August 8, 2022

Dear Dr. van Ravenzwaaij,

We thank you for your helpful feedback on our manuscript and for the opportunity to submit a revised version. As we outline in more detail below, we followed your suggestions to improve the manuscript and corrected a mistake that we made in the previous version. We hope that you will consider our revised manuscript for publication.

Sincerely,
The authors

**Responses to the EDITOR:**

**E-1:** The editor requests that we address the role of the latent normal distribution in our proposed modeling framework more clearly. **Response:** We thank the editor for this suggestion. In the model specification section (*Ordinal-Regression Setup*), where we introduce the latent standard normal, we now address the role of the latent distribution straight-on. The important part is that all possible distributions of Likert item responses across two conditions can be accounted for by a model with identical standard normals and free threshold parameters. Hence, the latent standard normals place no constraint on the data. **Revisions:** The revised paragraph is as follows (pp. 10, 11):

*We start by setting the latent distribution for both conditions to a standard normal ($\mu = 0, \sigma^2 = 1$). The free parameters in this setup are the category thresholds. Let $\gamma_{ij}$ denote the threshold between response category j and j + 1 (j = 1, …, J) in condition i (i = 1,2). For the setup to be valid, thresholds *within* each condition have to order, that is, $\gamma_{i0} = -\infty \leq \gamma_{i1} \leq \cdots \leq \gamma_{iJ} = \infty$. Although it may appear that the choice of identical standard normals is assumptive, in this setup with free threshold parameters, it is not. The latent distribution serves merely as a technical device that maps observed response frequencies onto regions on the real line. Importantly, all observed Likert distributions across conditions may be accounted for by appropriate settings of the thresholds. Thus, at this point, the model is unconstrained, nonparametric, and vacuous; there are as many parameters as degrees of freedom in the data.*

**E-2:** In relation to E-1, the editor requests that we more explicitly address the substantive assumptions underlying the choice of *identical* latent distributions for both conditions. **Response:** We acknowledge that in the shift model, the identical standard normals are indeed substantive. In the revised manuscript, we address this substantive assumption more explicitly, and we highlight how the dominance model differs from the shift model in this regard. **Revision:** We added the following sentences in the *Models* section on pp. 13, 14:

*Unlike the other models we propose in our framework that are nonparametric, the constant shift model imposes a parametric constraint on the latent threshold parameters, that is, constancy is made with respect to the normal distribution. Thus, for this model, the choice of identical latent distributions is indeed a substantive statement about the data. Of note, even though constancy reflects the choice of latent distributions, dominance does not. If thresholds order between conditions for one latent distribution, they must order for all other latent distributions.*

**E-3:** Summarizing E-1 and E-2, the editor suggests that we reflect on the substantive assumptions involved in the choice of latent distributions in the *Conclusion*. **Response:** In addition to our original concerns about the lack of development for within-subject designs and considering only two conditions, we now list two additional limitations in the *Conclusion* section. **Revisions:** The revised paragraph on p. 30 is as follows:

*Although we think that researchers will benefit from the development presented herein, there are also limitations: 1. The concept of the threshold here is not psychological and should not be interpreted as such. In this framework, thresholds describe the proportion of people that endorse particular responses. They do not describe the internal process by which people respond to Likert items. Likewise, the models do not address whether people use the same processes or the same response styles. In this regard, the model is a statistical account for addressing constraints at the population level. 2. Although the unconstrained, dominance, and null models are nonparametric, the constant shift model, which we suspect will be a simple, parsimonious account of condition effects, is parametric. Whether shifts are constant or not depends on the distributional form, and, here, the choice of identical normal distributions for all respondents is a substantive assumption. […]*

**E-4:** The editor points out typographical errors in the manuscript. **Revisions:** We corrected the errors and thank the editor for drawing our attention to them.

**Additional change:** We draw your attention to a mistake that we made in the previous draft that we now corrected. We had stated that the prior probability of the stochastic-dominance constraint was 1/J, where J is the number of categories, and referenced an internet-provided proof. Indeed, the result is correct for a previous version of the prior used here. In this previous version, priors were placed directly on $\gamma_{ij}$. The problem with this setup was that the prior was fairly inflexible and forced correlations between the size of the difference between the distributions and the shape of the distributions. This inflexibility motivated the use of two parameters, $\alpha_j$ and $\theta_j$. With this new setup, however, the closed-form result about prior probability of stochastic dominance no longer applies. Hence, we removed all references to this result and use a more conventional Monte-Carlo simulation to calculate the prior probability, much as we calculate the posterior probability. We also updated the Shinyapp accordingly. We apologize for the mistake in the previous draft.