Proposed Psychometrics OER: Authoring Platform Features

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Background

This document is intended to highlight features of the Quarto authoring platform, specifically focused on how this platform is uniquely appropriate for Psychometric instruction. Psychometrics is the scientific study of Psychological measurement - it has been described by some practitioners as "applied statistics" and fundamentally requires knowledgeable application of statistical concepts.

This brief overview does not cover *all* pedagogical features, so we encourage reviewers to "point and click" around this document to discover unique elements. For example, external links and alternative document formats are accessible via links in the upper right-hand toolbar. Annotation and note-taking capabilities are facilitated via hypothesis and accessed via floating icons located in the far upper-right of the browser window. Screen reader functionality can be partially appreciated by inspecting images (screen-readers will pick up alternative text descriptions that are provided for each image).

1 Basic Features

Hyperlinks connect content both within and external to the book material (for example, citations; See Knuth (1984) for an early discussion of literate programming [the underlying philosophy driving this authoring platform]). Or, see Chapter 2 for a demonstration of image and figure capabilities.

1.1 Code

The preferred statistical language represents a common area of frustration for Psychometrics students. This authoring platform offers several features intended to facilitate learning of the underlying language (`R`).

The code represented in Listing 1.1 (and all example pieces of code) can be copied by activating the clipboard option in the upper-right hand corner of the code chunk.

Listing 1.1 Addition within `R`

```
1 + 1
```

For more complex bits of code, hidden annotations are available (the student can access further assistance by hovering over the circled numbers):

```
library(psych)                                                    ①
data(bfi)                                                         ②

bfi$jibberish <- rowMeans(bfi[1:10], na.rm=TRUE)                  ③
bfi$gobbleyjook <- rowMeans(bfi[11:20], na.rm=TRUE)
```

① The `psych` package contains example data that we can access.
② This gives us access to the `bfi` dataset that contains personality item responses.
③ We make 2 scale scores, `jibberish` and `gobbleyjook`. The `$` notation indicates that these scale scores will be appended to the `bfi` dataframe.

