

diversamente

o n l u s

ricerca

# IMFAR 2010 International Meeting for Autism Research

Prosegue dal **Centro Disturbi Pervasivi dello Sviluppo dell'Azienda Ospedaliera G. Brotzu** di Cagliari la ricerca e lo studio sui disturbi inerenti l'AUTISMO, nel 2010 sono quattro i lavori realizzati dall'equipe del direttore del centro, il dott. **Giuseppe DONEDDU**.

Il comitato scientifico del prestigioso **Meeting Annuale Internazionale sulla Ricerca per l'Autismo (IMFAR)** ha accolto tutte e quattro le ricerche per essere presentate e discusse a Philadelphia (maggio '2010), Il Direttore del centro ci ha permesso di pubblicarle in forma integrale lo ringraziamo vivamente così come tutti i Ricercatori partecipanti a questo importante multi - progetto di ricerca e studio. Grazie ancora una volta al Direttore del "Centro" per la sensibilità mostrata alle famiglie e ai soci della nostra Associazione...



# THE IMPORTANCE OF EARLY INTENSIVE BEHAVIORAL INTERVENTION IN VERY YOUNG CHILDREN WITH ASDS FOR CORE SYMPTOMS AND COGNITIVE DEVELOPMENT

M. Foscoliano \*, P. M. Peruzzi \*, F. Casano \*, L. Ferretti \*, R. Fadda \*\* and G. Doneddu \*  
 (\*) Center for Pervasive Developmental Disorders, A.O. Brotzu, Cagliari, Italy, (\*\*) Department of Psychology, University of Sheffield, Sheffield, United Kingdom



## Background

Most studies on the outcomes of behavioural techniques have investigated the gains on standardized tests of children with Autism after 4 years (McEachin et al., 1993; Sheinkopf & Siegel, 1998; Eikeset et al., 2002). However, due to advances in diagnosing Autism Spectrum Disorders (ASDs) in children as young as 1 – 2 years old, there has now been an increased diagnosis rate of ASDs followed by early intensive intervention in very young children with ASDs (Cox et al., 1999; Itzhak et al., 2009; Lord et al., 1995). It has been assumed that very early intervention would yield improved outcomes because plasticity of neural systems in young children permits significant changes in the central nervous system (Dawson et al., 2000). Most of the outcome studies using ABA techniques noted that nearly half of the participants made substantial gains on standardized tests and showed a relevant improvement in cognitive and language abilities. The rest of the children made only mild to moderate progress on standardized test and continued to display typical autistic deficits (Lovaas, 1987; McEachin et al., 1993; Sheinkopf & Siegel, 1998). Many studies described how variables such as age, cognitive abilities, language development and social skills at the time of diagnosis may affect outcome of intervention. The main age range of treated children at the beginning of intervention was between 36 and 57 months in most studies (Rogers, 1998; Eaves & Ho, 2004). However, evidence about the effect of interventions in very young children has been limited due to the scarcity of follow-up studies in this population.

## Objectives

The current study investigated the effect of early intensive Applied Behavioural Analysis intervention (ABA-int) in very young children with ASDs on standardized tests of cognitive performance (Leiter-R) and adaptive behavior (Vineland Adaptive Behavior Scale – VABS). We also analyzed changes in severity of ASDs core symptoms as defined in the ADOS.

Tab. 1: Sample Characteristics

	ABA - Int Group	Eclectic Group
N	27	16
Age	M = 37, SD = 12	M = 43, SD = 13
Gender	20 M; 7 F	14 M; 2 F
Leiter IQ	M = 63.7, SD = 34.7	M = 53.1, SD = 33.1
VABS Score	M = 23.7, SD = 7	M = 22.9, SD = 6.6

## Materials and Methods

A group of 27 children with ASDs (20M; 7F), age range 23 - 65 mths (mean age = 37 mths, SD = 12), received ABA-int (10 hrs of ABA in DTT form and 5 hrs of speech therapy at week), were compared with 16 children with ASDs, age range 23-73 mths (mean age = 43 mths, SD = 13) that received Eclectic interventions: play group, psychomotricity, music therapy, for an average of 4 hours – week (Tab. 1). All the children were tested twice (T1-T2 = 12 months) with the Leiter-R Scale, with the VABS and with the ADOS. All children were diagnosed using the Autism Diagnostic Interview – Revised - ADI – R (Lord, Rutter, LeCouteur, 1994) and the Autism Diagnostic Observation Scale – ADOS (Lord, Rutter, DiLavore, Risi, 1999) and met established DSM – IV criteria of autism.

