

Diverse Reading Themes for Readability

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Digital reading applications give readers the ability to customize fonts, sizes, and spacings, all of which have been shown to improve the reading experience for readers from different demographics. However, tweaking these text features can be challenging, especially given their interactions on the final look and feel of the text.

THERIF

Our solution is to offer readers preset combinations of font, character, word and line spacing, which we bundle together into reading themes.

To arrive at a recommended set of reading themes, we combine (1) crowdsourced text adjustments, (2) ML clustering of the resulting text formats, and (3) design sessions.

READING THEMES FOR ITERATION R1

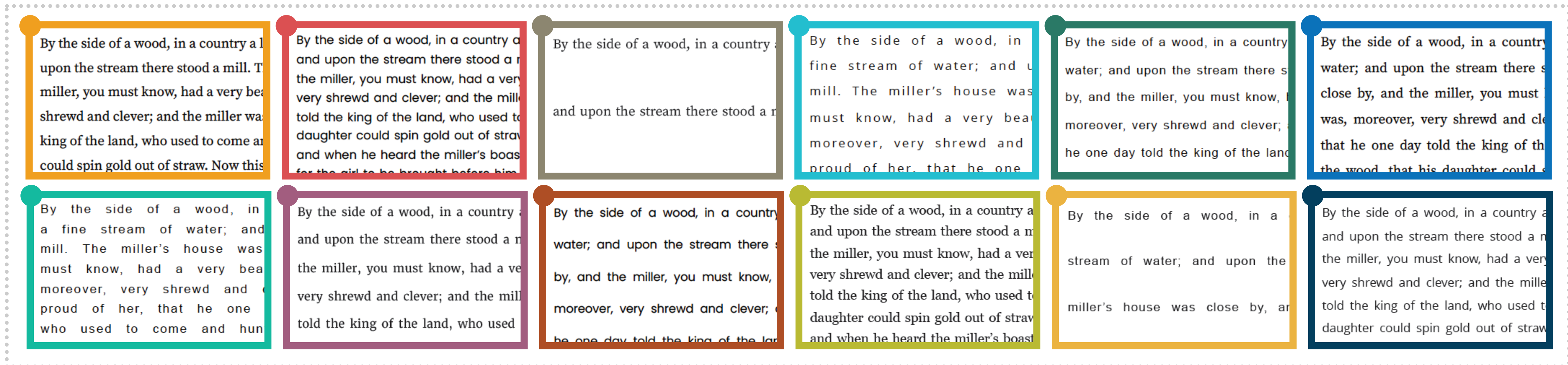
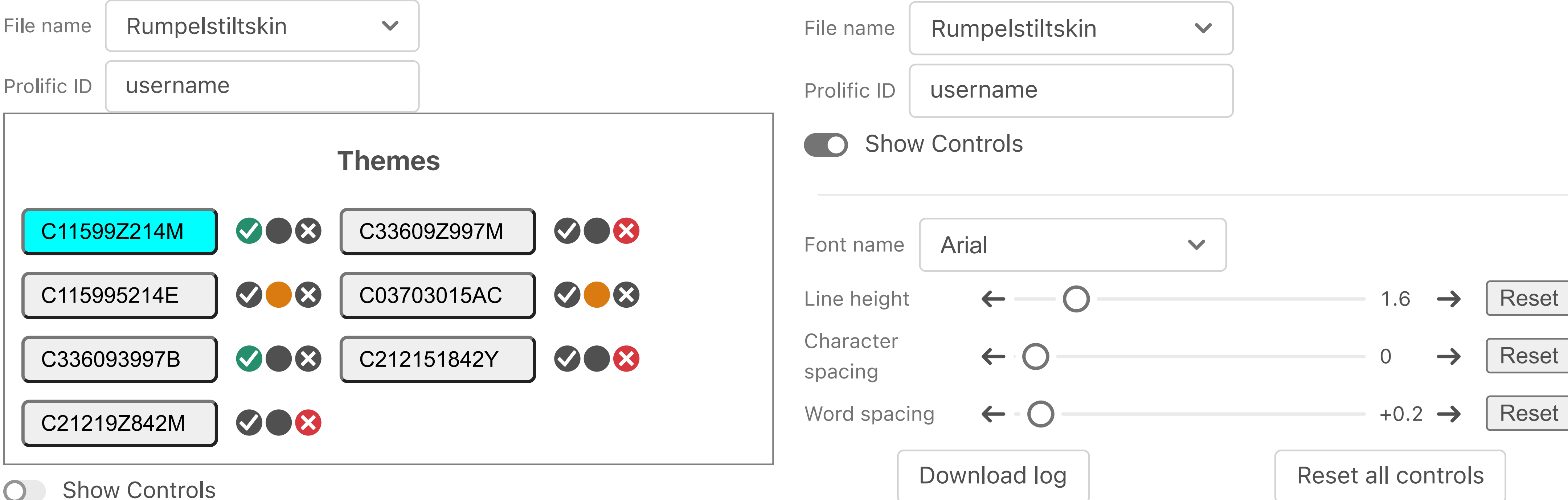


