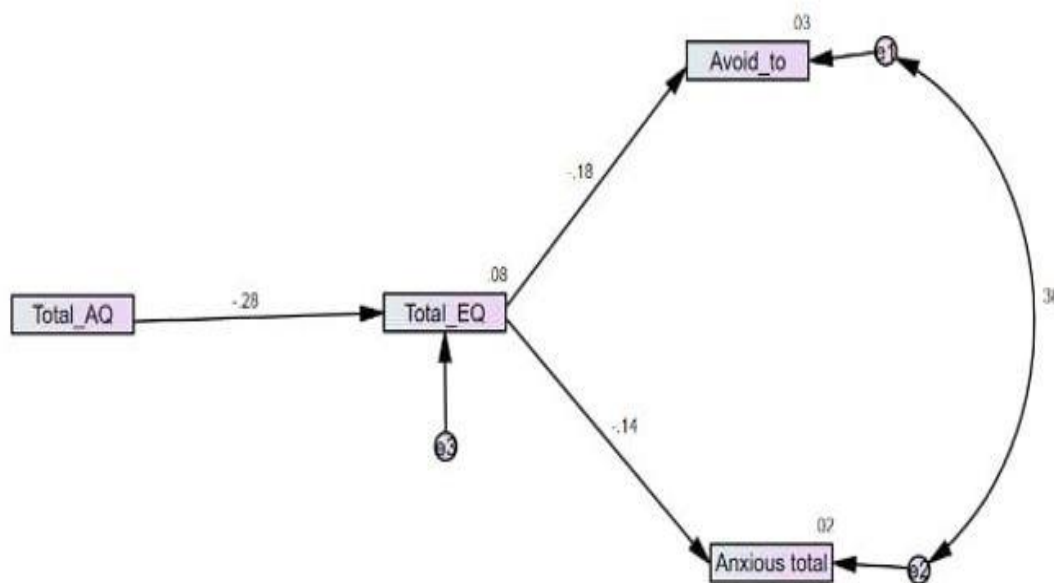
anxiety and a strong correlation was found for ATs and Attachment Avoidance suggesting a stronger association between these two variables. This strong connection goes in line with the common conceptualization of an overlap between the core features of people with higher presence of ATs and people who display high levels of avoidance behaviours. (Bejerot, Eriksson & Mortberg, 2014).

Support was found for hypotheses of people with high scores on ATs measure displaying a higher score on the dimensions of attachment avoidance and anxiety in comparison to people with low scores on ATs which further supports the significant presence of difference in the construct of attachment as a function of existing on the low and high end of the continuum of ATs even in the general population.

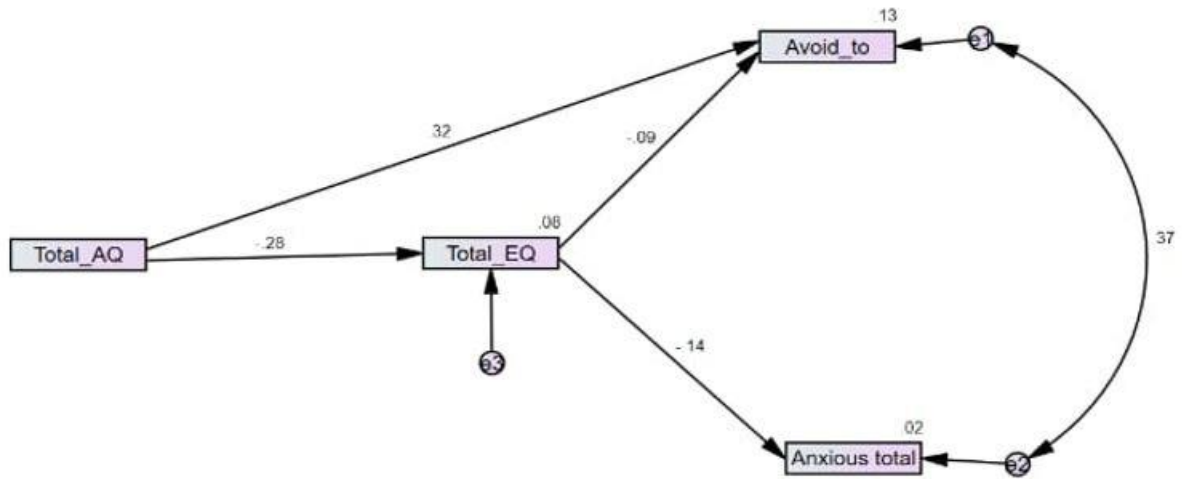
In line with past trends (Jamil, 2016; Lamont, 2017), present study findings show that ATs were significantly negatively correlated with empathy. This suggests a clear trend towards lower empathy levels as ATs increase. This goes in line with Empathizing -Systemizing theory which proposes that ASD individuals are characterized by empathy impairments and enhanced systemizing abilities (extreme S-Type brain). The same theory base can be extended to understand the negative association with empathy of people who exhibit higher levels of ATs or fall on the higher end of the continuum. (Baron-Cohen, 2009)