Children in ABA – Int group were patients whose parents accepted to include their child in a center – based Applied Behavioral Analysis (ABA) program.

## Measures

**Autism Diagnostic Observation Schedule – ADOS (Lord C., Rutter M., DiLavore P.C., Risi S., 2001):** a semi-structured, interactive schedule designed to assess social, communication, play and stereotyped behavior and restricted interests.

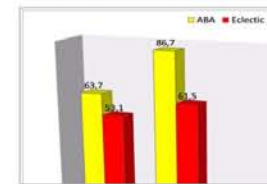
**Leiter International Performance Scale Revised- Leiter- R (Roid G.H., Miller L., 2002):** completely nonverbal and unimflunged by educational, social, and family experience, scale of intelligence.

**Vineland Adaptive Behavior Scales – VABS (Sparrow S.S., Balla D.A., Cicchetti D.V., 1984):** individual parent/caregiver interviews designed for assessing an individual's daily functioning.

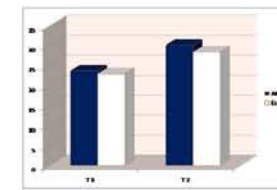
Tab. 2: Results

	T1	T2	F (p)			
	Mean	SD	Mean	SD		
IQ Leiter	ABA-int	63.6	34.7	66.7	21.3	F = 3.85 (df = 26, p = 0.05)
	Eclectic	53.1	33.1	61.5	34.1	F = 3.85 (df = 26, p = 0.05)
VABS	ABA-int	23.7	7.0	30.1	12.1	F = 3.3 (df = 26, p = 0.05)
	Eclectic	23.0	6.6	28.5	10.6	F = 3.85 (df = 26, p = 0.05)
ADOS Tot.	ABA-int	10.1	4.0	14.1	5.2	F = 5.24 (df = 26, p = 0.05)
	Eclectic	17.2	4.9	16.7	4.1	F = 6.0 (df = 26, p = 0.05)

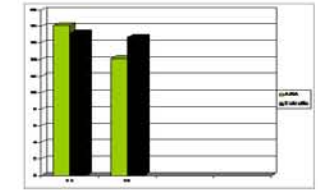
Graphic 1: Output Leiter-R



Graphic 2: Output VABS



Graphic 3: Output ADOS



## References

- Cox, A., Klein, K., Baird, G., Swettenham, J., Nightingale, N., Drew, A., & Baron-Cohen, S. (1999). Autism spectrum disorders at 20 and 42 months of age: stability of clinical and ADOS diagnosis. *Journal of Child Psychology and Psychiatry*, 40, pp. 759-770.
- Dawson, G., Osterling, J., Meltzoff, A.N., and Ruhl, P. (2000). Case study of the development of an infant with autism from birth to 2 years of age. *Journal of Applied Developmental Psychology*, 21, pp. 299-313.
- Eaves, L.J., & Ho, H.H. (2004). The very early identification of autism: outcome to age 4 1/2. *Journal of Autism and Developmental Disorders*, 34, pp. 299-310.
- Eikeseth, S. (2000). Outcome of comprehensive psycho-educational intervention for young children with autism. *Research in Developmental Disabilities*, 20, pp. 159-176.
- Itzhak, E.B., Zachor, D.A. (2009). Changes in Autism Classification with early intervention: Predictors and outcomes. *Research in Autism Spectrum Disorders*, 3, pp. 977-978.
- Lord, C. (1995). Follow-up of two-year-olds referred for possible autism. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 36, pp. 1325-1332.
- Lovaas, O.I. (1977). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, 45, pp. 2-9.
- McEachin, J.J., Smith, T., & Lovaas, O.I. (1992). Long-term outcome for children with autism who received early intensive behavioral treatment. *American Journal on Mental Retardation*, vol. 97, pp. 359-379.
- Rogers, S.J. (1998). Empirically supported comprehensive treatment for young children with autism. *Journal of Clinical Child Psychology*, 27, pp. 168-179.
- Sheinkopf, S.J., & Siegel, B. (1998). Home based behavioral treatment of young autistic children. *Journal of Autism and Developmental Disorders*, 28, pp. 45-53.

