

A comprehensive assessment process for children with autism spectrum disorders

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Abstract

Purpose – The assessment of Autism Spectrum Disorders (ASD) in childhood has two essential aspects: the identification of the risk (under 30 months of age) and the definition of a diagnosis that takes into account its core areas as well as further non-specific aspects. The purpose of this paper is to present an approach that considers the combination of clinical evaluation with the use of tools that analyse the various levels of the child's functioning as fundamental.

Design/methodology/approach – The comprehensive assessment at the Institute of Ortofonia in Rome provides the ADOS-2 and the Leiter-R for the evaluation of the symptomatology, the severity level, the non-verbal cognitive functioning and the fluid reasoning; the TCE and the UOI are used to identify, respectively, the child's emotional skills and the ability to understand the intentions of others, as precursors of the theory of mind. Within this assessment, the Brief-P, the Short Sensory Profile and the RBS are also included for the evaluation of executive functions, sensory pattern and of restricted and repetitive behaviours, as observed by parents.

Findings – How to define a reliable development profile, which allows to plan a specific intervention calibrated on the potential of the child and on his development trajectory, is described. Two clinical cases are also presented.

Originality/value – The entire process is aimed both at a detailed assessment of the child's functioning and at identifying a specific therapeutic project and predictive factors for achieving an optimal outcome.

Keywords Children, Comprehensive assessment, Autism spectrum disorder, Predictive factors, Development trajectory

Paper type Technical paper

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Introduction

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) introduced significant changes in the classification of Autism Spectrum Disorders (ASD) including them in the neurodevelopmental disorders. This classification comprises a group of conditions with childhood onset, characterised by developmental deficits that produce impairments of personal, social and academic functioning. ASD is defined by persistent deficits in social communication and social interaction across multiple contexts, including social reciprocity, nonverbal communicative behaviours used for social interaction, deficits in symbolic play and skills in developing, maintaining and understanding relationships. Severity is based on social communication impairments and restricted repetitive patterns of behaviour.

Data are progressively accumulating regarding the neurobiological basis of autism, with the hypothesis that altered brain connectivity between emotions, sensory processing, motor planning and creation of symbols may provide a key pathophysiological contribution to it. This lack hinders the development of intentional behaviour and adequate problem-solving, leading the child to implement repetitive and stereotyped behaviours and to have difficulties

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in reciprocal interactions, empathy, and in the development of a theory of mind (Baron-Cohen, 1991; Greenspan and Wieder, 2000). The reflections of the last 20 years on specific deficits in children with autism have highlighted that in addition to the difficulties in the linguistic, social and relational areas, there is a compromise of the embodied simulation mechanisms, that is of those imitative behaviours of the body that allow to give an experiential content to one's own and others' emotions (Di Renzo, Bianchi di Castelbianco, Vanadia, Racinaro and Rea, 2017; Gallese, 2001, 2006, 2014; Gallese and Rochat, 2018; Vulcan, 2016). Identifying in autistic children this emotional response, which can also be defined as emotional contagion, makes it possible to shift the therapeutic focus from the reduction of behavioural symptoms to the promotion of his emotional regulation skills. These characteristic aspects of autism, often make the assessment very complex both for the sensory component, which prevents or strongly limits the use of many diagnostic tools, and for the heterogeneity of the levels of social and cognitive functioning that we can find in autism, this based on the symptomatic severity and intensity of stereotyped and sensory seeking behaviours. In addition, the reading of child's behaviour should not be limited to evaluations with tests but enhanced by careful clinical observations that allow a better understanding of communicative and relational difficulties present and favour the search for that zone of proximal development (Vygotskij, 1934), where can be placed the therapeutic intervention that respects the individuality of each child.

The definition of the diagnostic framework must respond to recognized symptomatic criteria and at the same time highlight the potentialities that, together with the deficit areas, define the child's development profile, this for a targeted therapeutic project. The observation must take into consideration the different ways in which the autistic child expresses his atypia in body dimension, but also in cognitive, linguistic, behavioural and emotional areas, in order to place the therapeutic intervention in the zone of proximal development just mentioned (Vygotskij, 1934). The literature has shown a variety of evaluation batteries that are more comprehensive for both core and additional domains (Ozonoff *et al.*, 2005). Some of these studies suggest a comprehensive evaluation in research and/or clinical practice (Huerta and Lord, 2012; Goldstein and Ozonoff, 2018; Guthrie *et al.*, 2013; Ozonoff *et al.*, 2005; Rogers, 1998; Volker and Lopata, 2008; Williams *et al.*, 2009), but there are still few research indicators on the importance of selecting specific diagnostic tools.

Along with traditional tools for the evaluation of autism (symptomatology and gravity as well as intellectual assessment), we propose to consider the evaluation of the empathic response, the understanding of mental states and the parental perception of these children, to better deepen the knowledge of other aspects to complement the direct clinical evaluation. Therefore, it is important to evaluate these aspects as part of an overall assessment. The aim of this paper is therefore to present a comprehensive assessment for children with ASD, also considering the variety of studies in support of the importance of evaluating each aspect of the disorder, giving the importance of seizing the many facets of its expression and the impact that an accurate evaluation may have for clinicians.

Methodology

Clinical setting

At the Institute of Ortofonia (IdO) of Rome we base the diagnostic and therapeutic process on a developmental approach body mediated, centred on the relationship, which considers as integrated the cognitive and affective components (Bion, 1962, 1967; Freud, 1965; Winnicott, 1965a,b, 1971, 1974, 1989; Stern, 1985, 2004; Alvarez, 2012). The developmental, emotional regulation, relationship and body-based intervention (DERBBI) (Di Renzo *et al.*, 2019) aims, in the first year of therapy, to favour the affective attunement between child and primary caregiver, to stimulate the process of imitation between peers and to help the child to integrate and process sensory perceptions so that body experiences can be transformed into emotional experience. During the second year of

therapy the intervention is centred on the psychomotor/communicative-relational area with the aim of improving the level of emotion regulation, of stimulating, supporting and expanding the motor initiative, towards the redefinition of a body schema. In the third year the intervention aims to improve linguistic, cognitive, behavioural, relational and playing skills, for the emotion regulation, the attention span, the child's motivation to relate with the outside world and personal autonomy. Finally, the fourth year the intervention aims to expand the prerequisites for school learning, continuing to reinforce verbal and non-verbal relational strategies. In this perspective the body mediated developmental approach takes into account all the components that come into play in development, to provide the tools necessary to tackle both the diagnostic and the therapeutic process.

Within this framework, at IdO in Rome we implemented the TULIP protocol (Di Renzo *et al.*, 2016a) for a comprehensive assessment of the potentialities and predictors in children with ASD. In our model the diagnostic process of children with ASD is carried out by a group of experts with at least 10 years of experience in the field (psychologists, neuropsychiatrists, neurologists and other specialized figures) who deal with clinical and neuropsychological evaluation and the administration and interpretation of tests. The clinician responsible of the autism diagnosis service connects all the information obtained, draws up the final report and communicates them to the parents, giving appropriate therapeutic indications.

