Kindergarten Readiness Assessment
Fall 2016

Comparison of the
Deaf & Hard of Hearing students
with their counterparts

Oregon Department of Education

Intro:

In Fall 2016, Oregon Kindergarten Readiness Assessment (KA) was administered to almost 41 thousand children entering Kindergarteners statewide.

The Oregon School for the Deaf, ask the Oregon Department of Education (ODE) to compare the KA test results for the student identified as 'Deaf & Hard of Hearing' (D&HH), with their counterparts (referenced herein as the 'main group'. 64 students were identified with hearing disabilities, 54 of whom had valid KA test scores.

Oregon's Kindergarten Readiness Assessment looks at three areas:
- Students Learning Behavior (Self-Regulation and Interpersonal Skills)
- Early Mathematics (one test)
- Early Literacy (three tests, English Letter Names and Sounds Recognition)

Findings:

The overall conclusion is that aggregate D&HH results lag the main group in all three areas.

This most cases, observed lag computes to be statistically significant (@95% confidence interval). Yet, caution is advised when assigning practical significance to the observed differences, given that:

- this is a small subgroup relative to its population (54 vs 40,716, about one-tenth of one percent). Small sized groups compromise the confidence with which we could generalize to a larger or future D&HH population.
- the numerical difference between the scores have not been qualified/aligned/normalized to any future outcomes. In other words the present or future significance of say a 2 point score difference is currently undetermined.

However even with small performance differential, few would deny that parity is desirable outcome for equity reasons. Knowing where these differences occur, should help in coming up with performance gap mitigation strategies.

Demographically speaking, this D&HH group was primarily (**92%**) composed of two ethnicity/race subgroups: Hispanic 35%; White 57%. In contrast, **86%** of the main group were Hispanic 23%; White 63%.

The gender ratio for the D&HH group was 46% female, 54% male, fairly similar to the main group ratio of approximately 48.5% female, 51.5% male.

In the Approaches To Learning assessment, the D&HH male scores were much more variable than the D&HH female scores.   In contrast, the main group male and female scores were similar to each other.

In Early Mathematics, the D&HH Hispanic subgroup had lowest and most varied scores, very unlike the main group Hispanic scores. The D&HH male/female scored differently. In contrast, gender does not show differential performance in the main group.

In Early Literacy, for the **Uppercase** English Letter Name Recognition test, the D&HH Hispanic scores was *significantly* less than their main group counterparts. Similar pattern exists for the **Lowercase** English Letter Name Recognition test**.**

In Early Literacy, English Letter Sounds Recognition, the D&HH group Hispanic and males scored significantly lower than there main group counterparts.

It was interesting to note that the only instance in which a D&HH subgroup performed similar to their main group counterpart was the female subgroup and it was in the Early Literacy, English Letter Sounds Recognition test.

Document Contents:
The attached table and charts show the aggregate KA scores for the D&HH and main groups.
Additional breakouts for Hispanics and Whites, females and males are included.

The numerical results are presented in 10 side-by-side tables

	D&HH KA students	Other KA students
• ALL	**Table 1**	**Table 2**
• *Hispanic*	3	4
• *White*	5	6
• *Female*	7	8
• *Male*	9	10

This is the **Table 1** referenced above. It shows the aggregate statistics for the D&HH subgroup for the three Kindergarten Assessment domains.

ALL	N	Mean	Median	Mode	St. Dev	Qrtiles (25|50|75)
Approaches To Learning : Total (1-5)	54	3.3	3.4	3.7	1.0	(2.6 | 3.4 | 3.9)
Approaches To Learning : Self-Regulation (1-5)	54	3.1	3.3	3.5	1.0	(2.4 | 3.3 | 3.7)
Approaches To Learning : Interpersonal Skills (1-5)	54	3.5	3.8	4.0	1.0	(3.0 | 3.8 | 4.0)
Early Mathematics (0-16)	56	6.7	7	7*	3.9	(4.0 |7.0 |9.0)
Early Literacy: UC Letter Name Recog (0-26)	54	11.9	11	0	10.2	(1.8 | 11.0 | 23.0)
Early Literacy: LC Letter Name Recog (0-26)	54	9.8	6	0	9.4	(1.0 | 6.0 | 20.0)
Early Literacy: Letter Sound Recog (0-26)	54	7.0	2.5#	0	8.5	(0.0 | 2.5 | 14.5)

Deaf & Hard of Hearing KA students

\# = interpolated.   * = multiple modes, smallest value shown.

N: The subgroup count of students who had valid KA test scores.
Mean: Arithmetic mean of students in that subgroup
Median: 50th percentile score.
Mode: Most frequently observed aggregate score.
St.Dev: Standard deviation for the Arithmetic mean.
Qrtiles: Aggregate scores at the 1st, 2nd, and 3rd quartiles.
           50% of the student had score between the low and high numbers shown.

Some Observations:

While larger group size is desirable for making comparisons, the D&HH group was further subdivided into race/ethnicity and gender categories (see tables 3 to 10).

This sub-division resulted in subgroup counts too low for much statistical confidence in any interpolation. Induced conclusions need to be corroborated with external or additional assessment.

However one can see that in Fall of 2016, virtually all **aggregated** D&HH scores lagged their counterpart scores in every assessment (see tables 3 and 10).

