RSweave APA Template in LaTeX: Embed R code in your documents

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Abstract

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Keywords: APA LATEX, Sweave, R, knitr

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I created this template because of (a) the growing concern for reproducibility (in addition to replicability) and (b) because I like most researchers what to spend my time researching, not formatting documents or reordering page, table, or figure numbers etc. The great benefit of Sweave is that you can have a single document in which you have your manuscript [with all of the benefits of using LaTeX (automatically format references, figures, tables, etc.)] and your analytic code. This allows researchers to have truly reproducible reports. You no longer need to separate files for your code and your manuscript (which can lead chaotic file naming with several documents titled FINAL, but which did you actually use...).

The second equally important benefit of having your manuscript and R code (R Core Team, 2016) in the same place is that you no longer need to run the analyses and then take the long tedious process of copying and pasting all of the values over to the document (not to mention if something changes and you have to redo it...). Using Sweave you can embed the analyses in the document and then have it automatically print values (e.g., means, standard deviations, F-values, p-values, etc) and better yet, if you change any analyses, it will automatically update in your document with the new values! In this document, I will include various common elements of an APA style paper including headings (levels 1:4), lists; *italic* text (also can be done with `\textit{}`); **bold** face text; inserting R code both as chunks and as single values or lines; effect sizes (e.g., η^2) , *F*-ratios, and *p*-values (as well as how to use R to insert these values automatically); citing in parentheses and in-text; as well as inserting tables and figures.

Affect

I study emotion and decision making, and this template will semi-reflect that. In this section I would talk about affect. Researchers use affect as the umbrella term which encompasses both mood and emotion (as well as some other affective states).

Mood. Researchers tend to use mood to describe affect that is long lasting as opposed to emotion (short term affect).

Emotion. There are several theories of emotion (e.g., valance-arousal, approach-avoidance, and discrete emotion theories). My favorite emotion is Sadness. New pages can be started with the `\newpage{}`

Sadness. Here are some examples of how to cite in LaTeX. For this template I housed all the references in the example.bib file. LaTeX uses the BibTeX format for citations, which is a common citation format and can be produced with most citation machines. I store all of my references with endnote and create the .bib file with JabRef. The first example is with in-text citations in parentheses with, e.g., included. There is evidence that sadness can help you process information more systematically (e.g., Phelps, Lempert, & Sokol-Hessner, 2014). Notice how the citation automatically includes et al. because it has been cited previously (Phelps et al., 2014). In order to cite in the format author (year) you use `\cite{}`). Pessoa (2008) showed interconnectivity between “emotional" and “cognitive" regions in the brain (e.g., amygdala and DLPFC, respectively). You can cite with page numbers like this (Pessoa, 2013, p. 23). You can also insert citations that are only included in the reference list but not in text like this . The last examples I will show are with displaying the citation number [5], author only Pessoa, and year only 2013. LaTeXwill automatically include all of these in your reference list and for those with that are numbered or end with et al. it will automatically update as you add or remove references.

To make a new pararaph within a section just simply skip two lines like I did above. Occasionally you might want to make inline lists like this one. (a) first item, (b) second item. On the other hand, your paper may require you to make a numbered (separate lined) list. You can also do that like this

1. First hypothesis . . . . . . continue
2. Second hypothesis . . . . . . continue

And it looks like this as you continue typing.

Edits. You can also add nicely colored comments that are great for remind and edits.

Typo on remindERS.

Table 1

Frequency separated by gender and emotion condition.

Gender	Frequency
Female	27
Male	27

Note. You can insert a note like this.

Methods

Participants

We had 54 participants (50% female; see Table 1). Insert more information about the participants. There are several different functions that can be used to make tables in LaTeX. The tabular environment (see Table 1) is fairly simple but if you want to manipulate the width of the columns and force the table to be page width I suggested the tabu environment (see Table 2 in Results). Alternatively, there is the `xtable()` R function in the xtable package which tables any table or matrix (e.g., an anova summary output table) and converts it into LaTeX table format.

Materials

Participants rated their emotions on a sliding scale 1 = *Not emotional* to 100 = *Intense emotion*.

Procedures

They watched each movie clip and then rated their emotions. More information about procedures with sample **bold** text. You might have a figure to illustrate your design. You can either create them in R or upload figures from JPEGs, PNGs, or PDFs. For example see Figure 1.

Figure 1. Type your figure caption here. Ex. This is the R studio logo.

