

# Effects of an Integrated Psycho-Pedagogical and Social Program on Development of Behaviour Skills for Children with Autism Spectrum Disorder



Manuel Ojea Rúa <sup>1\*</sup> and Andrea Vieira Vázquez<sup>2</sup>

<sup>1</sup>Department of Analysis and Psychosocial- Educational Intervention, University of Vigo, Spain

<sup>2</sup>Psychologist of Autism Association, Spain

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**\*Corresponding author:** Manuel Ojea Rúa, Department of Analysis and Psychosocial-Educational Intervention, University of Vigo, Spain, Email: moxea@uvigo.es

## Abstract

This study aimed to show if an integrated psycho- pedagogical program, structured according to the social mediation model would result in greater *Flexibility* and functional activity of behaviour skills in individuals with Autism Spectrum Disorder (ASD). An experimental research design pre- tests (1) - post-test (2) was realized. A total of 14 children with ASD participated in the intervention program specific *ad hoc* applied during two years. Results found through comparative analysis Friedman Test and Multivariate Tests Within- Subjects Effects, showed that the intensive intervention improved children's behaviour and their functional adaptation to the context and, in conclusion, social live and inclusion improved.

**Keywords:** Autism Spectrum Disorder; Behavioral Skills; Social Abilities; Social Mediation

## Introduction

People with Autism Spectrum Disorder (ASD) are defined by the International Classification of Mental Disorders (American Psychiatric Association, 2013) [1] as a continuum of basic needs in two development dimensions: communication and social interaction, and behavioral areas. Frith [2], Brandwein et al. [3] and Kimhi et al. [4] also show that this set of diagnostic symptoms is related to the particular perceptual processing of information, characterized by the high selection of stimuli in evaluating experiences both internally and externally, not only analyzing contextual processes, but with response and functional behavior in the environment also being influenced. These limitations involve deficits in the learning of flexible and adapted behavior, which allows the social response to be specified in different everyday situations, meaning the individual action in the social context is wrong or limited and there is a high risk of social exclusion in social interaction with peers [5]. Even when behavioral kinds are learned, the adjustment of responses to the partner's requirements may also be limited [6,7].

Ojea [8] says these diagnostic features are not an isolated process, limited to observable behavior, but rather share the

functioning interrelation of the cognitive-perceptive system, in which all neuropsychological processes are interrelated as a whole. In didactic methodology, designing specific behavioral development programs is fundamental, although learning the programs should not be limited to teaching isolated, disconnected behaviors but rather the program structure must respond to two fundamental basic aspects:

- a) Systemic psychological interaction of one's own cognitive-perceptive dimensions; and
- b) Practical intervention methodology based on the principles of social mediation.

With regards to the first aspect, systemic psychological interaction requires all interrelated neuropsychological processes to be activated about learning, which involves the cognitive learning practices that include attitudinal, emotional, motivational, behavioral and motor dimensions. Lee and Vargo [9] used interrelated physical activity to improve the development of social skills through movement. Likewise, López, Moreno-Rodríguez, Alcover, Garrote and Sánchez [10] provided arguments for a motor teaching methodology to improve

behavioral and social development.

Chou, Lee and Feng [11] used the art approach to experiment with learned behaviors, exploring body movement elements such as the shape or rhythms to establish social adaptation. It is worth noting that Nelson, Paul, Johnston and Kidder [12] researched dance and creativity as basic instruments to enhance the development of social skills and communication. Bagaiolo et al. [13], Cardinal et al. [14] and Hughes and Yakubova [15] reported positive effects of video modeling as a method by which students learn new behaviors of viewing the skill modeled, including better effectiveness acquisition and generalization of social skills. With regards to practical intervention, this assumes that the interactive practices performed in the context should acquire functional understanding. Although there are different kinds of intervention models, the efficacy of a social mediation methodology has been evinced; this methodology consists of applying and assessing techniques for development and improvement of behavior in the natural environment, as well as carrying out the proposed activities within the social context along with peers, in order to promote social interaction and avoid social exclusion. Social mediation uses cooperation and co-teaching among the intervening factors in the educational process through specific training and coordination: family, teachers and peers, with extensive research showing effectiveness [16-20].

Furthermore, this study aims to unite both aspects in an integrated specific functional program for developing behavioral skills designed *ad hoc* to implement based parent-mediated behavioral intervention, with the following general goal:

- I. To improve the children's flexible and functional behavior through behavioral music, video-modeling, psychomotor, dance, art, theater, role-playing and graphic plastic programs in integrating social skills.