Charts:

The box-plot charts help visualize the numbers in the tables.
For example, this one compares the Early Mathematics results of **Male** students of the D&HH Main groups.
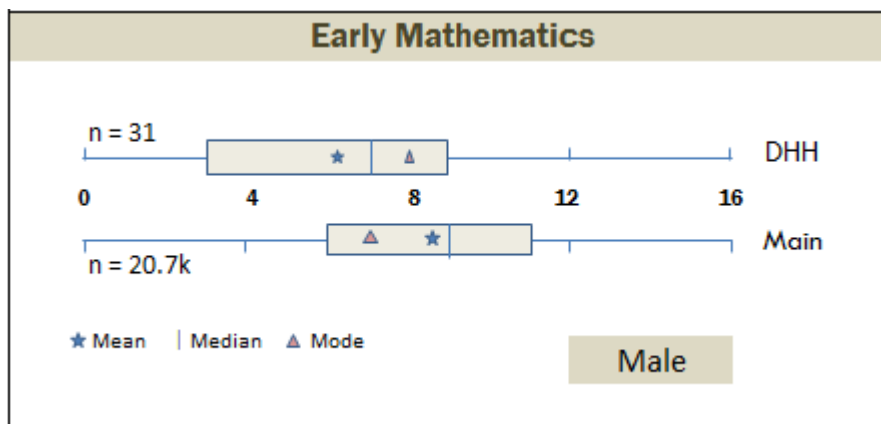
The chart shows some of the commonly used measures of central tendency and also includes a shaded rectangular object to represent the distribution of the scores within the referenced group (**Males**, in this example). The rectangle depicts the Inter-Quartile (IQ) score range (middle 50% of the students). The left side of the IQ box show the 25th percentile and the right side shows the 75th percentile. The median (50th percentile) is the vertical bar somewhere in the middle of the IQ box.

If the vertical bar is not roughly in the middle of the rectangle, then the score distribution is 'skewed' towards the longer section of the box. The X-axis shows the range of scores possible for the test. The group sizes are also shown on the left side of this chart.

Intra-group performance differentials can be visualized by comparing two adjacent charts.
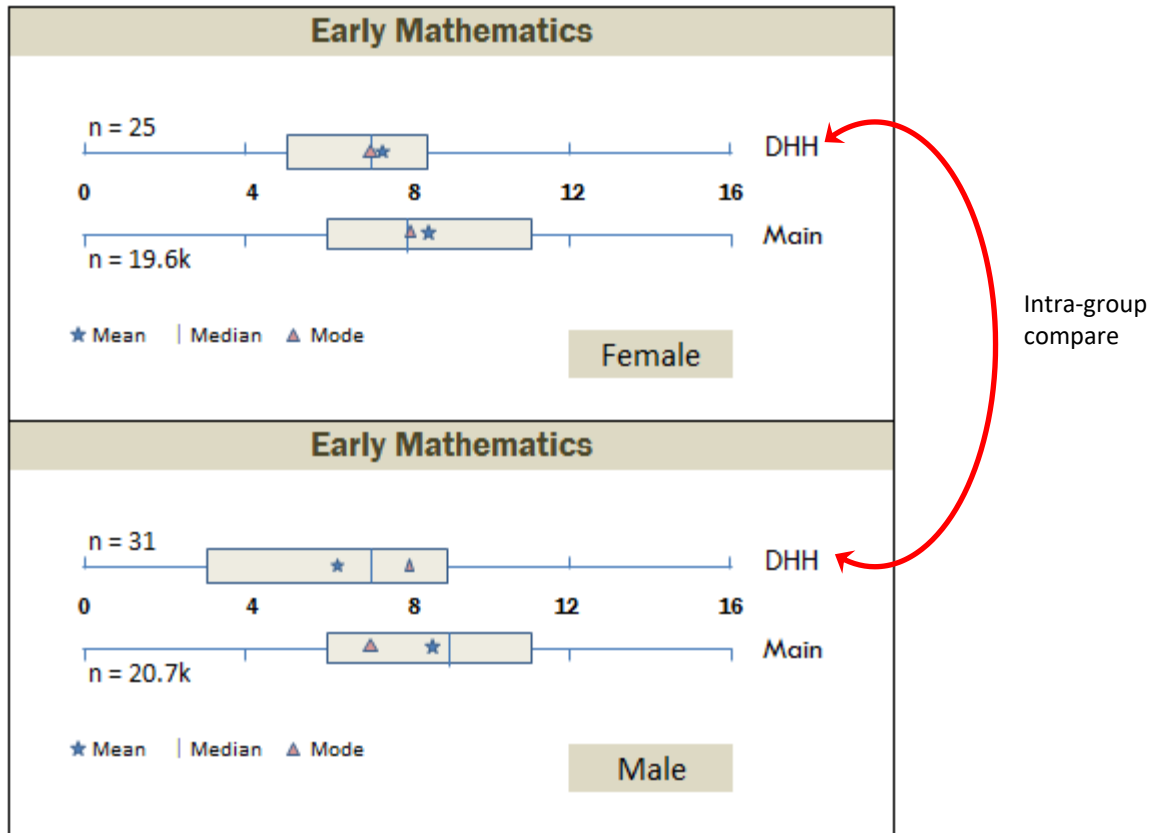
Compare the D&HH Female and Male box-plots. Notice the tighter cluster of scores for the D&HH females compared to the D&HH males. Also note that while both have 75th percentile scores around +8, the 25th percentile mark is significantly lower for the males, and that male score distributon is skewed left. Two-chart compares makes it easier to see that genders scored differentially in D&HH group Early Mathematic scores.

In contrast, a similar gender comparison in the Main group shows their IQ rectangles are fairly equivalent, the middle 50 percent had similar low and high scores. However note the differences in the Mode, and Median statistics for males.