

Assessment Service Bulletin Number 1

Score Differences Between the BDI-3™ and BDI-2 NU™ Standardization Samples

The score comparability study of the Battelle® Developmental Inventory, 3rd Edition™ (BDI-3; Newborg, 2020) and the Battelle Developmental Inventory, 2nd Edition Normative Update (BDI-2 NU; Newborg, 2016) was undertaken to obtain an understanding of the score differences that examiners may see across the two editions of this assessment instrument. This assessment service bulletin describes differences between the BDI-3 and BDI-2 NU and presents the results of the BDI-3 / BDI-2 NU score comparability study.





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Score Differences Between the BDI-3™ and BDI-2 NU™ Standardization Samples

The *Battelle® Developmental Inventory, 3rd Edition™* (BDI-3; Newborg, 2020) differs from the *Battelle Developmental Inventory, 2nd Edition Normative Update* (BDI-2 NU; Newborg, 2016) with regard to the demographic characteristics of the standardization samples as well as the test blueprint, test content, and item scoring criteria. This assessment service bulletin briefly reviews these differences and then describes the results of the BDI-3/BDI-2 NU score comparability study. This will provide users of both instruments with an understanding of score differences they may observe between the two editions.

Demographic Differences Between the BDI-3 and BDI-2 NU

The BDI-3 and BDI-2 NU standardization samples are composed of different examinees, tested approximately 15 years apart, with relatively small differences in demographic composition. The BDI-3 standardization sample reflects recent U.S. census estimates and 2020 U.S. population projections for children from birth through age 7 years, 11 months (U.S. Census Bureau, 2005, 2016, 2017a, 2017b). The demographic composition of the BDI-2 NU standardization sample reflects estimates and projections for 2015.

The continued shift, in terms of percentage of the population, away from the White demographic group toward other racial/ethnic groups is evident in the BDI-3 standardization sample. The decline in the percentage of examinees in the White group from the BDI-2 NU to the BDI-3 (51.1% to 50.2%) is offset by an increase in the combined percentages for the Asian and Other/Mixed race groups (9.2% to 10.1%). In the BDI-3 standardization sample, the Hispanic/Latino group remains the second largest group (25.7%); this represents only a small increase from the percentage that was reported in the BDI-2 NU (25.6%).

The BDI-3 standardization sample also reflects the continued regional migration away from the Northeast and Midwest toward the South and West as well as a slightly higher percentage of mothers with education beyond high school (64.5% for the BDI-3 compared with 63.9% for the BDI-2 NU).

Test Blueprint, Test Content, and Item Scoring Differences Between the BDI-3 and BDI-2 NU

Important distinctions exist between the two editions of the BDI related to the test blueprint, test content, and item scoring. Differences in the test blueprint are evident with respect to the number of subdomain scores that contribute to domain scores. For children ages 6 years and older, all 13 subdomains of the BDI-3 are administered. This stands in contrast to the BDI-2 NU, where only 7 subdomains were administered to this age group.

There are also important differences in test content. For example, in the Adaptive Domain, the BDI-3 Self-Care Subdomain includes a greater balance of items oriented toward eating, toileting, dressing, and sleeping relative to the BDI-2 NU. The BDI-3 Social-Emotional Domain (previously named the Personal-Social Domain) was revised and reorganized to reflect the current social-emotional literature. And in the Communication Domain, the BDI-3 Expressive Communication Subdomain was expanded to more completely address speech articulation.

Finally, revisions were made to the item scoring criteria in the BDI-3 to add greater objectivity and precision to the scoring rubrics.

Description of the BDI-3/BDI-2 NU Score Comparability Study

A total of 113 examinees from age birth through 7 years (median age = 4 years, 1 month) were tested with both the BDI-3 and the BDI-2 NU, including 44 children younger than 3 years old and 69 children ages 3 years and older. A counterbalanced design with random assignment was used so that approximately half of the sample was administered the BDI-3 first and half was administered the BDI-2 NU first. The two tests were typically given 0 to 15 days apart.

Sample Composition

The sample was 54% female, and the racial/ethnic representation of the sample was 58% White, 25% Hispanic, 7% Black or African American, 6% Other/Mixed, and 4% Asian. The reported education information for the child's mother indicated that 4% did not have a high school diploma or GED, 39% had only a high school diploma or GED, and 57% had completed some college or had a college degree.