The present study found weak but significant correlations were between the variables of empathy and attachment insecurity indicating that higher the scores on the variable of empathy lower the score on attachment avoidance as well attachment anxiety and vice versa.

**Figure 1. Original model diagram and estimates for path association between Autistic Traits (AQ-S scores) and dimensions of Attachment Anxiety and Attachment Avoidance with Empathy (EQ-S scores) as the mediator variable.**



**Figure 2. Model after modification of direct path drawn for association between Autistic Traits and Attachment Avoidance and estimates for the same.**



Based on the results which can be seen through Figure 1 and 2, the hypothesis for mediating role of empathy for the relationship between ATs and attachment anxiety was supported, indicating that ATs (as measured by AQ scores) significantly predicted scores on the dimension of Attachment Anxiety and this relationship was mediated by empathy. This goes in line with the mediation role of empathy found in a study done by Ameli (2020). The findings suggest that people with higher scores on the measure of ATs will score lower on the measure for empathy and this would lead to higher scores on the dimension of attachment anxiety. A study found that higher levels of empathy, especially empathic concern was associated with lower levels of attachment anxiety. (Joireman, Needham & Cummings, 2002). Cognitive empathy impairments in these people lead to them being unable to accurately or holistically process emotions and perceptions of people who they have relations with, thus contributing to their negative view of self, increased preoccupation with their own emotions and lack of capacity to reciprocate in a secure manner all of which can be conceptualized as indicators of attachment anxiety.

For this particular set of samples studied in this research support was not found for the mediation of empathy for the relationship between ATs and attachment avoidance. This was an interesting trend to see as it gives an insight into the direct and indirect effects of ATs on attachment avoidance and a study done by Lamport (2011) showed a contrast finding for the mediating role of empathy for the components of attachment avoidance and anxiety. Direct path between ATs and Attachment Avoidance was strongly supported rather than the mediation pathway. This might be due to the strong overlap between the profile of Autistic Traits and Attachment Avoidance. ATs of aloofness, pragmatic language and rigidity were found to be predictors of avoidance, where these traits rather than emotional deficits under the domain of autistic like conditions accounted for 11 percent variance in avoidance scores (Lamport,2011). Other avoidance behaviours such as social withdrawal, lack of dependence and loneliness displayed by people on the higher end of continuum for ATs have not only seen to be similar to the core features seen among ASD individuals (Bejerot, Eriksson & Mortberg, 2014) but were also seen as coping mechanisms to deal with the high levels of anxiety and negative social experiences they face while growing up. (White & Roberson-Nay, 2009). The predictive value of ATs on Attachment Avoidance might be then due to the overlap of other features and not due to significant mediation by inherent empathy. Thus, the direct effect of ATs on Attachment Avoidance accounted for most of the prediction value

while empathy showed nonsignificant and reduced prediction power for Attachment Avoidance.

### ***Practical Applications and Implications of the study***

The variables under the study, especially the variable of ATs, haven't been extensively explored in the Indian population. However, the reconceptualization of ATs on a continuum has rendered the variable important. Besides suggesting evidence for the nature and extent of the relationship between the variable of ATs in association with other relevant variables of attachment and empathy, the study results also imply the nature of ATs among the general population. With a stringent cut off-score of 70, 29 percent of the sample were seen as falling on the high end of the ATs continuum. This indicated that the general population experienced difficulties similar to the symptoms experienced by ASD individuals across various domains. These findings between ATs and attachment insecurity have implications for understanding difficulties faced by people with significantly more ATs, especially with regards to empathy and attachment. Results imply that the individuals exhibit insecure attachment patterns characterized by avoidance and anxiety, and are less likely to experience the positives associated with secure relationships such as feeling of well-being and relationship satisfaction. (Simpson, 1990).