To program an action-research methodology and involve family, teachers and peers in designing the interactive style intervention. Each session is structured in the following successive learning steps:

- a) Facilitate a description of the social behavior to be improved.
- b) Integration-observation of target behavior through video modeling using a pre-selected musical background.
- c) Movement-psychomotricity rhythmic reproduction of

**Table 1:** Distribution of the participants.

		Age			Total
		7-10 years	11-14 years	15-18 years	
Diagnosis	ASD1	2	1	1	4
	ASD2	2	2	2	6
	ASD3	1	2	1	4
Total	5	5	4	14	Total

music by free corporal dance movements.

- d) Graphic reproduction by association of movements with shapes, colors, lines or writing.
- e) Concept synthesis: oral expression-representation of learned behavior through theater.
- f) Discrimination-selection-generalization of repertoire behavior and generalization of different stimuli and settings by role-playing within peers' relationships.
- g) Peers, educators and parents receive hands-on intervention training to carry out the intensive program for support for parents, professionals and peers in order to develop their planned capacities.
- h) Behavioral action in real situations with peers-educators-parents-mediated support, engaging experiences in natural settings.
- i) Continuous assessment of applied behavior.
- j) Improvements program according the process of assessing involvement of the specific needs.

**Hypothesis:**

Interaction of the psychological perceptive-cognitive system in the learning of behavior skills, integrated in real-life experiences through interactions and relationships with parents, professionals and peers, improving behavior and striving for social inclusion of individuals with ASD.

**Method**

**Design**

The design is based on an experimental model of 1 group with 3 successive measures: pre-test - post-tests (1) - post-tests (2), which a specific *ad hoc* individual program was applied to improve the development of integrated behavioral skills (A<sub>1</sub>: base line - B: program - A<sub>2</sub>: development- A<sub>3</sub>: development).

**Participants**

A total of 14 children with a specific diagnosis of ASD of different levels (1, 2 and 3), between 7 and 18 years of age, belonging the Social Communication Disorders Association of Ourense (Spain), that are in several province schools, whose distribution can be seen in Table 1.

Diagnosis\*Age: Frequencies.

**Variables**

Study’s control of the behavioral dimensions has been analyzed by two variables included in the Autism Spectrum Inventory [21]:

- i. Variable *Flexibility* that measures the level of behavior adaptation in the environment, and
- ii. Variable *Activity* or functional sense and understanding of action carried out.

Three steps were intertwined corresponding with three measures in both variables: *Flexibility* 1, 2, 3 and 1, 2, 3. Step 1 each child have been assessed before starting the intervention to establish adapted *ad hoc* program. Step 2 and 3 was to know the level program effectiveness and, therefore, the children’s individual developmental. The child’s behaviors level in both variables was related to participants diagnosis level (variable: *Diagnosis*) and age range (variable: *Age*). Diagnosis level are classified to three degrees (1, 2, 3 level) by Diagnosis and Statistical Manual of Mental Disorders [1]. Age rank was defined into three intervals: (1) 7-18 years, (2) 11-14 years, (3) 15-18 years.

**Procedure**

After obtaining informed consent from the parents, the research was developed for 2 years in two weekly sessions, one individual session and another to the peer group, each session lasted 60 min. Three phases were structured. Phase 1 included the pre- test analysis and the program design according children’s assessments. Educators and parents were trained in the specific intervention. After 12 months, the Phase 2 second post-test analysis was carried out, which the program effectiveness was **Table 2:**Frequencies (°) evolution\*diagnosis and age.

evaluated. Changes and adjusting in the program were made according to the assessment data. Finally, 12 months later, Phase 3 was completed with the post-test measure to compare the successive data in the selected variables. During the all period, the educators-parents-child interaction is continued to learn and practice under the specialist’s support to promote the program implementation.

**Data analysis**

Data was analyzed using the following statistics:

- a) The comparative measure for *k* related samples of Friedman Test to compare the pre- intervention- post-interventions in the *Flexibility y Activity* variables and, consequently, assess the effectiveness of the program, and
- b) One analysis of Multivariate Tests Within-Subjects Effects was conducted to compare the data evolution in the categorical variable Factor 1 (*Flexibility 1,2,3 + Activity 1,2,3* intersection) and the relationship to the *Diagnosis* and *Age* variables and their intersection.

**Results**

Results showed that the intensive intervention improved children’s behavior of a global perspective by allowing a flexible behavior and their functional adaptation to the context. The data are described following the three sections:

**Frequencies of direct scores**

Indeed, the scores frequencies into the successive measures; *Flexibility 1,2,3 y Activity 1,2,3*, grouped according to the *Diagnosis* and *Age* variables is observed in Table 2. The participants have shown improvement in advanced adaptive *flexibility* and *activity* sense, as well as at the different levels of *Diagnosis* and *Age*.

