

Experimental Validation of the Revised Perceptual-Cognitive-Behavioural Precision Scale for The Diagnosis of People with Autism (PS-PC-ASD-R, 2nd ed.)

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ABSTRACT: This article presents the experimental validation of the Revised Perceptual-Cognitive-Behavioural Precision Scale (PS 2nd ed.) for the Diagnosis of the ASD (Ojea, 2026a), which has been specifically published as free access by Ojea (2026b) and constitutes the validated extension of their original scale, the Perceptual-Cognitive Scale for the Diagnosis of Autism Spectrum Disorder Revised (EPPC-ASD-R) (Ojea, 2024)

A total of 346 participants were involved in this new edition, comprising 254 'males' and 92 'females'; the study found a high level of statistical reliability, as determined by Cronbach's alpha reliability analysis ($\alpha = .91$). Subsequently, the experimental justification is presented, based on the analysis of the transformation of the direct scores (PD) into the typical scores (Z), from which the corresponding percentiles (P) are defined, relating both to the variables being analysed and to the dimensional categories comprising those variables. Final data for which are coded on a quantitative scale, constituting the final diagnostic analysis.

The whole process has been analysed experimentally through specific regression analysis, which demonstrates the significance of the variables collected for the analysis and, consequently, highlights the importance of the dimensions analysed, concluding with an effective diagnosis of ASD.

KEYWORDS: Autism Spectrum Disorder, Specific Diagnosis, Cognition, Perception, Social and Behavioural analysis.

INTRODUCTION

La PS 2nd ed. is based on evolutionary psycho-bio-genetic principles, combined with the behavioural contributions set out in the American Psychiatric Association's (APA) International Classification of Disabilities (2013), and integrating the psycho-perceptual principles that shape information connectivity throughout neurological processing (Ojea, 2023), in regard to the social and behavioural categories outlined by the APA (2023, *op. cit.*).

Therefore, once the booklet for the PS 2nd (2026b, it's based on evolutionary psycho-bio-genetic principles, combined with the behavioural contributions set out in the American Psychiatric Association's (APA) International Classification of Disabilities (2013), and integrating the psycho-perceptual principles that shape information connectivity throughout neurological processing (Ojea, 2023), regarding to the social and behavioural categories outlined by the APA (2013, *op. cit.*), which are specified by the clinician using the corresponding quantitative numerical criteria for each analysis' factor indicated on the own scale, enabling the diagnostic process to be defined; the experimental justification for this study is presented in this article.

Indeed, in recent years, a multitude of ASD diagnostic scales and tests have emerged, all of which are adapted to the core characteristics set out in the successive official classifications based on the original APA classification (2013, *op. cit.*), which have led to the development of a series of clinical applications for the diagnosis of these criteria. The most notable of these is the Screening Tool for Autism in Two-Year-Olds: the STAT (Stone, Coonrod, Turner & Pozdol, 2004); Furthermore, the following are key to diagnosis: the Screening Test for Infants and Young Children with Autistic Traits – Part 1: BISCUIT (Matson, Wilkins, Sevin, Knight, Boisjoli & Sharp, 2010); the Early Childhood Autism Screening: ADEC (Nah, Young, Brewer & Berlinger, 2014); the Systematic Observation of Red Flags: SORF (Dow, Guthrie, Stronach & Wetherby, 2017); and the Rapid Interactive Test for Autism in Toddlers: RITA-T (Choueiri & Wagner, 2015). The STAT and the RITA-T are the two secondary screening tools with the strongest scientific evidence, validated for children aged 36 months or younger. The 3rd edition of the Griffiths Scales of Child Development (Griffiths III) is the most recent version of the Griffiths Developmental Scales, which is a validated tool for assessing the development of children with ASD from birth to 6 years of age (Sandberg, Nyden, Gillberg & Hjelmquist, 1993). While, the

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Developmental Autism Early Screening Test (DAES) (Green et al., 2016) is also widely used. For this reason, every year, increasing numbers of students are diagnosed with ASD (Abebe & Hailemariam, 2008; Kogan, Levin & Routledge, 2009; Le Couteur, 2003; Livanis & Mouzakitis, 2010; Skuse, Mandy & Scourfield, 2005; Wilkinson, 2010). In this regard, there're are multiple empirically validated diagnostic assessment instruments; this analysis by Shaw and Hatton (2009), provides a summary of the tools most commonly used by 619 programme coordinators responsible for the assessment of people with ASD, in collaboration with the National Professional Centre on Autism Spectrum Disorders (NPDC-ASD), including, amongst others, the following:

