

Standardized marker size and line width helps reduce distorted presentation of graphs to readers

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ABSTRACT

Data are typically presented in many forms such as tables and graphs, but the X-Y scatter plot remains commonly used for two-dimensional depiction of data. However, non standardization of marker size and line width across datasets in the graph would likely emphasize data with larger marker size and line width as these captures the readers' attention more. This would likely lead to misinterpretation of data or arrival at the wrong or author's conclusion, without an opportunity for a proper assessment of all the trends displayed by the dataset. Hence, it is critical to display all dataset in a graph with standardized marker size and line width, which allows the underlying trend of the dataset to emanate in the graph for correct interpretation by the readers without interference from distorted data.

Keywords: marker size, line width, distortion, graph, visual attention,

Subject areas: education,

INTRODUCTION

Graphs is a key form of graphic presentation of research data that uses the human facility with visual recognition, to help readers digest and understand a vast amount of information quickly. However, different methods exist for graph plotting leading to possible bias and distortion of information; for example, by guiding readers to the wrong conclusion, or to the author's intended concept without providing an avenue for fair judgement of data. Specifically, incorrect use of marker size and line width is one common problem in graphs generated automatically by modern graph plotting programmes such as Microsoft Excel, which leads to the highlighting of specific datasets with larger marker size and enhanced line width. Hence, standardization of marker size and line width is critical to the correct presentation of all data encapsulated in a graph without bias and distortion.

METHODS

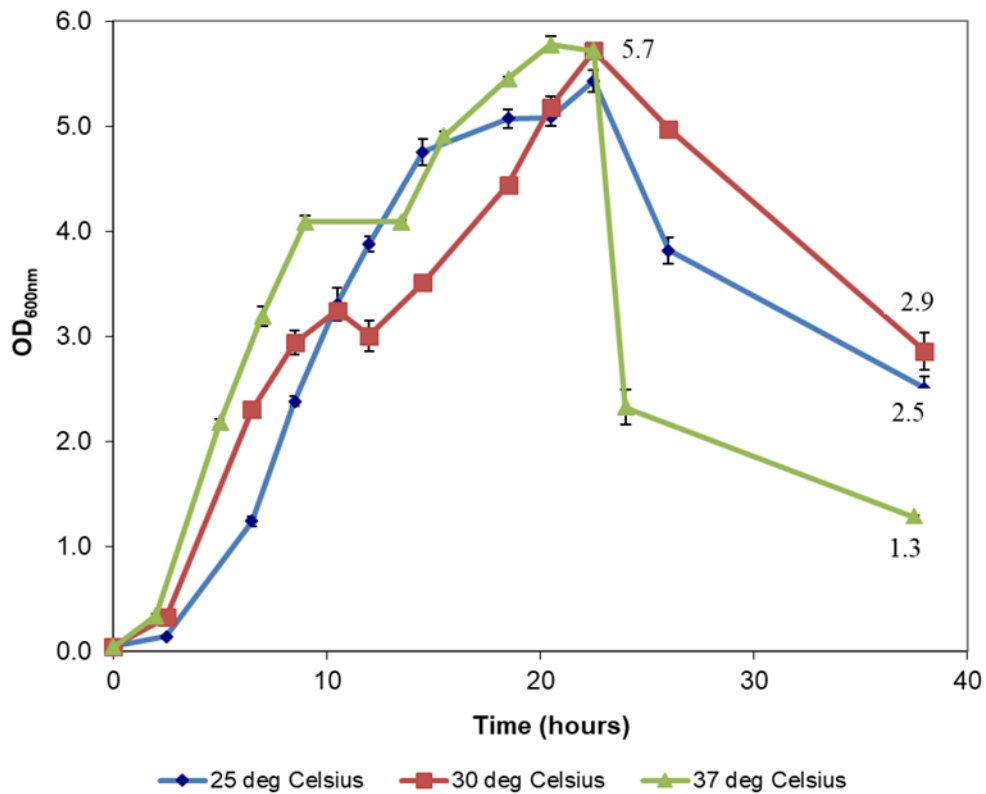


Figure 1: With a bigger marker size and thicker line width, the red line stands out from the other curves, which captures viewers' attention, and resulted in the inability to arrive at an independent conclusion about the content of the graph. In essence, non-standardization of line width and marker size leads the readers to the author's conclusions.