## Result

The groups were equivalent at T1 for Leiter-R Scale and VABS scores. After 6 months, there were 23 point IQ gained in the ABA-int group ( $t = -3.85$ ,  $df = 26$ ,  $p < 0.05$ ) while the Eclectic group (Graph 1) did not show any significant change in standardized test scores ( $t = -1.05$ ,  $df = 15$ ,  $p > 0.05$ ). VABS scores (Graph 2) increased significantly both in the ABA-int ( $t = -3.31$ ,  $df = 26$ ,  $p < 0.05$ ) and in the Eclectic group ( $t = -3.86$ ,  $df = 15$ ,  $p < 0.05$ ). The children in the ABA-int group scored significantly lower on the ADOS ( $t = 5.34$ ,  $df = 26$ ,  $p < 0.05$ ) while the severity of ASDs symptoms in the Eclectic group remained stable (Graph 3).

## Conclusions

Our results point out the effectiveness of an early intensive behavioural intervention in very young children with ASDs for cognitive development and in reducing symptoms severity. As shown in previous researches (Itzhak E. B., Zachor D.A. et al, 2009) the current study indicates that the intervention reduced some of the early social – communication deficits while the diagnostic classification of ASD (ADOS algorithm) remained in general stable after 1 year of intervention. However, as ABA early intervention seems to don't influence adaptive abilities, these findings highlight the importance of generalization in order for children to be successful in daily routines. An important future direction of research may be to study whether specific child characteristics at the pre – intervention time might predict the stability of autism symptoms, as well as the cognitive and adaptive abilities.

# Diagnostic Instruments for early identification of Autism Spectrum Disorders

Alessandra Mereu\*, Marinella Carta\*, Giuseppe Doneddu\* and Roberta Fadda\*\*

118.158

\*Center for Pervasive Developmental Disorders, A.O. Brotzu, Cagliari, Italy  
 \*\* Department of Psychology, University of Sheffield, Sheffield, United Kingdom

## Objects

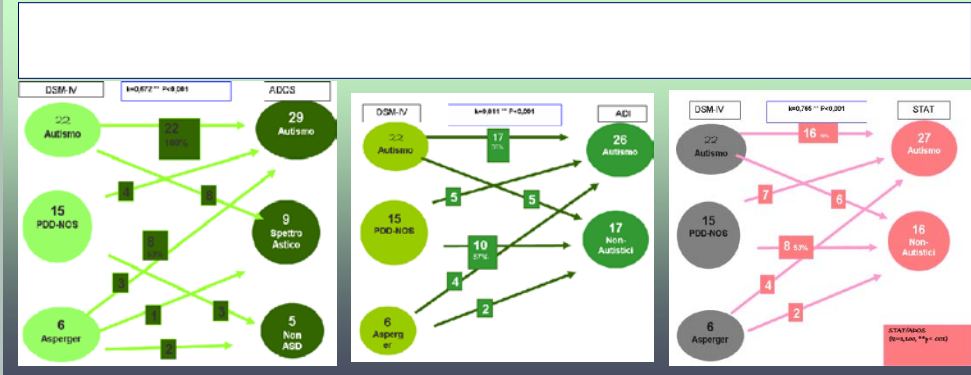
The purpose of the current study was to investigate the relationships among four widely used diagnostic measures for ASDs in toddlers: ADOS-G (Autism Diagnostic Observation Schedule, Lord et al., 1999), ADI-R (Autistic Diagnostic Interview-Revised, Lord, C., Rutter, M., & Le Couteur A., 1994), STAT (Screening Tool for Autism in Two-Year-Olds, Stone V. et al 2000, Tab.1), and clinical judgment based on DSM-IV criteria (Diagnostic and Statistical Manual of Mental Disorders IV Revised, 2000).

## Methods

The participants were 43 children with ASDs: 22 with a clinical diagnosis of Autism, 15 of PDD-NOS and 6 with Asperger syndrome (35 male, 8 female, mean chron. age= 48 months, mean developmental age= 22 months, Tab. 2). The children were diagnosed in terms of clinical judgment based on DSM-IV criteria and with the ADOS-G, ADI-R and the STAT. We calculated the sensitivity, the specificity, and the positive predictive value of the three instruments (ADI-R, ADOS-G, STAT) measured against DSM-IV-based clinical judgment for diagnosing ASDs in very young children. In this study we calculated the difference between PDD-NOS, Autism, Asperger based on QI and adaptive behaviors (Tab. 3)

