

The Effect of Arrows in an Illustration When Reading Scientific Text: Evidence from Eye Movements and Reading Tests

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Previous researches have shown that the use of arrows can aid the comprehension of graphical information. From the functional perspective, arrows can provide useful information about sequential relations between graphical components and indicate pathway directions. However, the presence of excessive arrows in an illustration may produce negative effects related to perceptual complexity and division of attention. In this study we investigated the effect of using arrows in an illustration when reading scientific text by recording viewers' eye movements and obtaining their reading test scores. The participants first read a scientific text that included an illustration either with or without arrows (arrow group versus nonarrow group), and then they completed a reading test. The accuracy on the "sequential items" and "integrative items" was higher and the mean saccade length on an illustration was shorter for the arrow group than for the nonarrow group, but there were no differences between the groups in total fixation duration, fixation duration on an illustration, the ratio of the total fixation duration on an illustration, and the number of saccades between text and an illustration. Although the results of the reading test supported that arrows have a positive effect on the reading of illustrations, the results for eye movements were inconsistent. Alternative explanations are discussed based on comparing the types of materials and reading tests between our and previous studies. The indicators of eye movements that reflect possible processes involved when reading illustrations and text are also discussed.

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