

Predictive Analysis of Anxiety Indices in People with Autism Spectrum Disorder

Manuel Ojea Rúa¹ & Adrián Tizón Ramírez²

Abstract

Individuals with autism spectrum disorders (ASD) have high anxiety indices due to complexity to understand the social interactions in which they participate, which may be due to the intrinsic characteristics that form diagnosis, investigated by the perceptual-cognitive hypotheses of the cognitive central theory (Happé, 1997; Happé and Frith, 2006). Likewise, its particular form of processing involves deficits in the development at neural interrelation of the cognitive system throughout the information processing operation during the interactions carried out –both lived and perceived– leads to immediate consequences in perceptual- cognitive process (Simmons and Barsalou, 2003). Then, according to these hypotheses, both clinical characteristics of personality and the confrontation of unforeseen contexts may involve significant predictive factors that high increase of anxiety levels in people with ASD. This research therefore aims to describe the possible explanatory predictive models for highlighted anxiety in students with ASD. A total of 111 students with ASD were involved in this study through the answers given by professionals directly related in their specific educational process to an *ad hoc* questionnaire, which is composed of 23 items relate to different possible explanatory variables of anxiety processes in students with ASD (see Appendix 1). Results found through statistical analysis of regression equation conclude that anxiety indices are related with following predictor variables: 1) “inattention” variable (attention deficit and hyperactivity), 2) “unpredictable” variable (context not foreseen), 3) “diagnosis” variable (disorder diagnosis), and 4) “internal” variable (personality characteristics, internal conflicts lived or perceived), which are included in predictive models to explain possible causes of increased anxiety in people with ASD. Furthermore, comparative analysis carried out through *Tukey HSD test* for the “diagnosis” and “age” variables, and the *t independent samples test* for the variable “sex”, didn’t show any differences in the anxiety levels with regard to the variables, so anxiety isn’t influenced for these static variables in people with ASD.

Keywords: Anxiety, Depression, Diagnosis, Autism Spectrum Disorder.

1. Introduction

Students with Autism Spectrum Disorder (ASD) present important limitations in two basic dimensions related to communication and social interaction, with differences in intensity according to three specific levels of diagnostic type, which have been defined by international classification of mental disorders DSM-5® (American Psychiatric Association (APA, 2013)). The neuropsychological implications of these limitations are supported by cognitive theories of central type. In this sense, the theory of cognitive central coherence (Happé, 1997; Happé and Frith, 2006) show that people with this disorder tend to have a perception of reality which is focused on particular aspects and characterised by perceptive inflexibility. This, in accordance with the studies of Northrup (2017), allows us to deduce that this particularity leads to significant difficulties in understanding social events, insofar as they become increasingly complex, especially since their perception of the social world is determined by the continuous unpredictability of contexts and social interaction, which ultimately leads to confused interpretation.

¹ University of Vigo

² University of Vigo

The empirical justification of these consequences is also determined by the functioning of the executive system (Wallace et al., 2016), which, for proper functioning, requires some flexibility and adaptation of met cognition processes; however, both elements are limited by the cognitive-perceptive deficits of people with ASD, which, at the same time, are associated with a comorbidity of depressive disorders and difficulties in adaptive functioning in the social environment? The neural interrelation (Simmons and Barsalou, 2003) of the cognitive system throughout the information processing operation during the interactions carried out –both lived and perceived– therefore leads to immediate consequences, such as the disproportionate increase in anxiety indices. This intolerance and resistance to change and the uncertainty of events are consubstantial to the specific characteristics of the diagnosis, related to the high sensory hypersensitivity of this disorder (Uljarevic, Carrington and Leekam, 2016); although it is not clear whether these cognitive-biological processes are analogous in individuals of neurotypic development, the research carried out by Hollocks, Pickles, Howlin and Simonoff (2016), confirm that there is a significant correlation between physiological answers and attentional deficits as predictive elements of manifest anxiety in people with ASD.