During the treatment, which lasts four years, three cognitive evaluations are performed (at the time of taking charge, two and four years after starting treatment), three assessments of autistic symptoms (at the time of taking charge, two and four years after starting treatment), an evaluation of the ability of understanding intentions and an evaluation of the emotional contagion (at the time of taking charge). The clinicians involved in the assessment process are not the same as those included in therapy and clinical intervention. Our evaluation at the IdO in Rome is therefore carried out in a comprehensive perspective and provides for an integrated protocol with specific tools for the various areas investigated, as indicated in Table I. Every year, we assess about 200 children with this comprehensive assessment.

Instruments

ADOS-2 – Autism diagnostic observation schedule – second edition The ADOS-2 (Lord *et al.*, 2012a,b; Italian version, Colombi *et al.*, 2013) is a semi-structured standardized assessment of communication, social interaction, play, and restricted and repetitive behaviours (RRBs). It presents various activities that elicit behaviours directly related to a diagnosis of ASD. In line with the DSM-5 (APA, 2013), the ADOS-2 algorithm considers two core clinical areas, such as social affection (SA) and RRBs and the total score is given by the sum these two SA+RRBs. The comparison score (CS) allows a standardized assessment of the evolution of autistic symptoms over time, for children of different ages and verbal skills. The ADOS-2 has good psychometric properties (Lord *et al.*, 2012a,b). They are characterised by high interrater and test-retest reliability, as well as high validity, confirming their usefulness in distinguishing individuals with ASD from other clinical groups

Table I Overall evaluation of the ASD at the Rome Institute of Ortofonia

| <i>What we measure</i> | <i>Instruments</i> |
|---|--|
| Symptomatology and severity level in ASD | Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) |
| Nonverbal cognitive functioning and fluid reasoning | Leiter International Performance Scale – Revised (Leiter-R) |
| Understanding of mental states | Intention Condition of Behavioural Enhancement Procedures (UOI) |
| Evaluation of the empathic response | Emotional Contagion Test (TCE) |
| The Evaluation of executive functions | Behavioural Rating Inventory of Executive Function - Preschool version (BRIEF-P) |
| Sensory profile | Short Sensory Profile (SSP) |
| Repetitive behaviours | Repetitive Behaviour Scale-Revised (RBS-R) |

(Mazefsky and Oswald, 2006). The instrument is continually being developed to improve its diagnostic validity, with new standardized severity scores and revised algorithms recently added (Gotham *et al.*, 2007, 2009; Hus and Lord, 2014; Esler *et al.*, 2015). The interrater agreement between this ADOS version and ADI-R is 79 and 77 per cent with clinical diagnosis. As for discriminating between autism and other autistic disorders, the sensitivity was 90.4 per cent, and its specificity was 48.1 per cent in the German study (Bölte and Poustka, 2004). Validity and reliability data for this tool are not yet available for the Italian population.

Leiter international performance scale – revised (Leiter-R) The Leiter-R (Roid and Miller, 2002; Italian translation by Roid and Miller, 2002) is a reliable and valid measure of non-verbal cognitive, memory and attentional abilities, and is specifically developed for individuals with communication difficulties, hearing problems, or other types of disorders that involve language. The non-verbal cognitive abilities do not require the ability to perceive, manipulate, and reason with words and numbers, so the scale can be administered completely without the use of verbal language, including instructions, because it requires no verbal response from the subject tested. The Leiter-R subtests describe the fluid reasoning (FR) and the Intelligent Quotient (IQ) scores, and are calibrated according to the age of the child. The Leiter-R shows good psychometric properties: good validity data as emerged from the content analysis studies, supported by the data coming from a vast analysis, from the studies on the criterion validity, from the classification accuracy of intellectual disability, and from various studies related to the construct (Roid and Miller, 2002; Roid *et al.*, 2003; Tsatsanis *et al.*, 2003).

Intention condition of behavioural enhancement procedures (UOI) The intention condition of behavioural enhancement procedures (Meltzoff, 1995; rev. by Di Renzo, 2007; Understanding Other's Intentions, UOI) evaluates the ability of the child to understand the intentions of the other. During the assessment the child observes how an experimenter tries to perform, without success, a target action (e.g. hands slipping off the sides of the dumbbell); the child has never seen the target action correctly concluded and neither the object. Three failed attempts to perform the action are shown by the examiner, then the object is left on the table in front of the child and is said "now it's your turn". The child should understand what the examiner intends to do and consequently perform the target action, not the failed action that the examiner actually did. The score 0 is assigned in case of child's inability to pay attention to the stimulus presented; stereotyped and/or sensory manipulation of the object; repetition of the failed attempt as seen by the examiner; approximation of the criterion action. The UOI is quick and easy to administer, requires a minimum amount of attention by the child and can also be used with children who show severe symptoms. Validity and reliability data for this measurement are not yet available.

Emotional contagion test (TCE) The TCE test (Di Renzo and Stinà, 2011) allows the evaluation of emotional contagion, from a quantitative and qualitative point of view, that is the presence or absence of affective attunement in the child, through the observation of his behavioural and emotional response in front of a structured stimulus (video). The child is presented with four video recordings in which a girl with typical development (TD) expresses, in a non-verbal way, four basic emotions: happiness, sadness, fear and anger. For each emotion presented, the observer signs on the coding protocol the absence or presence of expressive mimic reproductions corresponding to the emotional stimulus and the body and behavioural responses of the child. Each response is considered absent if the child does not reproduce the motor pattern of emotion and is evaluated with the score 0; it is considered present if the child reproduces the motor pattern of the emotion that can be evaluated with a score of 1, 2 or 3. The Italian normative sample (Di Renzo and Stinà, 2011) showed good psychometric characteristics for this instrument with very high ICC and highly significant concurrent validity.

Behaviour rating inventory of executive function – preschool version (BRIEF-P) The BRIEF-P (Gioia *et al.*, 2002) is a questionnaire composed of 63 distinct items that measure different aspects of executive functions in everyday environments, in preschool children from 2 years and 0 months to 5 years and 11 months. The BRIEF-P consists of five scales: Inhibit; Shift; Emotion control; Working memory; Plan/organise. The five clinical scales of BRIEF-P are combined to form three broad indexes, that is Inhibitory Self-Control/ISCI, Flexibility/FI, and Emergent Metacognition/EMI, one composite score/GEC and two validity scales (Inconsistency and Negativity). The scores correspond to the level of executive functioning of the child as indicated by the parents in the registration protocol. The psychometric characteristics of the instrument are good, since in its original version (Gioia *et al.*, 2002) it has very high internal coherence coefficients, between 0.80 and 0.97, and a good convergent validity, which are confirmed in the Italian adaptation (Marano *et al.*, 2014) where internal coherence coefficients emerge ranging from 0.76 to 0.96 as well as a very good convergent validity.

