

## Differences in Canadian and U.S. norms using the WAIS-IV.

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A recent study reported that a significantly larger percentage of subjects obtained FSIQ scores of 85 or less on the WAIS-IV Canadian as compared to the US norms (Harrison, Armstrong, Harrison, Lange, & Iverson; 2014). The sample consisted of 432 students accepted into various unreported types of postsecondary education programs. A sizable minority were mature students who had completed a high school equivalency or academic upgrade program. None were currently in programs designed for persons with intellectual disabilities. However, 75% of the sample had pre-existing diagnoses including LD, ADHD, and a variety of other conditions including some with borderline intellectual functioning. All subjects were being evaluated to determine if they qualified for a disability diagnosis that would allow them to obtain academic accommodations and supports, suggesting that secondary gain may have reduced the student's level of effort on the test. A substantial percentage of scores lower than the average range might be reasonably expected given the sample characteristics. As expected, many subjects obtained FSIQ scores lower than the average range on both the U.S and Canadian norms. When comparing scores using the U.S. and Canadian norms, a significantly smaller percentage of the sample obtained FSIQ scores of 85 or less when using the American norms (17%) than when using the Canadian norms (40%).

As this study shows, the WIAS-IV Canadian norms yield significantly lower scores than the American norms for subjects in the lower portion of the IQ distribution. The technical explanation of this phenomenon is provided below along with a more substantive explanation in keeping with the recommendations for best practice among Canadian Psychologists.

Theoretically, low ability cases from Canada and the U.S. should be functioning very similarly as there is no reason to hypothesize that there would be a categorical distinction between low ability in Canada and low ability in the United States. However, standard scores on the WAIS-IV are relative scores (scores vis-à-vis one's related peers) and the comparison group for low ability Canadians is not equivalent to the comparison group for low ability Americans. Studies using the WISC-III, WISC-IV, WAIS-IV, WPPSI-IV, and WIAT-III have consistently shown that Canadian adults and children from a normal population outperform U.S. adults and children when U.S. norms are applied. These prior studies have supported the need for country specific norms between Canada and the U.S. Given the Canadian normative sample consistently shows higher overall ability (FSIQ) compared to the U.S. normative sample, the gap between a typical and an atypical ability case will be greater in Canada than in the U.S.

In addition to having higher average ability, the Canadian normative sample on the WAIS-IV has a smaller standard deviation (SD) compared to the U.S. normative sample, indicating a more cognitively homogeneous population in Canada. As a result, given the same low raw score, the converted standard score is further away from the mean in the Canadian sample than in the U.S. sample. The following hypothetical example illustrates the impact that a smaller standard deviation has on raw to scaled score conversion. For example, given a mean of 20 and a raw score of 14, if the Canadian SD=2 and U.S. SD=3, then, the Canadian Z-score =  $(14-20)/2 = -3$ , and the Canadian standard score will be =  $(-3)*15 + 100 = \mathbf{55}$ . In contrast, the U.S. Z-score =  $(14-20)/3 = -2$ , and thus the U.S. standard score will be =  $(-2)*15 + 100 = \mathbf{70}$ .

With the combined differences in population means and SDs working together, the standard score difference can be even greater. In the above example, using a raw score of 14 but this time with a mean of 21 for Canada versus 20 for the U.S., we get a Canadian Z-score of  $(14-21)/2 = -3.5$ , and a Canadian standard score of  $(-3.5)*15 + 100 = \mathbf{47.5}$ , while the U.S. standard score is still  $\mathbf{70}$  (same analysis as above). These are extreme examples to demonstrate the impact of overall higher cognitive performance combined with greater homogeneity in performance can affect score comparisons between the countries. Also, it is important to consider that the relative heterogeneity in U.S. performance compared to Canada is larger below the mean than it is above the mean. Therefore, performance discrepancies tend to be observed in the lower-tail of the distribution rather than throughout the distribution.

The WAIS–IV Canadian norms provide an accurate representation of the Canadian population, and reliable and valid scores when comparing the performance of Canadian clients to the Canadian population. As a result of differences in the distribution and overall ability of Canadians, using Canadian norms will necessarily produce lower scores than the U.S. norms, making it more likely that a disorder is identified when one is present.

The use of any psychological or cognitive test can, at times, yield results which appear to be inconsistent with the examinee's presentation or performance on other measures. For these reasons, Practitioners making comparisons across test instruments regarding individual performance should use a consistent normative dataset. This means that if other instruments are being used for which Canadian norms are not available, then U.S. norms should be used to allow comparisons to be made to other tests also using U.S. norms. Similarly, if the purpose of assessment is to evaluate progress over time, practitioners may use U.S. tests and U.S. norms in order to compare performance against previous administrations using U.S. norms. Decisions regarding the normative set must be made *a priori* based on psychometric integrity and applicability to the target population. Pearson's recommendations are commensurate with the standards published by the Standards for Educational and Psychological Testing (1999).

If the resulting IQ score appears inconsistent with the presentation or level of impairment of the individual based on clinical judgment or standardized measures of adaptive functioning, Pearson recommends practitioners heed the current standards in the diagnosis of Intellectual Disability published by the American Psychiatric Association in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (2013). The DSM-5 states that the level of Intellectual Disability is “diagnosed based on the severity of deficits in adaptive functioning.” Scores on standardized intelligence tests are still considered important in the assessment process but should not define the level of severity. The DSM-5 states that “intellectual disability is considered to be approximately two standard deviations or more below the population, which equals an IQ score of about 70 or below”. The association of a strict cut-off on an IQ score below 70 to a diagnosis of ID has changed over time based in part on our understanding of measurement theory, procedures to control for measurement error, and normative changes over time (Schalock & Luckasson, 2005). As Luckasson et al. aptly described in their 2002 book, the cut-off criterion for Intellectual Disability is approximately two SDs below the mean, *considering the standard error of measurement for the specific assessment instruments used and the instruments' strengths and limitations* (p. 58; italics added).

## References

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