Indeed, different studies confirm these assertions. Magiati et al. (2016) show how the severity of anxiety scores are determined by the intensity of the symptoms that make up the diagnosis itself, such as stereotyped behaviours and the difficulties of adaptive functioning in the social context. Factor, Condy, Farley and Scarpa (2016) conclude that, although restricted behaviours can be useful as strategies for reducing social anxiety, these are significantly related to deficits in social motivation, deriving from specific symptoms that conceptualise the diagnosis, and which, moreover, increase the ritualised behaviours and difficulties in assuming changes to previously acquired routines. Likewise, Merrick, Grieve and Cogan (2017) find significant relationships between motivational orientation, frequency of maladaptive behaviour and psychological impacts when explaining the increase in anxiety. Lai et al. (2017) affirm, through autobiographical descriptions and clinical observation, the existence of relationships between cognitive constructs related to the functioning of memory and emotional development which, as a result of the cognitive effort involved in emotional understanding, leads to an increase in stress, anxiety and depression in people with ASD. Reisinger and Roberts (2017) assess the impact of adaptive behaviour and anxiety symptoms. Results reveal that anxiety factors and autistic disorder are risk factors, especially in the areas of self-control and social participation. Corbett, Blain, Loannou and Balsler (2017) indicate that there are significant links between the social challenges faced by people with ASD and their increase in anxiety levels. Ahlers, Gabrielsen, Lewis, Brady and Litchford (2017) studied three areas of socio-emotional development, as commonly experienced by people with ASD, in which anxiety is a central element, in addition to social isolation and affliction.

The presence of high anxiety indices therefore represents empirical evidence, currently present in people with this disorder due to their limitations in managing social emotional problems. A retrospective review of the medical histories of the chips of 126 individuals with ASD, performed by Saqr, Braun, Porter, Barnette and Hanks (2018), explored needs from medical comorbidities as well as the use of tightly controlled medication. Data show the presence of very high indices in anxiety and depression (22%), along with attention deficit and hyperactivity (52%). Finally, Storch et al. (2016) verify the existence of correlations between psychiatric and personality disorders and the severity of anxiety disorder currents in people with ASD.

2. Method

2.1. Aims

Before these empirical evidences, this research tries to respond to the following general aims: 1) deduce the explanatory predictive model of the increase in anxiety in students with ASD, and 2) conclude regarding the consequent rehabilitation process.

2.2. Hypothesis

Following alternative hypotheses have been proposed: 1) anxiety indexes are consubstantial to the diagnosis of the specific disorder, so the variable "diagnostic" is a reliable predictor of the variable "anxiety" manifested, 2) this influence is independent of the degree or level of diagnosis, age or sex of the participants, and 3) the situations characterized by unpredictability, which are developed in interactive contexts, generate a high growth in the levels of the "anxiety" variable in individuals with ASD.

2.3. Design

The research design is based on an empirical study of quantitative model, supported on the use of a questionnaire developed *ad hoc*, *Likert* type scale (0-5), being 0 "never happens", and 5 "happens very often" (see Appendix 1), to which the professionals who perform a specific direct educational treatment for students with ASD have answered.

2.4. Participants

A total of 111 professionals participated in this study corresponding to same students' number with ASD (N: 111).

2.5. Variables

Questionnaire is composed of 23 items relate to different variables, which according to previous studies, understand the possible contribution of the factors that raise anxiety indexes diagnosed in people with ASD. Of these variables, 4 are variables of static type: age (1), sex (2) and diagnosis (3), while the other variables are ordinal functional variables. Variable 4: "anxiety", has been operationalized as the dependent variable of the study (DV) and all other variables (5- 23) have been considered as possible factors or independent variables (IV).

Table 1 shows both the name of the variables and the subject- matter.

