

Social communication in Developmental Coordination Disorder and Autism Spectrum Disorder: A shared disability?

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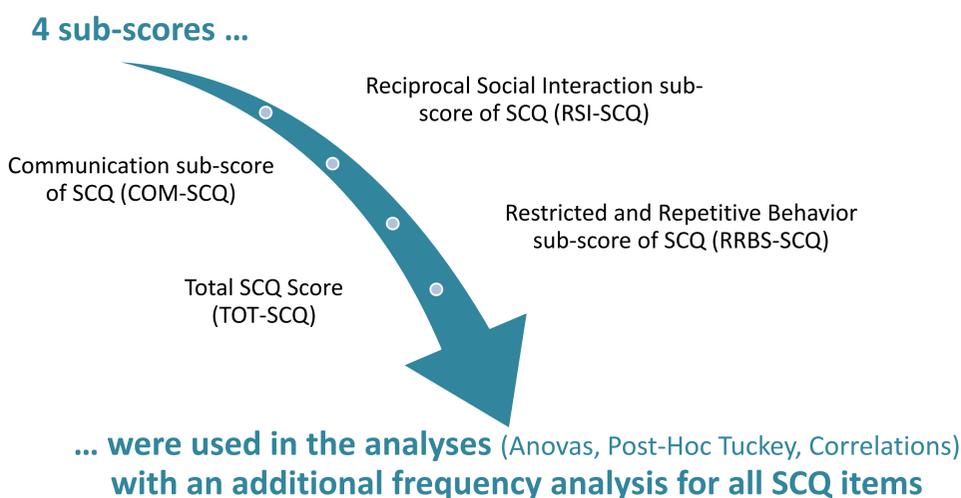


CONTEXT Developmental coordination disorder (DCD) is a lifelong neurodevelopmental disorder affecting 1.8-6% of school-aged children, with an additional 5 to 10% considered as being “at risk”. Despite normal intelligence and/or neurological condition, the children display significant and persistent impairments in gross and fine motor skills, motor learning, and sensorimotor coordination, deteriorating their daily living activities and/or academic achievement (American Psychiatric Association, 2013). Although the etiology of DCD remains multifactorial and unclear, soft neurological signs and brain features have been viewed as being a valid cause for all the DCD symptoms.

INTRODUCTION Apart from the motor impairments, insufficient capabilities for social cognition/participation/communication are also often found in DCD (Chen et al. 2003; Piek and Rigoli, 2015; Sylvestre et al., 2013). Conversely, apart from their social difficulties (main feature), youngsters with Autism Spectrum Disorder (ASD) generally have insufficient capabilities for motor skills (Hocking et al., 2017). The co-occurrence of motor and social deficiencies points out a commonality between DCD and ASD.

AIM The purpose of this study is to compare the social communication abilities in children with DCD, with ASD without movement disorders (M-ABC>15th) and with typical development (TD without social and movement disorders), in order to observe the level of social skills according to disorder. This way we wanted to further appreciate the overlap between DCD and ASD, rising the issue of a continuum between these two disorders (Sumner et al., 2016).

METHODS A group of 88 boys (8-12y7m; mean age = 9y9m; SD = 1y1m) were recruited: 30 DCD, 30 ASD, 28 TD. Inclusion criteria were: 8-12yo; with DCD or ASD (in accordance with DSM-5 criteria) or TD; no known psychiatric or neurological disorder and IQ score greater than 70. Children with Attention Deficit/Hyperactivity Disorder were excluded. For all these 88 boys, cognitive abilities were assessed by the Wechsler Intelligence Scale for Children (WISC-IV), motor ability by the Movement Assessment Battery for Children (M-ABC) and social communication impairments by the Social Communication Questionnaire (SCQ). ASD children with movement disorders (M-ABC<15th) were excluded. Only the SCQ test was considered in the analyses.



