



## More Than Just the Facts: Helping Patients Make Informed Choices

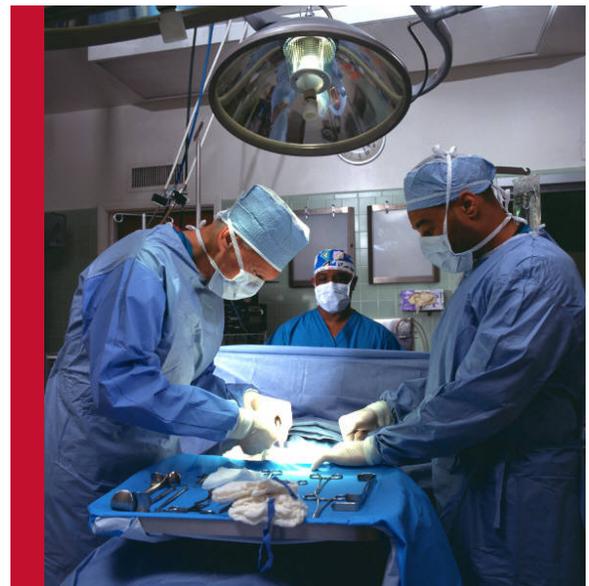
Insights for healthcare professionals and policy makers from research by [Dr. Valerie Reyna](#), Department of Human Development, Cornell University.

Eric Wargo

**H**ealth care in America emphasizes patient-centered choice. In the marketplace of medical treatment, it is up to individuals to understand the benefits and risks of different options and then make informed choices. There is no shortage of facts. Today's health consumers are bombarded by numbers and statistics. They read about new studies showing this or that group's risk for a certain type of cancer, or about their X-percent lifetime chance of having a heart attack. Once in the doctor's office, the facts mount.

Yet growing evidence suggests that being exposed to facts is not the same thing as being informed (Reyna & Hamilton, 2001). Studies show that medical information is difficult to understand and remember for people of all educational levels. Despite being steeped in health facts, over a third of Americans still possess only a basic or below-basic level of health literacy (defined as "The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions"; Kutner, Greenberg, Jin, & Paulsen, 2006, p. 3).

In one study, patients signing their consent form for a serious and risky operation were frequently unable to accurately report the risk estimates they had previously received in writing (Lloyd, Hayes, Bell, & Naylor, 2001). Many estimated their risks wildly inaccurately. These patients had been presented with information about their risks, but for many, the numbers had not registered. It is questionable to what extent the patients were truly "informed" (see Reyna, in press).

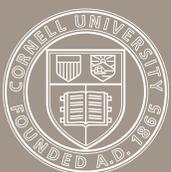


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Simply educating people with statistics has even been found to hinder prevention efforts. Due to low prevalences of HIV or cancer, for example, people tend to overestimate their risks. Consequently, interventions stressing the actual numbers may move people toward complacency as opposed to risk reduction (Reyna & Farley, 2006). When women learn that their actual risks for cancer are lower than they thought, they return for screening at a lower rate (Fagerlin, Zikmund-Fisher & Ubel, 2005). And some interventions to discourage adolescent drug use by presenting the risks have been shown to be ineffective or even to backfire (Lilienfeld, 2007; Reyna & Farley, 2006).

Valerie Reyna is a member of the National Mathematics Panel, commissioned by the White House in April, 2006. She serves as chair of the task group on standards of evidence. Reyna also advises the National Cancer Institute on their numeracy initiative, aimed at improving informed patient decision making.

This article was contributed by science writer Eric Wargo, a Managing Editor for the Association for Psychological Science.



Cornell University psychologist Dr. Valerie Reyna, an expert in health decision making, suggests that the flood of precise numerical data typical of health communication messages often impedes, rather than facilitates, making informed and appropriate health decisions (Reyna, in press). What researchers now know about how people process information and make risk judgments suggests new ways of packaging medical information to enable health consumers to make better, more truly informed choices.

### The Science of Decision Making

Psychologists and neuroscientists now believe that the brain encodes, stores, and retrieves information in two very different ways involving separate brain areas and distinct mental processes (Reyna, 2004). According to “fuzzy-trace theory,” developed by Reyna and her Cornell colleague Dr. Charles Brainerd (Reyna & Brainerd, 1991; see also Reyna, 2004; Reyna and Farley, 2006), one of these modes of thinking is highly deliberative and oriented toward facts and details. This type of rational processing pays attention to numbers and engages in analyzing risks and benefits. The other “fuzzy” mode of thinking tends to ignore details and focuses instead on the overall meaning or gist of a situation. The latter form of thinking is more intuitive, relying on emotional reactions and situational cues, rather than deliberative reasoning. It is also more categorical—seeing things in terms of black and white instead of shades of gray.

