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A Psycho-Educational Method Based on the Theory of Neural Connectivity Applied to People with Autism Spectrum Disorder

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ABSTRACT

Autism spectrum disorder can be defined as a neuropsychological developmental disorder, featuring severe limitations in information processing, especially in sensory perception and working memory, which makes it impossible to establish the necessary pathways in working memory to create episodic memory; it's the relationship between episodic and semantic memory where context-specific recovery is facilitated. Likewise, from a behavioural perspective, it may involve limitations of differing degrees of intensity in social interaction and communication, as well as stereotyped and restrictive behaviours. This study analysed the consequences of applying the method, called by author the 'Connectivity Theory', aiming to assess the improvement in global academic development, specifically owing the positive correlation with to-be-attributed dependent variables, which constitute the different phases and levels of neuropsychological information processing. A total of 6 people with autism participated in this study. The data, analysed throughout 2 school years, were assessed according to the General Linear Model for Repeated Measures (4 measurements), which enabled us identify the intersection between the learning factor 1-2: "learning" and the process variables dependents. Results found through the analysis of parameter estimates showed a significant positive correlation (< .05) between the factor (codes 1 and 2) and all the dependent variables used, exception being the variable related to stereotyped and restrictive behaviours: "stereotypies" variable.

Keywords: Autism Spectrum Disorder; Neural Connectivity; Information Processing; and Applied Functional Methods

Introduction

Specifically, autism spectrum disorder (ASD) is defined as a prevalent neurological condition characterised by stereotyped and restrictive behaviours and needs in communication and social interaction, ranging in intensity from mild to severe, with a score from 1 indicating a mild level, and 3 a severe level (American Psychiatric Association (APA) [1]; Centres for Disease Control and Prevention (CDC) [2,3]; National Institute of Neurological Disorders and Stroke (NINDS) [4].

Based on these institutions' findings, the guidelines or indicative criteria for the disorder have been present since early childhood, establishing chronic and persistent indicators throughout individuals' lives, the severity of which depends upon a wide variety of psychological, physical and environmental factors characterizing the given type of disorder. Moreover, keeping in view the functional systemic nature of the neurological system , the symptoms manifest themselves across the whole set of aspects that constitute human development, including socio-emotional reciprocity, a reduction in non-verbal communicative behaviours needed for social interaction, the development of motor coordination, understanding and participation in social interactive-communicative processes, as well as stereotyped and hyperactive motor behaviours, increasing or decreasing sensory hypo-responsiveness, which affects the neuropsychological processing of information right from the initial perceptual phase, affecting the normal functioning of the resulting cognitive abilities-both working memory, which is unable to function appropriately, as well as long-term memory and information recovery processing [5-9]. These impairments, however, should not be equated with cognitive deficits; while it is indeed valid that some people with ASD might have an in-

tellectual disability, many others have normal intellectual functioning, or, at least, their cognitive assessments don´t fully explain the symptoms observed in the perceptual, cognitive and relational areas [10].

Limitations in neural processing inhibit the formation of inter-informative nodes, which restrict contextual understanding of the concept and, consequently, executive functions-particularly higher-order functions such as the capacity for induction and deduction, levels of conceptual analysis, generalisation and, above all, practical application – limiting oneself to a mechanical repetition of what has been learnt and an insistence on conceptual and behavioural perseveration [11,12]. A great variety of studies, based on data obtained through functional neuroimaging, reveal these aetiological hypotheses, which are specifically linked to alterations in activation, perfusion and glucose metabolism in the frontal lobes, affecting the functioning of the frontal cortex; which in turn has a decisive influence on the nodal connectional process, or the connectivity of perceptual-cognitive information, as analysed through levels of electroencephalographic coherence [13-20] are achieved by synchronising the identifying signals across different points on the head, specifically in the frontal and parietal cortex.

This research is reinforced by studies on visual, attentional and inhibitory-behavioural processes, developed by [21], both in regard to processes of hyperconnectivity [22] and to those of hypo-connectivity [23,24]. For their own part, research into the aetiology of the limitations in cortical connectivity observed in people with ASD also suggested the involvement of immunological factors [25,26], In particular, regarding to a significant reduction in the number of peripheral lymphocytes of genetic origin, even at the first stage of genetic transmission. These findings are consistent with the conclusions of studies on [27-31], which lead to the same basic conclusions based on the increase in the levels of lymphocyte subpopulations, in particular suppressor/cytotoxic lymphocytes, thereby supporting the fundamental importance of the neuropsychological functioning of information processing, which is neurologically impaired and requires specific attention to alleviate, as far as possible, these specific limitations.

