



Simulated Data



Visualizing Achievement Gaps Across the Full Scale

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Cumu •	Ilative Proportion Plots (Ho & Reardon, 2012) CDF plotted for each group Achievement gap at any point in the scale is given by the vertical distance between the curves	Sp
Paire	d Proportion Plots (Ho & Reardon, 2012) x and y axes represent CDF for reference and focal groups, respectively	Qu

- diagonal reference line
- Area under the curve (AUC) summarizes overall gap without making distributional assumptions

All plots produced with the R statistical computing environment (R Core Team, 2016)

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olit-Beanplots (Kampstra, 2008)

Density trace for each group displayed side-by-side Stripchart overlay (1-d scatter) indicates sample size Boxplot alternative. Particularly useful when examining achievement gap interactions (e.g., by disability)

antile-Effect Size Plots

Each group split into deciles (or any other quantile) Raw gap between group computed at each quantile and divided by the overall pooled standard deviation

$$ES_{q} = \frac{\bar{X}_{focal_{q}} - \bar{X}_{reference_{q}}}{\sqrt{\frac{\sigma_{focal}^{2} + \sigma_{reference}^{2}}{2}}}$$
$$SE = \sqrt{\frac{n_{1} + n_{2}}{n_{1}n_{2}} + \frac{d^{2}}{2(n_{1} + n_{2})}}$$



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Funding Sources

Discussion

Overall Findings

Achievement gaps may not always be consistent across the distribution.

- Data visualizations can provide more complete
- pictures of the "effect" and may enhance
- understanding of group differences.

Different visualizations provide modestly different portrayals of achievement gaps

Limitations

Quantile-effect size plot mostly descriptive and exploratory

References

 Ho, A. D., & Reardon, S. F. (2012). Estimating achievement gaps from test scores reported in ordinal "proficiency" categories. Journal of Educational and Behavioral Statistics, 37, 489-517. doi: 10.3102/1076998611411918 Kampstra, P. (2008). Beanplot: A boxplot alternative for visual comparison of distributions. Journal of Statistical Software, 28, 1-9. R Core Team. (2016). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.Rproject.org/.