

# Cognitively SPEAKING



Fall 2017

## *CogAT*<sup>®</sup> **CogAT<sup>®</sup> Form 7 2017 Normative Update**

By Joni Lakin, Ph.D, with Sharon Frey and Victoria Driver

This past summer, updated 2017 norms for **CogAT** Form 7 and the **Iowa Assessments**<sup>™</sup> became available for scoring. This issue of *Cognitively Speaking* explains how and why we do normative updates for **CogAT**. It will also explore some of the changes to the norms and how the update may affect your use of **CogAT** scores.

### Why Do We Need Normative Updates?

The purpose of using normative information is to understand a student’s test performance in the context of how well his or her peers of similar age or years of schooling are performing. Ability tests measure reasoning skills that are developed through experience. We would not directly compare a 5-year-old’s performance on the **CogAT** tasks to a 10-year-old’s because the 10-year-old has had more opportunities to develop reasoning skills (not to mention the many other maturational and developmental processes at work).

This is why we use age groups in norming tests of cognitive abilities—so that students of similar age and experience are compared rather than students with a wider range of school and overall experience. We are seeking to control for differences in education, experience, and maturation in order to compare



Dr. Joni Lakin

“like to like.” This is also why local norms are especially helpful, because they compare students to peers that are not only of a similar age, but also from the same school district with more similar resources and experiences. This allows a better interpretation of how well a student reasons with the **CogAT** tasks compared to similar students.

When we use national norms, the quality of our comparisons to “similar peers” will change over time. As the demographic makeup of the U.S. changes, the distribution of students in a normative sample will become less similar to our current distribution of students. Updating the norms corrects for the demographic shifts that occur in our society. While we do not expect to find large differences in the norms over time, we do feel that it is valuable to test users to have regularly updated norms available.

**“As the demographic makeup of the U.S. changes, the distribution of students in a normative sample will become less similar to our current distribution of students. Updating the norms corrects for the demographic shifts that occur in our society.”**

## How Did We Update the Norms?

When **CogAT** Form 7 was initially released, it provided 2011 national norms obtained from the 2010–2011 standardization. These norms were based on data collected from a large and representative sample of the U.S. student population at the time. Of course, the demographic makeup of the U.S. is changing all the time. These changes in demographics can make the national norms less representative of students in later years.

To keep the norms current, a normative update was conducted to provide normative interpretations that reflect changes in the test-taking population in the years since the 2010 standardization based on the latest national school demographics. The 2017 normative update is considered a demographic update. This means we adjusted the 2010 standardization data using demographic weighting to reflect changes in the U.S. student population since 2010. We then recalculated the grade and age norms using a methodology similar to that used for the original norms development.

## How Did the Population Change Over Time?

The 2017 demographic targets were based the latest school information from the National Center for Educational Statistics (NCES). For public schools, the Public School Membership, School, and LEA Membership data files were used to determine the proportion of students in public schools, the percentage of schools that are Title I, and the proportions of districts by

size category. Private school information was obtained from the Private School Universe Survey (PSS) to determine the proportion of students in different types of private schools (Private Catholic versus Private non-Catholic).

For Private schools, a greater percentage of K–8 schools now reside in smaller school systems, including independent private schools. The trend is different for Private high schools where a larger percentage of schools are found in school systems that enroll 20,000 to 49,999 students.

The normative update standardization data were stratified the same way in 2017 as for the 2011 norms development: by School Type (Public/Private), socioeconomic status (SES), Region, and District/Diocese Size.

## Does This Lead to Any Important Changes in the Norms?

In looking at the new 2017 norms compared to the 2011 norms, we found that the norms were mostly stable across the different batteries and levels of **CogAT** 7. The majority of differences across grades and levels are within plus or minus 2 GPR (grade percentile rank) points. An increase in GPR for 2017 means that the same raw score (number correct) on the test will result in a higher GPR using the updated norms. The largest change from the 2011 to 2017 norms occurs for the Grade 1 fall Quantitative norms and the Grade 12 (fall and spring) Nonverbal norms, where the difference is 5 to 6 GPR points. For both grades, these differences occur at or below the 50<sup>th</sup> GPR, or, in other words, from the middle to the bottom of the performance distribution for that grade at that time of year.

Because we observe both increases and decreases in GPR across the various comparison points, this means that neither set of norms is overall “harder” or “easier” than the other. Schools will want to use the 2017 norms simply because they are most accurate for their students at this time. If you want to look closely at the differences in norms, you can request the “2011/2017 Norms Comparisons with Technical Information” from HMH®.

If you use APR (age percentile ranks), using the updated norms will affect your results to a small degree. At the 90<sup>th</sup> APR, the same raw score (number correct) on the 2011 norms resulted in an APR of 1 point higher or lower depending on the battery and test level; in other words, an APR of 90 is now an APR from 89 to 91. Around the average score—an APR near 50—the largest differences are 5 percentile points ( $\pm 5$ ) at the lower grade levels.

The table below shows a sample of the results for the Quantitative Battery for levels 5/6 through 10 comparing the GPR a student would receive using the 2011 norms to the rank a student would receive using the 2017 norms.