In this way, the Connectivity Theory method proposed in this study is based on linking the learning-objective directly to the specific context in which the perceived concept will occur, which should be more or less linked to the conceptual processing, This allows sensory memory to gather information relating to own context, the purpose of which is to ensure that working memory is able create specific neural nodes and enhance the process of connectivity with long-term memory, not justly through a connection with semantic memory-which forms part of long-term memory-but, above all, to also create neuro-informative nodes for the formation of episodic memory, which is likewise linked to long-term memory. When doing things this way, therefore, the recovery of information is highly influenced by the context itself, enabling an appropriate response based on the educational and/or social demands of the environment, and avoiding a situation where a student with ASD answers different questions with the same generalized response. E.g., in Year 4º of secondary school, within the optional Economics discipline, the concept of inflation is associated with its context when learning about economic issues:

1. **Concept (sensory memory):** Inflation is a generalized increase in the prices of products, meaning that, for the same amount of money, one cannot acquire the same products or services as previously, which leads to a depreciation of the monetary unit.

2. **Context (source text):** In group work, with groups of 3-4 students, they experienced how a bag of 20 sweets, which costs 2 euros, but if inflation were to happen with the same 2 Euros, they would only be able to buy 15 sweets; or, to get the same bag of 20 sweets, they would now have to pay 3 Euros. This activity was carried out whilst explaining the concept and related information. The participating student with ASD will also be examined, either accompanied by their family or their own, depending on their level of autonomy, the real market prices of a specific product at different times.

The difference between this method and what is known as functional learning is that context being worked on is intrinsically linked to perception of the concept or set of concepts, employing a system able to creating the source memory associated with the reception of the stimulus or initial learning, through the presentation of a relational video or a specific musical background environment during the initial perceptual phase.

AIMS

students with ASD, through the Connectivity Theory method. However, this study also assessed the 4 repeated measures of the factor; and its intersection with the dependent variables involved in the teaching-learning process allowed for the analysis and adjustment of the Semantic Integration Scale used as a measurement [32].

Method

Research Design

The study design involved a quantitative longitudinal study performed over 2 school years, with repeated measurements every 6 months of the students with ASD included in the research.

Participants

A total of 6 students with ASD have participated in this study; 4 of them initially had a lower-middle level (code 1) of learning and 2 had an average-high level (code 2). Likewise, the study was implemented in Years 3º and 4º of secondary education, across several schools, between the years 2018 and 2020.

Variables

The independent variable (IV) or factor, named 'learning', means

the students' level in the school subjects in which they are receiving educational support and reinforcement; this is coded into 2 levels, based on the students' grades: 1: lower-middle level (grades between 0 and 5) and 2: upper-intermediate level (scores academic between 5.1 and 10). The Dependent Variables (DVs), which are influenced by the method applied and assessed by following the 'learning' factor, are as follows: 'conceptual', 'significants', 'category', 'relations', 'inter-concepts', 'recovery', 'social' and 'stereotypies', with the following coding: 0: very-low level, 2: low level, 4: medium level, 6: medium-high level and 8: high level, following the general structure of the sub-dimensions of Semantic Integration Scale (see Annex 1), although not adhering strictly to the criteria, rather using quantitative coding and extending the analysis to additional DVs 7 and 8, related to 'social' and 'stereotypies' variables.

Annex 1

Initial Semantic Integration Scale

Annex Table 1: SUB-DIMENSION 1: CONCEPTS

1.1. There´s not significant conceptual units understanding.	8
1.2. There´s concretion of conceptual units' parts.	6
1.3. There´s conceptual units' analysis.	4
1.4. Conceptual units are understood, but with tendency to subdivide units into its parts.	2
1.5. There´s no qualitative deficit.	0

Deficits in the comprehension of conceptual units.

Annex Table 2: SUB-DIMENSION 2: MEANING

2.1. There´s no parts (units) reconstruction.	8
2.2. External help is need to stimulus reconstruction.	6
2.2. Stimuli parts reconstruction is carried out with learned relationships.	4
2.4. Stimuli parts are reconstructed as from relationships created.	2
2.5. There´s no qualitative deficit.	0

Deficits for the reconstruction of meaningful concepts.

Annex Table 3: SUB-DIMENSION 3: HIERARQUIZATION

3.1. There´s no belonging understanding.	8
3.2. There´s category construction is limited to some concepts.	6
3.3. External help is need to indicate units´ belonging level to categories.	4
3.4. There's awareness of belonging, but it´s difficult assign an unit to its category.	2
3.5. There´s tendency to concepts hierarchize in corresponding category.	0

Deficits in conceptual- categories hierarchy.