Short Sensory Profile The Short Sensory Profile (SSP) (McIntosh *et al.*, 1999) is a questionnaire derived from the Sensory Profile (Dunn, 1999). The questionnaire can be completed in about 10 min by caregivers, it is composed of 38 items divided into domains corresponding to seven different areas, which allow us to detect how the child with ASD modulates sensory input through sensory systems and which behavioural and emotional responses are associated with sensory processing. The domains evaluated are tactile sensitivity, taste/smell sensitivity, movement sensitivity, underresponsive/seeking sensation, auditory filtering, low energy/weak and visual/auditory sensitivity. The full version of the Sensory Profile has been standardized on 1,200 children; the short version that originates from it, has a reliability of 0.90 and a discriminating validity > 95 per cent in identifying children with and without sensory dysfunctions; it has an internal coherence of factors within the scale ranging from 0.70 to 0.90 (McIntosh *et al.*, 1999).

Repetitive behaviour scale-revised (RBS-R) The RBS-R questionnaire (Bodfish *et al.*, 1999, 2000) captures the breadth of repetitive behaviours in children with ASD. It consists of 44 items, on a four-point Likert scale ranging from “absent behaviour” to “ever-present behaviour”, where high scores are indicative of frequent dysfunctional behaviours, and six subscales including: stereotyped behaviour, self-injurious behaviour, compulsive behaviour, routine behaviour, sameness behaviour and restricted behaviour. Several studies have confirmed the six-factor structure of RBS-R (Georgiades *et al.*, 2010; Inada *et al.*, 2012, 2015; Lam and Aman, 2007; Mirenda *et al.*, 2010). Martínez-González *et al.* (2018) reported the internal coherence of RBS-R on different samples: between 0.78 and 0.91 on an American sample (Lam and Aman, 2007); above 0.72 on a Canadian sample (Mirenda *et al.*, 2010); between 0.75 and 0.92 on a Greek sample (Georgiades *et al.*, 2010); and between 0.69 and 0.93 on Japanese samples (Inada *et al.*, 2012, 2015). Convergent validity has shown appropriate values (Inada *et al.*, 2015). The diagnostic accuracy in discriminating ASD from children with TD in the Italian version of RBS-R was high for global assessment score, moderate for total scale, stereotyped behaviour, routine behaviour, restricted behaviour and sameness behaviour, while was low for the Self-Injurious Behaviour and Compulsive Behaviour scales (Fulceri *et al.*, 2016).

Explanatory cases

Case 1 Giulio has 37 months at the first access to our Centre. He is an only child of parents married for 4 years, with a 41-year-old father working as a computer scientist, a 38-year-old mother who works as a bartender. The two parents bring the child to our centre on the advice of the teachers who report bizarre behaviours, isolation and lack of language after 2–3 months from his inclusion at school. In terms of clinical observation, the child shows a severe deficit of social-emotional reciprocity, absence of language and RRBs of moderate frequency and intensity.

The ADOS-2 evaluation, carried out with Pre-Verbal Module 1, which is specifically indicated for children without spontaneous expressive language, highlights a global score (SA + RRBs = 28) which allows an ADOS-2 classification of Autism, and a CS (CS = 10/10) which places the communicative and relational pattern observed at a severe symptomatic level for an ASD. In the area of SA (SA = 20) a rare, poorly modulated in interactive regulation eye contact was observed, and deficient heterodirect spontaneous vocalizations. Moreover, a constant relational divergence emerges so defining a severe deficit of social-emotional reciprocity. Non-verbal communication is also lacking, with little investment in distal strategies and in the absence of the gesture of pointing. The ability to initiate and respond to shared attention sequences is absent. In the area of RRBs (RRBs = 8), we observe constant motor stereotypes associated with flapping and diffused mannerisms in the presence of repetitive non-etherodirect vocalizations, anomalous postures with visual fixation and ocular winks indicative of atypical visual sensoriality. There are also tactile sensorial interests towards surfaces and repetitive interests towards non-functional parts of objects. The expressive language is absent. Sensorimotor agitation and motor stereotypies do not allow the use of objects according to organized and shared functional patterns. The emotional response at the TCE is absent, indicating that empathy process is not yet started. Cognitive level is not assessable due to severe attentional difficulties and stereotyped manipulation of the objects and materials proposed with sensory research conducts that also prevent the evaluation of mental states. The sensory profile qualifies as clinically relevant in all areas. The global BRIEF-P score is indicative of significant deficits in the area of executive functions as well as in the individual-specific indices that denote severe impairment in the ability to flexibly modulate emotional-behavioural responses through adequate inhibitory control as well as in the ability to start, plan and support a problem-solving aiming at a goal. The social-cognitive profile observed ([Table II](#)) can be ascribed to a severe ASD with an unqualified intellectual level and absence of verbal language. We therefore considered appropriate to start a therapeutic pathway centered, in this developmental phase, on bodily and psychomotor aspects, in order to favour emotional and attention regulation and sensory integration, to reduce RRBs and improve the level of social-adaptive and executive functioning.

Case 2 Jacopo is a 51-month-old boy, the eldest son of his mother and second son of his father. The mother is a 42-year-old engineer, the father is a soccer coach for children and is 43 years old. Parents report having had some signals from the teachers who were pressing for an assessment, but to have postponed it because they thought the linguistic difficulties would disappear over time. In deed, the mother was the one between the two who obstructed the evaluation for as long as possible, while the father, comparing Jacopo with the first son he had from his previous relationship, for a long time thought that there was something wrong. The child shows a mild deficit in social-emotional reciprocity as emerges from ADOS-2 evaluation carried out with Pre-Verbal Module 1, which is indicated for children with spontaneous expressive language limited to single words and simple combinations of words in sentences, in the absence of verbal fluency. At the current assessment the overall score, equal to 8, allows an ADOS-2 classification of Spectrum (at the lower limit), but not of Autism and the CS (CS = 4/10) places the development profile observed at a level of mild symptomatic severity for an ASD. In the area of SA (SA = 6) there was dysregulation of affective states and difficulty in emotional adjustment as also confirmed by parents to RBS. In the area of SA (SA = 6), dysregulation of affective states and difficulties in emotional adaptation were observed, as confirmed by parents to RRBs. The spontaneous expressive language appears to be emerging with simple communicative and relational phrases that are not always intelligible, with occasional verbal repetitiveness, but never frankly idiosyncratic. Eye contact appears fairly flexible with possible good sequences of visual triangulation. The social smile is clear and reactive in response to shared entertainment sequences despite the fact that the facial expressive range is hypo-changed and limited to emotional extremes also as a function of the present regulatory deficit. Co-verbal gestures are sometimes associated with verbalisations in

