**Title**: Motor measures matter: Developmental trajectories of motor skills in autistic individuals differ according to the assessment used.

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**Introduction**: While motor skill difficulties in autistic individuals are well established in the literature, there is diverging evidence regarding what happens to motor skills in autistic individuals as they age. Some studies suggest that autistic individuals experience widening group differences with age in motor skills like grip strength, postural stability, and finger tapping speed (Abu-Dahab et al., 2013; Minshew et al., 2004; Travers et al., 2017). However, other recent studies suggest that autistic individuals experience sustained or narrowing group differences with age in postural stability and general motor skills (Fears et al., 2023; Martín-Díaz et al., 2024). This study aims to determine what factors may be contributing to these discrepancies to better understand the motor skill trajectories of autistic individuals.

**Method**: To clarify the nature of this relationship, 175 autistic participants and 138 non-autistic participants (i.e., with no known diagnoses), aged 6-18 years old, completed the Bruininks-Oseretsky Test of Motor Proficiency-Short Form, Second Edition (BOT-2) (Bruininks & Bruininks, 2005), and maximal grip strength testing. This data was collated from five previous studies, of which longitudinal data was available for 19 autistic individuals (n = 18 with 2 measurements; n = 1 with 3 measurements) and 10 non-autistic individuals (n = 9 with 2 measurements; n = 1 with 3 measurements). A subset of this sample included 62 autistic participants with attention deficit hyperactivity disorder (ADHD) and 41 autistic participants without ADHD between the ages of 6 and 11 years old. To examine group differences in motor skill development over time, we conducted linear, mixed-effects regression analyses of age and BOT-2 total raw scores as well as maximal grip strength. Due to ceiling and floor effects encountered on 10 of the 13 items of the BOT-2, we conducted follow-up, logistic mixed-effects regression analyses to examine group differences in the age at which participants reached ceiling or broke away from floor.

**Results**: Autistic and non-autistic participants demonstrated differences in the rate of change in motor skills by age; however, the nature of these differences depended on the measurement of motor skills. On the BOT-2, autistic participants demonstrated delays in motor skills that narrowed as children aged, while autistic participants demonstrated initially minimal delays in grip strength that widened as children aged. There were no significant group differences in motor skill development in autistic participants with vs. without ADHD. An examination of individual BOT-2 items demonstrated group differences across motor domains (fine manual control, manual coordination, body coordination, and strength and agility).

**Discussion:** This study and prior work that utilizes the BOT-2 suggests a narrowing of age effects on motor skills over time for autistic vs. non-autistic individuals. Our study further suggests that ceiling and floor effects encountered on the individual items of the BOT-2 may be obscuring this relationship, highlighting the need for new, comprehensive measures of fine and gross motor skills without ceiling or floor effects. Our results also contribute to converging evidence that grip strength differences between autistic and non-autistic individuals widen over time, emerging as early as twelve years of age. The widening of group differences in grip strength may reflect a higher risk for sarcopenia with age for autistic individuals. These findings have important implications for healthcare and community structures that address age-related motor changes within the autistic population.

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