Annex Table 4: SUB-DIMENSION 4: INTER-CONCEPTS

4.1. No competences of relationships meaning between concepts.	8
4.2. Don´t creates relationships, but understands similarities and differences between concepts.	6
4.3. External help is needed to create relationships among concepts.	4
4.4. Relationships are used between two concepts if its're previously learned.	2
4.5. There´s no limitations to form relationships between two new concepts.	0

Deficits to inter- conceptual relations development (nodes).

Annex Table 5: SUB-DIMENSION 5: NODES

5.1. There´s no understanding relationship between conceptual categories.	8
5.2. Two different conceptual categories are understood, but it´s not able to attribute relationships.	6
5.3. External help is required to establish relationships.	4
5.4. It´s given learned relationships to different conceptual categories.	2
5.5. Relationships are created between different conceptual categories.	0

Deficits to setting inter- categories relationships.

Annex Table 6: SUB-DIMENSION 6: RECOVERY

6.1. There´s information recovery, but it´s very limited.	8
6.2. External help is needed to facilitate information retrieval.	6
6.3. There´s information recovery, but from concrete concept.	4
6.4. There´s information recovery, from learned relationship.	2
6.5. There´s no qualitative deficit.	0

Note: Source: retrieved from Ojea M & Tellado F [18]. Semantic Integration Evaluation Scale (SIS) for children with autism spectrum disorder. Open Access Journal of Addiction and Psychology, 1(3), 1-6. https://irispublishers.com/oajap/article-in press.php?fbclid=IwAR0o8CzRwqkkc_JuV_GWl6j49L-1rqup84YRTlZoYJo 5qJYk_O1VBYpoCoKM

Deficits to information remind.

Procedure

The Connectivity Theory method is applied within the school's support services department, whereby small groups of students with light special educational needs-mainly those with learning difficulties or academic underachievement-are formed; these groups include one student with ASD in those academic subjects where the guidance department has recommended this support process. The necessary reports and authorisations have been drawn up for this processing.

Data Analysis

Factor (1-2) has been measured through the scores found in the subject areas in which the student experiences the greatest needs. DVs, which are influenced by the application of the teaching/learning method, have been analysed throughout 4 repeated measurements at 6-month intervals (a total of 2 academic school years). Despite the small number of participants (N: 6), were analysed by means of a quantitative study of parametric analysis, based on the General Linear Model for Repeated Measures (4), which makes it possible to determine the trajectory of their academic and social development of students with ASD [33].

Results

Firstly, Table 1 shows the within-subjects' factors, which make reference to the Repeated Measurements of all the DVs. It's expected, therefore, that 'learning' factor – with its initial coding – will improve significantly and will interact with the 8 DVs, owing specifically to Connectivity Theory's application (see Table 2). Effectively, the initial phase involves 4 students with ASD who have low-to-average academic and social-behavioural abilities, and 2 students with ASD who possess high-to-average academic and social-behavioural abilities (N:6). In this way, the Test for Between-Subjects Effects confirmed the levels of significance for both the interaction and the evolution of the successive measurements of the DVs (see Table 3). Similarly, the analysis of the Tests of Within-Subjects Effects (see Table 4), which indicated the level of significance of the improvement arising from the interaction between the 'learning' factor and the means of the 8 VDs. The analysis highlights the improvement observed in successive repeated measurements of the DVs, but most importantly, it also was shown a significant interdependence in the Assumed Sphericity test of the interaction between the DVs and the 'learning' factor, which suggested that educational method employed facilitates overall development, and this finding is further supported by a level of empirical statistical significance. Parameter Estimates analysis enables an examination of the different levels of the interaction between each DV and the factor (see Table 5).

Table 1: Measure: MEASURE_1.

Factors	DV
1	conceptual-1-2-3-4
5	significants-1-2-3-4
9	category-1-2-3-4
13	relations-1-2-3-4
17	interconcepts-1-2-3-4
21	recovery-1-2-3-4
25	social-1-2-3-4
29	stereotypies-1-2-3-4
Total	32

Table 2: Between-Subjects Factor.

Factor		Value Label	N
learning	1.00	learning medium- low	4
	2.00	learning medium-high	2

Table 3: Tests of Between-Subjects Effects.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	87.68	1	87.68	202.56	.00
learning	5.08	1	5.08	11.75	.02
Error	1.73	4	0.43	.	

Table 4: Measure: MEASURE_1.

