Analyzing Likert data

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Shall I use parametric or non-parametric tests for analyzing Likert data?

There's a long debate in the literature whether you can/should use parametric stats or not (as a Likert scale is technically not a continuous or ratio scale).

In a nutshell:

- if you use a questionnaire where multiple likert-items are combined into a likert-scale, then parametric analysis seems justified.
- If you have individual Likert item questions, there's more debate - that's why I often suggest using visual analog scales or finer Likert-like questions (e.g., 11-point scales or % scales, and add the numbers to it) to address the issue.
- If you want to bullet-proof your analysis (probably not always needed), you can in addition run the non-parametric test and if you get a similar result report both, corroborating your findings.

These 3 papers give a good overview, as does
https://lindeloev.net/can-i-use-parametric-analyses-for-my-likert-scales-a-brief-reading-guide/

Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, *7*(6), 836–850. https://doi.org/10.1016/j.cptl.2015.08.001

Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical Education*, *42*(12), 1150–1152. https://doi.org/10.1111/j.1365-2923.2008.03172.x

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education*, *15*(5), 625–632. https://doi.org/10.1007/s10459-010-9222-y

Harpe (2015) provides an excellent summary, here are some key points/quotes from the paper:

- *"Recommendation 2: Aggregated rating scales can be treated as continuous data*
- *Recommendation 3: Individual rating items with numerical response formats at least five categories in length may generally be treated as continuous data*
- *Recommendation 4: Consider nonparametric or categorical data analysis approaches for individual rating items with numerical response formats containing four or fewer categories or for adjectival scales"*

check the details though, e.g. Harpe (2015) explains on p. 843 that, "*One extremely important point related to data distribution bears a brief discussion. Although an item may have been developed with the intention that* **respondents might use all possible categories** *(e.g., from 1 ¼ "Strongly Agree" to 5 ¼ "Strongly Disagree"), respondents may only use two or three of the available response categories because of the wording of the item or the nature of group being studied. This would result in a "shorter" item that would fall under Recommendation 4. The determination between whether to follow Recommendation 3 or Recommendation 4 should be made after looking at the actual distribution of the responses (i.e., whether the full range of response options used or only a few).*"

How to plot Likert Data?

The below papers provide a great overview

Hardin, M., Hom, D., Perez, R., & Willilams, L. (n.d.). *Which Chart or Graph? A guide to data visualization*. Tableau Software. Retrieved April 20, 2020, from https://www.tableau.com/learn/whitepapers/which-chart-or-graph-is-right-for-you

Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836–850. https://doi.org/10.1016/j.cptl.2015.08.001