Table II Summary profile of scores obtained by the two children for each instrument administered during the comprehensive assessment

| | |
|---------------|---|
| <i>Giulio</i> | |
| ADOS-2 | 28 (SA = 20+RRBs = 8) |
| Leiter-R | IQ = NE; FR = NE |
| UOI | 0 |
| TCE | No response |
| BRIEF-P | GEC = 69 (Inhibit = 66; Shift = 68; Emotion control = 65; Working memory = 67; Plan/organise = 73); ISCI = 66; FI = 69; EMI = 70 |
| SSP | Tactile sensitivity: clinically relevant Taste/smell sensitivity: clinically relevant Movement sensitivity: clinically relevant Underresponsive/seeking sensation: clinically relevant Auditory filtering: clinically relevant Low energy/weak: clinically relevant Visual/Auditory sensitivity: clinically relevant Global Profile: clinically relevant |
| RBS-R | Parents report stereotyped motor behaviours with fingers and whole body involvement, stereotyped manipulation of objects and atypical sensory seek. No self-injurious behaviours. Present compulsive behaviours and rituals at mealtimes, sleep and while travelling. In the sameness behaviours described there are resistances to changes of activity with difficulty in transitions and agitation if interrupted, resistance to visit new places and toe walking. There are RRBs and interests towards specific parts of objects with difficulty separating from preferential objects or partial elements of the same. Such behaviours significantly interfere with daily activities |
| <i>Jacopo</i> | |
| ADOS-2 | 8 (SA = 6+RRBs = 2) |
| Leiter-R | IQ = 92; FR = 82 |
| UOI | 4/4; No false belief |
| TCE | Emotional contagion |
| BRIEF-P | GEC = 56 (Inhibit = 59; Shift = 55; Emotional control = 66; Working memory = 56; Plan/organise = 58); ISCI = 65; FI = 60; EMI = 57 |
| SSP | Tactile sensitivity: normal Taste/smell sensitivity: normal Movement sensitivity: normal Underresponsive/Seeks sensation: borderline Auditory filtering: normal Low Energy/weak: normal Visual/Auditory sensitivity: borderline Global profile: normal |
| RBS-R | Parents report minor stereotyped behaviours with hands and fingers mannerisms and atypical visual sensory seek. No self-injurious behaviours or compulsive and/or routine behaviours. There are monotonous behaviours such as resistance to changes during activities, with difficulty in transitions, emotional dysregulation and agitation if interrupted. RRBs and interests are present and concern specific action schemes and play sequences that can become repetitive, but in any case can be modified. Such behaviours slightly interfere with daily activities |

reciprocal sequences, with indications not always coordinated with eye contact, but enriched with instrumental, descriptive and conventional methods. Joint attention can be raised both in terms of response and as a spontaneous start. There are RRBs (RRBs = 2) such as mannerisms expressed by hand stiffening with slight overlapping of the fingers and sensory atypia of sporadic visual fixation. The use of objects includes functional and representative playful schemes, in the absence of symbolic substitutes. The empathy process is started, as shown by the response of emotional contagion to the TCE. The non-verbal cognitive level is in the lower-middle range with FR in deflection, compared to IQ, which indicates rigidity of mental strategies in inductive and deductive logical reasoning as also confirmed by the failure to resolve the false belief task. Discretely regulated are the attention capacities. The sensory profile is normal with mild atypia that involve the visual area, without being characterised as clinically relevant. The global BRIEF-P score is not indicative of significant deficits in the area of executive functions, however specific indexes require attention to the area of emotional regulation in the flexible modulation of emotional-behavioural responses through adequate inhibitory control. The social-cognitive profile observed (Table II) is attributable to an ASD of

mild severity with a non-verbal medium-lower intellectual level and emergent language. We therefore considered appropriate to start an integrated psychomotor and speech therapy rehabilitation programme in order to improve emotional self-regulation skills, preparatory to executive functions and to the spontaneous relational and communicative initiative, and to stimulate and integrate the verbal and non-verbal competences. Another aim, in a more structured therapeutic context, was to promote the flexibility of cognitive and mental strategies and to stimulate the linguistic and practical skills of the child.

Conclusions

The need to specifically describe the atypical social-cognitive pattern in neurodevelopmental disorders such as autism responds to the clinical need to define the development profile as correctly as possible, especially in a historical moment when the revision of classification (DSM-5), the incidence found in recent years (data report of 1 case per 68 children), the complexity of the diagnostic framework and the debates on treatment and therapeutic efficacy, make fundamental a specific training that involves all the professional figures in an integrated and multi-specialist perspective in dealing with such a complex and delicate clinical area.

Our evaluation protocol for children with ASD aims to describe development and functioning profiles in the social-relational and communicative area (ADOS-2), in the cognitive functioning (Leiter-R), in the emotional (TCE) and mental area (UOI) as well as in RRBs (ADOS-2, SSP, RBS-R), with particular attention to that emotional and relational reciprocity that finds in shared play strategies a cross-sectional area to all criteria. The framework of reference is a developmental and body mediated approach, that we have called DERBBI, which facilitates communication up to the symbolic expression in the interaction with the other, especially if the diagnostic process allows identifying potentialities and positive prognostic indicators. This approach emphasises the importance of integrating a quantitative assessment of symptoms gravity to the qualitative observation of the social-cognitive and adaptive functioning of the child with ASD, so allowing the clinician to calibrate a specific therapeutic project centred on social-emotional reciprocity deficits, or rather on the absence or poor integration of communicative, verbal and body language behaviours, which occur in the early stages of development and significantly limit the ability to begin, regulate and modulate the relationship with the other.

The choice of measures to implement the TULIP evaluation protocol in our assessment protocol, as presented in this paper, depends on some fundamental observations. In the context of current research on autism, ADOS-2 is recognised as an instrument of choice in the evaluation and quantification of symptoms gravity (Lord *et al.*, 2005). With a view to integrate evaluation, therapy and research, we now regularly used it at the IdO to evaluate the longitudinal evolution of symptoms through re-tests during the years of treatment (Di Renzo *et al.*, 2015; Di Renzo, Bianchi di Castelbianco, Petrillo, Donaera, Racinaro and Rea, 2016; Di Renzo, Bianchi di Castelbianco, Vanadia, Racinaro, and Rea, 2017). Our previous research (Di Renzo *et al.*, 2016b) also demonstrated the clinical relevance at a longitudinal level of RRBs and above all their prognostic value, underlining their importance at a quantitative level in terms of frequency and intensity, in the various ADOS retests during the years of treatment. The results presented demonstrate the connection of these behaviours with the severity level and therapeutic efficacy of a body-mediated work on archaic processes, that prevent the functional and symbolic use of objects through a structuring of behaviours that limit communication and induce a stereotyped use of the body. We underline that, although the ability to use objects does not fall within the overall score, it is an area of absolute qualitative importance in the social-cognitive pattern observed in the evaluation of play through the ADOS-2 observation (Lord *et al.*, 2012a, b). Furthermore, the main change in the ADOS-2, represented by the introduction of the Toddler Module for children between 12 and 30 months of age, brings an important innovation that responds to the need of clinicians and researchers to have a standardized tool for early and pre-verbal

age groups. A better knowledge of early symptoms and the possibility of identify a social-cognitive pattern in a “developmental risk” range rather than in a defined clinical framework, solves one of the weak points of the ADOS, which in these age groups risked to be hyper-inclusive and generate false positives. In such highly sensitive developmental stages, defining child’s social-relational impairment in terms of risk highlights the importance of understanding the diagnosis as a dimensional process and at the same time recognises how early treatment can change child’s developmental trajectory.