Table 1. VARIABLES: name and subject- matter

<i>NAME</i>	<i>SUBJECT- MATTER*</i>
1. Age	Age of the participants.
2. Sex	Sex of the participants.
3. Diagnosis	Diagnosis of the disorder.
4. Anxiety	Indexes of anxiety in the face of situations: DEPENDENT VARIABLE (DV).
5. Inattention	Hyperactivity level and attentional dispersion.
6. Anguish	Level of manifest anguish.
7. Obsession	Obsessive behaviors.
8. Treatment	Continuity of specific clinical and psychoeducational treatment.
9. Pharmacological	Adjustment of medication.
10. Organization	Level of organization of the task.
11. Diary	Continued use of temporalized diaries.
12. Space	Adjustment and knowledge of the spaces.
13. Indicators	Use of visual indicators in educational, social and family spaces and planned use of pictograms.
14. Game	Participation in games with peers.
15. Characteristics	Concretion of the levels of the planned activity.
16. Routine	Use of routines in the development of educational and social actions.
17. Conflict	Presence of conflicts during social interaction.
18. Unpredictable	Existence of unforeseen actions or demands.
19. Anticipation	Level of scheduling for the anticipation of the activity.
20. Internal	Personality characteristics. Internal conflicts lived or perceived.
21. Family	Conflicts in the family.
22. Development	Evaluation of evolutionary development.
23. Context	Adaptation of the social context. Participation and autonomy.

*Complete questionnaire may be observed in Appendix 1.

2.6. Procedure

Research has followed several steps: 1) construction of the questionnaire, 2) modifications of the questionnaire according to the advice of experts on the subject, 3) delimitation of the goal population: schools, health institutions, specific associations, that provide specialized attention to students with ASD, 4) application of the questionnaire, and 5) data analysis.

2.7. Data analysis

Data analysis has been adjusted to a quantitative model, based on the statistical test SPSS v. 23.0.0, through the following data: 1) predictive analysis of linear regression “stepwise” model, and 2) comparative *post-hoc* analysis to the variables "diagnosis" and "age" and, finally, 3) comparative study *t independent samples test* for the variable "sex".

3. RESULTS

3.1. People distribution

A total of 111 students with ASD have participated in this study, whose distribution is following:

3.1.1. Diagnostic variable: 47 students with ASD level 1 (42.3%), 11 students with ASD level 2 (9.9%) and 53 level 3 (47.7%).

3.1.2. Age variable: 11 students with ASD of 3-6 years (9.9%), 31 of the age range between 7-10 years (27.9%), 41 between 11-14 years (36.9%), 18 between 15-18 years (16.2) %), 3 between 19-22 years (2.7%) and 7-23-26 years (6.3%), and 3).

3.1.3. Sex variable: 98 male students (88.2%) and 13 women (11.7%).

3.2. Predictor model

Data analysis was adjusted to a high statistical validity and reliability (*Cronbach's Alpha*: 80.9). Predictive analysis indicates, as seen in table 2, that anxiety indexes are related to the following predictor variables assumed by the regression equation: model 1) the “**inattention**” variable (attention deficit and hyperactivity), model 2) the “**unpredictable**” variable (context not foreseen), model 3) the “**diagnosis**” variable (disorder diagnosis), and model 4) “**internal**” variable (personality characteristics, internal conflicts lived or perceived).

Table 2. Variables Entered/Removed(a).

<i>Model</i>	<i>Variables Entered</i>	<i>Method</i>
1	Inattention (var. 5)	Stepwise (Criteria: Probability-of-F-to-enter <= .05, Probability-of-F-to-remove >= .10).
2	Unpredictable (var. 18)	Stepwise (Criteria: Probability-of-F-to-enter <= .00, Probability-of-F-to-remove >= .10).
3	Diagnosis (var. 3)	Stepwise (Criteria: Probability-of-F-to-enter <= .50, Probability-of-F-to-remove >= .10).
4	Internal (var. 20)	Stepwise (Criteria: Probability-of-F-to-enter <= .05, Probability-of-F-to-remove >= .10).

a) Dependent variable: anxiety.

The statistical sum of the analysis of the prediction models are indicated in table 3.

Table 3. Model Summary.

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>	<i>Change Statistics</i>				
					<i>R Square Change</i>	<i>F Change</i>	<i>Df1</i>	<i>Df2</i>	<i>Sig.</i>
1	.85(a)	.722	.720	.71	.722	283.39	1	109	.00
2	.87(b)	.765	.761	.66	.043	19.81	1	108	.00
3	.88(c)	.779	.773	.64	.014	6.60	1	107	.01
4	.88(d)	.789	.781	.63	.010	5.26	1	106	.02

a) Predictors: (constant), Inattention.

b) Predictors: (constant), Inattention, Unpredictable.

c) Predictors: (constant), Inattention, Unpredictable, Diagnosis.

d) Predictors: (constant), Inattention, Unpredictable, Diagnosis, Internal.

e) Dependent variable: Anxiety.

