Reviewer's report:

I commend the authors for very thoroughly addressing the reviewers’ questions; the manuscript has improved greatly. This iteration, especially in the discussion, serves to provide a thorough overview of the literature, highlight the limitations of the study and explain the choices made. Several sections have become quite long because of this. Perhaps the authors should consider shortening (for example) the literature description in the introduction somewhat (while retaining a thorough discussion in the discussion), and focus more on leading into this studies choices, hypotheses. There remain some inherent limitations to the study design; they are, however, discussed as such.

I have some minor essential comments:

1. Page 5, line 4, please explicitly mention this is (still) in MS. As the first sentence of this paragraph almost implies that the paragraph will continue discussing “several primary neurodegenerative disorders”.

2. I understand why RR groups were subdivided into more/less severe patient groups and I don’t dispute the results. I am however still not convinced why this was done in favor of purely associative analysis. This especially in light of the small sample size and the perhaps now arbitrary (unintentional) split of (as the authors point out) a benign type in group 1. However, I commend the authors for addressing this limitation in the discussion, I am not convinced it is the most elegant design.

3. It is now stated in the Statistical analysis section that correlations’ p-values are both reported uncorrected and using the FDR method. Only in Table 5 mention is made whether the partial correlation is p<.05 Benjamini-Hochberg corrected. Consider also showing that in text (ie. only GDT net and processing speed).

4. It is not mentioned which measures did not satisfy normality assumptions, e.g. analyses include the Mann Whitney U test and Spearman rank correlation for non-parametric data. Was much of the data non-normally distributed, and was this a potential issue in other parametric analysis? For example, the ANOVA analyses are generally pretty robust when it comes to non-normal residuals, was this also tested and/or was it an issue considering some measures did not meet Kolmogorov-Smirnoff tested normality?

5. Consider replacing the word “impact” from the title, as it has minor causative
6. Page 16, line 1: “Neuropsychological test performance was summarized into composite scores, z-scaled based on this study’s healthy control group.” This is already mention in the methods section and can be removed.

7. Consider rephrasing the two sentences which are structured as questions (page 22 and page24).

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests