Title: Visualizing Distributions Over Time With Ridgeline Plots

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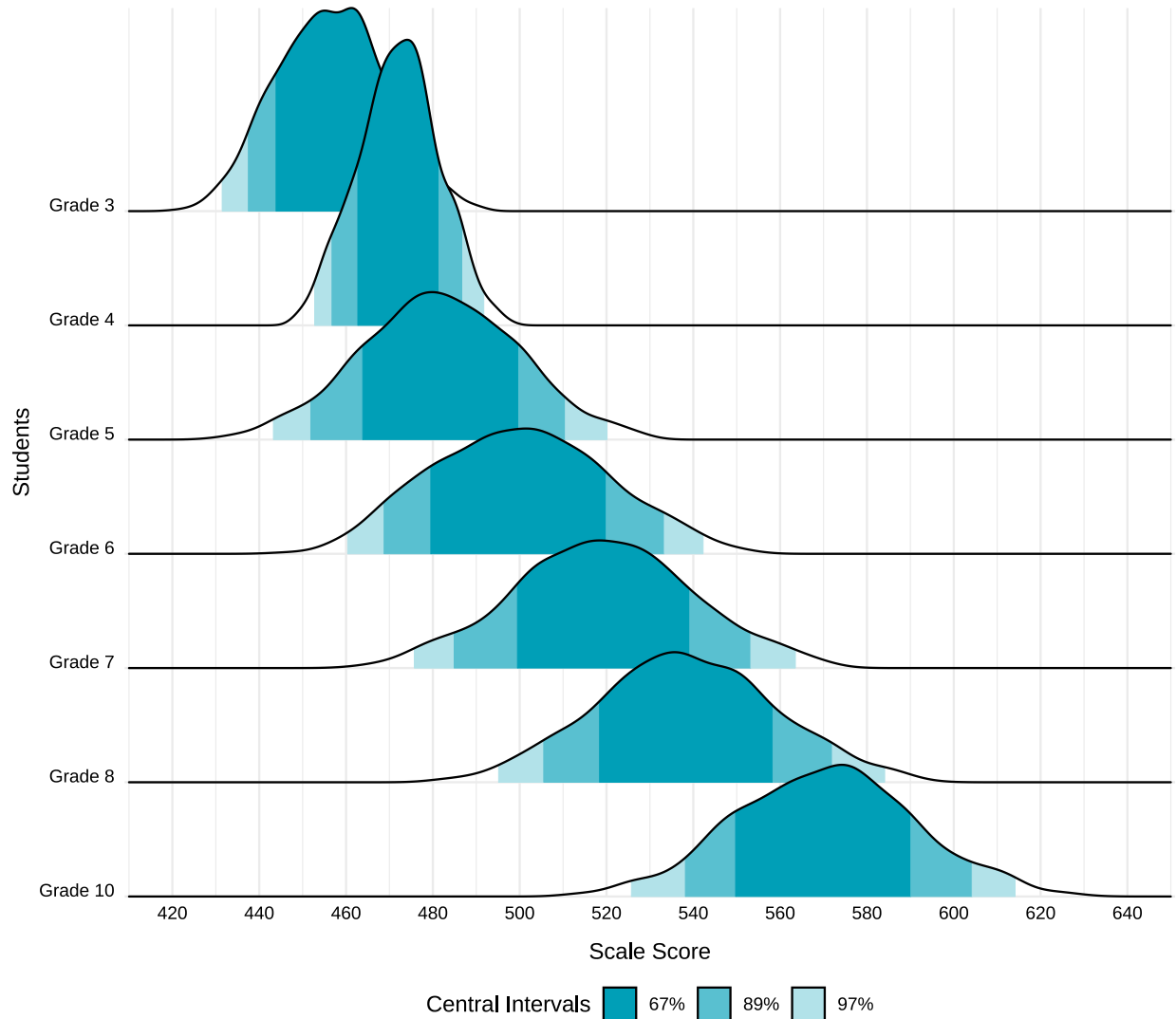ATLAS, University of Kansas
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Caption: An example ridgeline plot showing the distribution of scale scores across grade levels for a simulated vertically scaled assessment.

Description:

Ridgeline plots are a type of line plots, where the lines for each group partially overlap. The partial overlap creates a visually attractive graphic that allows users to easily compare distributions from different groups cross sectionally or from a single group over time. This type of visualization makes it straightforward to quickly see changes in centrality and variability across groups and/or time points. Ridgeline plots can be easily created in R using the {ggplot2} and {ggridges} packages (Wickham et al., 2022; Wilke, 2022).

This example of a ridgeline plot shows a simulation of an assessment that uses a vertical scale. For the distribution of scale scores for each grade level is plotted along the x-axis, and each grade level is partially overlapped on the y-axis. Using this visualization, we can quickly discern how scale scores increase across grades levels. There are small increases between lower grades, with slightly larger increases between the higher grades. Additionally, we can see that there is much more variability in the distributions for higher grades. In particular, grade 4, and to a lesser extent grade 3, have much more peaked distributions than other grades. The distributions

for each grade have also been shaded to show the central intervals so that we can also compare, for example, the middle 67% of each distribution. Thus, this type of graphic is able to both communicate rich information and maintain a visually attractive appeal.

References

Wickham, H., Chang, W., Henry, L., Pedersen, T. L., Takahashi, K., Wilke, C., Woo, K., Yutani, H., & Dunnington, D. (2022). *ggplot2: Create elegant data visualisations using the grammar of graphics*. R package version 3.4.0. https://ggplot2.tidyverse.org

Wilke, C. O. (2022). *ggridges: Ridgeline plots in ggplot2*. R package version 0.5.4. https://wilkelab.org/ggridges/