Appendix - Spanning the Boundaries of Data Visualization Work:
An Exploration of Functional Affordances and Disciplinary Values

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**Table 1.** Summary of R and Illustrator characteristics.

|  |  |  |
| --- | --- | --- |
|  | **R** | **Adobe Illustrator** |
| **Licensing Model** | GNU General Public License | Monthly licensing fee |
| **Launched** | 1997 | 1986 |
| **Description** | Software environment for statistical and graphical techniques | Vector graphics software application with scripting  |
| **Support & maintenance** | R Foundation for Statistical Computing | Adobe |
| **Primary Audience** | Statisticians and data scientists | Graphic designers and artists |
| **Purpose** | Data manipulation, calculation and graphical displayDeveloping statistical software | Creation of scalable vector graphics for use in print and digital productionSetting digital type |
| **Extensibility** | Community developed external packages and libraries | Suite of compatible products: photo/video editing, desktop publishing, web development |

**Table 2.** Data Visualization Functionality.

|  |  |  |
| --- | --- | --- |
|  | **R** | **Adobe Illustrator** |
| **Purpose of graphic functionality** | Uses structural rules for the representation of data; produces standardized output | Gives users creative and artistic control; ensures scalability through vector-based output |
| **How are data** **entered/imported?** | Via vectors and dataframe | Via a spreadsheet-like tool window |
| **Graphic output** | Plots exported as PDF | Charts generated as vector graphics or groups of vector objects |
| **Design patterns** | Seven base graphs, selected by calling specific functions in the code. ggplot2 includes functions for approximately 20 types of plots. | Nine templates that can be selected via a GUI |
| **Manipulation of aesthetics and layout** | Aesthetic specifications within the base graphic functions | Standard AI tool box (select tool, color picker, type tool, etc.) |
| **Data visualization functionality** | The grid package provides the basis for ggplot2 | Graph creation tools |

**Table 3.** Development of data visualization functionality over time: Black = Core functionality; Medium Grey = Secondary functionality (through packages or special tools); Light Grey = Emerging, limited or experimental functionality; White = No related functionality.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **R** |  | **Adobe Illustrator** |
|  | 1997 | 2018 |  | 1986 | 2018 |
| **Acquire** |  |  |  |  |  |
| **Parse** |  |  |  |  |  |
| **Filter** |  |  |  |  |  |
| **Mine** |  |  |  |  |  |
| **Represent** |  |  |  |  |  |
| **Refine** |  |  |  |  |  |
| **Interact** |  |  |  |  |  |