Then, have been found 4 predictive models, which are added each, as predictors factors of the changes in the variable "anxiety". First model is formed by the variable "inattention", which includes a prediction percentage of 72.2% (adjusted: 72%), with a standard error of the estimate: .71 (non-explanatory variance). Second model adds the variable "unpredictable", with 76.5% of the variance (adjusted R square: 76.1%) and a typical error of the estimate: .66, which involves an improvement of the prediction of 4.3% regarding to the first model. Third model is formed by the variable "diagnosis", which improves the predictive analysis by 1.2% (R square: 77.9%, adjusted: 77.3%, with a typical error of .64). Finally, fourth model has added the variable "internal", which improves the total of the predictive model by 1 point regarding to the immediately previous model (R: 78.9%, adjusted: 78.1%, typical error: .63), so that, throughout the 4 models, the predictive analysis has improved a total of 6.7 points.

The variance analysis (ANOVA) for the 4 models of regression analysis is indicated in table 4.

Table 4. ANOVA(e).

<i>Model</i>		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
1	Regression	144.99	1	144.99	283.39	.00(a)
	Residual	55.76	109	.51		
	Total	200.75	110			
2	Regression	153.63	2	76.81	176.06	.00(b)
	Residual	47.12	108	.43		
	Total	200.75	110			
3	Regression	156.37	3	52.12	125.67	.00(c)
	Residual	44.38	107	.41		
	Total	200.75	110			
4	Regression	158.47	4	39.61	99.32	.00(d)
	Residual	42.28	106	.39		
	Total	200.75	110			

a) Predictors: (constant), Inattention

b) Predictors: (constant), Inattention, Unpredictable.

c) Predictors: (constant), Inattention, Unpredictable, Diagnosis.

d) Predictors: (constant), Inattention, Unpredictable, Diagnosis, Internal.

e) Dependent variable: Anxiety.

First model, formed by the variable "inattention" shows an F: 283.3, critical significant critical score: .00. Second model, which includes the variable "unpredictable", indicates an F: 176, with a significant critical level: .00. Third model, which adds the variable "diagnosis", shows an F: 125.6 (Sig: .00), while fourth model, which is complemented by the variable "internal", reduces F to 99.3 (Sig: .00). These results suppose that there is a high probability that the variables picked up by predictive models affect highlighted anxiety of the students with ASD of this sample.

Therefore, the regression models, found by the Coefficients (see table 5) of the 4 models, allows the direct regression equation, which is formed by the sum to the constant of the scores found in B for each model. For example, first model presents the following direct equation: Y (DV): "anxiety" = $0.39 + 0.87X_1$, then add the data of $X_{234}(\dots)$

Table 5. Coefficients(a).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.39	.13		2.86	.00
	Inattention	.87	.05	.85	16.83	.00
2	(Constant)	.11	.14		.80	.42
	Inattention	.74	.05	.72	13.29	.00
	Unpredictable	.23	.05	.24	4.45	.00
3	(Constant)	.25	.14		1.70	.09
	Inattention	.74	.05	.72	13.66	.00
	Unpredictable	.25	.05	.25	4.80	.00
	Diagnosis	-.16	.06	-.11	-2.57	.01
4	(Constant)	.34	.15		2.30	.02
	Inattention	.75	.05	.73	14.07	.00
	Unpredictable	.25	.05	.25	4.89	.00
	Diagnosis	-.18	.06	-.13	-2.87	.00
	Internal	-.13	.05	-.10	-2.29	.02

a) Dependent variable: anxiety.

3.3. Comparative analysis

In order to asses if the regression analysis data differ about the three variables: 1) "diagnosis" (ASD_{1-2,3}), 2) "age", and 3) "sex". A *post-hoc* analysis through *Tukey HSD testis* carried out for the variable "diagnosis" and "age", while a test *t independent samples test* for the variable "sex" is applied since it only contains two response categories. Variable "diagnosis" type indicates that there're no significant differences in the results of the regression equation based on the level of diagnosis (ASD_{1-2,3}) (see table 6). In synthesis, the "diagnostic" variable influences the model as a whole, but it does not depend on the diagnostic type.