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
DVs	Sphericity Assumed	419.82	31	13.54	11.86	0
	Greenhouse-Geisser	419.82	2.67	156.90	11.86	0
	Huynh-Feldt	419.82	10.61	39.56	11.86	0
	Lower-bound	419.82	1.00	419.82	11.86	.02
DVs * learning	Sphericity Assumed	70.90	31	2.28	2.00	.00
	Greenhouse-Geisser	70.90	2.67	26.50	2.00	.17
	Huynh-Feldt	70.90	10.61	6.68	2.00	.05
	Lower-bound	70.90	1.00	70.90	2.00	.23

Table 5: Parameter Estimates.

DVs	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
conceptual1	Intercept	5.00	.50	10.00	.00	3.61	6.38
	[learning=1.00]	-3.00	.61	-4.89	.00	-4.70	-1.30
	[learning=2.00]	0(a)	.	.	.	.	.
conceptual2	Intercept	6.00	.61	9.79	.00	4.30	7.70
	[learning=1.00]	-3.50	.75	-4.66	.01	-5.58	-1.41
	[learning=2.00]	0(a)	.	.	.	.	.
conceptual3	Intercept	7.00	1.27	5.49	.00	3.46	10.53
	[learning=1.00]	-3.50	1.56	-2.24	.08	-7.83	.83
	[learning=2.00]	0(a)	.	.	.	.	.
conceptual4	Intercept	8.00	1.17	6.82	.00	4.74	11.25
	[learning=1.00]	-3.50	1.43	-2.43	.07	-7.48	.48
	[learning=2.00]	0(a)	.	.	.	.	.
significants1	Intercept	4.00	.70	5.65	.00	2.03	5.96
	[learning=1.00]	-3.00	.86	-3.46	.02	-5.40	-.59
	[learning=2.00]	0(a)	.	.	.	.	.
significants2	Intercept	6.00	1.17	5.11	.00	2.74	9.25
	[learning=1.00]	-2.50	1.43	-1.74	.15	-6.48	1.48
	[learning=2.00]	0(a)	.	.	.	.	.
significants3	Intercept	7.00	1.27	5.49	.00	3.46	10.53
	[learning=1.00]	-2.50	1.56	-1.60	.18	-6.83	1.83
	[learning=2,00]	0(a)	.	.	.	.	.

significants4	Intercept	8.00	.70	11.34	.00	6.03	9.96
	[learning=1,00]	-3.00	.86	-3.46	.02	-5.40	-.59
	[learning=2.00]	0(a)	.	.	.	.	.
category1	Intercept	4.00	.61	6.53	.00	2.30	5.70
	[learning=1.00]	-3.50	.75	-4.66	.01	-5.58	-1.41
	[learning=2.00]	0(a)	.	.	.	.	.
category2	Intercept	5.00	.79	6.32	.00	2.80	7.19
	[learning=1.00]	-2.50	.96	-2.58	.06	-5.18	.18
	[learning=2.00]	0(a)	.	.	.	.	.
category3	Intercept	6.00	.70	8.48	.00	4.03	7.96
	[learning=1.00]	-3,00	.86	-3.46	.02	-5.40	-.59
	[learning=2.00]	0(a)	.	.	.	.	.
category4	Intercept	7.00	.86	8.08	.00	4.59	9.40
	[learning=1.00]	-2.00	1.06	-1.88	.13	-4.94	.94
	[learning=2.00]	0(a)	.	.	.	.	.
relations1	Intercept	4.00	.61	6.53	.00	2.30	5.70
	[learning=1.00]	-2.50	.75	-3.33	.02	-4.58	-0.41
	[learning=2.00]	0(a)	.	.	.	.	.
relations2	Intercept	6.00	.00	.	.	6.00	6.00
	[learning=1.00]	-4.00	.00	.	.	-4.00	-4.00
	[learning=2.00]	0(a)	.	.	.	.	.
relations3	Intercept	6.00	.61	9.79	.00	4.30	7.70
	[learning=1.00]	-2.50	.75	-3.33	.02	-4.58	-.41
	[learning=2.00]	0(a)	.	.	.	.	.
relations4	Intercept	6.00	.61	9.79	.00	4.30	7.70
	[learning=1.00]	-1.50	.75	-2.00	.11	-3.58	.58
	[learning=2.00]	0(a)	.	.	.	.	.
interconcepts1	Intercept	4.00	1.17	3,41	.02	.74	7.25
	[learning=1.00]	-2.50	1.43	-1,74	.15	-6.48	1.48
	[learning=2.00]	0(a)	.	.	.	.	.
interconcepts2	Intercept	5.00	.79	6,32	.00	2.80	7.19
	[learning=1.00]	-2.50	.96	-2,58	.06	-5.18	.18
	[learning=2.00]	0(a)	.	.	.	.	.
interconcepts3	Intercept	6.00	1.17	5,11	.00	2.74	9.25
	[learning=1.00]	-1.50	1.43	-1,04	.35	-5.48	2.48
	[learning=2.00]	0(a)	.	.	.	.	.
interconcepts4	Intercept	7.00	.86	8,08	.00	4.59	9.40
	[learning=1.00]	-2.00	1.06	-1,88	.13	-4.94	.94
	[learning=2.00]	0(a)	.	.	.	.	.
recovery1	Intercept	5.00	.79	6,32	.00	2.80	7.19
	[learning=1.00]	-2.50	.96	-2,58	.06	-5.18	.18
	[learning=2.00]	0(a)	.	.	.	.	.

