

Numerical information can be persuasive or informative depending on how it's presented

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Would you rather support research for a disease that affects 30,000 Americans a year or one that affects just .01 percent of the U.S. population?

The numbers represent about the same number of people, but how you answered explains how you understand numerical information, according to a psychology professor at Kansas State University.

"People are comfortable with simple frequencies and percentages," said Gary Brase, an associate professor of psychology at K-State. "Everybody can understand five, six, 10, 20 or even 100, and percentages like 30 percent or 40 percent. We have a really good sense of how much that is.

"But it's really large numbers that we don't have nailed down exactly. If you say there were 20,000 people at a concert versus 30,000 people, we don't have a good sense of how much bigger that is exactly."

Brase has studied the perceptions and applications of various numerical formats. He will present a talk on the topic at the Midwestern Psychological Association conference May 1-3 in Chicago. The research has appeared in several publications including the *Journal of Behavioral Decision Making*, the *Journal of Nonprofit and Public Sector Marketing* and the *Journal of Extension*, where it can be viewed at www.joe.org/joe/2007august/a1.shtml

Brase's research also is in the current issue of *Psychonomic Bulletin and*

Review.

Brase's interest in people's preferences for numerical formats began with research on theories about how the mind processes numbers in complex math problems. Brase said this research suggested that people prefer working with frequencies.

"But then we thought, let's just start asking them what they prefer," Brase said

To find out, Brase conducted two studies. One looked at adults participating in forestry Extension activities and asked them to evaluate statistical information about forestry issues. They had to compare two statements using different numerical formats. Participants were asked which statement was clearer and which expressed a greater value. The research showed that people find percentages and simple frequencies, such as one-third or two-out-of-five, easiest to understand. However, the people studied also perceived absolute frequencies -- like 30 million Americans, for instance -- to be a greater number than a fraction or ratio, even when the numbers were equivalent.

Another study analyzed the responses to postcards asking recipients to show their support for cancer research. Each group of postcards presented the same information about cancer mortality rates in varying numerical formats. The researchers measured how many responses they received by each type of postcard. They found that people responded most often when the information was presented in absolute frequencies. That is, framing cancer mortality rates in millions of Americans rather than a ratio like 1 out of 100.

Brase said these findings have implications for the way people and groups convey numerical information, whether it's to inform or to persuade.

"When you want to persuade, you're interested in whole numbers and using a large reference class like the U.S. or world population," Brase said. "Take the numbers of people who have a rare disease. The percentage could be a tiny amount. But it also could be an impressive number if you consider a large population. You get something that sounds like an important issue."

The opposite, Brase said, is doing something like saying that a person has a .0001 percent chance of getting that disease.

"People really are not understanding the numbers," Brase said. "All they get out of that information is that it's a really, really tiny amount."

For people to really understand an issue, Brase said perhaps the best approach is to present numerical information in as many ways as possible.

Source: Kansas State University

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