In terms of integration between clinical research and longitudinal studies on therapeutic efficacy, the validity and diagnostic sensitivity of ADOS-2 is increased by the comparison score, as an indicator of severity that allows to compare the general level of symptoms related to autistic spectrum of the child, with that shown by subjects diagnosed with ASD of the same age and level of linguistic ability. Also the Leiter-R is used in our comprehensive assessment for children with ASDs as it has shown, in longitudinal studies on the efficacy of developmental relationship body-based intervention, the predictive value of fluid reasoning both on the progressive improvement of IQ expression and the reduction of autistic symptomatology after four years of therapy (Di Renzo *et al.*, 2015, 2016b). These data support the hypothesis that a relationship-based approach allows cognitive improvement regardless of the severity of autism. Our recent researches indicate the importance and effectiveness of the first two years of this type of treatment, and how the continuation of the intervention in the following years not only guarantees the stability of cognitive abilities, but also avoids possible regressions in these areas of functioning. In order to search for potentialities, even if still inhibited and/or unexpressed, which give a reliable prognostic value on the evolution of autistic symptomatology, the skills of inductive and deductive reasoning represent a clinically relevant predictor, as an expression, independent from learning, of mental flexibility that in a disorder characterised by rigid and stereotyped thinking, represent an important expression of social-cognitive functioning. We have also argued that the study of empathic response may represent a further milestone in a comprehensive assessment of the autism spectrum. Authors of the last decade (Rizzolatti and Vozza, 2007; Iacoboni, 2008; Damasio, 2010; Rizzolatti and Fabbri-Destro, 2010; Damasio and Carvalho, 2013) indicate that in children with autism, in addition to difficulties in linguistic, social and relational area, there is an impairment of imitation processes.

Furthermore, the lack of imitative abilities can be traced in those altered imitative behaviours of the body that allow to give an experiential content to own and others’ emotions, or the embodied simulation mechanisms (Gallese, 2006). Identifying this type of emotional response that children with autism are able to do, which can also be defined as emotional contagion, makes it possible to shift the therapeutic focus from the reduction of behavioural symptoms to the promotion of emotional regulation skills. In this perspective the use of the UOI (Meltzoff, 1995, revision Di Renzo, 2007) allows us to discriminate different levels of severity on the autistic spectrum. This instrument is quick and easy to administer, requires a minimum amount of attention by the child and can also be used in cases with severe symptoms. More importantly, the results of one of our studies with this tool confirmed that the presence of a high UOI, more than cognitive abilities, is a valid predictor of a positive evolution of autistic symptomatology, already after two years of treatment (Di Renzo, Bianchi di Castelbianco, Plescia, Racinaro, Petrillo and Rea, 2016). In the same study on predictive indicators of improvement in ADOS scores in a group of 49 children with ASD, we highlighted the importance of investigating the emotional contagion, both in a quantity and quality sense. Significant data from our Italian sample (Di Renzo, Bianchi di Castelbianco, Plescia, Racinaro, Petrillo and Rea, 2016d) showed that children with “emergent” or “present” emotional contagion during the first assessment exhibited an improvement over time (assessed with ADOS) and maintained the level achieved as constant over time. In addition, the evaluation of executive functions may represent an important element in the definition of individual development profiles in children with ASD where social-cognitive

deficits causes serious impairment of emotional and social-reciprocity areas, as well as of verbal and nonverbal communication, in the presence of RRBs (DSM-5, [APA, 2013](#)).

In view of the fact that cognitive processes included in the executive function domains are crucial for the development of children and for an effective adaptation to the environment in which they live, the early monitoring of these abilities can therefore be useful to identify children at risk of develop social problems and to plan psycho educational interventions adequate to favour the health and well-being of preschool children. Our data showed ([Di Renzo, Bianchi di Castelbianco, Vanadia, Racinaro, Stracqualursi and Rea, 2016](#)) that the Emergent Metacognition Index (EMI) of the BRIEF-P, expression of skills related to working memory and the ability to start, plan and support problem solving, correlates positively with RRBs and with the SA as assessed through the ADOS-2. This represents a confirmation of how much the metacognitive capacities are compromised in ASD and shows how the presence of mannerisms, stereotypes and sensory seeking behaviours are connected both to the flexibility of mental strategies and to communication and social responsiveness ([Di Renzo *et al.*, 2015](#); [Di Renzo, Bianchi di Castelbianco, Vanadia, Racinaro, Stracqualursi and Rea, 2016](#)).

Finally, we dealt with sensory processing anomalies and repetitive/stereotyped behaviours, two characteristic aspects of ASD, as confirmed by the latest editions of DSM-5 ([APA, 2013](#)) and ADOS-2, respectively. As regards RBS, the results of our research work carried out at the IdO ([Di Renzo, Bianchi di Castelbianco, Vanadia, Petrillo, Racinaro and Rea, 2017b](#)) indicate that the most frequently dysfunctional sensory areas in children with ASD are the tactile sensitivity, the auditory filter, the under-responsive and the low energy; while among the repetitive behaviours those most present are the stereotyped ones. In particular, in a recent study ([Di Renzo, Bianchi di Castelbianco, Vanadia, Petrillo, Racinaro and Rea, 2017b](#)) we showed that children with greater impairment at ADOS-2 obtain a pathological profile in stereotyped, repetitive and restricted behaviours, and also in almost all sensory areas, with the exception of the taste/smell area; and that children with greater impairment at the RRBs subscale of the ADOS-2 obtain extremely compromised, pathological profiles in almost all sensory areas, except for the taste-smell area and in almost all the behaviours evaluated: in stereotyped, repetitive, self-injurious, compulsive and restricted behaviours ([Di Renzo, Bianchi di Castelbianco, Vanadia, Petrillo, Racinaro and Rea, 2017b](#)). Furthermore, the lower emotional response of children with autistic symptoms, or with greater impairment in the ability of SA, corresponds to a greater presence of RRBs, given that it supports the empathy imbalance hypothesis ([Smith, 2009](#)), for which the greater presence of such behaviours would testimony defensive attitudes. Therefore, the direct evaluation with ADOS-2 and the indirect evaluation with rating scales not only converge on the same profiles, but suggest the utility of keeping together ecological observations with more structured ones ([Di Renzo, Bianchi di Castelbianco, Vanadia, Petrillo, Racinaro and Rea, 2017b](#)).