If you want to display equations inline you can do it like this: $f(x) = ax^2 + bx + c$. You can create bigger equations (e.g., those using $\sum$) like this.

$$\sum_{i}^{n}(X_i - \bar{X})^2$$

Alternatively, you can display equations with apa style with equation numbers like this:

$$\frac{d}{dx}\sin x = \cos x \frac{du}{dx} \tag{1}$$

or

$$\int 2ax + b = ax^2 + bx + C \tag{2}$$

Result

We found a significant difference in information processing style based on emotion, $F(1, 50) = 34.89$, $p < .001$, Partial $\eta^2 = 0.41$. Those that were sad ($M = 75.3$, $SD = 16.4$) were used more analytic processing style than those who were in the happy condition ($M = 53.19$, $SD = 11.05$; see Figure 2 and Table 2). Other common effect sizes R^2 and r^2.

Table 2

An ANOVA Summary Table for the Model.

	Df	Sum Sq	Mean Sq	F value	*p*
Emotion	1	12837.90	12837.90	93.82	†
Residuals	52	7115.73	136.84	–	–

Note. † indicates $p < .001$.

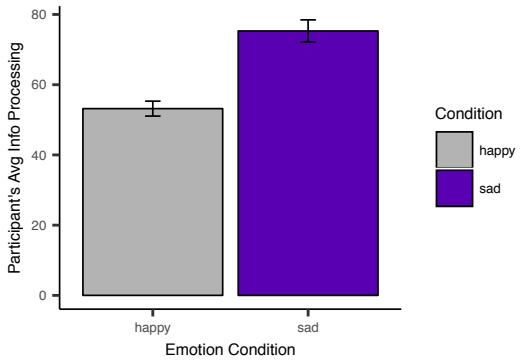
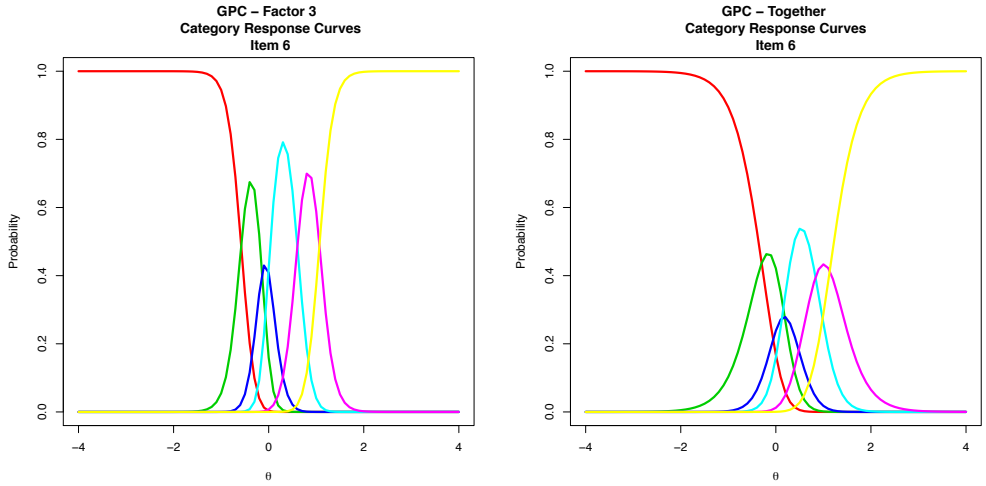


Figure 2. Bar graph displaying the information processing means between emotion conditions.

A "clever" alternative to long format of references is with `\cref{}` function which automatically types table or figure for you and can insert multiple references at once. For example, see Figures 1 and 2 and Table 1



(a) (b)

Figure 3. When estimated together, the GPC properly estimated the paraters; however, when analyzed separately, some parameters were overestimated. (a) Item 10 when estimated together (a = 3.08) (b) when estimated separately (a = 6.76).

Discussion

I hope that you were able to learn the basic elements of APA formatting in LATEX with this template. If you find any issues or have any comments of suggestions please contact me 3dbrano3@csu.fullerton.edu. Additionally, please cite me when you use this template in addition to all of the packages that made this possible (all citations below and BibTex versions in example.bib): R Core team, Rmisc package, psych package, lsr package, ggplot package, plyr package, lattice package.