**Table A. Sample of grade percentile ranks (GPR) based on 2011 and 2017 norms, for levels 5/6–10 using the Fall norms for the Quantitative Battery.**

Test Level	50 GPR on Q. Fall	75 GPR on Q. Fall	90 GPR on Q. Fall
5/6	50	<b>76</b>	<b>91</b>
7	<b>55</b>	<b>78</b>	90
8	47	73	90
9	47	74	89
10	<b>53</b>	<b>76</b>	<b>91</b>

**Bold** indicates higher APR in 2017. *Italics* indicate lower APR in 2017.

Say we have a student who took the Level 7 test. If they were at the 50<sup>th</sup> GPR for Quantitative in fall using the 2011 norms, they would now be at the 55<sup>th</sup> GPR using the 2017 norms. In other words, for the same raw score test performance, this student ranked relatively higher in 2017 based on the adjusted normative group. Using the 2011 norms in 2017 would underestimate how well this student is performing in comparison to age peers. If a student took the Level 8 test and received a 50<sup>th</sup> GPR using 2011 norms, the student would now receive a 47<sup>th</sup> GPR using the 2017 norms. In other words, using updated norms, this student is performing less well compared to the age peer group. As the table indicates overall, the changes mostly cancel each other out, meaning that the 2017 norms are not generally more difficult or easier; however, changes in scores will be seen for individual students. Whether the student rank would be raised or lowered by the new norms varies a small bit by battery, test level, and time of year that the student is testing and/or age grouping. You could say that the 2017 norms are simply a more accurate reflection of students' relative performance because it is comparing them to a peer group from 2017 rather than a less relevant 2011 peer group.

## How will updated norms affect my cut-scores?

Test users have many different ways of using test results in screening and identification. A wide variety of methods for setting cut-scores is in use, and all are equally appropriate. For instance, some cut-scores are set using grade and/or age percentile ranks (PR) where all students scoring at or above a certain PR are identified or flagged for further evaluation. As we discussed above, when the reference group shifts, PRs may change; therefore, percentile rank cut-scores may reflect a different raw score performance when using 2017 scores in comparison to 2011.

If a score scale is used other than PR, such as the Universal Scale Score (USS), you need to consider whether the USS cut-score was originally based on a percentile rank and make appropriate adjustments. For example, say your school district uses a selection cut-score for the **CogAT** composite at an USS score of 204. This USS cut-score may have been selected because it corresponded to a 90<sup>th</sup> GPR in the spring of Grade 2. In this case, you will want to check your scaled score to PR alignment and be sure that the 90<sup>th</sup> PR is still associated with the scaled score cut-score you are using. Otherwise, you may end up with more or fewer students than you expect if the norms have become somewhat easier or tougher for that particular score and level.

When local norms are used for cuts-scores, the updated norms will not affect your process. Rank orders of students within local norms will not change due to the normative update. Only comparisons to the national normative sample are affected.

## How does the normative update affect other scores?

The normative update does not have a direct effect on the raw score to Universal Scale Score (USS) conversion. However, the national reference group for the USS has changed due to the demographic update, and so percentile ranks and age scores may change. Changes to battery scores may affect composite scores. For instance, if a student has small changes to each battery score (V, Q, N), these changes may have a larger effect on the VQN or other composite score if the changes are all in the same direction. Small increases may add to a larger effect on the composite, or small decreases across each battery may result in a larger decline for the composite. Small changes to battery scores in different directions may offset one another so that the composite score remains the same regardless of norm year used. The magnitude and impact of these changes will differ by battery, test level, grade level, and time of year tested.

The normative update also does not change the way the Ability Profile Score is calculated. In general, most Ability Profile Scores will not change with the normative update. However, small changes in a student's battery scores due to the normative update could be enough to slightly change the student's Ability Profile. While these changes will not be major, the median stanine of the Ability Profile Score could shift up or down one stanine. For instance, a median stanine of 5 using the 2011 norms could shift up to 6 or down to 4 in 2017 if the student's median battery score changes. Similarly, the pattern of strengths and weakness could shift slightly

depending on the magnitude and direction of battery score changes. An A profile, where all battery scores are at roughly the same level, could now reflect a strength or a weakness with a B profile (one score relatively above or below the others). The reverse could also be true when one or more battery scores change and what was previously a strength or weakness is now closer to equivalence. Again, these change will not be large; student's will not move from an A ("sAme") profile to an E ("Extreme"), but slight changes could result from shifts in the balance across scores.



**Dr. Joni Lakin** is an Associate Professor of Educational Foundations, Leadership, and Technology at Auburn University. She worked on Form 7 and on the next edition of **CogAT** Form 8, due out at the end of 2017.



**Sharon Frey** is Research Scientist in the Assessment Studio at Houghton Mifflin Harcourt® and has been heavily involved in **CogAT**'s development for over 25 years.



**Victoria Driver** is the Director of Product Management at Houghton Mifflin Harcourt for **CogAT**. She has worked in assessments, education, and research at HMH for over 10 years.

Check out previous issues of *Cognitively Speaking* and view webinars on how to use **CogAT** results on [CogAT.com](http://CogAT.com).

If you have questions, please contact your **Houghton Mifflin Harcourt** Assessment Account Executive or call HMH Customer Experience at **800.323.9540**. You can also visit [CogAT.com](http://CogAT.com) for more information.

**PAGE 1** | WHY NORMATIVE UPDATES?

**PAGE 2** | NORMS CHANGES

**PAGE 3** | EFFECTS ON SCORES

**PAGE 5** | AUTHORS

Connect with us:



Houghton Mifflin Harcourt®, HMH®, CogAT®, and Iowa Assessments™ are trademarks or registered trademarks of Houghton Mifflin Harcourt. © Houghton Mifflin Harcourt. All rights reserved. 10/17 WF245641

[hnhco.com](http://hnhco.com) • 800.323.9540