## Results

### Univariate Pairwise Analyses



Tab. 1: Description of STAT Items

Domain	Item	Description
Play	Turn-taking	Examiner rolls a ball or toy car to the child to engage him/her in back-and-forth play.
	Drill play	Examiner presents the child with a doll or stuffed animal, along with furniture and eating utensils, to observe the use of functional play.
Requesting	Snack	Examiner presents the child with a clear, tightly sealed jar filled with delectable food treats.
	Bubbles	Examiner blows soap bubbles and then hands the tightly sealed jar to the child.
Directing Attention	Ballroom	Examiner inflates a balloon and then lets go so that it flies across the room as it deflates.
	Puppet	Examiner places an animal puppet on his/her own hand when the child is not looking and then begins writing with it within the child's view.
Motor Imitation	Bag of toys	Examiner presents an opaque bag containing interesting toys to the child and encourages him/her to look inside.
	Nonemaker	Examiner activates a nonemaker out of view of the child.
Motor Imitation	Rattle	Examiner shakes a rattle, then encourages the child to do the same.
	Car	Examiner rolls a small car back and forth across the table, then encourages the child to do the same.
	Drum hands	Examiner drums his/her hands on the table, then encourages the child to do the same.
Hop dog	Hop dog	Examiner brings a small toy dog across the table, then encourages the child to do the same.

Tab. 2: Description of Sample

Mean diagnostic age	36.0 month
Mean chronological age	48.0 month
Men (%)	81
Q	53
Mean developmental age (month)	22
Bayley Scales of development	
VABS Communication	35
VABS Daily Living	33
VABS Social	29
VABS Motor	34

### Sensitivity and Specificity

Sensitivity, specificity, and positive predictive values had similar rates for the ADOS. ADI-R had lower sensitivity but equal specificity compared to the other measures (Tab. 4). STAT specificity was slightly higher for the diagnosis of PDD-NOS (Tab. 3 and Tab. 5).

Tab. 4: Identification of Autism or PDD-NOS

ADI had lower sensitivity but equal specificity compared to the other

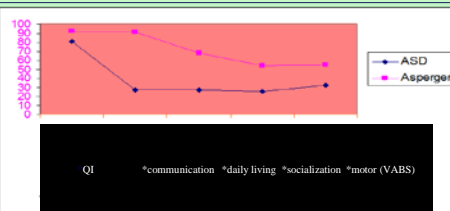
	Sensitivity	Specificity	PPV
ADOS	0.883	1.00	1.00
ADI	0.604	1.00	1.00
STAT	0.827	0.900	1.00

Tab. 5: Identification of Autism

STAT specificity was slightly higher for the diagnosis of PDD-NOS

	Sensitivity	Specificity	PPV
ADOS	0.758	0.671	0.758
ADI	0.446	0.809	0.446
STAT	0.814	0.701	0.814

Tab. 3: Demographic, IQ, and adaptive skills data for Asperger and other ASD groups



Descriptive Statistics. Comparison between Asperger and others ASD the scores increased with significant difference\* p<.001. QI assessed with The Leiter International Performance Scale Revised, Wechsler Scales (WISC-III, WPPSI, WAIS) and The Bayley Scales of Infant and Toddlers Development, Third edition), Mullen Scales, and CAS; Adaptive Behaviors assessed with Vineland Adaptive Behaviors Scales (VABS Communication Domain, Daily Living Domain, Socialization Domain and Motor Domain Standard Score

## Conclusions

clinical judgment based on DSM-IV criteria converge in showing agreement in the diagnosis of ASDs in toddlers.

Limitations. Small size of the sample and range of chronological age are the limitations of this study.

## Clinical Implication

specificity and positive predictive values, all these instruments should be included as important tools in clinical protocols for early identification of ASDs.

## REFERENCES

Baird, G., Charman, T., Baron Cohen, S., Cox, A., Swettenham, J., & Wheelock, et al. (2000). A screening instrument for autism at 18 months of age: A 6-year follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(4), 694-702.

Mullen, E. (1995). Mullen scales of early learning. Cranston, RI: T.O.T.A.L. Co.

Robins, D. L., Fein, D., Barton, M. L., & Green, J. A. (2001). The modified checklist autism severity scale: An initial study investigating the early detection of autism in pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 31(2), 131-144.