recovery2	Intercept	5.00	.86	5,77	.00	2.59	7.40
	[learning=1.00]	-2.00	1.06	-1,88	.13	-4.94	.94
	[learning=2.00]	0(a)	.	.	.	.	.
recovery3	Intercept	6.00	.70	8,48	.00	4.03	7.96
	[learning=1.00]	-1.00	.86	-1,15	.31	-3.40	1.40
	[learning=2.00]	0(a)	.	.	.	.	.
recovery4	Intercept	8.00	1.00	8,00	.00	5.22	10.77
	[learning=1.00]	-2.00	1.22	-1,63	.17	-5.40	1.40
	[learning=2.00]	0(a)	.	.	.	.	.
social1	Intercept	2.00	.61	3,26	.03	.30	3.70
	[learning=1.00]	-.50	.75	-,66	.54	-2.58	1.58
	[learning=2.00]	0(a)	.	.	.	.	.
social2	Intercept	3.00	.86	3,46	.02	.59	5.40
	[learning=1.00]	5.00-E-016	1.06	,00	1.00	-2.94	2.94
	[learning=2.00]	0(a)	.	.	.	.	.
social3	Intercept	4.00	.00	.	.	4.00	4.00
	[learning=1.00]	6.66-E-016	.00	.	.	6.66E-16	6.66E-16
	[learning=2.00]	0(a)	.	.	.	.	.
social4	Intercept	5.00	.50	10,00	.00	3.61	6.38
	[learning=1.00]	-1.00	.61	-1,63	.17	-2.70	.70
	[learning=2.00]	0(a)	.	.	.	.	.
stereotypies1	Intercept	1.00	.79	1,26	.27	-1.19	3.19
	[learning=1.00]	-.50	.96	-,51	.63	-3.18	2.18
	[learning=2.00]	0(a)	.	.	.	.	.
stereotypies2	Intercept	1.00	1.11	,89	.42	-2.10	4.10
	[learning=1.00]	1.00	1.36	,73	.50	-2.80	4.80
	[learning=2.00]	0(a)	.	.	.	.	.
stereotypies3	Intercept	2.00	1.41	1,41	.23	-1.92	5.92
	[learning=1.00]	3.33 E-016	1.73	,00	1.00	-4.80	4.80
	[learning=2.00]	0(a)	.	.	.	.	.
stereotypies4	Intercept	2.00	1.17	1,70	.16	-1.25	5.25
	[learning=1.00]	.50	1.43	,34	.74	-3.48	4.48
	[learning=2.00]	0(a)	.	.	.	.	.

As can be seen, the level of intersection between the DVs and the 'learning' factor, for both code 1 (lower-middle academic level) and code 2 (upper-middle academic level), showed significant changes from the previous measurement to the subsequent measurement in the intersections in the VDs 'concepts', 'significants', 'category', 'relations', 'interconcepts', 'recovery' and 'social', although, nevertheless, there´re differences in specific measurements from one step to the next. However, on the opposite side, no significant changes are observed in the interaction with the 'stereotypies' variable. This means, therefore, that parametric estimation has confirmed the validity of the method applied throughout the teaching-learning process, excluding the 'stereotypies' variable; although the correlation between this variable and the factor has progressively improved, it has not reached positive statistics significance, but only between measures 1 and 2 (sig.-1: .27; sig.-2: .42; sig. 3: .23; and sig. 4: .16).

Study Limitations

The main limitation is related to the small number of students with ASD participating in the study, for which a parametric test was used, as non-parametric tests aren´t available for analysing repeated measures. However, a second limitation should also be highlighted, relating to the application of the Connectivity Theory method, which has been implemented only in those academic subjects where students performed most weakly and within the school's support programme, whereas ideally its framework would be implemented within the mainstream educational settings for all academic discipline.