Figure 2. We recruited equal numbers of participants with and without dyslexia and attempted to balance participants across ages by recruiting separately from each of the age buckets visualized.

Study interface

Crowdworkers in each THERIF iterations first review and rate each theme (good, unsure, or bad) from the previous iteration before selecting their favorite theme. We always included a random validation theme, intended to represent a poor reading format.



Final themes

Four iterations of THERIF converged on a set of three COR (Compact, Open, and Relaxed) themes that are designed for different readers.

From the last THERIF iteration (R3), we plot the demographics of participants whose text formats were clustered to produce each of these three themes.

- Almost half the participants (47%) made text setting adjustments that corresponded to the Relaxed theme.
- A vast majority of participants with dyslexia had text settings that corresponded to the Relaxed theme, whereas mostly participants without dyslexia had settings that corresponded to the Open theme.
- We see similar differences by age. For instance, no participants over 55 had text settings that corresponded to the Compact theme.

FINAL THEMES

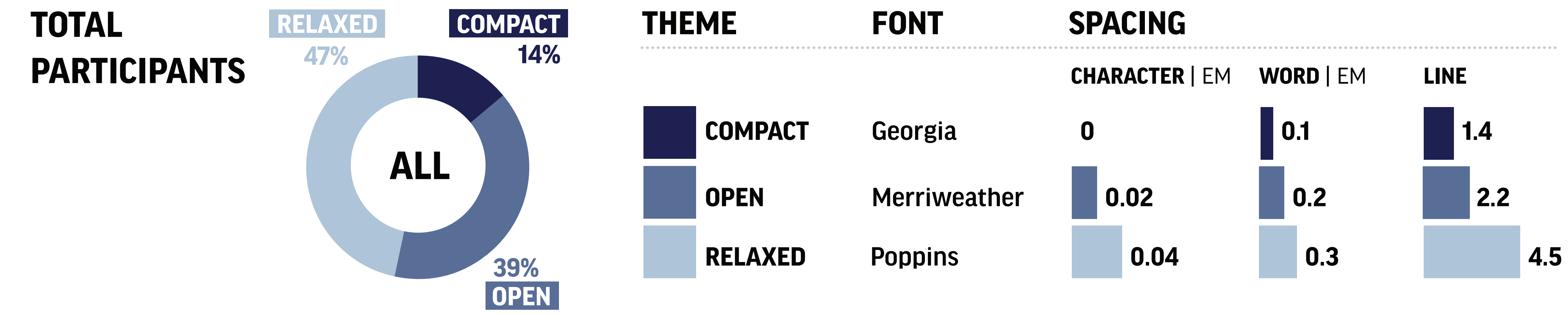
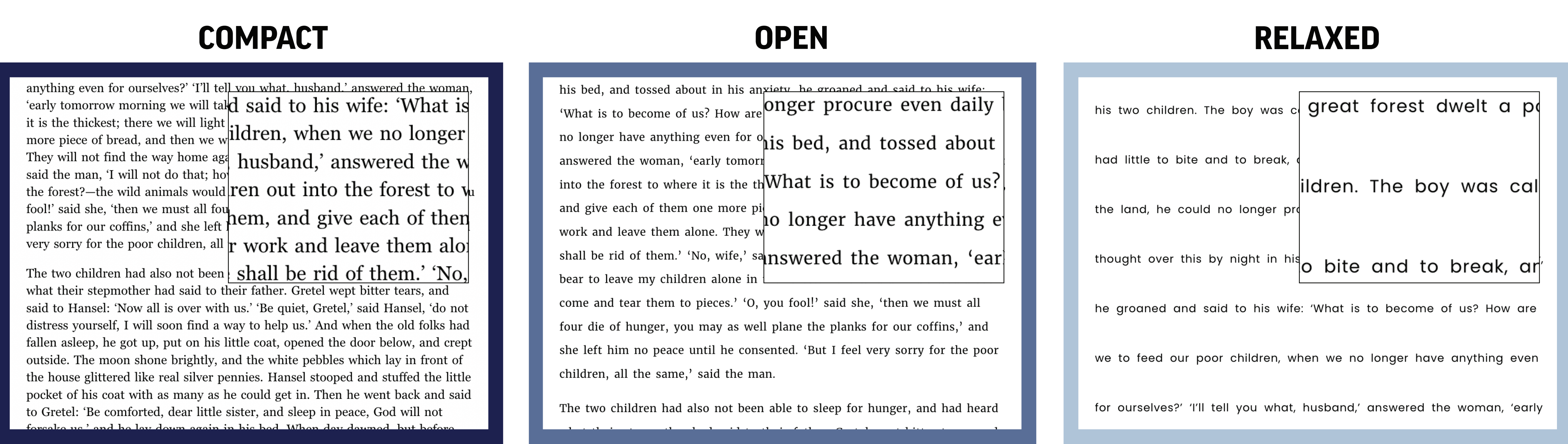