To conclude, we underline the importance of estimating potentialities in children with ASD in prognostic terms, so meeting the criteria of the DSM-5 ([APA, 2013](#)), which invites to specify the symptomatic characteristics of the child referring to the concept of “autisms” rather than autistic disorder. As the two clinical cases we here presented show, defining a reliable development profile of the child ([Di Renzo *et al.*, 2015](#)) at the time of the first assessment, allows to plan the intervention in a specific way, according to the needs and potentialities of the child. This includes the active collaboration among professionals, at a multi-disciplinary level, with all the figures involved in the same direction, always respecting the child and his developmental trajectory, thus ensuring over time a more harmonious and integrated development of social-cognitive abilities. The therapeutic and research work we experienced at IdO has shown that the model adopted is valid and repeatable and, as most of the studies cited state, confirms that autism is not unique and that the concept of autistic spectrum necessarily refers to the identification of profiles as individualised as possible. Starting from a comprehensive assessment of the development profile, the opportunity to define the therapeutic project calibrated for the specificity of the child responds to the need

to consider the heterogeneity of the levels of social-cognitive functioning that we can find in autism. The monitoring of development trajectories during the therapeutic path defines on one hand the indicators of therapeutic efficacy and on the other it allows to integrate the clinical point of view with research, in the current enhancement of early diagnosis and identification of prognostic indicators.

These reflections open to further lines of research regarding the possibility of identifying predictors and indicators of the outcomes of the therapeutic approach, also through the annual retest of the areas investigated, in order to obtain short and long-term follow-up and to identify more specific development trajectories. This kind of follow-up should also be calibrated on the basis of the language levels reached and the social-relational use of verbal skills to verify the consolidation or otherwise the results achieved in different moments of development (2–5 years, 6–10 years and 11–16 years).

References

- Alvarez, A. (2012), *The Thinking Heart: Three Levels of Psychoanalytic Therapy with Disturbed Children*, Routledge, Hove, available at: <http://dx.doi.org/10.4324/9780203078358>
- APA (2013), *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, American Psychiatric Association, Washington, DC.
- Baron-Cohen, S. (1991), "Precursors to a theory of mind: understanding attention in others", in Whiten, A. (Ed.), *Natural Theories of Mind: Evolution, Development and Simulation of Everyday Mindreading*, Basil Blackwell, Oxford, pp. 233-51.
- Bion, W.R. (1962), *Learning from Experience*, William Heinemann, London.
- Bion, W.R. (1967), *Second Thoughts*, William Heinemann, London.
- Bodfish, J.W., Symons, F. and Lewis, M. (1999), "The repetitive behavior scale: test manual", Western Carolina Center Research Reports, Morganton.
- Bodfish, J.W., Symons, F.J., Parker, D.E. and Lewis, M.H. (2000), "Varieties in repetitive behavior in autism", *Journal of Autism and Developmental Disorders*, Vol. 30 No. 3, pp. 237-43.
- Bölte, S. and Poustka, F. (2004), "Diagnostic observation scale for autistic disorders: initial results of reliability and validity", *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie*, Vol. 32 No. 1, pp. 45-50, doi: [10.1024/1422-4917.32.1.45](https://doi.org/10.1024/1422-4917.32.1.45).
- Colombi, C., Tancredi, R., Persico, A. and Faggioli, R. (2013), *ADOS-2 – Autism Diagnostic Observation Schedule-Second Edition*, Hogrefe, Firenze.
- Damasio, A. (2010), *Self Comes to Mind: Constructing the Conscious Brain*, Pantheon/Random House, New York, NY.
- Damasio, A. and Carvalho, G.B. (2013), "The nature of feelings: evolutionary and neurobiological origins", *Nature Reviews Neuroscience*, Vol. 14 No. 2, pp. 143-52, doi: [10.1038/nrn3403](https://doi.org/10.1038/nrn3403).
- Di Renzo, M. (2007), *I Significati Dell'autismo. Integrazione Della Realtà Emotiva e Cognitiva Nella Ricerca e Nella Clinica*, Magi, Rome.
- Di Renzo, M. and Stinà, M. (2011), *TCE – Test del Contagio Emotivo*, Hogrefe, Firenze.
- Di Renzo, M., Bianchi di Castelbianco, F., Petrillo, M., Racinaro, L. and Rea, M. (2015), "Assessment of a long-term developmental relationship-based approach in children with autism spectrum disorder", *Psychological Reports*, Vol. 117 No. 1, pp. 26-49, available at: <https://doi.org/10.2466/15.10.PRO.117c15z8>
- Di Renzo, M., Bianchi di Castelbianco, F., Vanadia, E., Racinaro, L. and Rea, M. (2017), "The psychomotor profile in children with autistic spectrum disorders: clinical assessments and implications for therapy", *Autism Open Access*, Vol. 7, No. 3, pp. 209-16, doi: [10.4172/2165-7890.1000209](https://doi.org/10.4172/2165-7890.1000209).
- Di Renzo, M., Bianchi di Castelbianco, F., Petrillo, M., Donaera, F., Racinaro, L. and Rea, M. (2016), "The emotional contagion in children with autism spectrum disorders", *Austin Journal of Autism & Related Disabilities*, Vol. 2 No. 2, pp. 1020-26.
- Di Renzo, M., Bianchi di Castelbianco, F., Plescia, F., Racinaro, L., Petrillo, M. and Rea, M. (2016), "The understanding of others intentions can predict the improvement of symptomatology in children with autism – an exploratory study", *Current Pediatric Research*, Vol. 20 No. 2, pp. 183-92.

