

## COMPARATIVE COMPREHENSION OF SEVEN METHODS OF PRESENTING STATISTICAL INFORMATION IN SOCIAL RESEARCH REPORTS<sup>1</sup>

by

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1. **Introduction.** Writers, and/or editors of social research reports are often faced with the task of presenting statistical information to their readers. They can choose from among several presentation methods; they can use a graph, or a short table of figures, or a long table of figures—or they can place the statistical information into the text of the report. Without doubt, their primary aim is to deliver the message most effectively to their readers. In selecting an appropriate method, they often have to ask themselves questions such as these:

Which communicates better, a **SHORT AND SIMPLE TABLE** or a **LONG AND DETAILED TABLE** which carries more information?

Does a **GRAPH** tell the message better than a **TABLE**?

How does **TEXT** compare with **TABLES** and **GRAPHS** in effectiveness of communication?

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<sup>1</sup> This popularized report is based on the writer's Ph.D. dissertation titled "The Relative Effectiveness of Seven Methods of Presenting Statistical Information to a General Audience" published by the University of Wisconsin (Research Bulletin 32) in 1962 and in The Philippine Agriculturist (Vol. XLVI, # 7) in the same year. Presented at the PSA Annual Conference in June, 1967.

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Is communication improved when TABLES and GRAPHS are supported by TEXT repeating the same information?

Past research has not supplied very firm answers to these questions. The study reported here was an attempt to provide some of the answers.

2. **Experiments in Comparative Comprehension.** In the experiments the writer compared the comparative comprehension of a well-designed horizontal grouped BAR GRAPH, a SHORT AND SIMPLE TABLE, a LONG AND DETAILED TABLE, TEXT alone, and each of the first three methods supported by text. A total of 1,293 high school and college students, extension agents and members of Farmers Federations and Home-maker Clubs in Dane County, Wisconsin, and students in the agricultural college of the University of the Philippines, College, Laguna, Philippines, studied the presentation methods and answered questions about them. The questions concerned such things as choosing one value from among several values, comparing amounts (ordinal), comparing proportions, and the like — things you normally want people to be able to do from the statistical information in a research report.

Many books on statistical presentation guided the writer in designing the tables and texts. The graph was designed according to the findings of previous research on graphs and tables. The tests were given in such a way that the writer could be sure the differences obtained were due to the method of presenting the information—not due to the differences between persons tested, the order in which the test groups saw the materials being tested nor to the subject of the presentation. The experimental design used was the **Graeco-Latin Square**. Analyses of variance, multiple range tests and t-tests were run on the test data.

The next three pages tell briefly what was learned in the study. In this report the writer used a much simpler graph, text and tables than were used in the experiments, but they illustrate the general types of presentation methods tested.

### 3. These were best.

#### (1) A Well-Designed Graph.

AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PRESENTING STATISTICAL INFORMATION	
PERFECT SCORE = 7.0	
GRAPH	6.3
SHORT TABLE	5.7
LONG TABLE	5.4
TEXT	4.7

A Good GRAPH definitely does communicate—far better than the other single methods of presentation tried in the experiments. Note that each bar has a label identifying it, and the figures represented are printed on the bars. Previous research has shown that this helps make good graphs.

The graph's only weakness was with a question which required the reader to add up a total for each set of three bars and then say which of the three totals was largest. This work was already done for the reader in the tables and texts used in the experiments.

For all other types of questions asked, the graph was consistently best.

#### (2) A Short, Simple Summary Table

It pays to edit tables down to the essential information you want to communicate. The SHORT TABLE contained only the information the readers needed for answering the questions asked, in the tests.

AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PRESENTING STATISTICAL INFORMATION.	
PERFECT SCORE = 7.0	
GRAPH	6.3
SHORT TABLE	5.7
LONG TABLE	5.4
TEXT	4.7

4. Text added helped.

AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PRESENTING STATISTICAL INFORMATION	
PERFECT SCORE = 7.0	
GRAPH	6.3
SHORT TABLE	5.7
LONG TABLE	5.4
TEXT	4.7

Perfect score on this test was 7.0 answers correct. The graphs obtained an average score of 6.3 answers correct. Average score for the short summary-type table was 5.7. The longer detailed table obtained an average score of 5.4, and text scored an average of only 4.7 answers correct.

It helps to repeat the information in two forms—GRAPHS with TEXT (as in the preceding page) or SUMMARY TABLE with TEXT (as below). The writer tested both of these variations in supplementary experiments.

The groups tested averaged about 6.6 correct answers—again out of a perfect score of 7.0. This was a better score than the same

groups got when answering from either the graph alone or the summary table alone.

This would indicate that some research writers have been making the right choice in putting selected statistical information into summary tables or graphs alongside a textual explanation of the figures—even if the text does no more than repeat the figures.

AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PRESENTING STATISTICAL INFORMATION	
PERFECT SCORE = 7.0	
GRAPH	6.3
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LONG TABLE	5.4
TEXT	4.7

Perfect score on this test was 7.0 answers correct. The graphs obtained an average score of 6.3 answers correct. Average score for the short summary-type table was 5.7. The longer detailed table obtained an average score of 5.4, and text scored an average of only 4.7 answers correct.

### 5. Long-detailed table was not good.

**AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PREVENTING STATISTICAL INFORMATION.**

PERFECT SCORE = 7.0

GRAPHS AVERAGE	6.3
11 High Schools and Colleges	6.4
6 Adult Clubs	6.2
SHORT TABLE AVERAGE	5.7
11 High Schools and Colleges	5.9
6 Adult Clubs	5.4
LONG TABLE AVERAGE	5.4
11 High Schools and Colleges	5.5
6 Adult Clubs	5.0
TEXT AVERAGE	4.7
11 High Schools and Colleges	4.9
6 Adult Clubs	4.6

The writer and/or editor can pack a lot of information into a LONG TABLE. But can the readers get it out easily? The tests indicate that when only a few facts are to be stressed, the long table handicaps the reader. He finds crucial facts more surely and accurately in the shorter, summary-type table.

Experience seems to play some part here. Several of the test groups were made up of people who probably do not have much experience in reading statistical tables, e.g., rural or small town homemakers. The difference between the short and long tables was much greater for these groups than for high school and college students, who presumably encounter tabled information more frequently in their school work.

An alternative is to print a long table, but support it with text summarizing the most significant points. Although the writer did not test this directly there were indications that such a combination would be better than a long table by itself, and much better than text by itself.

### 6. Text alone did not deliver the message.

In two separate experiments, TEXT all by itself gave the lowest number of correct answers—an average of around 4.7 out of a possible 7.0. This text consisted of four to six paragraphs merely presenting in narrative form the information given by the graph and short table. There was no attempt to dress up the textual presentation nor to make particularly striking parallels and comparisons. The tests give no indication of what the picture might have been with more spritely writing.

**AVERAGE NUMBER OF CORRECT ANSWERS TO 4 WAYS OF PRESENTING STATISTICAL INFORMATION.**

PERFECT SCORE = 7.0

Perfect score on this test was 7.0 answers correct. The graphs obtained an average score of 6.3 answers correct. Average score for the short summary-type table was 5.7. The longer detailed table obtained an average score of 5.4, and text scored an average of only 4.7 answers correct.

Hence, for effective communication of statistical information....

1st choice: A well-designed graph supported by text

2nd choice: Short summary table supported by text

3rd choice: Graph (but be sure it's a good one)

4th choice: Short summary table

Don't depend entirely on long tables or text to communicate figures.