

# Designing Rating Scales for Equidistance: Comprehensive Calibration and Implications for Measurement Invariance Across Populations

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Summated rating scales are frequently considered interval-scaled rather than ordinal-scaled, with results published regularly in highly ranked journals. This may be due to the simplified application of parametric statistics and the more convenient results these methods offer. However, when assumptions such as equidistance are violated, which is often unclear, bias can occur, complicating interpretation and affecting the robustness of findings. In previous research, IRT methods have been utilized to test equidistance. However, the principle of “design trumps analysis” can be employed to develop scales that are equidistant by design. In this vein, Casper et al. (2020) recently presented a large set of scale anchors along with empirical numerical scores that allow researchers to calibrate scales for equidistance in their questionnaires. We extend this work in important ways. We replicate the study by Casper et al. (2020) using a representative sample of the US working population and a similar sample from the German-speaking population. Using an additional set of samples, we aim to demonstrate that calibrated scale anchors meet the equidistance assumption better than previously used uncalibrated anchors. Lastly, we will establish that these calibrated anchors are more effective in achieving measurement invariance across different languages.

## Are you currently an Early Career Researcher?

Yes, I am still a student or have not yet received my Ph.D.

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