A Pilot Study for Test–Retest Reliability of the Purdue Pegboard Test in Adolescents and Young Adults With Down Syndrome

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A review of the literature indicates that individuals with Down syndrome (DS), a subgroup of intellectual disability (ID), are at high risk for Alzheimer’s disease (AD) (Lott & Head, 2001). Because there is a lack of a measuring tool with good sensitivity, the ability to detect the development of AD in this population is limited. Kluger et al. (1997) demonstrated that the Purdue Pegboard Test was able to distinguish typical older adults from older adults with early AD as effectively as other cognitive tests. In addition, Burt and Aylward (2000) further suggested the Purdue Pegboard Test for the diagnosis of dementia in individuals with ID and DS. To date, there is little evidence regarding the reliability of the Purdue Pegboard Test in individuals with ID (Guarnaccia, Daniels, & Sefick, 1975). In the study by Guarnaccia et al. (1975), high test–retest correlation coefficients were obtained; however, researchers did not clarify whether there were any subjects with DS.

Since 1948, the Purdue Pegboard Test has been widely utilized by therapists as an outcome measure of manual dexterity in different special populations, such as those with brain damage (Fernald, Fernald, & Rines, 1966), Parkinson’s disease (Uitti et al., 1997), multiple sclerosis (Gallus & Mathiowetz, 2003), and carpal tunnel syndrome (Amirjani, Ashworth, Olson, Morhart, & Chan, 2011). These studies reported the test–retest reliability of the one-trial administration and the sum-of-three-trials administration procedures when the test and retest were separated by time. In addition, moderate to good reliability for both procedures was evident, which means the one-trial administration procedure may be applied to clinical settings when limited time is available. Previous studies have indicated that individuals with DS have challenges with their motor performance compared with
their typical peers and with individuals with ID but without DS (Angelopoulou et al., 2000; de Campos, Rocha, & Savelsbergh, 2010). Thus, there is a need to investigate whether the Purdue Pegboard Test is a reliable tool to assess manual dexterity in individuals with DS.

In summary, the purpose of the current study was to examine the test–retest reliability of the Purdue Pegboard Test when testing the one-trial and sum-of-three-trials administration procedures in individuals with DS. Consistent with the study by Guarnaccia et al. (1975), it was hypothesized that both procedures would yield good test–retest reliabilities in individuals with DS.

**Methods**

**Participants**

A total of 15 participants with DS (12 males, 3 females, aged 14–22 years) were recruited from a variety of local organizations (e.g., Sharing Down Syndrome Arizona; Down Syndrome Network; Special Olympics; Raising Special Kids newsletters, meetings, and e-mail lists; and others). All participants were trisomy 21. The average age of the participants was 18.75 years (SD = 2.93). Interested parents/guardians were given a description of the task and eligibility requirements for participation via telephone or e-mail. All protocols were approved by the human subjects institutional review board of our university.

In this study, the Peabody Picture Vocabulary Test-Third Edition (PPVT-III) was used to measure the mental ages of participants. If the participant’s mental age was below 3 years, they were to be excluded from the study. The mean mental age was 6.68 ± 2.08 years. Then, vision and hearing assessments were also conducted. Vision was tested using a standard eye chart (i.e., Snellen chart) and a modified version, which consists of E’s pointing in different directions for participants who cannot recognize letters. Participants were instructed to say or point in which directions the E’s were pointing. Hearing was tested using an audiometer (Maico Ma 25, Eden Prairie, MN). If participants did not have normal or at least 20/100 vision and normal or corrected-to-normal hearing, they were to be excluded from the study. The purpose of these assessments was to ensure participants had the capabilities to understand the instructions and perform the test. In the current study, no participants were excluded.

**Measures**

While arriving in the laboratory, participants read (or were read) and signed the informed consent or assent forms, and a parent/guardian signed a consent form before testing was started. After prescreening using the PPVT-III and vision and hearing assessments, handedness was also tested by using a seven-item handedness inventory (Oldfield, 1971). Participants physically performed writing with a pen, drawing a circle with a pen, using scissors, using a hammer, throwing a ball, pretending to brush their teeth, and pretending to eat with a spoon. If a participant performed four out of seven items with either their right/left hand, this hand was deemed as the dominant hand, with the other hand deemed the nondominant hand.