Conclusion

Firstly, the application of the method employed has facilitated an improvement in the 'learning' factor, which, by cross-referencing, has led to improvements in all the DVs, exception the 'stereotypies' variable, thereby improving the academic performance of all students with ASD who participated in the study. Of the 5 students, 5 have progressed to A-levels form and 1 has been chosen to undertake intermediate-level vocational training. The 5 students who undertook their A-levels have successfully completed them; of these, 3 have progressed to university degree programmes and 2 have elected to undertake a higher-level vocational training course. Hence, the Connectivity Theory approach has proven to facilitate the creation of source memory (contextual sensory memory), which, being linked to sensory perception, enables working memory to develop not only semantic memory but also episodic memory; these two forms of memory are intrinsically linked to adapting learning and, subsequently, responding adequately to demands of the context, thereby avoiding the generalised responses that people with ASD usually giving the same answer to different questions. Nevertheless, further research in this area is required in order for the 'stereotypies' DV to contribute to significant improvements, justly as other variables do – such as anxiety-reducing behavioural training programmes, which are integrated into the Theory of Connectivity itself and which facilitate development in people with ASD.

Intersecting with the 'learning' factor, which has contributed to the overall improvement observed for both factor´ "learning" to code 1 and code 2 (see Figure 1). Secondly, regarding to the second goal of this study-which focuses on the possible improvement of the Semantic Integration Scale employed to measure the DVs-this study also concluded with the inclusion of 2 sub-dimensions within the Scale as a whole, which are shown in Table 6, thereby completing the Scale in percentile terms for its analysis at a worldwide level, with all 32 items being globally interrelated. Consequently, the Semantic Integration Scale, which previously included 6 sub-dimensions, would now comprise eight subunits, the evaluation of which is determined by the percentage average score, with a diagnostic level of autism above $\mu\sum$: 50, while maintaining the structure of the three criterion dimensions indicated in the original scale: 1) Social Interaction and Communication, 2) Stereotyped and Restrictive Behaviours, and 3) Semantic Memory, based on the 3 degrees of intensity shown in that Scale (Table 6).

Table 6: Addition of 2 new subunits (7 and 8) to the Semantic Integration Scale (Ojea & Tellado [32], op. cit.).

SUB-DIMENSION 7: SOCIAL	
Social interaction and communication.	
7.1. There´s a lack of social interaction and communication.	8
7.2. There´s hardly any social interaction, and social communication is highly limited.	6
7.3. Social interaction happens only in answer to social demands, and social communication is only based on the student's responses to questions asked by the environment.	4
7.4. Social interaction still occurs, but social communication is very limited.	2
7.5. There is no qualitative deficit.	0
SUB-DIMENSION 8: BEHAVIOUR	
Stereotypies and restrictive behaviours.	
8.1. Constant stereotyped behaviours are observed, which interfere with attention. These restrictive behaviours affect various areas of daily life.	8
8.2. There´re stereotypical hand movements and partial body movements, which interfere with their ability to maintain attention. Their attention to perceptual stimuli is dependent on the context, and they show aversion to specific situations.	6
8.3. Stereotypical behaviours, particularly hand-flapping, are common, but the individual can maintain selective attention. Behaviours restricting food texture or to specific textiles or places are observed	4
8.4. The person displays selective stereotypical behaviours, which coincide with episodes of high anxiety. No restrictive behaviours are observed.	2
8.5. There is no qualitative deficit.	0