According to fuzzy-trace theory, people are generally capable of both forms of thinking, and may use them simultaneously. But when they make judgments, it is the second, gist-oriented mode that will prevail. This is because the human brain is essentially a meaning machine. Even if people are capable of judging the odds numerically, their choices will be governed by the bottom-line meaning (“That’s a low risk”; or “I’m going to get cancer like my sister did”), not the numbers (Reyna, in press). This is particularly true when the numbers involve ratio concepts like probabilities and prevalence rates—which are standard for the presentation of health- and risk-related data (Reyna & Brainerd, in press). Genetic risks, such as the risk of getting breast cancer if people have genetic mutations such as BRCA, are especially difficult to understand for physicians and for patients because they involve conditional probabilities (Reyna, Lloyd, & Whalen, 2001).

There is a vast disconnect, in other words, between the way health information is commonly presented and the way real people make decisions based on that information. The answer, however, is *not* to change the way people make

judgments by getting them to pay more attention to the precise facts. It won’t work—and it won’t lead to better choices.

Here’s why: Gist-based thinking is not simply a folly of those unschooled in more precise forms of reasoning. Gist-based thinking is actually the more advanced of the two processes and typically leads to better judgments. Children and adolescents, for example, tend to weigh facts and engage in deliberate, “rational” reasoning, yet their choices are poorer than those of adults (Reyna & Farley, 2006). It partly has to do with life experience, and partly with the slow maturation of frontal brain areas suited to making quick and intuitive judgments. The adult brain simply is better at cutting quickly to the bottom line.

The tendency to make intuitive rather than deliberative judgments characterizes expert decision makers in medicine and other highly skilled fields. In one study, physicians at different levels of expertise—ranging from medical students to expert cardiologists—made diagnostic and admission judgments based on presented case descriptions of patients at varying levels of risk for a type of heart disease, unstable angina (Reyna & Lloyd, 2006). As would be expected, the more expert physicians made better diagnoses and made more prudent judgments (e.g., about whether to admit a patient to intensive care). The important finding, though, was *how* the different groups made their judgments. Less expert physicians made fine-grained decisions among patients and weighed more dimensions of verbatim information. Expert cardiologists, on the other hand, made simpler categorical decisions, using less information and processing it more crudely. Experts decided whether patients with chest pain had turned a corner in their heart disease, and were about to have a heart attack or not. In other words, the experts ignored irrelevant details and cut, so to speak, to the heart of the matter—the gist of whether patients were at imminent risk or not. Focusing on gist made physicians’ choices better (see also Reyna, Lloyd, & Whalen, 2001).

### The Power of Gist

The same principle of gist-based reasoning should be allowed to guide patient decision making. “The key to informed consent,” according to Reyna, “is getting the gist” (Reyna, in press). And the gist won’t necessarily correspond with the numbers.

The risk of dying on the table during carotid endarterectomy (a vascular surgery procedure that removes plaque from the lining of your carotid artery) is 2%. On giving their consent for the procedure, some estimated their chance of dying as

10%; others estimated as little as 0%. Although 0% (no risk) is closer to 2% than 10% is, fuzzy-trace theory would say that someone who estimates 10% has made a more informed choice. The number is wider off the mark, but that person at least grasps the important bottom-line: the surgery involves some risk.

Even math-literate people have difficulty extracting a meaningful bottom line from raw numbers and statistics—particularly those involving ratios and probabilities (Reyna, in press). Supplementing quantitative information with qualitative explanation helps—e.g., explaining to a woman that her 26.5% lifetime risk of getting breast cancer is actually a “high risk” even if it is objectively a low probability (Reyna, in press). Visual displays of information in graphs and charts are also very effective in helping people extract the gist from numerical data and avoiding common numerical reasoning errors (Reyna & Brainerd, in press; Reyna & Mills, 2007).

As powerful as gists are, however, they are only as good as a person’s level of knowledge or understanding. People may still draw the wrong conclusions. For instance, the gist that “condoms block the exchange of bodily fluids” leads people to overestimate condoms’ effectiveness against sexually transmitted diseases, because it does not take into account infections that are transmitted by skin-to-skin contact, such as human papilloma virus. This is even true for doctors who “know better” (Reyna & Adam, 2003). In the realm of treatment, the common gist, “chemotherapy is poison,” may encourage patients to look for other, less effective (or less proven) remedies, while the intuitively compelling gist that “surgery removes the cancer” explains why cancer patients often opt for surgery when other treatments may be just as effective (Reyna, in press).

In each of these examples, patients need to be taught a different mental model in order to get the right gist: that some infections are transmitted skin to skin, not via exchange of fluids; that chemotherapy kills fast-growing cells like cancer and hair follicles (so hair falling out is not a sign of poisoning); and that surgery does not kill the cancer cells that have spread, but chemotherapy travels and can kill those cells.