Table 6. Multiple Comparisons: diagnosis.

DV: anxiety.

	(I) Diagnosis	(J) Diagnosis	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
<i>Tukey HSD</i>	ASD1*	ASD2	-.00	.14	.99	-.39	.38
		ASD3	.08	.08	.58	-.14	.32
	ASD2	ASD1	.00	.14	.99	-.38	.39
		ASD3	.09	.14	.79	-.28	.48
	ASD3	ASD1	-.08	.08	.58	-.32	.14
		ASD2	-.09	.14	.79	-.48	.28

*ASD_{1-2,3} (APA, 2013).

However, variable "age" points out different results. Thus, the age groups the intervals between 3-6 years, 7-10 years and 11 a-14 forms own groups differentiated, both among themselves and with respect to the other groups of age ranges of the study. As well, the 3 age ranges between 15-18 years, 19-22 years and 23-26 make up a specific group different from the previous ones (see table 7).

Table 7. Post- hoc for the “age” variable.

		DV: anxiety.				
	<i>Age</i>	<i>N</i>	<i>Subset</i>			
			1	2	3	4
Tukey HSD (a, b, c)	3-6 years	11	1.27			
	15-18 years	18		.94		
	19-22 years	3		2.00		
	23-26 years	7		2.14		
	11-14 years	41			2.63	
	7-10 years	31				2.87
	Sig.			1.00	.66	1.00

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares.

The error term is Mean Square (Error) = .07.

a) Uses Harmonic Mean Sample Size = 8.83.

b) The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c) Alpha = .05.

Finally, variable "sex", measured through the *t independent samples test, t-test for equality of means*, indicates that no differences are observed between males and females in relation to its influence on the regression model.

4. Conclusions

According to the analysis data, following general conclusions can be made. With regard to first alternative hypothesis of the study, the anxiety indices observed in students with ASD are indeed related to diagnosis process itself, which is supported empirically by the insertion of the variable: "diagnosis" in predictive model 3. Furthermore, this confirmation is reinforced by the incorporation of the personality variable "inattention" (included in predictive model 1), and the variable "internal" (personality characteristics, included in predictive model 4), since both variables form part of the intrinsic idiosyncratic characteristics of the specific diagnosis, which make up the psychiatric and psychological comorbidity criteria of the disorder.

The second alternative hypothesis, i.e. the relationship between the "anxiety" variable and the level of the "diagnosis" variable, confirms that DV is strongly related to the “diagnosis” variable as a global whole, although no relationships between anxiety and type of diagnosis are indicated: ASD₁₋₂₋₃. There are also no significant differences in the predictive results in relation to the "gender" variable. However, with regard to the "age" variable, the hypothesis is confirmed only relatively, as there are some age groups without any difference: age intervals between 15-18 years, 19-22 years, and 23-26 years, along with other age intervals measured, exhibit significant differences in the results of the regression models: 3-6 years, 7-10 years and 11-14 years. With regard to the third alternative hypothesis, it may be confirmed that the "unpredictable" variable (stimuli not foreseen in the social context, which is included in predictive model number 2 of regression education), becomes a hard predictor of highlighted levels of anxiety observed in students with ASD. All other variables studied (19 remaining variables) were excluded from the predictive models.

5. Discussion

Therefore, it's deduced from the previous conclusions that, from an educational and health viewpoint, as well as from family and social perspectives, a highly structured scheduling of specific programmes is key to reducing anxiety in people with ASD. In this sense, Cuesta, Sánchez, Orozco, Valenti and Cottini (2016) show the importance of scheduling foreseeable environments, as the developer of the perception of contingencies of social actions through activities of control of contextual stimuli. Hillier et al. (2018). This planning includes weekly discussions and structured time management, along with planned actions, group work and other social communications. Results conclude that the programme has had a positive impact on the development of participants' social skills and interaction, as well as executive functioning, goal setting, academic processes and resources, and, above all, on reducing stress and anxiety.