In the population of young adults, attachments form a major part of their developing identities. Thus, empathy deficits under the domain of ATs might also affect their ability to emotionally connect with others around them. As found in the present study, insecure attachments are considered to be associated with ATs, especially for the dimension of attachment anxiety. Findings of this study have application in initial screening of individuals who exhibit high levels of attachment anxiety as a result of a high presence of ATs and empathy deficits. Despite not falling on the extreme end of the autistic continuum (ASD diagnosis), these individuals require attention and would benefit from interventions that inculcate well-equipped and thorough coping mechanisms to deal with their most prominent deficits under the domain of ATs, empathizing abilities. Based on the findings of this study, it has application for people who fall in the category of Broad Autism Phenotype, experiencing mild to moderate ATs. Having access to the above-mentioned mental healthcare can help these people to function better and gain maximum satisfaction from the close and intimate relationships in their life.

### ***Limitations of the study***

The current study has its limitations which need to be considered while interpreting the results. In the present study, gender differences were not analyzed and accounted for while exploring the variables. A higher extent of ATs, as measured by scores on Autism Quotient as well as BAPQ (Broad Autism Phenotype Questionnaire) scale, has been seen in men as compared to women. (Lamport, 2011; Baron-Cohen, 2001; Hoekstra et al, 2011). Even on the EQ-Short scale, a trend observed females significantly showing higher levels of empathy and different empathizing abilities in comparison to men. (Baron-Cohen, 2005; Lamport, 2011). The major trend in regards with attachment patterns across males and females is seen as males reporting higher avoidance and females reporting higher anxiety and ambivalence behaviors (Scharfe, 2017). In the given study, the number of females (124) were higher than males (98) and despite the trend of gender differences on all of the three variables under study, it was neither taken as a predictor nor sex differences were controlled for. This is one of the limitations of the current study. Other limitations pertain to the age range- ages 18-30 was included, so as to have the scope to understand and generalize results to a wider

population but most respondents were only from the age range of 21-23 years. Thus, the findings may not be fully applicable to all young adults.

### **Future Research Suggestions**

The present study is one of the first studies conducted on the Indian population. Although it did not find significant support for the mediating role of empathy between ATs and attachment avoidance, there have been past studies suggesting an association between these two variables of empathy and attachment avoidance where higher affective empathy scores predicted lower avoidance scores. Empathy also played a mediating role between the two variables explored in the present study. Thus, there is a need for these variables to be explored further in the Indian population with an in-depth analysis procedure exploring latent variables. Longitudinal studies should also be run to see if a similar trend is observed or if new discoveries are made about the nature of the variables seen in the study. In the course of the current research, no studies investigating the mediating role of attachment patterns between the relationship for ATs and empathy (Khodabakhsh, 2012) emerged but there have been studies showing that insecure attachment styles predict lower scores on empathy. Future studies should consider exploring subdomains under ATs, cognitive empathy and affective empathy- individually with regards to attachment, in order to understand the strength of these subdomain interactions. Since the three variables have been seen to be of high relevance and the mixed casual direction of effect between empathy and attachment in general, future studies should check for mediating role of attachment patterns instead of empathy; through path analysis or other techniques; to explore the nature and causal pattern of these three variables more comprehensively. Future studies could also investigate the nature of these associations across genders and other relevant constructs.

### **CONCLUSION**

People in the general population already tend to experience insecure attachment patterns due to a variety of reasons including deficits in empathy and social skills. The study aimed to highlight how disposition of ATs can bring about a change in these insecure attachment patterns, affecting individuals with a higher disposition in a more disruptive manner taking into account empathy deficits as well and potentially move towards finding solutions and better access for these people based on the knowledge found. The findings of the present study have shown what facets need to be looked into for development of more secure attachment patterns and opened avenues for more comprehensive research for these variables.

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