- ✓ The *Observation Schedule- Generic Test "OSGT"* (Lord, Rutter, DiLavore & Rissi 1999).
- ✓ The *Autism Diagnostic Interview- Revised "ADI- R"* (Rutter, Le Couteur & Lord 2003).
- ✓ The *Childhood Asperger Syndrome Test (CAST)* (Scott, Baron-Cohen, Bolton & Brayne, 2002).
- ✓ The *Gilliam Asperger Disorder Scale (GADS)* (Guilliam, 2001).
- ✓ The *Test Gilliam Autism Rating Scale "GARS- 2"* (Gilliam, 2005).
- ✓ The *Autism Spectrum Inventory "ASI"* of Rivière (1997).
- ✓ The *Australian Scale for Asperger's Syndrome (ASAS)* (Attwood, 1998).
- ✓ The *Checklist for Autism in Toddlers (CHAT)* (Wheelwright, 1989).
- ✓ The *Modified Checklist for Autism in Toddlers (MCHAT)* (Robins, Fein & Barton, 2001).
- ✓ The *Autism Screening Instrument for Educational Planning (ABC)* (Krug, Arick & Almond, 1980).
- ✓ The *Asperger Syndrome Diagnostic Scale (ASDS)* (Myles, Jones-Bock & Simpson, 2001).
- ✓ The *Ages and Stages Questionnaire: Social- Emotional (ASQ-SE)* (Squires, Bricker & Twombly, 2002).
- ✓ The *Reliability and item content of the Baby and Infant Screen for Children with Autism Traits (BISCUIT): parts 1, 2 and 3* (Matson, Wilkins, Sevin, Knight, Boisjoli & Sharp, 2009).
- ✓ The *Communication and Symbolic Behavior Scales Developmental Profile Infant/Toddler Checklist (CSBS-DP)* (Wetherby & Prizant, 2002).
- ✓ The *Screening for emotional and behavioral delays: The Early Screening Project (ESP)* (Feil, Severso & Walker, 1998).
- ✓ The *Pervasive Developmental Disabilities Screening Test II (PDD ST II)* (Siegel, 2004).
- ✓ The *Social Communication Questionnaire (SCQ)* (Rutter, Bailey & Lord, 2003).
- ✓ The *Screening Tool for Autism in Two-Year-Olds (STAT)* (Stone & Ousley, 2004).
- ✓ The *Temperament and Atypical Behavior Scale (TABS)* (Bagnato, Neisworth, Salvia & Hunt, 1999).

Effectively, the diagnostic instruments cited above are valid for the purpose of specific diagnosis, in keeping with the criteria of the official classifications currently available, however, there's never been a standard accepted by all empirical studies; i.e., as Conn (2014) says, the effectiveness of this process is linked to the development of strategies for performing a diagnosis that gathers data from the natural environment of interaction, Covering the family, educational and social aspects of the diagnostic process – that is, health services and specialised educational factors-must aim to design the necessary structural framework through which it is possible to collate the information gathered from previous diagnostic tests and scales, based on the actual context of individuals' participation in the official diagnostic process.

However, empirical research into the genetic complex, which affects the connectivity of neural information processing, has brought about the development of new tests and scales that measure variables related to cerebral and cerebellar neural information processing. In this respect, it should be highlighted, amongst many others, the initial diagnostic synthesis of the Semantic Integration Evaluation Scale (SIS) for children with Autism Spectrum Disorder (Ojea & Tellado, 2018) and the Perceptual-Behavioural Accuracy Scale (EP-PC-TEA) (Ojea, 2024, *op. cit.*). Both diagnostic tests do not dispense with the coded behavioural observations of the official International Classifications, but rather incorporate, in terms of dimensional proportions, the perceptual-cognitive variables that affect the neurological connectivity of information processing, with the aim of seeing how the process progresses from sensory perception, its relationship with source memory, the role of working memory in incorporating the content into semantic memory, as well as into episodic or contextual memory within permanent memory or Long-Term Memory (LTM).

Similarly, it's hypothesised that difficulties in communication and social interaction are caused by alterations in cognitive connectivity (Brunsdon & Happé, 2014), affecting the brain processes relevant to perceiving the context between the self and the other, which affects access to information and the relational construction of source memory; and, given the interrelationship of all these major cortical components, this may lead to disruptions in all subsequent perceptual-cognitive processes, such as social motivation, emotion recognition, social attention, joint attention and social learning and, in fact, various studies have shown

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that greatest limitations or impediments are found in the relational development of sensory memory and initial source memory (Baribeau et al., 2015; Happé, Coock & Bird, 2017; Nijmeijer et al., 2008; Sodian & Thoermer, 2008).