		SUM																														
Level	Age	Flexibility1					Flexibility2					Flexibility3					Activity1					Activity2					Activity3					
		0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	
ASD1	7-																															
10	2						2					1	1	1	1							2										
	11-14	1						1							1						1				1							
	15-18	1							1						1	1								1							1	
ASD2	7-																															
10	1	1					1	1				1	1		1	1						1	1				1	1				
	11-14	2							2					2							2			1	1				1	1		
	15-18	2						1	1					2							1	1			1	1				2		
ASD3	7-																															
10	1						1						1		1									1					1			
	11-14	1	1					2					1	1							1	1			2					2		
	15-18	1					1						1								1			1					1			

°Measures (“0”: very low, “1”: low, “2”: middle, “3”: high, “4”: very high).

**Descriptive analysis**

Preliminary statistical analysis was indicated in Table 3. In general, students improved on the treatment objectives from

**Table 3:** Descriptive statistics.

	N	Mean	Std. Deviation	Minimum	Maximum
Flexibility1	14	,57	,51	,00	1,00
Flexibility2	14	1,50	,65	,00	2,00
Flexibility3	14	2,50	,94	1,00	4,00
Activity1	14	,50	,51	,00	1,00
Activity2	14	1,42	,51	1,00	2,00
Activity3	14	2,35	,74	1,00	4,00

**Level comparative**

A Friedman Test was conducted to compare the significances of scores in the evolution of the two variables into the pre-intervention and post-intervention (Table 4). The results find significant improvements in children’s skills behavior in the two controlled variables over the intervention (posts): Sig=,00 (Chi-Square= 61,21). This study revealed, then, that after 2 years of intervention, children’s behavior with ASD showed improvement on both analyzed variable

**Table 4:** Test statistics<sup>a</sup>

N	14
Chi-Square	59,56
df	5
Asymp. Sig.	,00

**Multiple analysis**

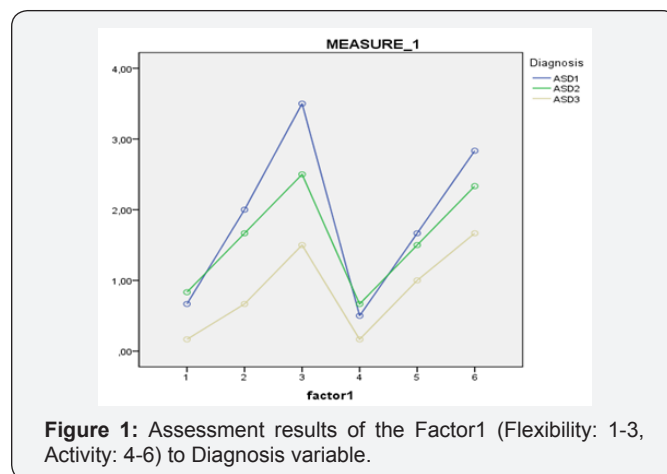
The Tests of Between- Subjects Effects was used to compare the results of the *Factor 1* variable (interactive scores of the two variables *Flexibility 1,2,3* and *Activity 1,2,3*), as well as the relationships with the variables *Diagnosis* and *Age* (Table 5).

Regarding this analysis, the following essential results were analyzed:

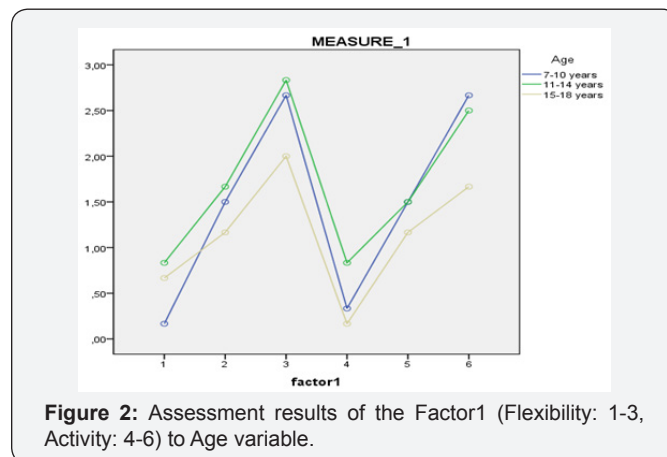
- a) Concerning pointing the increase in the *Factor 1* scores, the results find the significant improvement in intercept source (Between-Subjects Effects: Sig=,00).
- b) Multivariate Comparative Test showing a significant interaction the *Factor 1* with *Diagnosis* variable (Sig=,03), which means that changes in *Factor 1* are related to the *Diagnosis* level. However, the Kruskal Wallis Test complemented found interactions only significant in *Flexibility 2* (Sig=,01) and *Flexibility 3* variable (Sig=,01), but the results did not find significant interaction to *Activity* variable (*Activity 1*: Sig= ,46, *Activity 2*: Sig= ,10, *Activity 3*: Sig= ,06).
- c) Nevertheless, Between-Subjects Effects found no interactions between the *Factor 1* and *Age* variable (Sig= ,20).
- d) Also, it found no significant interaction between *Factor 1* and the intersection of *Diagnosis - Age* (Sig= ,96).

pre-test (*Flexibility 1*:  $\mu=,57$ ;  $\sigma=,51$  and *Activity 1*:  $\mu=,50$ ;  $\sigma=,51$ ) compared to post-test (*Flexibility 3*:  $\mu= 2,50$ ;  $\sigma=,94$  and *Activity 3*:  $\mu=2,35$ ;  $\sigma=,74$ ).

