

Thinking Straight About Facts and Figures

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How often do you, as an adult, dodge discussion on a problem of major concern in the current social scene with the excuse, "But I don't understand the numbers." Intelligent consideration of world trade, the European Recovery Plan, or the cost of living requires an understanding of the facts and figures connected with the case. Millicent Haines, supervisor of social studies at New York State College for Teachers, Albany, indicates some of the numerical concepts which youth and adults need and suggests ways for developing them.

EVEN A CURSORY EXAMINATION of such reading material as the Public Affairs Pamphlets, the "News of the Week" section of the *New York Sunday Times*, and the weekly news magazines suggests that the intelligent reader needs to know how to interpret concepts which are based on numerical and statistical data. Such reading matter is typical of that which high school seniors meet in social studies classes; it is also likely to be the reading fare of educated adults who seek information on current affairs.

Those responsible for the high school program are concerned that their pupils establish the habit of reading this type of material, read it with understanding, and draw sensible conclusions on which to base civic action. Only one skill involved in achieving these goals—that of interpreting certain concepts based on numerical and statistical data—is considered in this article.

Try Yourself on These

To better appreciate the need for special instruction in interpreting these concepts, a teacher might try asking pupils in a typical class to write an ex-

planation of the following statements:

1. The *national income* in 1948 is expected to reach almost two hundred billion dollars.
2. The *cost of living index* at the end of the first quarter of 1948 reached 169.
3. The *median wage* in a certain factory is \$1.25 an hour.
4. In March, 1948 a national *public opinion poll* showed that sixty-three percent favored the Marshall Plan for aid to Europe.

The phrases in italics are representative of the concepts which are needed to think intelligently about current problems. Students tend to show not so much a misunderstanding of the "boner" type as a meagerness of understanding, a lack of background, a superficial approval of the idea, and, therefore, a lack of caution in interpreting a problem's significance.

That few students carry over much understanding from typical mathematics lessons is probable. Unless special effort is made to provide for using data in thinking through social problems, little can be expected. It is possible that the high school social studies teacher should be the one to initiate cooperation between the two departments in this area.

However, since the use of such data is imperative if current problems are to be considered realistically, responsibility cannot be shrugged off by any teacher concerned with social issues.

National Income and Statistics

Two hundred billion dollars is an almost inconceivable amount to any of us, and attempts to visualize it in terms of stacks of money or dollar bills laid end to end aren't particularly helpful. The total has meaning only when used as a basis for comparison.

In order to think about a national income, students need to know in a non-technical sense: what makes up this composite figure, whether it is high or low compared to other nations or other key periods in our history, how it is distributed among the American people, and what it will purchase compared to other times.

Assuming that students will use these parts of the total concept of national income as tools to think about present-day problems rather than as ends in themselves, a teacher would not wish to spend an indefinite amount of time developing them. A class can work out its own definition of national income. This definition will be accurate enough for non-technical thinking and will probably run something like this: *the total amount of money earned by all the people in the United States during the year.*

Often current national incomes of other countries are not available when needed, but previous knowledge of comparative standards of living will enable pupils to conclude that our national income far outranks that of others. The forty billion dollar national income of 1932 can be examined along with the

1948 estimate for a comparison of depression and boom, of deflation and inflation.

Figures of distribution of the national income are continually brought up to date by the United States Department of Commerce. The following data was collected by a classroom teacher for use in the fall of 1948:

Percentage of Spending Units (Families or Individuals Living Alone) at Various Income Levels¹

1935-36		1946
46.4%	Under \$1,000	14%
35.3%	1,000—1,999	28.7%
11.2%	2,000—2,999	30.7%
4.6%	3,000—4,999	17.7%
2.4%	Over \$5,000	8.9%

Illustrative of the kind of critical thinking involved in the interpretation of such data is the fact that what appears to be a great gain in family income is partially offset by the relatively lower purchasing power of the dollar.

Other useful statistics on distribution of national income concern regional differences. In 1947 the following average per capita incomes were reported:²

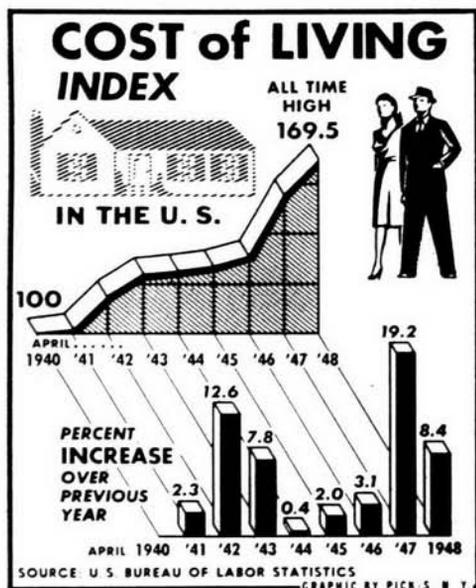
Nation as a whole	\$1,323
New York State	1,781
Mississippi	649
Iowa	1,144

In addition to this, all fifteen southern states were among the sixteen states in the nation with the lowest per capita averages. The per capita income of the whole nation was up nine percent over the preceding year. From a study of

¹ Figures in this table adapted from Information Please Almanac, 1947. John Kieran, editor. Doubleday, p. 282.