GOALS

This study, which is a re-examination of a sample (N: 346) that took part in the validation of the original scale, aims to provide a specific summary of the new scale and to offer the experimental justification needed to validate the data found to the PS 2nd ed., with the main aim of highlighting the importance of perceptual-neuro-cognitive variables in the analysis of the ASD diagnostic group.

METHOD

Research design

The design is based on a quantitative study analysed using a coding process previously applied to the scale, from which the direct scores (DS) corresponding to each variable on the scale are obtained. Afterwards, the DS are coded and converted into typical scores (Z), to which the corresponding percentile (P) is assigned, calculated in intervals of 5, which precisely positions the ASD diagnostic process. The research design is based on a quantitative study involving the analysis of a coding process previously applied to the values scale, from which the DS corresponding to each variable on the scale are obtained.

Participants

Therefore, there're a total of 346 participants, whose characteristics in terms of the variables 'age' and 'gender' are shown in Table 1.

Table 1: Participants by 'age' and 'gender' (N: 346).

		Gender		Total
		Males	Females	
Age	3-6 yrs old	18	14	32
	7-10 yrs old	114	31	145
	11-13 yrs old	65	34	99
	14-17 yrs old	26	10	36
	>18 yrs old	31	3	34
Total		254	92	346

Variables

The dependent variables (DV) are made up of: 1) 'group', corresponding to the type of diagnosis found, with the following codes: 0: no ASD; 1: ASD-1; 2) ASD-2; and 3) ASD-3.

The 'gender' DV, which corresponds to the following codes: 0: males, and 1: females.

The DV 'age' categories, with the following codes: 0: 3–6 yrs, 1: 7–10 yrs, 2: 11–13 yrs, 3: 14–17 yrs and 4: greater than 18 yrs.

The independent factors or variables (IV) are distributed throughout the three categories of the scale: I) the PROCESSING category, which is made up of six factors: 1) 'concepts', 2) 'significant', 3) 'hierarchisation', 4) 'interconcepts', 5) 'nodes', and 6) 'retrieval'; II) the SOCIAL category, which includes two factors: 7) 'social interaction' and 8) 'social behaviour'; and III) the BEHAVIOUR category, which features two factors: 9) 'stereotypies behaviours' and 10) 'restrictive behaviours' (see Table 2).

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Table 2: Dimensional categories of the variables.

Categories		Concept	Variables	Values
DVs		ASD' group.	ASD-group	0) no ASD, 1) ASD-1, 2) ASD-2 and 3) ASD-3.
		Gender.	Gender	0) male and 1) female.
		Age.	Age	0) 3–6.9 yrs, 1) 7–10.9 yrs, 2) 11–13.9 yrs, 3) 14–17.9 yrs, and 4) >18 yrs.
IVs	PROCESSING	Understanding of conceptual units. Perception and source-origin memory.	Concepts	0) no deficit is observed, 1) a low deficit is observed, 2) a moderate deficit is observed, 3) a moderate-to-high deficit is observed, and 4) a highly significant deficit is observed.
		Reconstruction of significants.	Significant	" ... "
		Hierarchisation of categories.	Hierarchy	" ... "
		Development of relationships – conceptual nodes.	Interconcepts	" ... "
		Development of relationships – categorical nodes.	Nodes	" ... "
		Semantic memory, episodic memory and memory retrieval	Memory retrieval	" ... "
	SOCIAL	Social interaction.	Social interaction	" ... "
		Social communication.	Social behaviour	" ... "
	BEHAVIOUR	Stereotyped behaviours.	Stereotyped behaviours	" ... "
		Restrictive behaviours.	Restriction	" ... "

Data analysis

Data found were analysed through the following statistical analyses, as extracted with the SPSS statistical package. This study presents the overall frequency of the codes identified throughout the coding process, by analysing the *Mean Frequencies* of the degrees of diagnosis determined. Furthermore, the incidence of the DVs in the study is analysed regarding the factors or IVs, *Means of a One-Way ANOVA*, as well as the corresponding Test for *Homogeneity of Variances*.

A predictive analysis was performed based on a *Stepwise Linear Regression Analysis* of the whole set of study variables and their associated statistics and coefficients, which helped to identify the most influential variables to assess the effectiveness of the diagnosis.

Procedure

The PS 2nd ed. was administered to the whole sample of participants (N = 346), while which the indicators and activities set out in the published PS 2nd ed. scale were followed; the analysis was developed in keeping with ethical principles and the corresponding authorizations.

Results

Cumulative frequencies found while coding

Firstly, the level of coding identified and its average scores are analysed, grouped in accordance with the analysis of average frequencies for the study as a whole (see Table 3).

