Fonts of wider letter shapes improve recognition in peripheral vision

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Background

Crowding is the perceptual phenomenon where the recognition of a visual target is impaired by the presence of its flankers and can result in mislocation; the erroneous reporting of a flanker instead of the target.

Effects of crowding can be mediated by target and flanker features like relative eccentricity, spatial frequency, and complexity, such as stroke frequency; the number of lines crossed by a horizontal slice through a letter, divided by the width of that letter (Bernard & Chung, 2011; Maja, Pelli, Kurshan, & Palomares, 2002).

Font conditions

a b c d e f g h i j k l m n o p q
Helvetica Neue Condensed

a b c d e f g h i j k l m n o p q
Helvetica Neue Roman

a b c d e f g h i j k l m n o p q
Helvetica Neue Extended

Aim

We investigated the influence of font width on crowding in a trigram single report recognition paradigm.

Experiment design

To investigate the effect of width on letter recognition, we tested three variations of Helvetica (Condensed, Roman, and Expanded).

Experiment 1: 10 participants seated 200 cm from the monitor. Targets were shown at 1.9° eccentricity

Experiment 2: 15 participants seated 45 cm from the monitor. Targets were shown at 9° eccentricity

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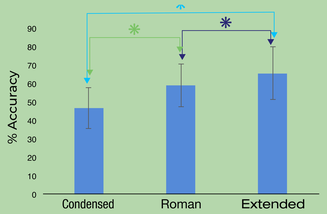
Results were analysed using one-way ANOVAs with three repeated measures and Bonferroni corrected pairwise comparisons.

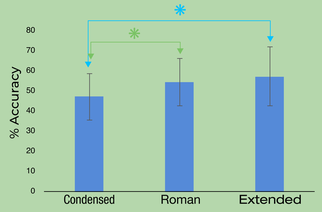
Results - Recognition

Experiment 1 – Parafovea



In the parafovea, recognition increased monotonically with width, as mean recognition for Condensed font was significantly lower than Roman and Extended, while Roman was significantly lower than Extended.

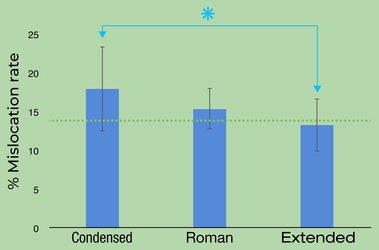
Experiment 2 – Periphery



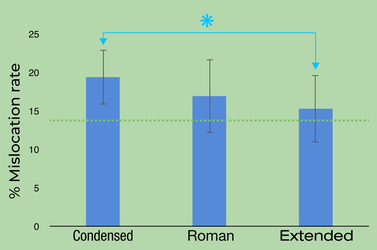
In the periphery, however, while mean recognition for Condensed was significantly lower than both Roman and Extended, the difference between Roman and Extended did not reach significance.

Results - Mislocation

Experiment 1 – Parafovea



Experiment 2 – Periphery



Both in the parafovea and the periphery mean mislocation rates for Extended were significantly lower than for Condensed.

Conclusion

We found that extending the fonts horizontally increased recognition by reducing the crowding interference from flanking letters.

References

Bernard, J.-B., & Chung, S. T. (2011). The dependence of crowding on flanker complexity and target–flanker similarity. *Journal of Vision*, 11(8).

Majaj, N. J., Pelli, D. G., Kurshan, P., & Palomares, M. (2002). The role of spatial frequency channels in letter identification. *Vision Research*, 42(9), 1165–1184.