Making motor impairment part of autism diagnosis is unlikely to help, may mislead

BY **SOMER BISHOP, AUDREY THURM**

11 JANUARY 2023

The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) defines autism spectrum disorder primarily by deficits in the development of expected skills in social communication and play. Although the development of these skills is also affected in children with other developmental disorders, especially those with global delays or **intellectual disability**, children with autism show relative deficits in social communication and play that are above and beyond what would be expected for their overall developmental level.

This is not to say that other domains of development are not also affected in autism. Intellectual and language impairments are commonly observed, so they are designated as specifiers in the diagnosis. And a growing literature indicates a high prevalence of various types of motor difficulties. Moreover, failure to develop skills in social communication and play has well-documented negative cascading effects on other areas of development because it significantly reduces opportunities to learn and practice. This can include lack of academic achievement, as well as impairments in all aspects of adaptive behavior.

It is important to recognize and address these delays and impairments. It is not clear, however, that adding any of them to the definition of autism would make it more likely that children get the help they need, or whether doing so would only confuse and obscure what autism is, while also losing information about the source and nature of an individual's specific problem that would enable a clinician to target it most effectively.

Research on neurodevelopmental disorders has repeatedly shown that the most interesting and diagnostically relevant story is not someone's absolute level of skill or deficit in any one domain, but the profile of skills in relation to one another. By definition, and as specified in the DSM-5, developmental disorders are characterized by atypical development of chronologically age-expected skills. However, characteristic profiles of strengths and deficits differentiate these conditions; for example, basic aspects of motor development may emerge as a relative strength in autism, whereas basic aspects of social-communication development may emerge as a relative strength in intellectual disability without autism.

Indeed, motor development is so closely tied to "overall developmental level" that it's difficult to say what is being measured when motor skills themselves are assessed. In infants and young

children, developmental tests and adaptive behavior measures rely heavily on fine- or gross-motor skills to estimate a child's level of ability because these skills are so central to development overall, so scores on these tests do provide information about motor delays and should be reported as such. Using these measures, decades of studies in young children with autism have highlighted motor development as an area of relative strength, even though it may be delayed early on, at least as compared with social and language skills.

This is consistent with a commonly described autism onset pattern, in which children initially appear to be developing typically, achieving early motor milestones such as sitting and walking on time (although their quality may differ, as others discuss), but then show plateauing or regression in social-communication development. Similarly, many parents of older autistic children with intellectual disability describe surprising capacities in running, climbing, and other gross-motor skills that far outpace their children's abilities in other areas. Parents talk about their children moving furniture to be able to reach high locks and open doors. These children are at increased risk of elopement and of getting into dangerous situations, for example by climbing over security gates surrounding pools. Even some of the **repetitive behaviors** observed in children with autism rely on a certain level of manual dexterity (e.g., spinning objects).

By contrast, for children who have intellectual disability without autism, motor skills are often a primary area of disability, standing out as a relative weakness, usually from a young age. For example, the vast majority of autistic children, with or without intellectual disability, attain independent walking by 18 months, whereas some children with intellectual disability (without ASD) may not walk until later preschool age or may never attain this skill. Play with objects is also significantly reduced in many children with intellectual disability, especially in the context of genetic syndromes, as these children may lack the motor skill to engage with toys and other objects.

Studies that closely follow infants who go on to be diagnosed with autism do observe subtle differences in both gross- and fine-motor skills, even from an early age. Several recent studies, and years of anecdotal reports, describe reduced motor performance, such as difficulties participating in sports or riding a bike, in children with autism. These difficulties might be expected in children with autism and co-occurring intellectual disability as a result of general delays in development, but such motor difficulties are also evident in children with autism who have higher cognitive abilities. These findings are clearly borne out in recent studies using the Developmental Coordination Disorder Questionnaire (DCDQ), which show that a large proportion of children with autism score below chronological age expectations.

Given that the DCDQ is heavily focused on motor performance, or adaptive motor skills, it is possible that this finding represents another consequence of negative developmental cascades, in which children with autism have less exposure to and practice with these physical activities. But it is also plausible that certain aspects of motor development, such as visual-motor integration, are fundamentally different in children with autism. Whether observed motor deficits in autism are a cause or consequence of the condition's core symptoms, or whether they represent primary or

secondary deficits, labeling all these possibilities the same way does little to elucidate the problem.

Children across diagnostic boundaries may manifest clinically significant adaptive deficits across domains — especially when compared with same-age peers — and it is critical that interventions be available, regardless of diagnosis, to promote development across domains and augment participation in developmentally appropriate opportunities. At the same time, as with any behavioral or developmental domains, we need to be clearer about what we mean by “deficits” in motor skills, social communication or any other aspect of development.

These are broad domains that rely on, and are closely intertwined with, other domains of development, so measurement is complex and can be misleading. And there is vast heterogeneity within these domains in terms of skill development. Simply recommending any one type of therapy, such as physical therapy or applied behavior analysis, is unlikely to yield positive results unless the specific targets of the therapy are carefully delineated. Toward this end, understanding more about which types of specific skills are affected or preserved in which groups of children may shed light on why we observe these difficulties and what we can do to help.

This work was written as part of Audrey Thurm’s official duties as a government employee. The views expressed in this article do not necessarily represent the views of the National Institutes of Health, the Department of Health and Human Services or the United States government.