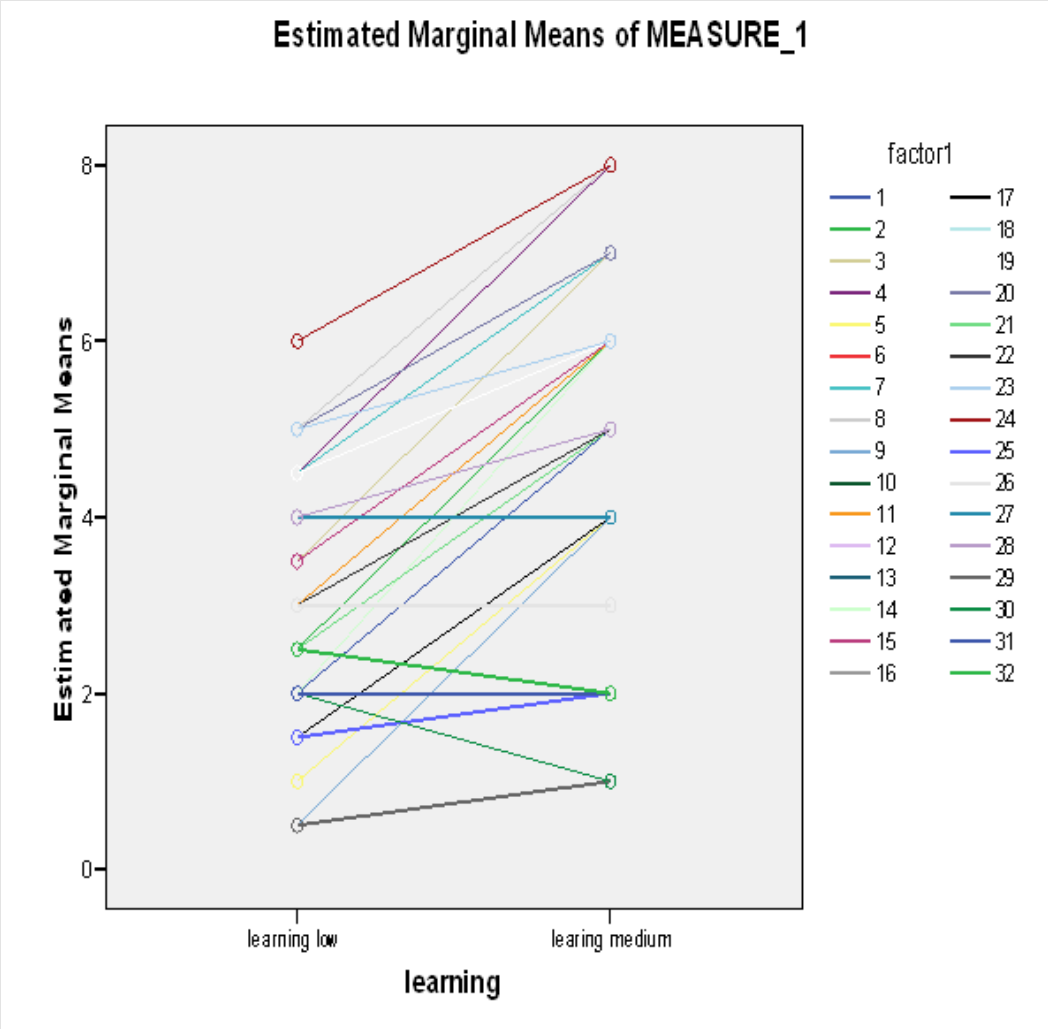

Figure 1: Profile Plots.

References

1. (2013) American Psychiatric Association. Diagnostic and Statistical manual of mental disorders (DSM-5®). American Psychiatric Publications.
2. (2020a) Center for Disease Control and Prevention (CDC). Autism spectrum disorder, screening and diagnosis of autism spectrum disorder.
3. (2020b) Center for Disease Control and Prevention (CDC). Autism Spectrum Disorder- Diagnostic Criteria.
4. (2020) National Institute of Neurological Disorders and stroke (NNDS). Autism Spectrum Disorder fact sheet.
5. Gilotty L, Kenworthy L, Sirian L, Black D O, Wagner AE (2002) Adaptive skills and executive function in autism spectrum disorders. Child Neuropsychology 8(4): 241-248.
6. Cheung M, Chan AS, Sze SL, Leung W W, To CY (2010) Verbal memory deficits in relation to organization strategy in high- and low-functioning autistic children. Research in Autism Spectrum Disorders 4(4): 764-771.
7. Liss M, Fein D, Allen D, Dunn M, Feinstein C, et al. (2001) Executive functioning in high-functioning children with autism. The Journal of Child Psychology and Psychiatry and Allied Disciplines 42(2): 261-270.
8. Ozonoff S (1997) Components of executive functioning in autism and in other disorders. In: J Russell (Edt.)., Autism as an executive disorder. Oxford University Press, pp. 179-211.
9. Ozonoff S, Jensen J (1999) Brief report. Specific executive function profiles in three neurodevelopmental disorders. Journal of Autism and Developmental Disorders 29(2): 171-177.
10. Happe F (1999) Autism: Cognitive deficit or cognitive style?. Trends in Cognitive Sciences 3(6): 216-222.
11. Bennetto L, Pennington B F, Rogers S J (1996) Intact and impaired memory functions in autism. Child Development 67(4): 1816-1835.
12. Nyden A, Gillberg C, Hjelmquist E, Heiman M (1999) Executive function/attention deficits in boys with Asperger syndrome, attention disorder and reading/writing disorder. APA PsycNet 3(3): 213-228.
13. Mizuhara H, Yamaguchi Y (2007) Human cortical circuits for central executive function emerge by theta phase synchronization. NeuroImage 36(1): 232-244.

