Why C is not G: How we identify letters

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The next time you are reading a book, or even as you read this article, consider the words that you are seeing. How do you recognize these words? Substantial research has shown that while reading, we recognize words by their letters and not by the general shape of the word. However, it was largely unknown how we differentiate one letter from another.

Psychologist Daniel Fiset from the University of Victoria and his colleagues investigated which features of letters are necessary for their identification. In these experiments, the researchers used the "Bubbles" technique, in which randomly sampled areas of a letter were shown to volunteers. The researchers then evaluated which areas of each of the 26 letters of the Roman alphabet were crucial for letter recognition.

The results, reported in the November issue of *Psychological Science*, a journal of the Association for Psychological Science, reveal that the most important features for identifying both upper and lower case letters are the points where the letters end, also known as line terminations. The presence of horizontal lines in the letters was the second most important feature for letter recognition.

To compare the human volunteers' use of letter features with optimal use of the provided information, the researchers developed an "ideal-observer" model, which used all of the visual information that was available for letter identification. There were some notable differences comparing the human results to those of the ideal observer. For instance, the most useful feature of letters for the ideal observer were vertical

lines and curves opening up and not line terminations. The authors note that the human visual system is believed to be specialized in the processing of line terminations, which allow us to recognize and distinguish surrounding objects. They suggest that the great importance of terminations for letter recognition results from an interaction between the relative usefulness of this feature and a strong natural tendency of the human visual system to encode it.

The researchers conclude that these findings may lead to the development of fonts which could result in improved and faster letter recognition, both for normal readers and individuals with letter-by-letter dyslexia.

Source: Association for Psychological Science