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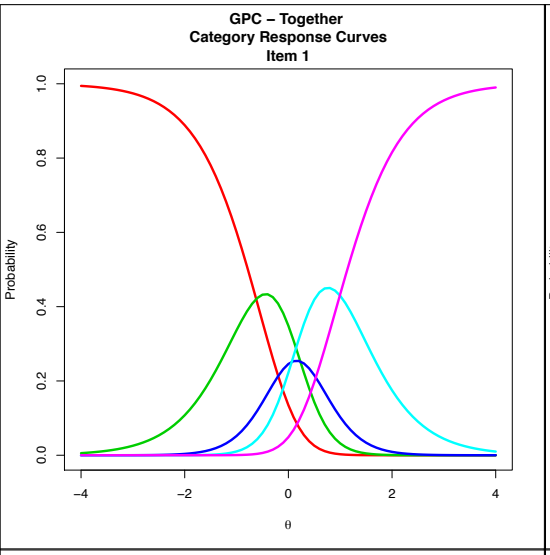
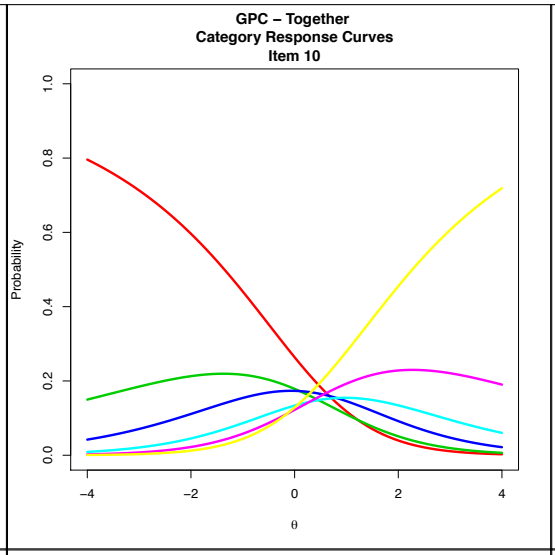
Appendix A

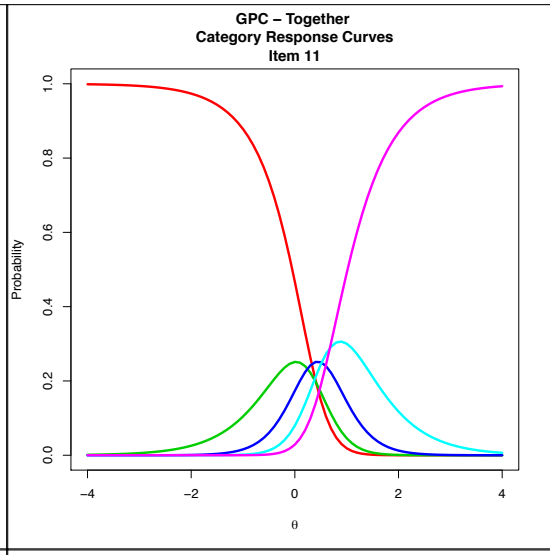
Creating a single Landscape Page for Appendices/Figures