McVey et al. (2016) qualify the intervention carried out through the “PEERS®” (Program for the Education and Enrichment of Relational Skills), which aims to reduce anxiety in young people and adults (18-35 years) with ASD. The results indicated significant improvements in capacity of social response and reduction of anxiety (LSAS- SR, $p = .01$). Paula (2013) proposes highly structured programmes of clear situational patterns, which enhance autonomous learning with the aim of generating routine and highly predictable contexts. Lozano and Alcaraz (2009) put forward the development of social understanding as a measure to improve social skills, which helps reduce anxiety rates. Golan, Ashwin, Granader, McClintock, Day, Legget and Baron-Cohen (2010) use an animated series: "The Transporters" as a programme to improve emotional understanding in people with ASD aged 4-7 years. Conclusions confirm that participants in the experimental group improved significantly in emotional aspects compared to their peers in the control group.

Bernard-Ripoll (2007) uses “Video-Modelling” and “Social Stories”, through an A-B design, to teach children with ASD to recognise and understand emotions about themselves and, therefore, to generalise to other situations of everyday life. Data showed a significant improvement of the behavioural baseline, although the most important aspect was the acquisition of the ability to recognise and understand the contingencies of the interactions. Also worthy of note are the current programmes based on new technologies to improve social skills. Bölte (2004) proposes the use of computing (CBI) to improve social and emotional skills. Results suggest that adequately customised software can significantly improve social interaction skills. In summary, according to this research data, the following basic dimensions adjusted to people with ASD should be developed to reduce anxiety indices (see table 8).

Table 8. Basic dimensions of the intervention

<i>DIMENSIONS</i>	<i>SUBJECT- MATTER</i>
Sanitary	Adjusted therapy and tracing.
Educational	Specific support group. Adjusted scheduling to individual, group and school level.
Family	Intensive mediation programs.
Social	Social resources. Share in social contexts.

Both dimensions must follow a strategy based on the following general lines of intervention which’s observed in table 9.

Table 9. General lines of the intervention

<i>ACTION TIME</i>	<i>SUBJECT- MATTER</i>
1.Previous	1.a. To essay the scheduled action. 1.b. Test- error: training consequent behavior.
2. Process	2.a. Action of the support group. 2.b. List of specific behaviors. 2.c. Learning behavior routines (predictability). 2.d. Providing visual indicators. 2.e. Handling the routine.
3. Posterior	3.a. Mediation: analysis of behavioural contingencies. 3.b. Understanding of complex interactions. 3.c. Coaching of the same routine (2.e) in another situation or with other methods. 3.c. Analysis of changing situations.
1® Previous2	1.1.a. From point 3.c. start the new concrete learning process (...) 1.1.b. Flexibility of routine 2.e. and 3.c. (method or contexts) (...)

Study Limitations

This data has been considered with caution owing to the sample size, so it would be necessary to replicate in populations with a greater number of participants.

Acknowledgments

We want to express our greater gratitude to all professionals from different schools and specific associations who have answered the questions indicated in this research study.