Stone, W. L., Lee, E. B., Ashford, L., Brissie, J., Hepburn, S. L., & Coonrod, J. et al. (1999). Can autism be diagnosed accurately in children under 3 years? *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 40(2), 219-226.

Klin, A., Lang, J., Cicchetti, D. V., & Volkmar, F. R. (2000). Brief report: Interrater reliability of clinical diagnosis and DSM-IV criteria for autistic disorder: Results of the DSM-IV field trial. *Journal of Autism and Developmental Disorders*, 30(2), 163-165.

Spitzer, R. L., & Siegel, B. (1990). The DSM-III-R trial of pervasive developmental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 29(5), 855-862.

Cox, A., Klein, K., Charman, T., Baird, G., Baron Cohen, S., & Swettenham, J. (1999). Autism spectrum disorders at 20 and 42 months of age: Stability of clinical diagnosis. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 40(5), 719-722.



## Background

Smith-Magenis syndrome (SMS) is characterized by distinctive facial features, developmental delay, cognitive impairment and behavioral abnormalities. The facial appearance shows midfacial hypoplasia, relative prognathism, and heavy brows with a "pugilistic" appearance (Greenberg et al., 1991; Potocki et al., 2003). The behavioral phenotype includes sleep disturbance, stereotypes, inattention, hyperactivity, maladaptive behaviors including frequent outbursts/temper tantrums, impulsivity, distractibility, aggression and self-injurious behaviors including self-hitting, self-biting, and/or skin picking, inserting foreign objects into body orifices (polyembolokoliamania), and yanking fingernails and/or toenails (onychotillomania) (De Leensyder et al. 2001; Smith, Dykens & Greenberg, 1998a, 1998b). The diagnosis of Smith-Magenis syndrome is based on clinical findings and confirmed by detection of an interstitial deletion of 17p11.2 by G-banded cytogenetic analysis and/or by fluorescence in situ hybridization (FISH). Probes for FISH testing must include the RAI1 gene which is the only gene known to account for the majority of features in Smith-Magenis syndrome. Autistic type behaviors have been reported in many cases, including resistance to change, repetitive questioning and preoccupations with particular themes. However for the best of our knowledge, there are not clinical studies published in this regard.

## Objective

The aim of this study was to investigate the extent of autistic traits in patients exhibiting the Smith-Magenis syndrome, using reliable, objective assessment tools.

Tab. 1 PARTICIPANTS

	FEMALES (N. 2)	MALES (N. 3)
Average Chron. Age (s.d.)	30.95 (5.73)	20.23 (9.85)
Average Non Verbal I.Q. (s.d.)	30	44.67 (12.01)

## Methods

### Participants

Five subjects with Smith-Magenis syndrome (SMS), ages 11 to 35 years (3 males and 2 females, av. chron. age 24.5; s.d. 9.5).

### Measures

Each subject was evaluated using the Autistic Diagnostic Observation Schedule – ADOS and the Leiter-R scale. The parents completed the Autism Disorder Interview – Revised (ADI-R) and the Vineland Adaptive Behaviour Scales (VABS).

#### AUTISM DIAGNOSTIC OBSERVATION SCHEDULE - ADOS (Lord C., Rutter M., et al. 1999)

This semi-structured assessment can be used to evaluate almost anyone suspected of having autism, from toddlers to adults, from children with no speech to adults who are verbally fluent. The ADOS consists of various activities that allow you to observe social and communication behaviors related to the diagnosis of pervasive developmental disorders. The ADOS includes four modules; you select the appropriate module for each person.

**LEITER-R** (Roid G.H., Miller I., 2002). This scale is especially suitable for children and adolescents who are cognitively delayed, disadvantaged, nonverbal or non-English speaking, speech or hearing impaired, motor impaired, ADHD, Autistic or suffering from traumatic brain injury. It spans ages 2 years, 0 months through 20 years, 11 months. In this study was considered the LEITER-R VR battery.

#### AUTISM DIAGNOSTIC INTERVIEW – REVISED (ADI – R) (Rutter M., Le Couteur A., Lord C., 1994)

This interview is a clinical diagnostic instrument for assessing autism in children and adults. The ADI-R provides a diagnostic algorithm for autism as described in both the ICD-10 and DSM-V. The instrument focuses on behavior in three main areas: qualities of reciprocal social interaction, communication and language; and restricted and repetitive, stereotyped interests and behaviors. The ADI-R is appropriate for children and adults with mental ages from about 18 months and above.