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Table 3: Grouped frequencies (μ), corresponding to the diagnostic processes identified by PS 2nd ed.

CATEGORY	FACTORS	GROUP	N	μ DP	μ Z
PROCESSING	Concepts	NO ASD	112	2.11	-.22
		ASD-1	140	2.00	-.31
		ASD-2	67	2.96	.51
		ASD-3	27	3.89	1.32
	Significant	NO ASD	112	1.85	-.48
		ASD-1	140	2.16	-.15
		ASD-2	67	2.88	.52
		ASD-3	27	3.78	1.37
	Hierarchization	NO ASD	112	1.86	-.43
		ASD-1	140	2.16	-.56
		ASD-2	67	2.81	.45
		ASD-3	27	3.93	1.50
	Interconcepts	NO ASD	112	1.98	-.46
		ASD-1	140	2.19	-.25
		ASD-2	67	3.10	.66
		ASD-3	27	4.00	1.56
	Nodes	NO ASD	112	1.99	-.53
		ASD-1	140	2.41	-.10
		ASD-2	67	3.06	.54
		ASD-3	27	3.93	1.41
	Recovery	NO ASD	112	2.45	-.24
		ASD-1	140	2.33	-.35
		ASD-2	67	3.42	.66
		ASD-3	27	4.00	1.21
SOCIAL	Social interaction	NO ASD	112	1.36	-.84
		ASD-1	140	2.18	.02
		ASD-2	67	2.82	.69
		ASD-3	27	3.74	1.66
	Social communication	NO ASD	112	1.04	-.80
		ASD-1	140	1.94	-.27
		ASD-2	67	2.92	.82
		ASD-3	27	3.62	1.44
BEHAVIOUR	Stereotypies	NO ASD	112	.54	-.93
		ASD-1	140	2.06	-.58
		ASD-2	67	2.91	.76
		ASD-3	27	3.40	1.15
	Restriction	NO ASD	112	.54	-.89
		ASD-1	140	2.12	.25
		ASD-2	67	2.46	.49
		ASD-3	27	3.37	1.15

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Table 4 shows the data found in relationship to the DPs with analysis factors.

Table 4: Statistics regarding the DPs.

		Concept s	Significa nts	hierarch ization	Intercon cepts	Nodes	Recover y	Social interacti on	Social commu nication	Stereoty pies	Restricti on
P	5	,00	1,00	1,00	1,00	1,00	1,00	1,00	,00	,00	,00
	10	1,00	1,00	1,00	1,00	1,00	1,00	1,00	,00	,00	,00
	15	1,00	1,00	1,00	1,00	2,00	2,00	1,00	1,00	,00	,00
	20	1,00	2,00	2,00	2,00	2,00	2,00	1,00	1,00	,00	,00
	25	2,00	2,00	2,00	2,00	2,00	2,00	2,00	1,00	,00	,00
	30	2,00	2,00	2,00	2,00	2,00	2,00	2,00	1,00	1,00	1,00
	35	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	1,00
	40	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,0
	45	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
	50	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00
	55	2,00	2,00	2,00	2,00	2,00	3,00	2,00	2,00	2,00	2,00
	60	2,00	2,00	2,00	3,00	3,00	3,00	2,00	2,00	2,00	2,00
	70	3,00	3,00	3,00	3,00	3,00	4,00	2,00	2,00	2,00	2,00
	75	3,00	3,00	3,00	3,00	3,00	4,00	2,00	2,00	3,00	2,00
	80	4,00	3,00	3,00	3,60	4,00	4,00	3,00	3,00	3,00	3,00
	85	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
	90	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
	95	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
	100	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	6,00

Likewise, for each DP found above, the corresponding typical scores have been calculated (see Table 5).

Table 5: Typical scores (Z)

