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Application of the Repetitive Behavior Scale-Revised – Italian version – in preschoolers with autism spectrum disorder

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ABSTRACT

Restricted repetitive and stereotyped patterns of behavior, interests, and activities (RRB) are mandatory features for a diagnosis of Autism Spectrum Disorder (ASD) according to the Diagnostic and Statistical Manual of mental disorders-fifth edition (DSM-5). Despite the strong diagnostic role of RRB, their expressiveness and their relationship with other clinical/demographic features in ASD is not fully elucidated.

The Italian version of the Repetitive Behavior Scale-Revised (RBS-R) was applied to a relatively large sample of preschool-aged children with ASD who underwent a comprehensive clinical assessment. The relationship between RRB and sex, age, non-verbal IQ, autism severity, as well as the diagnostic accuracy of the RBS-R were explored.

Stereotyped and Ritualistic/Sameness behaviors were the most common RRB in preschoolers with ASD, without widespread differences between males and females. No significant correlations between RRB and chronological age, or non-verbal IQ were detected. The expressiveness of ritualistic/sameness behaviors positively correlated with autism severity, assessed through the Calibrated Severity Score (CSS) derived from the Autism Diagnostic Observation Schedule (ADOS). Receiver Operator Characteristic (ROC) analysis showed high diagnostic accuracy using the Global Rating Score, which represents the judgment of the parents of as the RRB affect the child's life. However, while the Global Rating Score performed well, the remaining subscales did not.

This investigation extends the limited research on early pattern and associated features of RRB in young children with ASD. The use of the RBS-R may increase the knowledge of the RRB complexity and variability and in turn improve the diagnostic and therapeutic procedures within the autistic spectrum.

1. Introduction

Restricted repetitive and stereotyped patterns of behavior, interests, and activities (RRB) are mandatory features for a diagnosis of Autism Spectrum Disorder (ASD) according to the Diagnostic and Statistical Manual of mental disorders-fifth

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edition (DSM-5; American Psychiatric Association, 2013), along with the social-communicative impairments. Despite their strong diagnostic significance, most of the research on core symptoms of ASD has been directed to explore the social-communicative impairment rather than RRB and therefore RRB profiles and associated features within ASD have not yet been fully elucidated.

The lower interest for RRB could be due primarily to their supposed poor specificity and underestimated diagnostic role in ASD. Indeed, RRB are not unique to ASD, but evident both in other clinical populations and in typical development (TD) (for recent reviews, see Langen, Durston, Kas, van Engeland, & Staal, 2011; Leekam, Prior, & Uljarevic, 2011). Moreover, according to the previous DSM (DSM-IV-TR; American Psychiatric Association, 2000), RRB were not mandatory, but just "possible" feature in the large Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) category.

Second, the assumption that RRB appeared after the onset of the social-communicative impairment (Charman & Baird, 2002; Osterling, Dawson, & Munson, 2002) might have contributed to minimize their role in programs for early detection of ASD. However, children with ASD, since a very early age, demonstrate RRB with objects, body, and sensory behaviors more frequently and for longer periods of time than children with TD matched on chronological age (Watt, Wetherby, Barber, & Morgan, 2008). Moreover, a higher frequency and a greater diversity of RRB in young children with ASD than age-matched TD have been recently detected (Harrop, McConachie, Emsley, Leadbitter, & Green, 2013). Repetitive actions with objects and repetitive movements of the body/arms/hands have been described as warning symptoms for a diagnosis of ASD in the second year of life (Wetherby et al., 2004). More recent studies supported that RRB may be among the earliest behavioral manifestations of ASD (Kim & Lord, 2010; Ozonoff et al., 2008). In particular, Ozonoff et al. (2008) reported an atypical way of object exploration in one year old children subsequently diagnosed with ASD, whereas Wolff et al. (2014) highlighted that as early as 12 months of age a broad range of repetitive behaviors frequently occurred in toddlers who will receive an ASD diagnosis. Although data should be interpreted with caution and require further investigations, some RRB could be ASD-specific, since children with TD rarely roll or wobble objects, or demonstrate careful placement of objects or spinning objects (Barber, Wetherby, & Chambers, 2012; Watt et al., 2008). Therefore, even if RRB have been neglected for a long time, the interest for these symptoms is growing for the support in early identification of ASD behavioral markers.