#### VINELAND ADAPTIVE BEHAVIOUR SCALE – VABS (Sparrow S.S., Balla D.A., Cicchetti D.V., 2003)

The VABS were designed to assess handicapped a non handicapped people from birth to adulthood in their personal and social functioning. The VABS is organized around four behavior domains: Communication, Daily Living Skills, Socialization and Motor Skills.

## RESULTS

Tab. 3 VABS AND LEITER-R SCALE CORRELATION

		Correlations				
		Leiter-R I.Q. age equivalent	VINELAND Communication Scale	VINELAND Daily Living Skills Scale	VINELAND Socialization Scale	Vineland Composite Scale age equivalent
Spearman's rho	Leiter-R I.Q. age equivalent	1,000	,051 ,935	-,410 ,493	-,516 ,289	-,154 ,805
	VINELAND Communication Scale	Correlation Coefficient Sig. (2-tailed) N	,051 ,935 5	1,000 -,700 5	-,400 ,505 5	-,500 ,391 5
	VINELAND Daily Living Skills Scale	Correlation Coefficient Sig. (2-tailed) N	-,410 ,493 5	-,700 ,188 5	1,000 ,037 5	-,900 ,037 5
VINELAND Socialization Scale	Correlation Coefficient Sig. (2-tailed) N	-,516 ,289 5	-,400 ,505 5	-,900 ,037 5	1,000 ,104 5	-,800 ,104 5
	Vineland Composite Scale age equivalent	Correlation Coefficient Sig. (2-tailed) N	-,154 ,805 5	-,500 ,391 5	-,900 ,037 5	1,000 ,104 5

Scores on Vineland Communication, Socialization, Daily Living Skills, Composite scales were not significantly related to the Leiter-R I.Q.

Tab. 2 VINELAND DOMAINS	Mean score (months)	St. Dev. score (months)
Communication	98	30
Socialization	74.2	42.6
Daily Living Skills	92.6	22.8
Composite Scale	84	19

All five subjects were significantly below average in the all domains

Tab. 4 ADI-R DOMAINS	≠ CUT OFF MEAN SCORE (SD) N=3	⇒ CUT OFF MEAN SCORE (SD) N=2 (males)
SOCIAL RECIPROCAL INTERACTION	5 (1.73)	11.5 (7.7)
VERBAL COMMUNICATION	3 (2)	9.5 (2.1)
NON VERBAL COMMUNICATION	1.67 (1.56)	7 (1.4)
RESTRICTED REPETITIVE BEHAVIOUR	1.33 (1.15)	3 (1.41)

On the ADI-R interview, two subjects (40%) were above autism cut-off in two domains (Verbal Communication: av. score 9.5 s.d. 2.1 and Non Verbal Communication: av. score 7 s.d. 1.4; Social Reciprocal Interaction: av. score 11.5 s.d. 7.7)

Tab. 5 ADOS DOMAINS	≠ CUT OFF MEAN (SD) N=3	⇒ CUT OFF MEAN (SD) N=2 (males)
COMMUNICATION AND LANGUAGE	3.67 (1.15)	3
SOCIAL RECIPROCAL INTERACTION	3.33 (1.15)	10 (4.24)
COMMUNICATION + SOC. REC. INTER.	7	13 (4.24)

On ADOS test the same subjects were above autism cut-off (Communication and Language: av. score 3; Social Reciprocal Interaction: av. score 10 s.d. 4.2)

## Conclusions

This study provides a description of ASD symptoms in subjects with Smith-Magenis syndrome (SMS) based on objective, validated assessment tools. Data from the current study indicate that 2 of the 5 subjects with Smith-Magenis Syndrome show symptoms of Autism Spectrum Disorder. These results might be used to drive more effective and individualized intervention in subjects with SMS. It is necessary to increase the sample size in order to improve the reliability of these results and to better define the phenotypic characterization of individuals with Smith-Magenis syndrome.