Figure 4. Final "COR" reading themes

Themes converge to match readers' preferences

In the initial refinement iteration (R0), most participants increased character, word, and line spacing from the default theme, resulting in a set of diverse formats.

Participants with dyslexia increased word spacing during R1 and R3, and participants without dyslexia increased character spacing in R2 and word spacing in R3, respectively.

As the THERIF iterations progressed, participants made fewer refinements to the provided themes, indicating that the defaults meet their preferences.

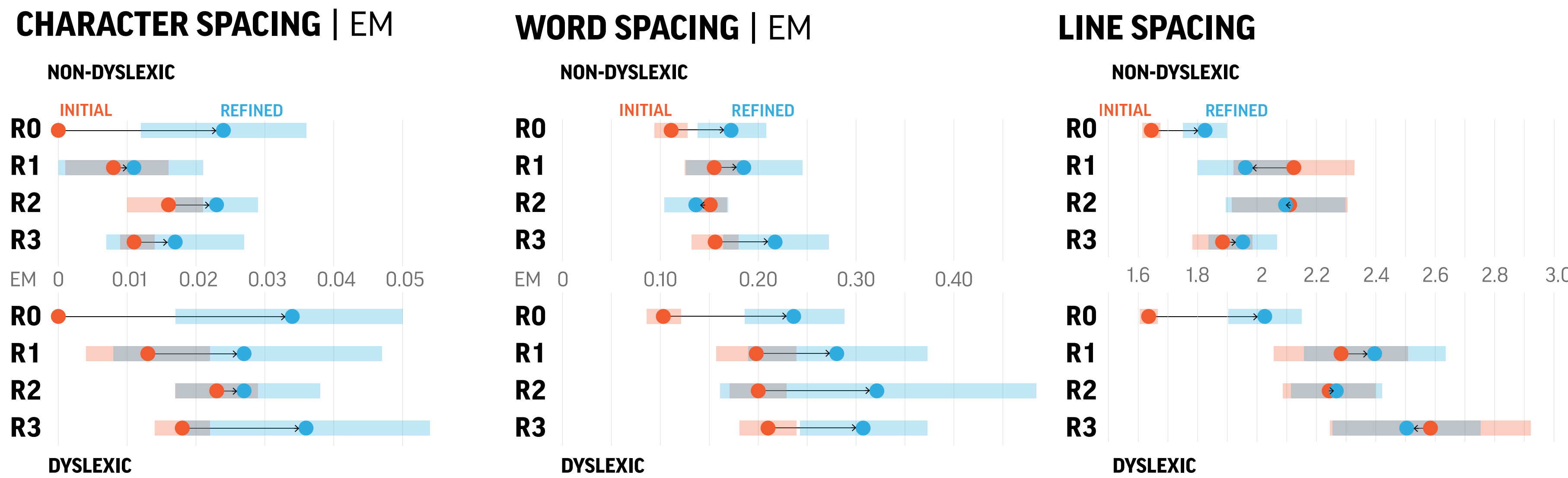


Figure 5. Differences between initial theme settings and the refined settings in each THERIF iteration.

With more iterations, participants also spent less time refining the text settings, indicating that themes now better meet their needs.