Usually, RRB refer to a broad range of behaviors. Turner (1999) categorized this wide spectrum of behaviors into "lower level" characterized by repetition of movement including stereotyped movements, repetitive manipulation of objects, and repetitive forms of self-injurious behavior, and "higher level" including object attachments, insistence on sameness, repetitive language, and circumscribed interests. Lower level behaviors have been found associated with lower cognitive abilities, poorer adaptive skills and younger chronological age whereas higher level behaviors have been shown either no relationship or positive relationships with the same variables (Leekam et al., 2011).

Association between RRB and socio-communicative features of ASD is a controversial issue: some researchers have proposed a dissociation between the socio-communicative and RRB (Happé, Ronald, & Plomin, 2006), whereas others researchers found a link between RRB and social deficits measured by the ADOS-G (Watt et al., 2008). Also sex differences in RRB expression were explored with some contrasting findings: a greater level of RRB in males (Sipes, Matson, Worley, & Kozlowski, 2011; Szatmari et al., 2012; Mandy et al., 2012), and an absence of sex differences (Andersson, Gillberg, & Miniscalco, 2013; Joseph, Thurm, Farmer, & Shumway, 2013) have been reported. A recent systematic review and meta-analysis that examined the impact of sex on the core ASD symptoms described more RRB in boys only if they were over six years of age (Van Wijngaarden-Cremers et al., 2013).

As far as the RRB assessment tools, several methods of measuring RRB in ASD were used, including caregiver interviews or questionnaires and observational methods. The most widely used and validated measure is the "Restricted interests and repetitive behaviors" section of Autism Diagnostic Interview-Revised (ADI-R; Rutter, Le Couteur, & Lord, 2003), even though other instruments have been used including the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989a,b) and its adapted version for Children (CY-BOCS; Scahill et al., 1997), the Yale Special Interests Interview (YSII; South, Klin, & Ozonoff, 1999), the Childhood Routines Inventory (CRI; Evans et al., 1997), the Repetitive Behavior Questionnaire (RBQ; Turner, 1995) and the Repetitive Behavior Interview (RBI; Turner, 1997). Among the parent-report instruments for the evaluation of RRB, the Repetitive Behavior Scale-Revised (RBS-R) proposed by Bodfish, Symons, Parker, and Lewis (2000) is a questionnaire that provides a detailed assessment of RRB. To our knowledge, to date the RBS-R scale has not yet been translated into Italian language.

Previous studies that seek to substantiate the relationship between RRB and other clinical features in children with ASD through the RBS-R found contrasting results. In a large sample of children and adolescents aged 4–18 years with ASD, Bishop et al. (2013) reported an inverse correlation between "lower level" RRB and both NVIQ and chronological age, whereas "higher level" behaviors showed no relationship with IQ. Mirenda et al. (2010) did not observe any significant relationship between RRB and both non-verbal IQ and chronological age in a sample of 287 preschool-aged children with ASD. Joseph et al. (2013) failed to find significant relationship between RRB and non-verbal Developmental Quotient, chronological age, social communication and sex in an autistic sample of preschoolers. In a sample of ASD toddlers, Wolff et al. (2014) observed that "higher level" RRB increased with chronological age and restricted behaviors were modestly negatively correlated with non-verbal Developmental Quotient at 12 months of age, suggesting that the relationship between RRB and cognitive measures develops over time.

It is worth noting that the different composition of ASD samples across studies in terms of age, sex, cognitive function and ASD symptom severity may contribute to obtain different and sometimes contradictory results, and thus may have significantly interfered with a clear understanding of the RRB profile in ASD patients.