## Bibliography

- DSM-IV-TR (2000) Diagnostic and Statistical Manual of Mental Disorders
- Greenberg E. et al. (1991). Molecular analysis of the Smith-Magenis syndrome: a possible contiguous-gene syndrome associated with del(17)(p11.2). American Journal of Genetics 49(6):1297-13.
- Potocki L. et al. (2003). Variability in clinical phenotype despite common chromosomal deletion in Smith-Magenis syndrome del(17)(p11.2p11.2). Genet Med. 5(6):430-4.
- De Leensyder H. et al. (2001). Beta (1)-adrenergic antagonists improve sleep and behavioural disturbances in a circadian disorder, Smith-Magenis syndrome. Journal of Medical Genetics 38(9): 586-90.
- Smith A.C. et al. (1998). Sleep disturbance in Smith-Magenis syndrome. American Journal of Medicine and Genetic 81(2):186-91.
- Smith A.C. et al. (1998). Behavioral phenotype of Smith-Magenis syndrome. American Journal of Medicine and Genetic 81(2): 179-85.

# Stability of Language Improvements One Year After the End of ABA Intervention in ASD Children.



Ferretti L.\*, Saba G.\*, Marras S\*, Peruzzi P.\*, Doneddu G.\*, Fadda R.\*\*

\* *Center for Pervasive Developmental Disorders, A.O.B., Cagliari, Italy*

\*\* *Dep. of Psychology, University of Sheffield (UK)*



**Background:** Children with Autism Spectrum Disorders (ASDs) show significant improvements thanks to intensive and early ABA intervention (Howlin, 1998). Usually, the great deal of knowledge about the stability of the effect of prolonged ABA intervention pertains to the diagnostic reclassification and the academic achievements of children in regular education classrooms in the course of treatment (Reichow, 2009). No studies, for the best of our knowledge, monitored the stability of IQ scores and adaptive abilities after the end of ABA interventions. In particular, no study examined receptive and expressive language skills after the end of ABA intervention.

**Objectives:** This study was designed to evaluate if any gains on Adaptive Skills and on IQ, obtained thanks to 4 yrs of ABA intervention, remain stable 1 yrs after the end of ABA intervention and the beginning of an Eclectic intervention in the community.

**Methods, Participants and Procedure:** 35 participants with ASDs (26 M; 9 F; aver. chron. age= 6;3 yrs; DS:2,6; aver. IQ= 66; DS= 25), divided at the beginning of the study in three groups of intervention: ABA-int (10 hrs of Discrete Trial Teaching [DTT] a week, 5 hrs of speech therapy a week), ABA-non int (5 hrs of DTT a week, 2 hrs of speech therapy a week), Eclectic intervention (non evidence-based intervention, variable range of amount of intervention). At the end of the 4<sup>th</sup> year, ABA-int and ABA-non int intervention ended the ABA treatment and they received Eclectic intervention. The participants were tested with the Vineland Adaptive Behavior Scale (VABS) and with the Leiter-R (Battery VR) once a year.

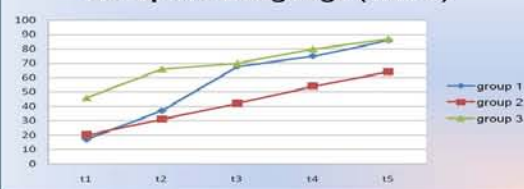
**Results and Conclusions :** The IQ scores increased significantly over the four yrs of ABA and remained stable at the end of the ABA intervention ( $F=7,413$ ;  $df= 4$ ;  $p < 0,05$ ) in the ABA-int (IQ scores:  $t1= 56$ ;  $t2=92$ ;  $t3=90$ ;  $t4=87$ ;  $t5=80$ ) and in the ABA-non int (IQ scores:  $t1= 49$ ;  $t2=69$ ;  $t3=55$ ;  $t4=67$ ;  $t5= 61$ ) but not in the Eclectic group (IQ scores:  $t1= 76$ ;  $t2=73$ ;  $t3=70$ ;  $t4=71$ ;  $t5= 69$ ). The general VABS scores increased significantly in all the groups from  $t1$  to  $t5$  ( $F= 76,57$ ;  $df=4$ ;  $p < 0,05$ ). Only ABA-int and ABA-non-int group improved in Receptive Language ( $F=33,77$ ;  $df=4$ ;  $p < 0,05$ ) and in Expressive Language ( $F=2,6$ ;  $df=8$ ;  $p < 0,12$ ).

The results highlight the stability of the gain in IQ scores in ABA groups after one year of interruption of ABA treatment. Moreover the data showed a significant improvement of Receptive and Expressive skills in the ABA groups, supporting the fact that ASD children maintain the gain obtained from ABA treatment when switching to an Eclectic one.