Subdomain Scaled Score and Domain Standard Score Differences

Subdomain scaled score and domain standard score differences between the BDI-3 and the BDI-2 NU were computed for each examinee in the study. Difference scores were computed by subtracting an examinee's BDI-2 NU subdomain scaled score and domain standard score from the examinee's respective BDI-3 scores. The median difference scores are presented in Table 1 for the total sample as well as for each of the two separate age groups. The median difference scores as well as the standard deviations (*SDs*) of those differences are displayed for each domain and subdomain.

As expected, the magnitude of the difference scores is greater at the domain level than at the subdomain level. This is primarily a reflection of differences in the underlying score metrics as well as the composite nature of the domain standard scores. At the domain level, 17 out of the 18 median difference scores (94%) are within one third of a standard deviation of their respective score metric and are considered small or less than small. At the subdomain level, 33 out of the 39 median difference scores (85%) are within one third of a standard deviation and are considered small or less than small. The direction of the domain score differences is largely positive, with positive difference scores in 15 of the 18 domain comparisons (83%). Overall, these score differences suggest that children are expected to obtain domain standard scores that are slightly higher with the BDI-3 than with the BDI-2 NU.

The *SDs* of the difference scores are also presented in Table 1. Subdomain scores have a mean of 10 and a standard deviation of 3. The subdomain difference score *SDs* range from 2.17 for the Attention and Memory Subdomain to 3.84 for the Reasoning and Academic Skills Subdomain, both of which are reported for the birth to 35-month-old age group. At the domain level, where the underlying score metric has a mean of 100 and a standard deviation of 15, larger difference score *SDs* are expected. The domain difference score *SDs* range from 6.87 for the BDI-3 Total Score to 14.02 for the Adaptive Domain score, both of which are reported for the 36- to 95-month-old age group.

The score differences in Table 1 may be best understood when the median and the *SD* of the difference scores are considered together. For example, in the Cognitive Domain, the median standard score difference for the 36- to 95-month-old age group is 3 points, with 68% of the difference scores being within a range of roughly 11 standard score points. Hence, the expectation is that the Cognitive Domain standard score differences will range from -8 (3 minus 11) to +14 (3 plus 11) for this age group.

Table 1
Median BDI-3/BDI-2 NU Score Differences and Standard Deviations for the Total Sample and by Age Group

BDI-3 and BDI-2 NU Domains and Subdomains	Age Group and Total Median Score Differences (SDs)		
	Birth to 35 Months	36 to 95 Months	Total
ADAPTIVE	2 (11.10)	4 (14.02)	4 (12.89)
Self-Care	1 (2.29)	-1 (3.14)	0 (2.72)
Personal Responsibility	-0.5 (2.70)	1 (2.99)	0 (2.99)
SOCIAL-EMOTIONAL*	4 (11.01)	-1 (12.74)	2 (12.25)
Adult Interaction	0.5 (2.98)	-2 (3.77)	-1 (3.52)
Peer Interaction	0.5 (3.68)	0 (3.06)	0 (3.18)
Self-Concept and Social Role	1 (2.67)	0 (3.15)	0 (2.97)
COMMUNICATION	2 (13.16)	-4 (11.71)	-1 (12.75)
Receptive Communication	1 (3.35)	0 (3.54)	0 (3.47)
Expressive Communication	1 (3.20)	-1.5 (2.57)	-1 (3.01)
MOTOR	2 (8.86)	5 (11.44)	4 (10.68)
Gross Motor	-1 (2.20)	0 (3.04)	0 (2.58)
Fine Motor	1 (2.48)	2 (2.71)	2 (2.66)
Perceptual Motor	0 (2.95)	1 (2.37)	1 (2.44)
COGNITIVE	5 (10.16)	3 (10.60)	4 (10.47)
Attention and Memory	1 (2.17)	2 (3.42)	2 (2.92)
Reasoning and Academic Skills	-0.5 (3.84)	0 (2.20)	0 (2.43)
Perception and Concepts	1 (2.45)	0 (3.36)	0 (3.06)
BDI-3 Total	6 (6.96)	2 (6.87)	3 (7.04)

Note. A negative value indicates that the median BDI-3 standard or scaled score is lower than the respective score in the BDI-2 NU. A positive value indicates that the median BDI-3 standard or scaled score is higher than the respective score in the BDI-2 NU.

*The Social-Emotional Domain is named the Personal-Social Domain in the BDI-2 NU.

Summary

Several differences exist between the BDI-3 and the BDI-2 NU, including those between the standardization samples, test blueprint, and test content as well as revisions to the item scoring criteria that were implemented in the BDI-3. Though the demographic and test composition has changed across the two editions, most differences in subdomain scaled scores and domain standard scores, as demonstrated in the BDI-3/BDI-2 NU score comparability study, can be characterized as relatively small.

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