Demographic and clinical characteristics of the ASD, DCD and TD groups

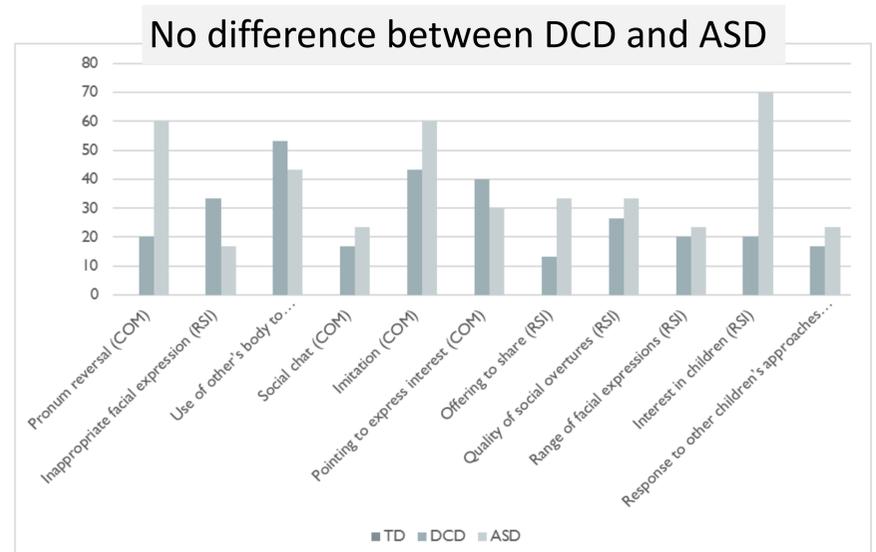
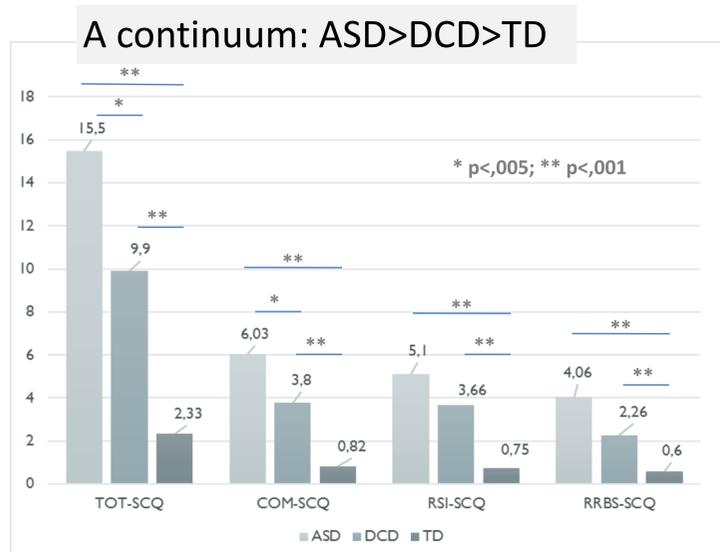
	Age*		IQ	
	Mean (SD)	Min.-Max.	Mean (SD)	Min.-Max.
ASD (n=30)	120.9 (15.95)	96-144	100.4 (18.22)	78-130
DCD (n=30)	118.6 (15.38)	99-151	99.25 (13.64)	79-125
TD (n=28)	117.56 (8.69)	100-131	106.33 (11.57)	88-128

IQ: Intellectual Quotient; SD: Standard deviation; n: number; ASD: Autism Spectrum Disorder; DCD: Developmental Coordination Disorder; TD: Typical Development. * Age in month.

TWO MAIN RESULTS WERE FOUND

(i) on the majority of SCQ items and on the 4 SCQ sub-scores, ASD children obtained the highest scores; **DCD children scored significantly higher than TD controls and were in a middle course.**

(ii) on RSI-SCQ and RRBS-SCQ sub-scores and on several SCQ items, DCD children displayed significantly higher scores as compared to TD individuals. Of interest, **there was no difference between DCD and ASD children.**



CONCLUSION SCQ scores confirms the presence of a social communication deficit in DCD, bringing to the fore such commonality between DCD and ASD disorders. The gradation of all SCQ sub-scores between ASD, DCD and TD let think about a continuum typology. The absence of difference between DCD and ASD children in RSI-SCQ and RRBS-SCQ sub-scores corroborates this hypothesis. This raises question about the nature of social impairment in DCD: Is it a consequence of poor motor engagement in DCD, as supported by several authors (see Cairney et al., 2013), or rather the expression of a continuum between the two disorders ?

REFERENCES
 Cairney, J., & Veldhuizen, S. (2013). Is developmental coordination disorder a fundamental cause of inactivity and poor health-related fitness in children?. *Developmental Medicine & Child Neurology*, 55(s4), 55-58.
 Chen, H.-F., & Cohn, E. S. (2003). Social participation for children with developmental coordination disorder: Conceptual, evaluation and intervention considerations. *Physical and Occupational Therapy in Pediatrics*, 23, 61-78.
 Hocking, D. R., & Caeyenberghs, K. (2017). What is the nature of motor impairments in autism, are they diagnostically useful, and what are the implications for intervention? *Current Developmental Disorders Reports*, 4(2), 19-27. doi: 10.1007/s40474-017-0109-y
 Piek, J., & Rigoli, D. (2015). Psychosocial and behavioural difficulties in children with developmental coordination disorder. In J. Cairney (Ed.), *Developmental coordination disorder and its consequences* (pp. 108-137). Toronto: University of Toronto Press.
 Sumner, E., Leonard, H. C., & Hill, E. L. (2016). Overlapping Phenotypes in Autism Spectrum Disorder and Developmental Coordination Disorder: A Cross-Syndrome Comparison of Motor and Social Skills. *J. of Autism and Developmental Disorders*, 46(8), 2609-2620.
 Sylvestre, A., Nadeau, L., Charron, L., Larose, N., & Lepage, C. (2013). Social participation by children with developmental coordination disorder compared to their peers. *Disability and Rehabilitation*, 35(21), 1814-1820.