Bibliography

- Ahlers, K. P., Gabrielsen, T. P., Lewis, D., Brady, A. M., and Litchford, A. (2017). Supporting individuals with autism spectrum disorder in understanding and coping with complex social emotional issues. *School Psychology International*, 38(6), 586- 607. In <http://dx.doi.org/10.1177/0143034317719942>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* ®. Arlington: American Psychiatric Association. In <https://www.psychiatry.org/psychiatrists/practice/dsm>
- Bernard-Ripoll, S. (2007). Using a self-as-model video combined with social stories to help a child with Asperger syndrome understand emotions. *Focus on Autism and Other Developmental Disabilities*, 22 (2), 100-106. In <http://vsmproject.pbworks.com/f/emotion.pdf>
- Bölte, S. (2004). Computer-based intervention in autism spectrum disorders. In O. T. Ryaskin (ed.), *Focus on autism research*. New York: Nova Biomedical (pp. 247-260).
In <https://www.tandfonline.com/doi/abs/10.3109/17518423.2011.651655?journalCode=ipdr20>
- Corbett, B. A., Blain, S. D., Ioannou, S., and Blaser, M. (2017). Changes in anxiety following a randomized control trial of a theatre- based intervention for youth with autism spectrum disorder. *The International Journal of Research and Practice*, 21(3), 333- 343. In <http://dx.doi.org/10.1177/1362361316643623>
- Cuesta, J. L., Sánchez, S., Orozco, M., Valenti, A., and Cottini, L. (2016). Autism spectrum disorder: educational intervention and lifelong learning. *Psychology, Society & Education*, 8(2), 157- 172. In <http://repositorio.ual.es/bitstream/handle/10835/4774/Espectro%20autista.pdf?sequence=1&isAllowed=y>
- Factor, R. S., Condy, E. E., Farley, J. P., and Scarpa, A. (2016). Brief report: Insistence on sameness, anxiety, and social motivation in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(10), 3295-3307. In <http://dx.doi.org/10.1007/s10803-016-2781-x>
- Golan, O., Ashwin, E., Granader, Y., McClintock, S., Day, K., Leggett, V. et al. (2010). Enhancing emotion recognition in children with autism spectrum conditions: an intervention using animated vehicles with real emotional faces. *Journal of Autism and Developmental Disorders*, 40 (3), 269-279. In Doi: 10.1007/s10803-009-0862-9. <https://link.springer.com/article/10.1007%2Fs10803-009-0862-9>
- Happe, F. (1997). Central coherence and theory of mind: reading homographs in context. *British Journal of Development Psychology*, 15, 1- 12. In <https://doi.org/10.1111/j.2044-835X.1997.tb00721.x>
- Happe, F., and Frith, U. (2006). The weak coherence account: detail focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 36(1), 5- 25.
In <https://www.ncbi.nlm.nih.gov/pubmed/16450045>
- Hillier, A., Goldstein, J. Murphy, D., Trietsch, R., Keeves, J. Mendes, E. et al. (2018). Supporting university students with autism spectrum disorder. *The International Journal of Research and Practice*, 22(1), 20- 28. In <http://dx.doi.org/10.1177/1362361317699584>
- Hollocks, M. J., Pickles, A., Howlin, P., and Simonoff, E. (2016). Dual cognitive and biological correlates of anxiety in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 46(10), 3295-3307. In <http://dx.doi.org/10.1007/s10803-016-2878-2>
- Merrick, A. D., Grieve, A., and Cogan, N. (2017). Psychological impacts of challenging behaviour and motivational orientation in staff supporting individuals with autistic spectrum conditions. *The International Journal of Research and Practice*, 21(7), 872-880. In <http://dx.doi.org/10.1177/1362361316654857>
- Lai, M- Ch., Lombardo, M. V., Ruigrok, A. N., Chakraborti, B., Auyeung, B., Szatmari, P. et al. (2017). Quantifying and exploring camouflaging in men and women with autism. *The International Journal of Research and Practice*, 21(6), 690-702. In <http://dx.doi.org/10.1177/1362361316671012>
- Lozano, J., and Alcaraz, S. (2009). Learn with “Zapo”. *Didactic proposals for the learning of emotional and social skills*. Madrid: Wolters Kluwer Spain. In <https://www.agapea.com/libros/Aprende-con-Zapo-propuestas-didacticas-para-el-aprendizaje-de-habilidades-emocionales-y-sociales-9788471979179-i.htm>
- Magiati, I., Ong, C., Lim, X. Y., Tan, J. W., Ong, A. Y., Patrycia, F., et al. (2016). Anxiety symptoms in young people with autism spectrum disorder attending special schools: Associations with gender, adaptive functioning

and autism symptomatology. *Autism: The International Journal of Research and Practice*, 20(3), 306-320. In <http://dx.doi.org/10.1177/1362361315577519>

McVey, A. J., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., Casnar, Ch. L. et al. (2016). A Replication and extension of the PEERS® for young adult social skills intervention: Examining effects on social skills and social anxiety in young adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(12), 3739-3754. In <http://dx.doi.org/10.1007/s10803-016-2911-5>

Northrup, J. B. (2017). Contingency detection in a complex world: A developmental model and implications for atypical development. *The International Journal of Research and Practice*, 41(6), 723-734. In <http://dx.doi.org/10.1177/0165025416668582>

Paula, I. (2003). Cooperativeness between anxiety and autism. The hypotheses of social error and allostatic load. *Revista Neurología*, 56(1), 45-59. In https://www.researchgate.net/profile/Isabel_Paula/publication/255822003_Coocurrencia_entre_ansiedad_y_autismo_Las_hipotesis_del_error_social_y_la_carga_alostatica/links/00b7d520ca19cbc296000000/Coocurrencia-entre-ansiedad-y-autismo-Las-hipotesis-del-error-social-y-la-carga-alostatica.pdf

