



HELPING AMERICANS MAKE MORE-INFORMED CHOICES ABOUT SCIENCE POLICY

by Jon D. Miller, Ph.D., and William McCready

How can media companies and academia bridge the knowledge gap on scientific topics that are key to current political debates?

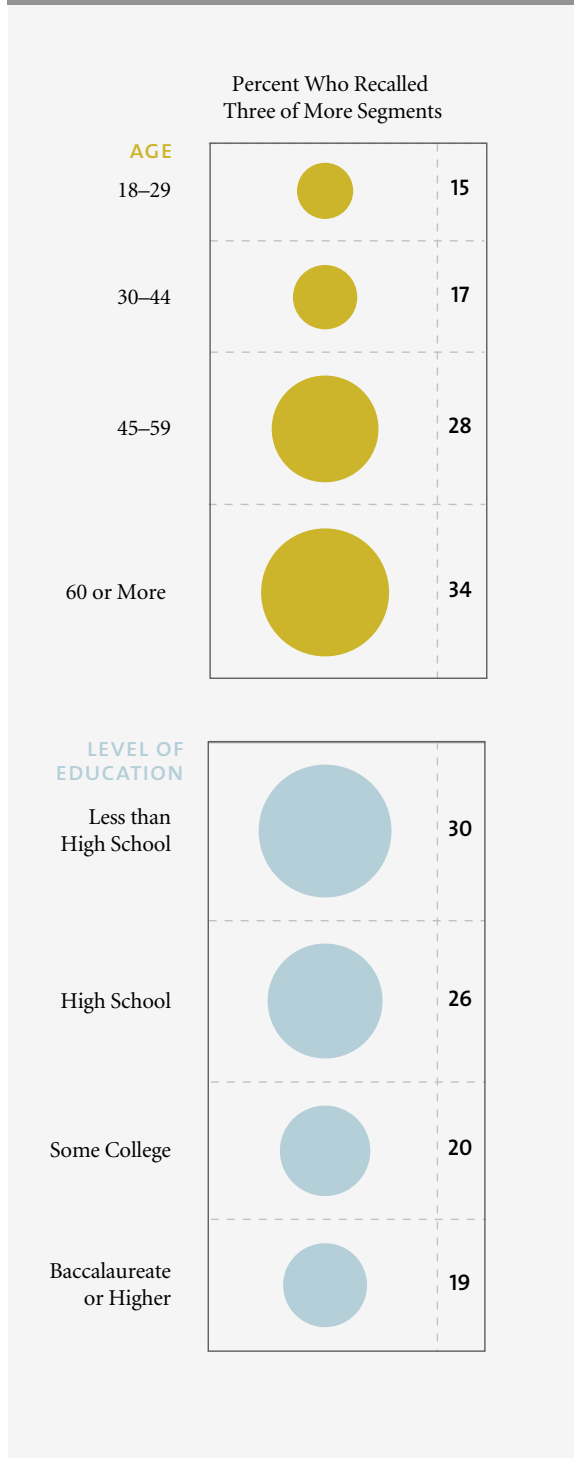
Americans lead the world in computer use, but have little understanding of science, according to a 1996 National Science Board report. Another study showed that some 40 percent of Americans are very confident in the leadership of the scientific and medical communities, but only one in nine feel well informed about science and technology. Still other research shows that fewer than one in five adults is sufficiently scientifically literate to read and understand the science section of the *New York Times* or similar materials.

Yet scientific issues—from cloning to global warming to steroid use—continue to play a high-profile role in U.S. government policy and regulations; reaching an informed opinion about each issue requires a level of knowledge that few people seek out after

concluding their formal education. Most adults are exposed to new information about science and technology through media, work (direct experience, in-service training), recreational and informal sources (museums, zoos, planetariums), and personal experience (home repairs, home computing). Clearly these sources of learning are not currently providing the level of learning and awareness that Americans need to make informed choices about scientific issues.

Developing an effective TV vehicle for enhancing this learning was a challenge that ScienCentral, Inc., took on with funding from the National Science Foundation. They envisioned a system of science and technology information (in the form of news stories) disseminated through network centers to

FIGURE 1: ABILITY TO ACCURATELY RECALL TV SCIENCE SEGMENTS



The ability to recall three or more science news segments increases with age and decreases with the level of education.