- Di Renzo, M., Bianchi di Castelbianco, F., Vanadia, E., Petrillo, M., Racinaro, L. and Rea, M. (2016a), "TULIP protocol (TCE, UOI, Leiter-R as indicators of predictivity) for the assessment of the developmental potential in children with autism spectrum disorders", *Autism Open Access*, Vol. 6 No. 4, pp. 188-94, doi: [10.4172/2165-7890.1000188](https://doi.org/10.4172/2165-7890.1000188).
- Di Renzo, M., Bianchi di Castelbianco, F., Vanadia, E., Petrillo, M., Racinaro, L. and Rea, M. (2016b), "From the emotional integration to the cognitive construction: the developmental approach of turtle project in children with autism spectrum disorder", *Autism Open Access*, Vol. 6 No. 1, pp. 160-9, doi: [10.4172/2165-7890.1000160](https://doi.org/10.4172/2165-7890.1000160).
- Di Renzo, M., Bianchi di Castelbianco, F., Vanadia, E., Racinaro, L., Stracqualursi, M. and Rea, M. (2016), "Assessment of executive functions in preschool-aged children with autism spectrum disorders: usefulness and limitation of BRIEF-P in clinical practice", *Journal of Child and Adolescent Behavior*, Vol. 4 No. 5, pp. 313-20, doi: [10.4172/2375-4494.1000313](https://doi.org/10.4172/2375-4494.1000313).
- Di Renzo, M., Bianchi di Castelbianco, F., Vanadia, E., Petrillo, M., Racinaro, L. and Rea, M. (2017), "Sensory processing and repetitive behaviors in clinical assessment of preschool children with autism spectrum disorder", *Journal of Child and Adolescent Behavior*, Vol. 5 No. 2, pp. 1-8, doi: [10.4172/2375-4494.1000342](https://doi.org/10.4172/2375-4494.1000342).
- Di Renzo, M., Vanadia, E., Petrillo, M., Trapolino, D., Racinaro, L., Rea, M. and Bianchi di Castelbianco, F. (2019), "Developmental, emotional regulation, relationship and body-based intervention for children with autism spectrum disorders", *Journal of Early Intervention* (under review).
- Dunn, W. (1999), *Sensory Profile*, Psychological Corporation, San Antonio, TX.
- Esler, A.N., Bal, V.H., Guthrie, W., Wetherby, A., Weismer, S.E. and Lord, C. (2015), "The autism diagnostic observation schedule, toddler module: standardized severity scores", *Journal of Autism and Developmental Disorders*, Vol. 45 No. 9, pp. 2704-20, available at: <https://doi.org/10.1007/s10803-015-2432-7>
- Freud, A. (1965), *Normality and Pathology in Childhood Assessments of Development*, Karnac Books, London.
- Fulceri, F., Narzisi, A., Apicella, F., Balboni, G., Baldini, S., Brocchini, J. and Tancredi, R. (2016), "Application of the repetitive behavior scale-revised-Italian version-in preschoolers with autism spectrum disorder", *Research in Developmental Disabilities*, Vol. 48, January, pp. 43-52, doi: [10.1016/j.ridd.2015.10.015](https://doi.org/10.1016/j.ridd.2015.10.015).
- Gallese, V. (2001), "What action can do: from mirror neurons to the 'shared manifold' hypothesis", *Journal of Consciousness Studies*, Vol. 8 Nos 5-7, pp. 33-50.
- Gallese, V. (2006), "Intentional attunement: a neurophysiological perspective on social cognition and its disruption in autism", *Brain Research Cognitive Brain Research*, Vol. 1079 No. 1, pp. 15-24, available at: <https://doi.org/10.1016/j.brainres.2006.01.054>
- Gallese, V. (2014), "Bodily selves in relation: embodied simulation as second-person perspective on intersubjectivity. Philosophical transactions of the royal society of London. Series B", *Biological Sciences*, Vol. 369 No. 1644, p. 20130177, doi: [10.1098/rstb.2013.0177](https://doi.org/10.1098/rstb.2013.0177).
- Gallese, V. and Rochat, M.J. (2018), "Forms of vitality: their neural bases, their role in social cognition, and the case of autism spectrum disorder", *Psychoanalytic Inquiry*, Vol. 38 No. 2, pp. 154-64, available at: <https://doi.org/10.1080/07351690.2018.1405672>
- Georgiades, S., Papageorgiou, V. and Anagnostou, E. (2010), "Brief report: repetitive behaviours in greek individuals with autism spectrum disorder", *Journal of Autism and Developmental Disorders*, Vol. 40 No. 7, pp. 903-6, available at: <https://doi.org/10.1007/s10803-009-0927-9>
- Gioia, G., Espy, K.A. and Isquith, P.K. (2002), *BRIEF-P-Behavior Rating Inventory of Executive Function, Preschool Version*, Psychological Assessment Resources, Odessa, FL.
- Goldstein, S. and Ozonoff, S. (Eds) (2018), *Assessment of Autism Spectrum Disorder*, 2nd ed., Guilford Press, New York, NY.
- Gotham, K., Pickles, A. and Lord, C. (2009), "Standardizing ADOS scores for a measure of severity in autism spectrum disorders", *Journal of Autism and Developmental Disorders*, Vol. 39 No. 5, pp. 693-705, doi: [10.1007/s10803-008-0674-3](https://doi.org/10.1007/s10803-008-0674-3).
- Gotham, K., Risi, S., Pickles, A. and Lord, C. (2007), "The autism diagnostic observation schedule: revised algorithms for improved diagnostic validity", *Journal of Autism and Developmental Disorders*, Vol. 37 No. 4, pp. 613-27, doi: [10.1007/s10803-006-0280-1](https://doi.org/10.1007/s10803-006-0280-1).