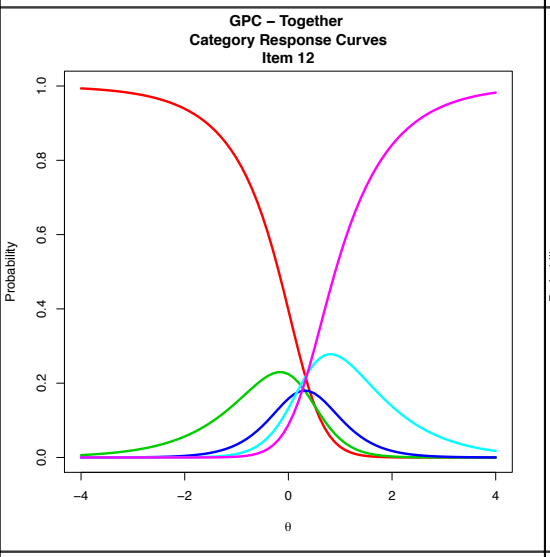
Appendix B

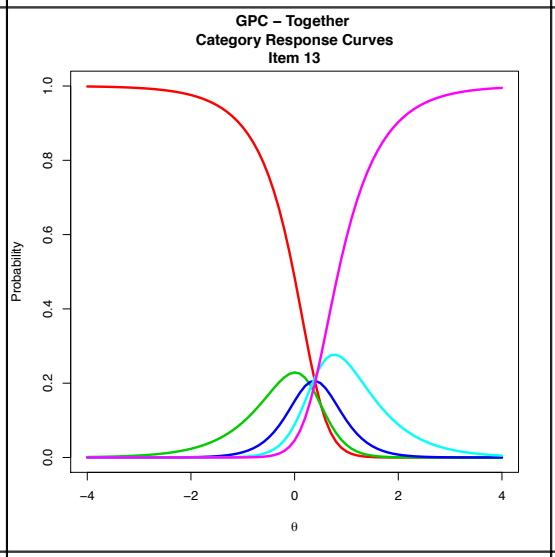
FlexMIRT Output: Nominal Response Model for all Models Plots Together and Separate