		ZConce pts	ZSignific ants	Zhierarch ization	ZInterc oncepts	ZNodes	ZRecov ery	ZSocial interact ion	ZSocial commu nication	ZStereo types	ZRestric tion
N	Valid	346	346	346	346	346	346	346	346	346	346
P	5	-2,05	-1,24	-1,24	-1,44	-1,53	-1,60	-1,22	-1,7	-1,32	-1,28
	10	-1,18	-1,24	-1,24	-1,44	-1,53	-1,60	-1,22	-1,71	-1,3	-1,28
	15	-1,18	-1,24	-1,24	-1,44	-,52	-,66	-1,22	-,84	-1,32	-1,28
	20	-1,18	-,30	-,30	-,44	-,52	-,66	-1,22	-,84	-1,32	-1,28
	30	-,31	-,30	-,30	-,44	-,52	-,66	-,17	-,84	-,60	-,56
	35	-,31	-,30	-,30	-,44	-,52	-,66	-,17	,02	,11	-,56
	40	-,31	-,30	-,30	-,44	-,52	-,66	-,17	,02	,11	,16
	45	-,31	-,30	-,30	-,44	-,52	-,66	-,17	,02	,11	,16
	50	-,31	-,30	-,30	-,44	-,52	-,66	-,17	,02	,11	,16
	55	-,31	-,30	-,30	-,44	-,52	,27	-,17	,02	,11	,16
	60	-,31	-,30	-,30	,56	,48	,27	-,17	,02	,11	,16
	70	,55	,63	,63	,56	,48	1,21	-,17	,02	,11	,16
	75	,55	,63	,63	,56	,48	1,21	-,17	,02	,83	,16
	80	1,41	,63	,63	1,16	1,48	1,21	,88	,89	,83	,88
	85	1,41	1,58	1,57	1,56	1,48	1,21	1,93	1,76	1,55	1,61

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90	1,41	1,58	1,57	1,56	1,48	1,21	1,93	1,76	1,55	1,61
95	1,41	1,58	1,57	1,56	1,48	1,21	1,93	1,76	1,55	1,61
100	1,41	1,58	1,57	1,56	1,48	1,21	1,93	1,76	1,55	3,06

Furthermore, in aim of enabling a comparative analysis of the data, the DPs for each factor have been grouped and linked to their typical scores by corresponding category (see Tables 6abc), allowing each analyst can to observe the incidence overall by dimensional category, which group the relevant variables to define the ASD' diagnosis.

Table 6a: Transformation of DPs to Z-scores for the processing category factors.

PROCESSING CATEGORY (6 variables)												
P	Conc.	Zconc.	Sig.	Zsig.	Hier.	Zhier.	Interc.	Zinterc.	Nodes	ZNodes	Ret.	Zrec.
5	,00	-2,05	1,00	-1,24	1,00	-1,24	1,00	-1,44	1,00	-1,53	1,00	-1,60
10	1,00	-1,18	1,00	-1,24	1,00	-1,24	1,00	-1,44	1,00	-1,53	1,00	-1,60
15	1,00	-1,18	1,00	-1,24	1,00	-1,24	1,00	-1,44	2,00	-,52	2,00	-,66
20	1,00	-1,18	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
25	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
30	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
35	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
40	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
45	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
50	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	2,00	-,66
55	2,00	-,31	2,00	-,30	2,00	-,30	2,00	-,44	2,00	-,52	3,00	,27
60	2,00	-,31	2,00	-,30	2,00	-,30	3,00	,56	3,00	,48	3,00	,27
65	3,00	,55	3,00	,63	3,00	,63	3,00	,56	3,00	,48	3,55	,79
70	3,00	,55	3,00	,63	3,00	,63	3,00	,56	3,00	,48	4,00	1,2
75	3,00	,55	3,00	,63	3,00	,63	3,00	,56	3,00	,48	4,00	1,21
80	4,00	1,41	3,00	,63	3,00	,63	3,60	1,16	4,00	1,48	4,00	1,21
85	4,00	1,41	4,00	1,52	4,00	1,57	4,00	1,56	4,00	1,48	4,00	1,21
90	4,00	1,41	4,00	1,58	4,00	1,57	4,00	1,56	4,00	1,48	4,00	1,21
95	4,00	1,41	4,00	1,58	4,00	1,57	4,00	1,56	4,00	1,48	4,00	1,21
100	4,00	1,41	4,00	1,58	4,00	1,57	4,00	1,56	4,00	1,48	4,00	1,21

Table 6b: Conversion of DPSs to Z-scores for social class factors.

p	CATEGORÍA SOCIAL (2 variables)			
	Interac	Zinterac	Comm	Zcomm
5	2.16	-1.22	1.97	-1.71
10	1.00	-1.22	.00	-1.71
15	1.00	-1.22	.00	-.84
20	1.00	-1.22	1.00	-.84
25	1.00	-.17	1.00	-.84
30	2.00	-.17	1.00	-.84
35	2.00	-.17	1.00	.02
40	2.00	-.17	2.00	.02
45	2.00	-.17	2.00	.02
50	2.00	-.17	2.00	.02
55	2.00	-.17	2.00	.02
60	2.00	-.17	2.00	.02
65	2.00	-.17	2.00	.02

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70	2.00	-.17	2.00	.02
75	2.00	-.17	2.00	.02
80	2.00	.88	2.00	.89
85	3.00	1.93	3.00	1.76
90	4.00	1.93	4.00	1.76
95	4.00	1.93	4.00	1.76
100	4.00	1.93	4.00	1.76

Table 6c: Transformation of PDs to Z-scores for factors in the behaviour category.

p	BEHAVIOUR (2 variables)			
	Estereo	ZEstereo	Restric	ZRestric
5	1.84	-1.32	1.77	-1.28
10	.00	-1.32	.00	-1.28
15	.00	-1.32	.00	-1.28
20	.00	-1.32	.00	-1.28
25	.00	-1.32	.00	-1.28
30	.00	-.60	.00	-.56
35	1.00	.11	1.00	-.56
40	2.00	.11	1.00	.16
45	2.00	.11	2.00	.16
50	2.00	.11	2.00	.16
55	2.00	.11	2.00	.16
60	2.00	.11	2.00	.16
65	2.00	.11	2.00	.16
70	2.00	.11	2.00	.16
75	2.00	.83	2.00	.16
80	3.00	.83	2.00	.88
85	3.00	1.55	3.00	1.61
90	4.00	1.55	4.00	1.61
95	4.00	1.55	4.00	1.61
100	4.00	1.55	4.00	3.06

From this data, it's possible to calculate the sum of the grouped arithmetic means of the DPs, regarding to the grouped means of the Z-scores and their corresponding P-values, found through the mean frequencies of the diagnosis, as shown in Table 7.

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Table 7: Summary corresponding* to the categories (DP), their Z-score and the corresponding P.

P	ΣDP- PROCESSING/6	ΣZ- PROCESSING/6	ΣDP- SOCIAL/2	ΣZ-SOCIAL/2	ΣDP- BEHAVIOUR/2	ΣZ- BEHAVIOUR//2
5	5.16	-6.92	1.17	-1.93	.00	-1.97
10	5.16	-6.92	1.50	-1.65	.00	-1.97
15	6.33	-5.76	1.50	-1.65	.00	-1.97
20	8.33	-3.74	1.50	-1.65	.00	-1.97
25	10.33	-2.00	2.00	-1.03	.00	-1.97
30	10.33	-2.00	2.50	-.59	1.50	-.88
35	10.33	-2.00	3.00	-.16	2.50	-.16
40	10.33	-2.00	3.00	-.16	3.00	.19
45	10.33	-2.00	3.00	-.16	3.00	.19
50	10.66	-1.69	3.00	-.16	3.00	.19
55	12.33	.00	3.00	-.16	3.00	.19
60	12.66	.18	3.00	-.16	3.00	.19
65	14.59	2.13	3.00	-.16	3.00	.19
70	15.50	2.91	3.00	-.16	4.00	.91
75	15.87	3.34	3.50	.27	4.00	.91
80	16.66	3.93	4.50	1.32	4.50	1.27
85	19.66	6.95	5.47	2.35	5.00	1.63
90	20.66	7.83	6.00	2.81	6.00	2.36
95	20.66	7.83	6.00	2.81	6.00	2.36
100	20.66	7.83	6.00	2.81	6.00	2.36

* PROCESSING (concepts) + (significant) + (hierarchy) + (interconcepts) + (nodes) + (retrieval)/6.

*SOCIAL: (interaction) + (communication)/2.

*BEHAVIOUR: (stereotypies) + z(restriction)/2.

It' is possible to determine the probability of the final diagnosis corresponding to each of the cases analysed (see Table 8).

Table 8: ASD' specific diagnostic.

		PD TOTAL	Z TOTAL
N	Valid	346	346
Mean		20,84	,00
Std. Deviation		8,30	6,12
Percentiles	5	8,00	-9,23
	10	9,70	-8,02
	15	10,10	-7,81
	20	14,00	-3,91
	25	15,77	-3,69
	30	16,38	-2,55
	35	18,20	-2,10
	40	18,20	-2,10
	45	18,20	-2,10
	50	19,20	-1,38
	55	20,00	,07
	60	20,40	,60
	65	23,20	,88
	70	26,20	2,79
	75	26,20	3,84

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	80	28,20	4,83
	85	32,15	8,64
	90	34,67	10,59
	100	36,40	11,43

- a) The diagnostic process for ASD Level 1 includes percentiles 50–55 and 65–70; Level 2 is between percentiles 70 and 80–85; and finally, Level 3 is between percentiles 85–100.

Predictive analysis of the study factors

To answer this question, the statistical test known as Stepwise Linear Regression Analysis is used for all the factors in the study, in the aim of verifying that the three categorical dimensions have been correctly selected for the analysis, as well as the factors selected for them, in relation to the diagnostic conclusions of the 'group' variable.