The entire code block can also be hidden unless asked-for. These features permit students of different knowledge and confidence levels to access help on an as-needed basis:

```r
library(psych)                                                    ①
data(bfi)                                                         ②

bfi$jibberish <- rowMeans(bfi[1:10], na.rm=TRUE)                  ③
bfi$gobbleyjook <- rowMeans(bfi[11:20], na.rm=TRUE)
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2 Unique capabilities

2.1 Data vizualizations

Figure 2.1 demonstrates `lightbox` capabilities for Quarto book images, whereby clicking isolates the image for closer inspection. This is useful for larger images that may not display on a single html page (such as the example frequency distributions of Figure 2.1).

Figure 2.2 demonstrates interactive components for graphical representations of data. In Psychometrics, this is helpful to isolate data outliers, obtain feedback on data clusters, and highlight the differences between aggregate and individual datapoints.

2.2 Geo-spatial

Figure 2.3 is another example of interactivity - these maps can help reinforce the concept of representativeness within normative samples (e.g., where the data "came from" and who the data represents).

> **Browsers vs. Static PDF Readers**
>
> Note that all interactive visuals will be captured via static representation if a reader elects to download a PDF file [by accessing the button located within the toolbar]. These images are not currently optimized for static representation, so interactivity will render imperfectly within the example PDF.

2.3 Multi-media

Figure 2.4 shows yet another example - videos can be pulled from external sites (like this clip) or can be locally produced video files.

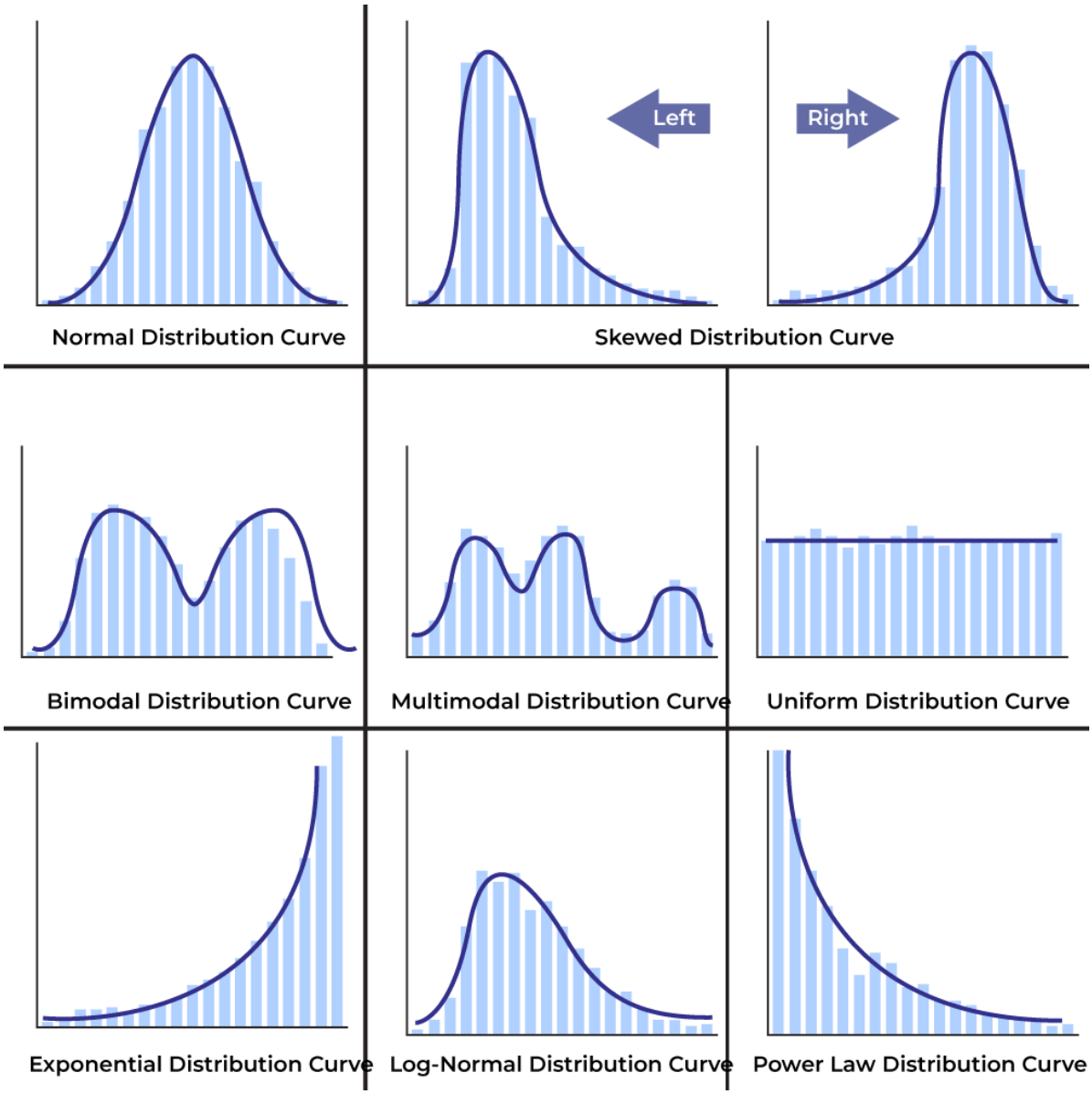

Figure 2.1: Common normative distributions

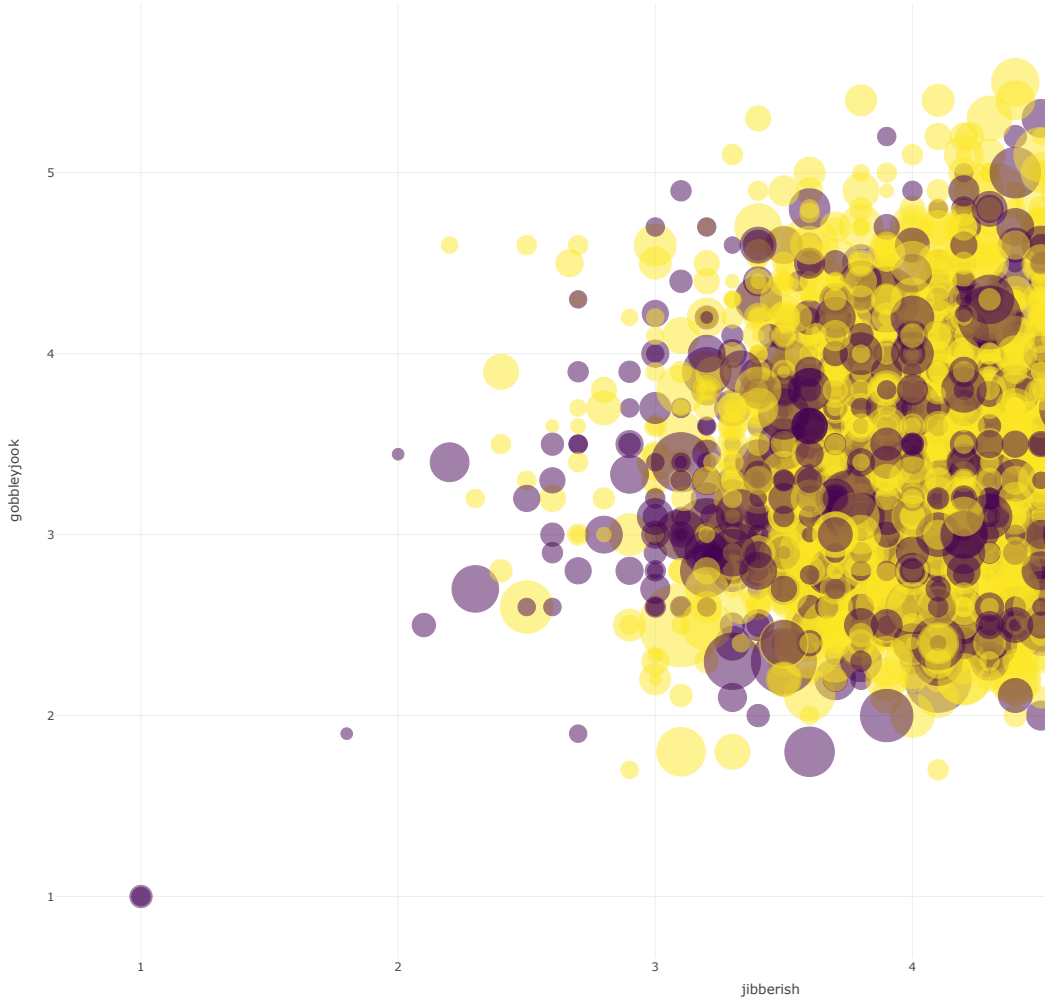

Figure 2.2: Example interactive plot

Figure 2.3: Example normative representation by geographic location.

https://www.youtube.com/watch?v=yU8HF64S92U

Figure 2.4: Psychometric terminology

References

Knuth, Donald E. 1984. "Literate Programming." *Comput. J.* 27 (2): 97–111. https://doi.org/10.1093/comjnl/27.2.97.