Motor challenges have a place within the broader definition of autism

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There is growing debate over whether motor difficulties in children with autism are sufficiently pervasive, persistent, significant and autism-specific to be considered part of the autism definition. A significant body of evidence suggests that they are and highlights the need to represent motor issues in the next revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM) — at a minimum, as a new domain-specific specifier of autism, if not within the core diagnostic criteria.

Motor challenges are intimately linked to the core and co-occurring challenges of autism. Adding motor difficulties to the DSM will bring greater recognition to this issue and help begin conversations about how to create a clinical pipeline for early diagnosis and for appropriate referrals to movement therapies.

The SPARK study conducted by the Simons Foundation (*Spectrum*'s parent organization) follows the development of about 25,000 autistic children and adolescents in the United States. Its research team included the Developmental Coordination Disorder Questionnaire (DCDQ), a screener of motor delay, within its battery of parent questionnaires. The screener has a high (i.e., 71 to 87 percent) predictive value for **identifying true motor difficulties**. My analyses of SPARK DCDQ data have revealed that 87 percent of children with autism are **at risk of a motor delay**, indicating "pervasive" motor difficulties. This prevalence is similar to what is often reported in studies that **use standard motor assessments**. The proportion of SPARK study participants who experienced motor delay also did not differ between ages 5 and 15 years, indicating "persistent" motor delays.

Autistic children have particular delays in visuomotor and ball skills (hitting, catching and throwing a ball), whole-body coordination and planning skills (jumping, running and planning actions), fine-motor skills (writing fast, legibly and with proper force, and cutting shapes) and general motor skills (playing a sport, moving quickly and learning new actions). These motor subdomains tracked with and explained variations in social communication and **repetitive behavior**, as well as co-occurring cognitive, language and functional delays, my **analysis** of SPARK study data revealed. The associations were somewhat intuitive in that complex action-planning (including fine-motor) skills were linked to cognitive delays, whereas eye-hand coordination (fine-motor and ball) skills were linked to language delays. Both gross- and fine-motor skills were associated with functional delays.

Some have argued that motor delays in autism are mainly present in children with co-occurring **intellectual disability** (ID), which is already a DSM specifier. And although children with autism and ID in the SPARK study had significantly greater motor difficulties than those without ID, 83 percent of autistic children without ID still had motor delays, according to a 2021 **study**.

Multiple prior studies have also reported motor difficulties in children with autism **after accounting for cognitive delay**, or reported motor delay in autistic children **both with and without cognitive delay**. A **systematic review** across 114 studies that used normative standardized motor assessments to obtain a large sample of 6,423 autistic children confirmed significant gross-motor problems in the autistic children and found a modest correlation between children's gross-motor and social-communication difficulties.

Although the SPARK data do not address the specificity of motor issues in autism at this time, other studies have compared motor and gestural performance between children with autism versus those with developmental coordination disorder (DCD) or **attention-deficit/hyperactivity disorder** (ADHD) and found that motor impairments may be equal or more severe in children with autism. And children with autism have more difficulty producing gestures (also known as praxis) than do those with **DCD** or **ADHD**. More research is needed to understand whether autistic children's patterns of motor problems differ from those of children with other diagnoses.

Movement experts also must conduct larger systematic studies to further probe the issues of motor challenge prevalence, persistence, severity and specificity, plus the associations with core and co-occurring conditions, using robust motor and other system measures — as well as among different comparison populations. But the autism scientific community needs to evaluate and reflect on the robust body of literature on motor difficulties in autism that already exists.

Adding motor problems to autism's DSM definition could have an immediate practical impact by putting it on the radar of diagnosticians and encouraging them to screen for motor delays and refer children to movement clinicians for further assessment and intervention. Only 15 percent of the SPARK study children were diagnosed with a motor delay (when 87 percent were at risk), 31 percent were receiving physical therapy and 13 percent were receiving recreational therapies. There seems to be a subgroup of children with autism who are underdiagnosed and undertreated for their motor delays.

Early motor delays are known to **increase in magnitude with age** and by the time a child is school-age, their motor abilities could be at the level of a child half their age. Hence, a lack of motor services could exacerbat the scale of motor problems in the future. For this reason, it is important to recognize even moderate motor delays in autistic children and address them through further treatment referrals. Children and adolescents with autism who have unmet motor needs should be able to build their motor skills through play, movement practice and individual and community-based physical activity throughout their lives to improve their functional independence and social participation, as well as their mental well-being and quality of life.