Firstly, Table 9 provides a summary of the *Regression Model*, showing the number of steps included in the model to construct the stepwise linear regression model. The model consists of four steps. The first step consists of the variable 'social interaction', which belongs to the social category; the second step consists of the variable 'restrictive behaviours', which belonging to the behavioural category; the third and fourth steps respectively are formed by variables belonging to the processing category: 'interconcepts' and 'concepts'.

Table 9: Variables introduced/eliminated (a).

Model	Variables included	Variables removed	Method
1	Interaction		Stepwise (criteria: F-probability for entry ≤ 0.05 , F-probability for exit ≥ 0.10).
2	Restriction		Stepwise (criteria: F-probability for entry ≤ 0.05 , F-probability for exit ≥ 0.10).
3	Interconcepts		Stepwise (criteria: F-statistic for entry ≤ 0.05 , F-statistic for exit ≥ 0.10).
4	Concepts		Stepwise (criteria: F-statistic for entry ≤ 0.05 , F-statistic for exit ≥ 0.10).

a) VD: Group.

As can be seen, the model summary showing how the level of variance explained by the variables is increased across the four steps outlined by model (see Table 10).

Table 10: Model summary.

Model	R	R ²	R ² corrected	Typical error of estimation
1	.733(a)	.538	.536	.62
2	.766(b)	.587	.584	.58
3	.789(c)	.623	.620	.56
4	.805(d)	.649	.645	.54

- a) Predictor variables: (Constant), Interaction.
b) Predictor variables: (Constant), Interaction, Restriction.
c) Predictor variables: (Constant), Interaction, Restriction, Interconcepts.
d) Predictor variables: (Constant), Interaction, Restriction, Interconcepts, Concepts.

Therefore, for the 'social interaction' variable, which has an adjusted R^2 of .53, this goes up to .58 in the second step: 'restriction'. Finally, the model increased the explanatory power of the adjusted R^2 to .62 and .64 for the "interconcepts" and "concepts" variables belonging to the processing category respectively, leading to an 11-point increase in the explanatory strength of the regression model, however, one must not discount values not included in the model, as they indicate a significant diagnostic influence on the values shown in the categorical-dimensional tables presented above.

ANOVA table associated with the regression model corroborates the above data. Specifically, the value of the *F-statistic*, which analyses the R^2 value for each step, shows that, as can be seen, all steps exhibit significant critical levels, with the R^2 values being significantly different from zero in all four steps included in the regression model (see Table 11).

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Table 11: ANOVA(e).

Model		Sum of squares	DF	Mean square	F	Sig.
1	Regression	154.22	1	154.22	400.28	.00(a)
	Residual	132.54	344	.38		
	Total	286.76	345			
2	Regression	168.24	2	84.12	243.45	.00(b)
	Residual	118.51	343	.34		
	Total	286.76	345			
3	Regression	178.69	3	59.56	188.48	.00(c)
	Residual	108.07	342	.31		
	Total	286.76	345			
4	Regression	186.03	4	46.50	157.43	.00(d)
	Residual	100.73	341	.29		
	Total	286.76	345			

- a) Predictor variables: (Constant), Interaction.
b) Predictor variables: (Constant), Interaction, Restriction.
c) Predictor variables: (Constant), Interaction, Restriction, Interconcepts.
d) Predictor variables: (Constant), Interaction, Restriction, Interconcepts, Concepts.
e) DV: Group.

Furthermore, the partial *Regression Coefficients* for each of the variables included in the regression model – particularly the beta value, which highlights the importance of each variable within the model and its associated critical level of significance, showed a significant level for all the steps included in the model (see Table 12).

Table 12: Coefficients(a).

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	-.50	.08		-6.02	.00
	Interaction	.70	.03	.73	20.00	.00
2	(Constant)	-.47	.07		-6.00	.00
	Interaction	.54	.04	.56	12.86	.00
	Restriction	.18	.02	.27	6.37	.00
3	(Constant)	-.71	.08		-8.26	.00
	Interaction	.39	.04	.41	8.41	.00
	Restriction	.19	.02	.29	7.00	.00
	Interconcept	.21	.03	.23	5.74	.00
4	(Constant)	-.72	.08		-8.70	.00
	Interaction	.40	.04	.42	8.84	.00
	Restriction	.19	.02	.29	7.32	.00
	Interconcept	.44	.05	.48	7.59	.00
	Concept	-.24	.04	-.30	-4.98	.00

- a) DV: Group.