- e) In summary, our study found general improvement behavior’s skills after the program intervention.
- f) Graph 1 could be observed the significant improvement achieved by the children during the implementation of the program into *Factor 1* (*Flexibility*= 1-3 sources; *Activity*= 4-6 sources) to *Diagnosis* level.
- g) Likewise, Graph 2 could be observed the significant improvement achieved by the children during the implementation of the program into *Factor 1* (*Flexibility*= 1- 3 sources; *Activity*= 4-6 sources) to *Age* level. Also, development is progressive, but in measure 6 (*Activity3*), in which a slight setback in the age 15-18 years group is indicated.



**Figure 1:** Assessment results of the Factor1 (Flexibility: 1-3, Activity: 4-6) to Diagnosis variable.



**Figure 2:** Assessment results of the Factor1 (Flexibility: 1-3, Activity: 4-6) to Age variable.

**Table 5:** Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	154,00	1	154,00	181,18	,00
Diagnosis	11,77	2	5,88	6,92	,03
Age	3,71	2	1,85	2,18	,20
Diagnosis* Age	,47	4	,12	,14	,96
Error	4,25	5	,85		

Measure: MEASURE\_1

### Discussion

This program can be considered an effective intervention to promote the development of social skills. Participants have successfully improved behavior performance in the flexibility and functionality tasks. The initial hypothesis has therefore been verified in a pre-post comparative quantitative analysis. The program has improved the level of autonomy in all the participants in the study, with a range of benefits such as achieving better social positive behavior; this is less relevant in the 15-18 years age group, although this does not imply that implementation in older children was not effective. It is therefore important to note that this contribution should be considered in behavior modification programs based on the modeling and stimulus-response perspective [22-23] in order to achieve the following goals:

- a) To encourage behavior development by interacting with the cognitive-perceptive system: motivation, emotion, motor or tactile system.
- b) To facilitate a diverse repertoire of behaviors in the same learned action, providing greater flexibility and social functionality (activity).
- c) To develop social skills (integrated-mediated learning) that is transformed into behavioral alternatives in the environment and replaces disruptive behaviors.

Children with ASD have pragmatic limitations on information perception that involve deficits in the global understanding of perceived stimuli [24-26], meaning programs should facilitate total understanding through the cognitive activation of psycho neurological processes of an integrated and interactive learning method, rather than focusing only on isolated behavior. Achieving this goal requires an intervention protocol based on social mediation between parents-teachers and peers, since support will lead to the basic intervention program, facilitating the development of the programs applied to individuals with ASD in order to improve and increase their behavior skills or repertoires [27-28]. The efficiency of the educational programs intervention support strategy to learn parents-educators and peers support working together to improve of children's developmental. The benefits of the familiar context in which these programs are carried out are particularly notable, allowing children with ASD to play an active part along with other children in a natural family-school interaction context which includes the

social mediation model.

Diverse studies [29-31] have defined the social mediation model as an interactive strategy of continuous specific training and an intensive coordination process among those intervening in the natural intervention context: parents-educators and partners. Ojea [32] shows the scientific effectiveness of an applied program for individuals with ASD according to the basic theoretical principles of the social mediation model. The meaning of "social mediation" in this intervention has highlighted the learning perspective and the joint work strategy in relation to the scheduled specific didactic intervention. This study has demonstrated that a mediated program increases intentional social communication and interactions. The design of the mediation social model must therefore include the five well-structured phases [33-37]:

- i. Family training based on the aims, spaces, times and methodology of the program.
- ii. Training of educators according to the specific intervention process.
- iii. Collaboration of peers through cooperative learning strategies.
- iv. Coordination of family-educators-peers to organize the programmatic proposals.
- v. Ongoing assessment process.

### Limitations

The results of this study should be interpreted with caution due the small sample involved, as common in research into this disorder, especially ASD; however, this does not mean that its conclusions cannot be effective or their outcomes applied in other programs to improve the future of programs designed for people with ASD.

### Declaration of conflicting interests

The authors declare no potential conflicts of interests with respect to the research, authorship and publication of this article.

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