Additional Reading

Miller, J.D. 1983b. “Scientific Literacy: A Conceptual and Empirical Review.” *Daedalus* 112:2:29–48.

local stations for broadcast. This is the conceptual model on which a good deal of modern communication practice is built. In theory, viewers watch the local news, attend to these science and technology stories, incorporate the information into a sustained interest in science and technology, improve or sustain a high level of scientific literacy, and utilize this science and technology information in making a wide array of personal and public policy judgments.

But how well would the model work in practice? What could we learn from actual viewers about their recollection of science-based news stories? And how could we apply their patterns of recall to creating a more effective program for informing science policy choices among everyday Americans?

PRODUCERS: THE FIRST HURDLE

In a three-year project, Dr. Jon Miller—with his colleague Dr. Eliene Augenbraun of ScienCentral, Inc.—is using the research facilities of Knowledge Networks to study the influence of television science programming, including WGBH’s NOVA, on viewers of ABC and NBC affiliates. The research team designed a two-wave study using the Knowledge Networks panel to accurately measure the impact of science stories inserted into local television news broadcasts. Many of the items studied were from Miller’s work on his book, *Science and Engineering Indicators*, over the last two decades, allowing a comparison with results from other national probability samples. (The new data compared favorably with

Miller, J.D. 1987. “Scientific Literacy in the United States.” In *Communicating Science to the Public*, ed. D. Evered and M. O’Connor. London: Wiley.

Miller, J.D. 1992. "From Town Meeting to Nuclear Power: The Changing Nature of Citizenship and Democracy in the United States." In *The United States Constitution: Roots, Rights, and Responsibilities*, ed. A.E.D. Howard. Washington, DC: Smithsonian Institution Press.

these benchmarks.) Knowledge Networks conducted a second wave of data collection with the same individuals after a six-week period during which ScienCentral distributed stories to local ABC and NBC stations on a normal and continuing basis.

The stories in the series covered a variety of salient scientific topics. One of the first challenges that emerged in the process was the variability of news producer acceptance of a given segment. Local NBC news producers varied substantially in terms of how frequently they used these stories. Thirty-two stations used the Valentine's Day story "Addicted to Love," while only four local NBC affiliates picked up the writer's block story. The same was true for the local ABC producers. Just over fifty local affiliates used the teen tanning story, while only seven picked up "Bird Flu Clues."

Looking at the producers' use patterns for both ABC and NBC affiliates, the results suggest, not surprisingly, that human interest factors are more responsible for producers' decisions than scientific substance *per se*. It appears that Valentine's Day stories and those about teenagers tanning themselves are very attractive, while the more "scientific" leads were less so. Because one goal of this research is understanding how to improve the public understanding of science through the use of TV programming, this is an important issue.

GAINING A Foothold in Viewers' Minds

It is a widely accepted axiom of advertising managers that you need numerous different messages over time to build a foundation of recognition (often in the form of brand

awareness). Applying this principle to science communication, the cumulative impact of news stories over two major networks provides a variety of messages. The proportion of the population that was aware of all or some of these stories serves to measure the gain in the public awareness and appreciation of science and technology.

A key method for evaluating the success of these efforts is measuring viewer recall in markets that aired science and technology news stories. This involves a separate determination of local television viewing habits and specific recall questions about each of the stories an individual may have seen. The second Knowledge Networks survey—at the end of the six-week test window—asked each respondent to report the number of days per week he or she watched the local ABC or NBC news during the preceding six weeks.

The measurement of the recall of story substance is a challenging problem. Respondents tend to claim recall in phone interviews even when they may not have seen the story or show in question. In this project, the online surveys provided a text response box; respondents described what they recalled about the story. The researchers then coded the responses into two categories: 1. R recalled no information or 2. R recalled some content information.