14. Murias M, Webb SJ, Greenson J, Dawson G (2007) Resting state cortical connectivity reflected in EEG coherence in individuals with autism. Biological Psychiatry 62(3): 270-273.
15. Ohnishi T, Matsuda H, Hashimoto T, Kunihiro T, Nishikawa M, et al. (2000) Abnormal regional cerebral blood flow in childhood autism. Brain 123: 1838-1844.
16. Pierce K, Haist F, Sedaghat F, Courchesne E (2004) The brain response to personally familiar faces in autism: Findings of fusiform activity and beyond. Brain 127: 2703-2716.
17. Schmitz N, Rubia K, Daly E, Smith A, Williams S, et al. (2006) Neural correlates of executive functions in autistic spectrum disorders. Biological Psychiatry 59(1): 7-16.
18. Schroeter ML, Zysset S, Wahl M, von Cramon DY (2004) Prefrontal activation due to stroop interference increases during development-An event-related fNIRS study. Neuroimage 23(4): 1317-1325.
19. Nunez PL, Srinivasan R (2006) Measures of EEG dynamic properties. In: PL Nunez & R. Srinivasan (Eds.)., Electric fields of the brain: The neurophysics of EEG (2nd Edn.)., New York: Oxford University Press, pp. 353-401.
20. Ford JM, Mathalon DH, Whitfield S, Faustman WO, Roth WT (2002) Reduced communication between frontal and temporal lobes during talking in schizophrenia. Biol Psychiatry 51(6): 485-492.
21. Harmony T, Alba A, Marroquin JL, Gonzalez-Frankenberger B (2009) Time-frequency-topographic analysis of induced power and synchrony of EEG signals during Go/No-Go task. International Journal of Psychophysiology 71(1): 9-16.
22. Chan AS, Han YMY, Sze Sl , Cheung M, Leung WW, et al. (2011) Disordered connectivity associated with memory deficits in children with autism spectrum disorders. Research in Autism Spectrum Disorders 5(1): 237-245.
23. Coben R, Clarke AR, Hudspeth W, Barry RJ (2008) EEG power and coherence in autistic spectrum disorder. Clinical Neurophysiology 119(5): 1002-1009.
24. Isler JR, Martien KM, Grieve PG, Stark RI, Herbert MR (2010) Reduced functional connectivity in visual evoked potentials in children with autism spectrum disorder. Clinical Neurophysiology 121(12): 2035-2043.
25. Ashwood P, Anthony A, Pellicer AA, Torrente F, Walker-Smith JA, et al. (2003) Intestinal lymphocyte populations in children with regressive autism: Evidence for extensive mucosal immunopathology. Journal of Clinical Immunology 23(6): 504-517.
26. Pardo CA, Vargas DL, Zimmerman AW (2005) Immunity, neuroglia and neuroinflammation in autism. International Review of Psychiatry 17(6): 485-495.
27. Ashwood P, Wills S, Van de Water J (2006) The immune response in autism: A new frontier for autism research. Journal of Leukocyte Biology 80(1): 1-15.
28. Carper R A, Courchesne E(2005) Localized enlargement of the frontal cortex in early autism. Biological Psychiatry 57(2): 126-133.
29. Fatemi SH, Earle J, Kanodia R, Kist D, Emamian ES, et al. (2002) Prenatal viral infection leads to pyramidal cell atrophy and macrocephaly in adulthood: Implications for genesis of autism and schizophrenia. Cellular and Molecular Neurobiology 22(1): 25-33.
30. Neumann H, Medana IM, Bauer J, Lassmann H (2002) Cytotoxic T lymphocytes in autoimmune and degenerative CNS diseases. Trends in Neurosciences 25(6): 313-319.
31. Han YMY, Leung WW, Wong CK, Lam JMK, Cheung M (2011) Lymphocyte subset alterations related to executive function deficits and repetitive stereotyped behavior in autism. Research in Autism Spectrum Disorders 5(1): 486-494.
32. Ojea M, Tellado F (2018) Semantic Integration Evaluation Scale (SIS) for children with Autism Spectrum Disorder. Open Access Journal of Addiction and Psychology 1(3):1-6.
33. Barry RJ, Ckarke AR, McCarthy R, Selikowitz M (2007) EEG coherence in children with attention-deficit/ hyperactivity disorder and comorbid oppositional defiant disorder. Clinical Neurophysiology 118(2): 356-362.

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