CONCLUSIONS

This study supports the experimental justification for including neurocognitive and perceptual factors in order to verify the diagnosis of ASD with greater reliability. Although further studies of greater scale and depth are required, it's evident that neurocerebral connectivity presents significant limitations in people with ASD, specifically when it involves attributing concepts and relating them to others already acquired in the context of specific actions. This is caused mainly to deficits in linking the

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conceptual input to the source or contextual memory, which limits the ability of working memory (WM) to process incoming information, not just in semantic memory, but rather with episodic memory (EM) consequently, a single response selected by a person with ASD in response to a request could be valid for several different situations, owing to the lack of contextual analysis of the initial sensory input that has been learnt; hence, processing arises because the incoming concept presents difficulties for the source memory, leading to deficits in working memory's ability to configure episodic memory.

In other words, in great detail, the content of the information or concept is accessed through sensory perception or sensory memory (SM), through the WT their access to semantic memory (SeM), within Permanent Memory or Long-Term Memory (LTM), where the information or concept will be stored indefinitely. But if only this semantic connectivity (SeM) what happens and no EM is formed; hence, the concept or information stored, without the involvement of the initial source or contextual reference memory (FM), The concept or information could be generalised to any socio-academic situation or request arising from the environment, as it has not been possible to establish a relationship between SeM and episodic memory (EM) within LTM, owing to the lack of contextual discrimination while undergoing the initial learning process.

To avoid this from happening, right from the beginning, perception or SM should establish a clear link between the concept or information and the source memory (FM), which constitutes the complementary contextual memory associated with the corresponding content initially perceived; this is possible only if the SM associated the concept or information with the so-called FM in such a way as to give it a specific differential, thereby providing a concrete context the incoming semantic content; that's to say, it is not the same when that same content happens in a relationship between equals as when it does in a family relationship, in a playing situation or in an academic context, within a friendly or hostile interaction; such contexts allow us to distinguish that concept from other similar or related concepts that might arise in different situational contexts.

If this relationship is set up in the SM and the initial FM, then, the WM, as well as developing the neural nodes to facilitate access to information in Semantic Memory (SM), might also be able to associate the concept with the EM, which is related to the SM, both of which are already included within the LTM or Permanent Memory, in a way that could differentiate between identical or similar concepts or amounts of information, but which correspond to different contexts or environments, and conversely.

By doing so, the interaction between the MS, the MF and the MeS with the ME, which are nodally interconnected by the WT, will, to a greater measure, ensure academic and social success for people with ASD, given the extensive empirical evidence of deficits in these individuals across each vertical group of relationships, particularly between the initials MS and the MF.

Deficits in cortical connectivity between these brain regions in response to cognitive processes have been assessed through biomedical studies (Murias, Webb, Greenson, J. & Dawson, 2007; Rippon, Brock, Brown & Boucher, 2007), which aim to analyse the synchronisation between two brain areas in regards to signals at different points on the head, that's why a low level of synchronisation suggests low coherence (Nunez & Srinivasan; Nunez & Silberstein, 1998).

In addition to the level of synchrony, it has been shown these correlate highly with various cognitive processes (Rippon, Brock, Brown & Boucher, 2007, *op. cit.*), who found that greater long-range coherence in the theta range between the anterior and posterior brain regions is associated with greater demands on WM (Sarnthein, Petsche, Rappelsberger; Shaw, & von Stein, 1998) and with successful encoding and subsequent memory storage (Doppelmayr, Klimesch, Schwaiger, Stadler, & Rohm; Volf, & Razumnikova, 1999; Weiss & Rappelsberger, 2000).

Greater *theta* coherence was also found between the frontal and parietal regions when performing memory tasks involving manipulation rather than simply retrieving and keeping information; therefore, effectively processing memory relies on the simultaneous activation of all cortical areas.

Nevertheless, it's also needed to keep in mind that it cannot be overlooked that ASD is commonly associated with comorbid conditions which, on numerous occasions, affect the cerebellar-cortical circuit just as much as the disorder itself, as stated by the Analytic eXtract (MAX) Medicaid, which points to concomitant conditions such as intellectual disability, obsessive-compulsive disorder, attention deficit hyperactivity disorder or severe depression, and they have also observed a strong association with Parkinson's disease, endocrine disorders and, above all, epilepsy.

For this reason, the percentile of final disorder level might slightly vary, depending on the non-coded data from the initial history as specified in the PS 2nd ed. Consequently, classifications should consider comorbid associations, where present, as well as bio - genetic and psycho-perceptual-cognitive principles, which, together with measurable social and behavioural variables, will enable

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a drastic reduction in the number of diagnostic errors—which currently ranks between 60 and 65 per cent—a figure that significantly impacts the planned psychosocial and educational development, leading to predictable failure.

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