Among adults, 37 percent correctly described some of the content of one or two of the sixteen science news stories. Approximately 23 percent of adults provided some content description for three or more of the stories (*see Figure 1*). Women were slightly more likely to recall the content of

See Figure 1
on pg. 25

Miller, J.D., and R. Pardo. 2000. "Civic Scientific Literacy and Attitude to Science and Technology: A Comparative Analysis of the European Union, the United States, Japan, and Canada." In *Between Understanding and Trust: The Public, Science, and Technology*, ed. M. Dierkes and C. von Grote, 81–129. Amsterdam: Harwood Academic Publishers.

Miller, J.D. 1995. "Scientific Literacy for Effective Citizenship." In *Science/Technology/Society as Reform in Science Education*, ed. R.E. "Ed" Yager, 185–204. New York: State University of New York Press.

science news stories than men; 38 percent of women recalled the content of one or two stories, compared to 30 percent of men. Older people were more likely to recall three or more stories than younger people, while the level of education was inversely related to the recall of three stories or more.

THE CHALLENGE IS TO IMPROVE THE UNDERSTANDING AND RETENTION OF MORE SCIENTIFICALLY ADVANCED INFORMATION, IN AREAS SUCH AS BIOMEDICAL AND GENOMIC RESEARCH.

On balance, it is likely that the viewing audience over the six-week period included between 70 and 100 million adults, and that approximately 70 million adults were able to retain some information about the story a few weeks later. This is an impressive result.

MAKING TV NEWS A BETTER VEHICLE FOR SCIENCE LEARNING

There are important implications from this research for improving the public's understanding of science and technology through the medium of TV news programming.

Producers are your first audience: Local news producers will undoubtedly continue to be the major decision makers in story usage; it is important to improve the communication of information about both stories and potential audiences to

Miller, J.D. 2001. "The Acquisition and Retention of Scientific Information by American Adults." In *Free-choice Science Education*, ed. J.H. Falk, 93–114. New York: Teachers College Press.

them. Providing audience-interest data to them will improve their willingness to run future stories, given that most of them have little science in their backgrounds.

Don't underestimate "small" victories: The numbers of adults in the estimated-viewing and content-recall audiences illustrate the enormous potential of television for the communication of science and technology information. Even when a science or technology news story is used by only a third of local news producers, it reaches tens of millions of people.

Linking to larger themes is essential: The level of story recall among adults who watch local television newscasts was respectable, but there is room for improvement. It is also important to note that the respondent's level of education did not affect story recall, indicating that there is no "elite" effect in these data. To a large extent, the responsibility for these results belongs to the skillful linking of science news to larger themes by ScienCentral—for example, connecting bear bones and osteoporosis. We hope that these data will enhance ScienCentral's ability to improve these linkages in future programming, and encourage others to try such strategies.

Simple content does stick: Fourth, the level of content recall was impressive, especially in terms of the size of the projected audience. Seventy-one million adults recalled some program content from at least one of the science stories, and 12 million recalled content information from

Miller, J.D., R. Pardo, and F. Niwa. 1997. *Public Perceptions of Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada*. Madrid: BBV Foundation.

Miller, J.D. 1998. "The Measurement of Civic Scientific Literacy." *Public Understanding of Science* 7:1–21.

Miller, J.D. 1983a. *The American People and Science Policy: The Role of Public Attitudes in the Policy Process*. New York: Pergamon Press.



three or more of the stories during the six-week test period. The challenge is to improve the understanding and retention of more scientifically advanced information, especially in areas such as biomedical and genomic research.

It is also reasonable to expect that there is a learning curve among viewers and that continued exposure to science and technology stories will create more sophistication among consumers of this information.

The results of these and future projects should stimulate ways that TV news stories can help improve the public's understanding of complex topics in science

and technology—topics that are increasingly key to understanding the policy decisions being made by our representatives in local, state, and federal government. ▀

Jon D. Miller, Ph.D., is Director of the Center for Biomedical Communications and Professor in the Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University.

William McCreedy is Vice President, Client Service, of Knowledge Networks, Inc. He can be reached at bmccreedy@knowledgenetworks.com.

Miller, J.D. 2000. "The Development of Civic Scientific Literacy in the United States," in Kumar. *Science, Technology, and Society: A Sourcebook on Research and Practice*, ed. D.D. & D. Chubin, 21–47. New York: Plenum Press.