² U.S. Department of Commerce figures carried by a United Press dispatch to newspapers on August 25, 1948.

such data a wide-awake group is almost certain to move on to the purchasing power of this income. After exchange of examples of high prices, they will need to use the cost of living index, itself a difficult concept.



Since high school pupils are familiar with graphic representation, they should know the term, base line, and have no difficulty seeing that 100 is the base number and 1940 the base year in the upper part of the graph. A vertical scale beside the cost of living would be helpful and can be supplied as 120, 140, and 160. This will enable one to read more readily the intervening points between 1940 and 1948. Some pupil will undoubtedly recognize the reason for the use of 1940 as the base year since that was the last normal year before the United States entered World War II. The dates of the passage and repeal of the Price Control Act will make the graph more meaningful.

The cost of living index is significant in terms of the wage level. A class can understand this by considering the effect of the rising cost upon families of fixed incomes whose wage increases have lagged behind the rising costs, those whose incomes have kept pace, and those whose incomes have increased more rapidly than costs. Imaginary but typical—and also actual—cases can be considered. The recent agreement between General Motors and the United Automobile Workers is an example of an attempt to keep wages and the cost of living in line with each other.

Cost of Living Index Graphs

The accompanying graph (from the *New York Sunday Times*), enlarged or projected, may be used to help a class study a cost of living index. The graph, however, does not suggest how the data is derived. What was used to figure these rising costs? Through discussion a group may discover that certain basic items in a family budget are priced periodically at retail to determine the rise or fall in the cost of living. Included in these items are such things as flour, milk, and eggs. Of course, prices vary between sections of the country, but the average of certain key places is used.

The "Average"—Its Inconsistencies

People are continually thinking about problems which involve many figures, so many that it would be very difficult to remember them. So they take refuge in averages. In doing so they are often unaware of the disadvantages in using the average or typical for the whole.

Pupils who know what average means insofar as understanding the arithmetic

process by which it is derived may nevertheless be unwary in interpreting averages in social data. The limitation of the significance of "average" needs to be brought home to them. One approach to this would be to put on the blackboard a frequency table of weekly allowances of a class of high school students, such as the following:

To the Nearest Twenty-five Cents

\$3.00	7
2.75	5
2.50	2
2.25	
2.00	
1.75	3
1.50	8
1.25	2
1.00	5
.75	2

The group has a real problem to consider when using such data. If a committee of students and teachers is deciding what to charge for school activity tickets, will they have adequate information if they know only the average amount of spending money? What is that average in this example? How many are above the average? How many below? If the committee wishes widespread attendance at school events, will a price aimed at the average allowance be likely to provide it?

This procedure will facilitate the introduction of the statistical terms—spread, distribution, and median—which can then be transferred to considering such a problem as wages. Young people will be more wary of arguments based solely on average figures and will be likely to demand more data before making up their minds.

Opinion Polls Interpreted Correctly

Since the author has previously suggested a possible way to help high school students understand public opinion polls,³ we shall review only a few points which George Gallup says are important in securing a representative sample in a survey of opinions on a national issue. Pupils who are aware of these points will have an idea of how adequate sampling is secured.

The size of the sample population is much less important to accuracy of prediction than is the character of the cross section. A proper proportion must be secured of: people from each state; people from the upper, middle, and lower economic groups; men and women; farmers and residents of small towns; medium-sized cities and big cities; adult of all age groups; and Democrats, Republicans, and members of other political parties. Those who take various surveys must be prepared to explain the basis on which the sample is made. Citizens will want to know.

A Job To Be Done

Perhaps this article appears to labor the obvious. So it may seem to teachers and even many high school students. For this reason considerations of this sort are often omitted in classrooms with the result that many pupils read, listen, and discuss with meager understanding. If concepts of the type discussed here are necessary to straight thinking on today's problems, they are worth an investment in time and effort to make them meaningful to everyone.

³ Millicent Haines, "Taking an Opinion Poll in Your High School," *Social Education*, May, 1945.

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