

Motor Competence of Youth with Intellectual Disability with and without Down Syndrome: A Question of Homogeneity

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Motor competence (MC) is the ability to perform a spectrum of fundamental movements involving a combination of gross motor skills that include balance (BAL). For children and adolescents, MC is associated with physical activity levels, organized sports participation, health-related physical fitness, and cognitive function. BAL scores of youth with intellectual disabilities (ID) but without Down syndrome (W^{DS}) fluctuate from low to high (i.e. large standard deviations) when compared to consistently high BAL capacity for typically developing (TD) youth. However, it has not been established whether variations in BAL differ between youth with ID with and W^{DS} . The purpose of this study was to examine the presence of homogeneity (i.e. similarities in test variability) for seven BAL test scores between youth with ID with and W^{DS} . Participants included a total of 622 youth with ID divided into two different groups, those W^{DS} and those with DS. There were 502 youth W^{DS} (6-21 years): 252 from Brazil (159 males and 93 females) and 250 from the US (160 males and 90 females). DS participants consisted of 120 youth (7-21 years): 56 from Brazil (35 male and 21 female) and 64 from the US (35 males and 28 females). The BAL test items used in this study were from the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2). Tests were stopped when the participant reached the ceiling scores that were established by the BOT-2 to represent the expected score for TD youth (i.e., no impairment exists). BOT-2 test items for BAL included: BAL-1 and BAL-4, standing feet apart on a line with eyes-open or eyes-closed, respectively (ceiling scores 10 seconds); BAL-2 and BAL-5, walking forward on a line and walking forward heel-to-toe on a line, respectively (ceiling scores 6 steps); BAL-3 and BAL-6, standing on one leg on a line with eyes-open or eyes-closed, respectively (ceiling scores 10 secs); and BAL-7, standing on one leg on a balance-beam eyes-open (ceiling score 10 secs). For homogeneity data, values were reported as means and SDs and level of significance was set at $p < 0.05$. Homogeneity between the eight populations for each of the 7 test item scores (sex, country, and presence or absence of DS) was defined in terms of population mean using the nonparametric bootstrap method. For example, for the test item BAL-1 (standing feet apart on a line eyes-open), μ_1, \dots, μ_8 denotes the means of populations 1 ($\mu_1 =$ Brazil, female, W^{DS}) through population 8 ($\mu_8 =$ US, male, DS). All 8 populations are homogeneous for BAL-1 if:

$$\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu$$

where μ denotes a common value of the mean for all populations. For all 7 test items, the p values did not allow for rejection of the null hypothesis. That is, there was no significant difference between means for each population (μ_1, \dots, μ_8) when compared to the common value of the mean (μ). Therefore, homogeneity exists in that the means for each of the 7 test item scores for sex, country, and the presence or absence of DS shared the same population mean. The present study is one of the first comprehensive comparative examinations of MC between youth with ID with and W^{DS} that has reported homogeneity of test outcomes. This finding has implications related to standardization of expected general balance outcomes for youth with ID.