Use of non-standardized marker size and line widths tend to lead the reader to the author's conceptualization of the data or a wrong conclusion (Figure 1). Specifically, as viewers' attention tend to be focused on graph lines with larger marker size and thicker line widths, these data appeared to be highlighted for prominence compared to datasets plotted with smaller line widths and marker size. Hence, non-standardization of marker size and line widths would likely lead to a distortion of experiment data, or guiding readers to the wrong conclusion.

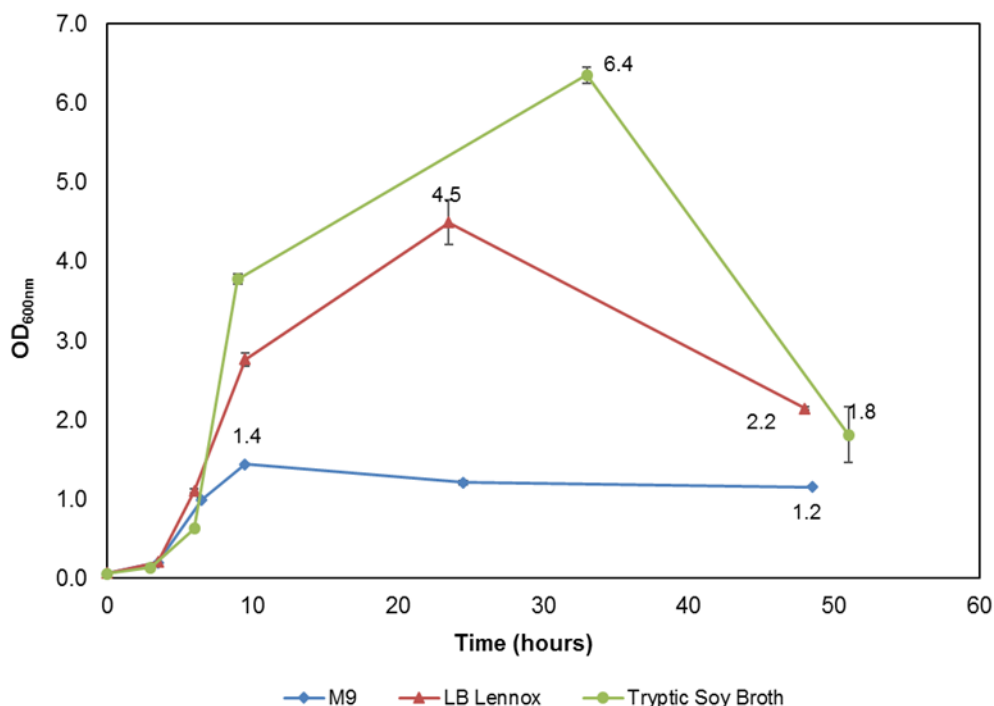


Figure 2: Standardized line width and marker size reduces distortion in graphs, and enables readers to independently come to a conclusion that may be different from the author.

On the other hand, use of standardized marker size and line width (Figure 2) provides a fair platform for readers to independently judge and understand the data without interference from larger marker size and thicker line widths, which distorts the graph and, more importantly, hampers correct interpretations of trends encapsulated in the dataset. Therefore, standardized marker size and line widths must be used across all datasets plotted on the same graph to help readers interpret the data independently without interferences from distortion in poorly plotted graphs.

CONCLUSIONS

Marker size and line widths play important roles in guiding the visual field of the reader of graphs. Thus, standardization of marker size and line width is critical in enabling a correct interpretation of the presented data without interference from distortion that a non-standardized marker size and line width brings. Specifically, use of non-standardized marker size and line width would likely place predominant emphasis on trends displayed by larger marker size or thicker line widths that in distorting or biasing the data, lead the readers to the wrong conclusion or the author's conceptualization of the data.

Conflicts of interest

The author declares no conflicts of interest.

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