Plaisted, K. (2001). Reduced generalization in autism: an alternative to weak central coherence. En J. Burack, T. Charman, N. Yirmina and P. Zelazo (eds.), *The development of autism: perspectives from theory and research* (pp. 149-169). Mahwah, N. J.: Erlbaum. In <https://www.repository.cam.ac.uk/handle/1810/248652>

Reisinger, D., and Roberts, J. E. (2017). Differential relationships of anxiety and autism symptoms on social skills in young boys with Fragile X syndrome. *American Journal on Intellectual and Developmental Disabilities*, 122(5), 359-373. In <https://doi.org/10.1352/1944-7558-122.5.359>

Sagr, Y., Braun, E., Porter, K. Barnette, D., and Hanks, Ch. (2018). Addressing medical needs of adolescents and adults with autism spectrum disorders in a primary care setting. *The International Journal of Research and Practice*, 22(1), 51-61. In <http://dx.doi.org/10.1177/1362361317709970>

Simmons, W. K., and Barsalou, L. W. (2003). The similarity in topography principle: reconciling theories of conceptual deficits. *Cognitive Neuropsychology*, 20, 451-486. In <https://www.ncbi.nlm.nih.gov/pubmed/20957580>

Storch, E. A., Nadeau, J. M., Johnco, C., Timpano, K., McBride, N., Mutch, P. J. et al. (2016). Hoarding in youth with autism spectrum disorders and anxiety: incidence, clinical correlates, and behavioral treatment response. *Journal of Autism and Developmental Disorders*, 46(5), 1602-1612. In <http://dx.doi.org/10.1007/s10803-015-2687-z>

Uljarevic, M., Carrington, S., and Leekam, S. (2016). Brief report: Effects of sensory sensitivity and intolerance of uncertainty on anxiety in mothers of children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(1), 315-319. In <http://dx.doi.org/10.1007/s10803-015-2557-8>

Wallace, G. L., Kenworthy, L., Pugliese, C. E., Popal, H. S., White, E. I., Brodsky, E. et al. (2016). Real-world executive functions in adults with autism spectrum disorder: profiles of impairment and associations with adaptive functioning and co-morbid anxiety and depression. *Journal of Autism and Developmental Disorders*, 46(3), 1071-1083. In <http://dx.doi.org/10.1007/s10803-015-2655-7>

APPENDIX 1

QUESTIONNAIRE

Sign with an "X" what corresponds:

DATA OF THE STUDENT WITH AUTISM SPECTRUM DISORDER

1)	AGE			
2)	SEX	M	W	
3)	DIAGNOSIS	ASD 1	ASD 2	ASD 3

Score with an "X" the answer that you consider more adjusted to the following questions, accounting the range of 0 to 5, being 0: minimum and 5: maximum (0 = Never, 1 = Almost never, 2 = Sometimes, 3 = Enough times, 4 = Frequently, and 5 = Very often):

Answer according to the student present the following characteristics.	0	1	2	3	4	5
4) Does it show a level of generalized anxiety?						
5) Do you have a level of hyperactivity and attention deficit?						
6) Do you show incidents of anguish when faced with stimuli or situations?						
7) Do you manifest obsessive behavior?						
8) Do you receive continued psychiatric and / or psychological treatment?						
9) Do you receive adjusted pharmacological treatment?						
10) Are the daily tasks scheduled?						
11) Do you use temporary diaries of homework?						
12) Do you know properly the spaces in which you participate?						
13) Do you use visual indicators to carry out daily activities?						
14) Do you participate in the game with the peer group?						
15) Has planned activity been anticipated?						
16) Do you adhere to daily routines?						
17) Do conflictive situations happen experienced or perceived in the social context?						
18) Is there restlessness in unforeseen situations?						
19) Is there an early training of the shares?						
20) Do you show personality disorders?						
21) Are there conflicts at the family level?						
22) Is evolutionary development adjusted?						
23) Does the social context adapt to your needs?						