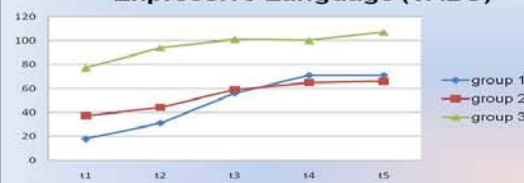
Tab. 1 : Participants

	Group 1	Group 2	Group 3
N.	10	12	13
Treatment	Intensive ABA	Non Int -ABA	Eclectic
Aver. Chron. Age	53,7 (SD = 24)	70 (SD = 25)	99 (SD = 32)
IQ - T1	56 (SD = 27)	49 (SD = 23)	76 (SD = 17)
IQ- T4	87 (SD = 20)	67 (SD = 22)	70 (SD = 20)
VABS - T1	23 (SD = 5)	33 (SD = 15)	68 (SD = 28)
VABS - T4	61 (SD = 22)	65 (SD = 34)	103 (SD = 30)
VABS (receptive) - T1	17 (SD = 0)	20 (SD = 6)	46 (SD = 28)
VABS (receptive) - T4	75 (SD = 29)	54 (SD = 36)	80 (SD = 29)
VABS (Expressive) - T1	18 (SD = 3)	37 (SD = 26)	77 (SD = 28)
VABS (Expressive) - T4	71 (SD = 37)	65 (SD = 32)	100 (SD = 13)

Graphic 1: Long Term Effect on Receptive Language (VABS)



Graphic 2: Long Term Effect on Expressive Language (VABS)

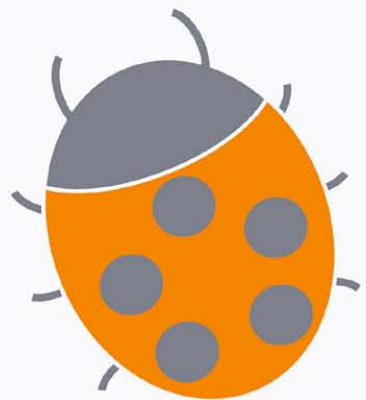


Tab 2: IQ and Language Scores One yr After the End of ABA Intervention

	Group	T4		T5		F (p)
		Mean	SD	Mean	SD	
IQ	Group 1	87,9	20	80	23,2	4.35 (df = 8; p < 0,05) [Treat*time]
	Group 2	67,4	22	61	19,2	
	Group 3	70,7	20	69	20,7	
VABS (Receptive)	Group 1	75	29	86,4	28	33,8 (df = 4; p < 0,05) [time]
	Group 2	54,2	36	64,1	34	
	Group 3	80	29	87,4	19	
VABS (Expressive)	Group 1	71	37	71	36	2,6 (df = 8; p < 0,12) [treat*time]
	Group 2	65,4	32	67	35	
	Group 3	100	13	106	10	

#### References

- Dawson G., Osterling J. (1997). Early intervention in autism. In M.J. Guralnick (ED), The effectiveness of early intervention for pre-school children with autism, MD: Brookes.
- Eikeseth S, Smith T, Jahr E, Eldevik S (2002). Intensive behavioral treatment at school for 4- to 7-year-old children with autism: A 1-year comparison controlled study. Behav Modif. Jan;26(1):49-68.
- Howlin P. (1998). Fractioner review: psychological and educational treatments for autism. J Child Psychol Psychiatry. 1998 Mar;39(3):307-22.
- Lord C, Wagner A, Rogers S, Szatmari P, Aman M, Charman T, Dawson G, Durand V, Gillman M, Gosselin L, Guthrie D, Harris S, Kasari C, Marcus L, Murphy S, Odom S, Pickles A, Scallan L, Shaw E, Slagel B, Sigman M, Stone W, Smith T, Yoder P. (2005) Challenges in evaluating psychosocial interventions for Autistic Spectrum Disorders. J Autism Dev Disord.35(6): 696-700
- Leivaal I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. Journal of Consulting and Clinical Psychology. 55, 3-9.
- Smith T, Green AD, Wynn JW. (2000) Randomized trial of intensive early intervention for children with pervasive developmental disorder. Am J Ment Retard. 105(4):269-95.
- Reichow B., Wolery M. (2009). Comprehensive Synthesis of Early Intensive Behavioral Interventions for Young Children with Autism Based on the UCLA Young Autism Project Model. Journal of Autism and Developmental Disorders Volume 39, Number 1 / January, 2009.



diversamente

o

n

l

u

s