- Greenspan, S.I. and Wieder, S. (2000), "A developmental approach to difficulties in relating and communicating in autism spectrum disorders and related syndromes", in Wetherby, A.M. and Prizant, B. M. (Eds), *Autism Spectrum Disorders: A Transactional Developmental Perspective*, Paul H. Brookes, Baltimore, MD, pp. 279-303.
- Guthrie, W., Swineford, L.B., Nottke, C. and Wetherby, A.M. (2013), "Early diagnosis of autism spectrum disorder: stability and change in clinical diagnosis and symptom presentation", *Journal of Child Psychology and Psychiatry*, Vol. 54 No. 5, pp. 582-90, available at: <https://doi.org/10.1111/jcpp.12008>
- Huerta, M. and Lord, C. (2012), "Diagnostic evaluation of autism spectrum disorders", *Pediatric Clinics of North America*, Vol. 59 No. 1, pp. 103-11, doi: [10.1016/j.pcl.2011.10.018](https://doi.org/10.1016/j.pcl.2011.10.018).
- Hus, V. and Lord, C. (2014), "The autism diagnostic observation schedule, Module 4: revised algorithm and standardized severity scores", *Journal of Autism and Developmental Disorders*, Vol. 44 No. 8, pp. 1996-2012, doi: [10.1007/s10803-014-2080-3](https://doi.org/10.1007/s10803-014-2080-3).
- Iacoboni, M. (2008), *Mirroring People. The New Science of How we Connect With Others*, Farrar, Straus and Giroux, New York, NY.
- Inada, N., Kuroda, M., Koyama, T., Uno, Y., Inokuchi, E. and Kamio, Y. (2012), "Reliability and validity of the Japanese version of the repetitive behavior scale-revised", *The Japanese Journal of Developmental Psychology*, Vol. 23 No. 2, pp. 123-33.
- Inada, N., Ito, H., Yasunaga, K., Kuroda, M., Iwanaga, R., Hagiwara, T., Tani, I., Yukihiko, R., Uchiyama, T., Ogasahara, K., Hara, K., Inoue, M., Murakami, T., Someki, F., Nakamura, K., Sugiyama, T., Uchida, H., Ichikawa, H., Kawakubo, Y., Kano, Y. and Tsujii, M. (2015), "Psychometric properties of the repetitive behavior scale-revised for individuals with autism spectrum disorder in Japan", *Research in Autism Spectrum Disorders*, Vols 15-16, July, pp. 60-8, available at: <https://doi.org/10.1016/j.rasd.2015.01.002>
- Lam, K.S. and Aman, M.G. (2007), "The repetitive behavior scale-revised: independent validation in individuals with autism spectrum disorders", *Journal of Autism and Developmental Disorders*, Vol. 37 No. 5, pp. 855-66, available at: <https://doi.org/10.1007/s10803-006-0213-z>
- Lord, C., Luyster, R., Gotham, K. and Guthrie, W. (2012a), *Autism Diagnostic Observation Schedule (ADOS-2) Manual (Part II): Toddler Module*, 2nd ed., Western Psychological Services, Torrance, CA.
- Lord, C., Rutter, M., Di Lavore, P.C. and Risi, S. (2005), *ADOS-G: Autism Diagnostic Observation Schedule-Generic*, Organizzazioni Speciali (OS), Florence.
- Lord, C., Rutter, M., DiLavore, P.C., Risi, S., Gotham, K. and Bishop, S. (2012b), *Autism Diagnostic Observation Schedule (ADOS-2) Manual (Part I): Modules 1-4*, 2nd ed., Western Psychological Services, Torrance, CA.
- McIntosh, D.N., Miller, L.J. and Shyu, V. (1999), "Development and validation of the Short Sensory Profile", in Dunn, W. (Ed.), *Sensory Profile Manual*, Psychological Corporation, San Antonio, TX, pp. 59-73.
- Marano, A., Innocenzi, M. and Devescovi, A. Italian adaptation by (2014), "Behavior rating inventory of executive function (BRIEF-P)", in Gerard, A., Gioia, P.K., Isquith, S.G.G. and Lauren, K., Hogrefe, F. (Eds).
- Martínez-González, A.E., Rodríguez-Jiménez, T., Piqueras, J.A., Vera-Villaruel, P. and Torres-Ortega, J. (2018), "Emotional and behavioural symptoms, risk behaviours and academic success in Chilean mapuche and non-mapuche adolescents", *Ethnicity & Health*, Vol. 28 No. 2, pp. 1-12, available at: <https://doi.org/10.1080/13557858.2018.1427702>
- Mazefsky, C.A. and Oswald, D.P. (2006), "The discriminative ability and diagnostic utility of the ADOS-G, ADI-R, and GARS for children in a clinical setting", *Autism*, Vol. 10 No. 6, pp. 533-49, available at: <https://doi.org/10.1177/1362361306068505>
- Meltzoff, A.N. (1995), "Understanding the intention of others: re-enactment of intended acts by 18-month-olds", *Development Psychology*, Vol. 31 No. 5, pp. 838-50, available at: <http://dx.doi.org/10.1037/0012-1649.31.5.838>
- Mirenda, P., Smith, I.M., Vaillancourt, T., Georgiades, S., Duku, E., Szatmari, P., Bryson, S., Fombonne, E., Roberts, W., Volden, J., Waddell, C., Zwaigenbaum, L. and Pathways in ASD Study Team (2010), "Validating the repetitive behavior scale-revised in young children with autism spectrum disorder", *Journal of Autism and Developmental Disorders*, Vol. 40 No. 12, pp. 1521-30, available at: <https://doi.org/10.1007/s10803-010-1012-0>
- Ozonoff, S., Goodlin-Jones, B.L. and Solomon, M. (2005), "Evidence-based assessment of autism spectrum disorders in children and adolescents", *Journal of Clinical Child and Adolescent Psychology*, Vol. 34 No. 3, pp. 523-40, available at: https://doi.org/10.1207/s15374424jccp3403_8

- Rizzolatti, G. and Fabbri-Destro, M. (2010), "Mirror neurons: from discovery to autism", *Experimental Brain Research*, Vol. 200 Nos 3-4, pp. 223-37, available at: <https://doi.org/10.1007/s00221-009-2002-3>
- Rizzolatti, G. and Vozza, L. (2007), *Nella Mente Degli Altri. Neuron Specchio e Comportamento Sociale*, Vol. 4, Zanichelli Editore, Bologna.
- Rogers, S.J. (1998), "Neuropsychology of autism in young children and its implications for early intervention", *Mental Retardation and Developmental Disabilities Research Reviews*, Vol. 4 No. 2, pp. 104-12, available at: [https://doi.org/10.1002/\(SICI\)1098-2779\(1998\)4:2<104::AID-MRDD7>3.0.CO;2-P](https://doi.org/10.1002/(SICI)1098-2779(1998)4:2<104::AID-MRDD7>3.0.CO;2-P)
- Roid, G., Nellis, L. and McLellan, M. (2003), "Assessment with the leiter international performance scale —revised and the S-BIT", *Handbook of Nonverbal Assessment*, Springer, Boston, MA, pp. 113-40.
- Roid, G.H. and Miller, L.J. (2002), *Leiter-R – Leiter International Performance Scale – Revised*, Organizzazioni Speciali (OS), Firenze.
- Smith, A. (2009), "The empathy imbalance hypothesis of autism: a theoretical approach to cognitive and emotional empathy in autistic development", *The Psychological Record*, Vol. 59 No. 2, pp. 489-510, available at: <https://doi.org/10.1007/BF03395675>
- Stern, D. (1985), *The Interpersonal World of the Infant*, Basic Books, New York, NY.
- Stern, D. (2004), *The Present Moment in Psychotherapy and Everyday Life*, Norton, New York, NY.
- Tsatsanis, K.D., Dartnall, N., Cicchetti, D., Sparrow, S.S., Klin, A. and Volkmar, F.R. (2003), "Concurrent validity and classification accuracy of the Leiter and Leiter-R in low-functioning children with autism", *Journal of Autism and Developmental Disorders*, Vol. 33 No. 1, pp. 23-30, available at: <https://doi.org/10.1023/A:1022274219808>
- Volker, M.A. and Lopata, C. (2008), "Autism: a review of biological bases, assessment, and intervention", *School Psychology Quarterly*, Vol. 23 No. 2, pp. 258-270, available at: <http://dx.doi.org/10.1037/1045-3830.23.2.258>
- Vulcan, M. (2016), "'I'ma translating body': therapists' experiences working with children diagnosed with autism spectrum disorder", *Journal of Psychotherapy Integration*, Vol. 26 No. 3, p. 326, available at: <http://dx.doi.org/10.1037/int0000026>
- Vygotskij, L.S. (1934), *Thought and Language*, MIT Press, Cambridge, MA.
- Williams, M.E., Atkins, M. and Soles, T. (2009), "Assessment of autism in community settings: discrepancies in classification", *Journal of Autism and Developmental Disorders*, Vol. 39 No. 4, pp. 660-9, available at: <https://doi.org/10.1007/s10803-008-0668-1>
- Winnicott, D.W. (1965a), *The Family and Individual Development*, Tavistock, London.
- Winnicott, D.W. (1965b), *Maturational Processes and the Facilitating Environment: Studies in the Theory of Emotional Development*, Hogarth Press, London.
- Winnicott, D.W. (1971), *Playing and Reality*, Tavistock, London.
- Winnicott, D.W. (1974), "Fear of breakdown", *International Review of Psychoanalysis*, Vol. 1, pp. 103-7.
- Winnicott, D.W. (1989), *Psychoanalytic Explorations*, Karnac Books, London.

Further reading

- Marcelli, D. (1983), "La position autistique. hypotheses psychopathologiques et ontogenethiques", *Psychiatrie Infant*, Vol. 24, pp. 5-55.

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