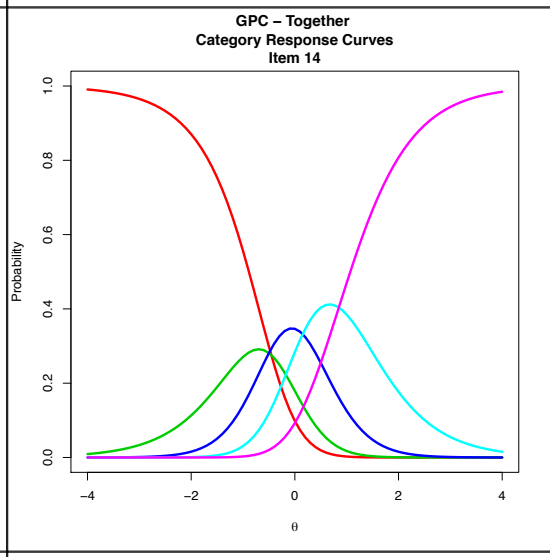


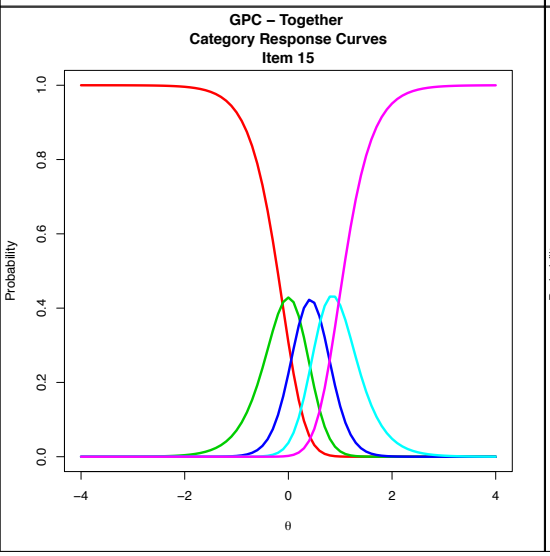


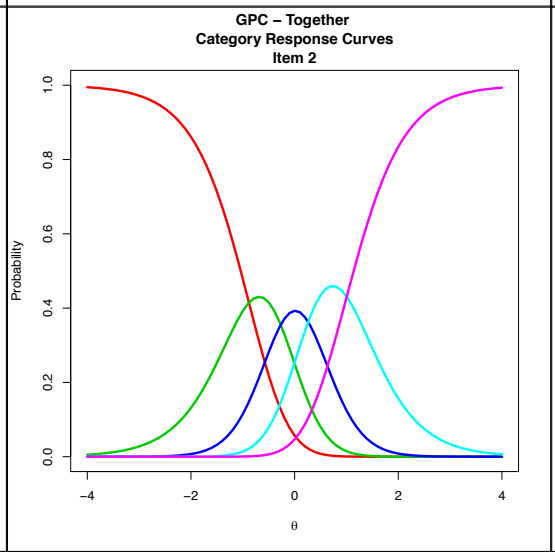


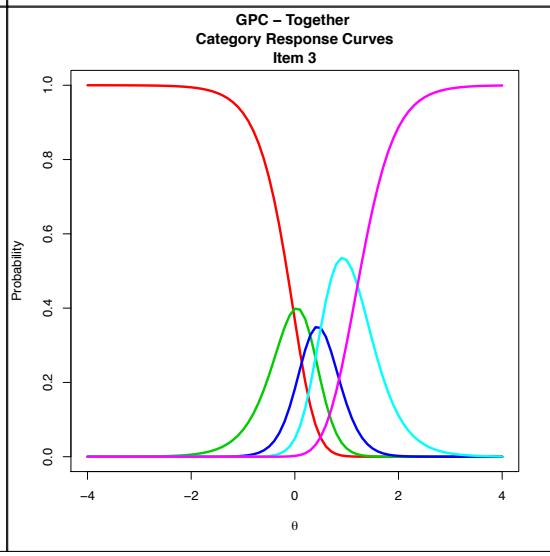


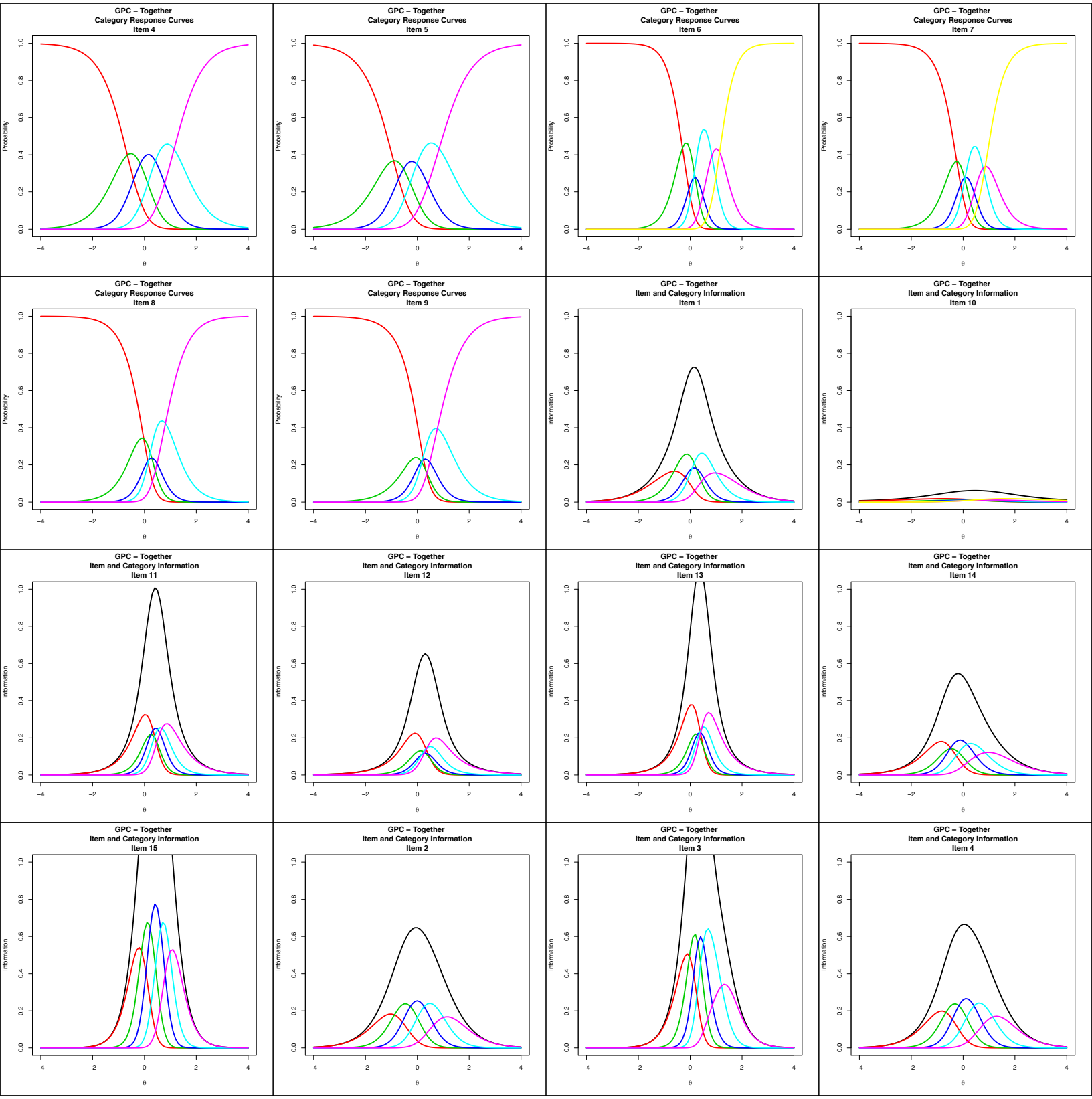











GPC – Together
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Item 9
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