Besides helping patients get the gist, professionals must also help them recall the health-related values and knowledge they already hold. An example of this principle would be the (re)shaping of a message about the value of screening. Research shows that most people see getting screened when asymptomatic as taking a chance between “feeling okay” (the

test coming back negative) and “possibly not feeling okay” (the test coming back positive). Such a gist—which may be implicit in a prevention message promoting screening for peace of mind—will actually discourage screening, for the following reason: Given the choice to screen or not to screen, it is only not screening that *guarantees* an asymptomatic person will feel okay. Screening is a gamble that might turn out badly. Instead, thoughtfully promoting an alternative gist, “screening detects disease early,” and reminding people of the value that “early is better,” encourages the intended choice: *Get screened* (Reyna, in press).

### Interventions

It is not enough to present the facts and expect health consumers to remember and use them effectively. Health-care professionals and health policymakers need to package, present, and explain information in more meaningful ways that facilitate forming an appropriate gist. The following intervention strategies have been tested successfully in educational, medical, and health prevention contexts (for more information, see Reyna, in press; Reyna & Brainerd, in press).

- **Explain quantities *qualitatively*.** Don’t rely solely on numbers when presenting information, and don’t expect facts to make people more precise in their reasoning. Explain frequencies, percentages, and probabilities verbally, stressing conceptual understanding (the bottom-line meaning of information) over precise memorization of facts and data.
- **Display information visually.** People of all ages readily extract salient gists from graphical displays of information. Common and effective displays include *simple bar graphs* and *risk ladders* for highlighting relative risks; *pie charts* for highlighting relative proportions; *stacked bar graphs* for conveying absolute risks; and *line graphs* for displaying trends over time. Along with *stacked bar graphs*, *Venn diagrams*, *2 x 2 grids*, and *100-square grids* have been shown to reduce common errors when reasoning about ratio concepts like prevalence rates and probabilities.
- **Tailor the format to trigger the appropriate gist.** Frame messages and choose the most suitable visual formats to convey the appropriate bottom line (see figures on next page). Presenting a low absolute risk visually in a stacked bar graph could have the unwanted effect of discouraging a desired prevention behavior, for example, since it will diminish a person’s impression of their own risk. By the same token, the gist of “small” for unlikely

Figure 1

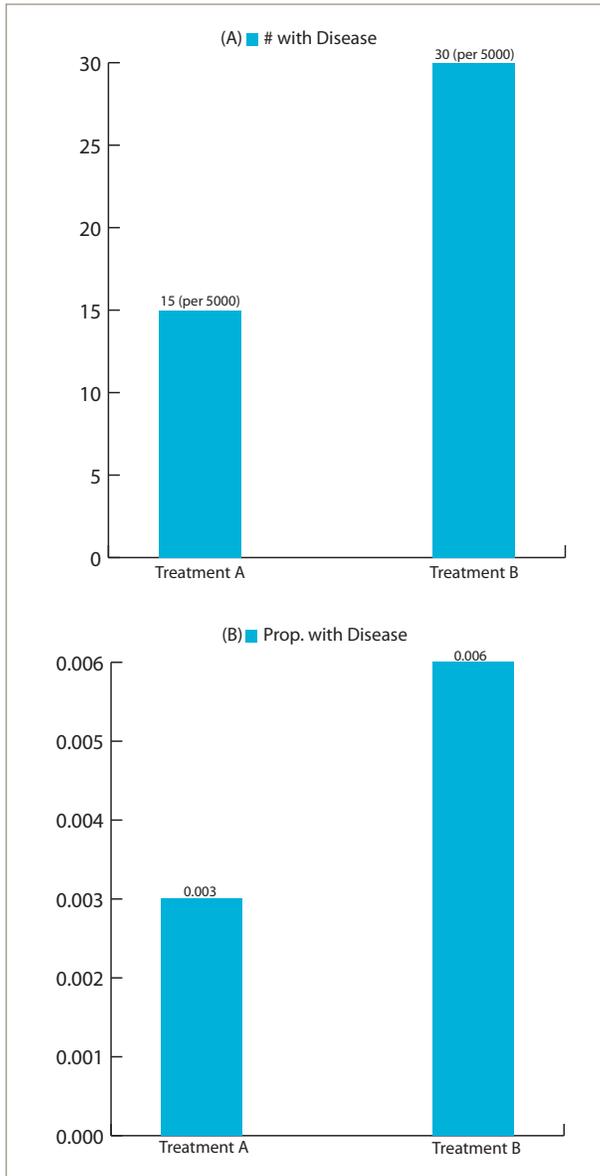


Figure 2

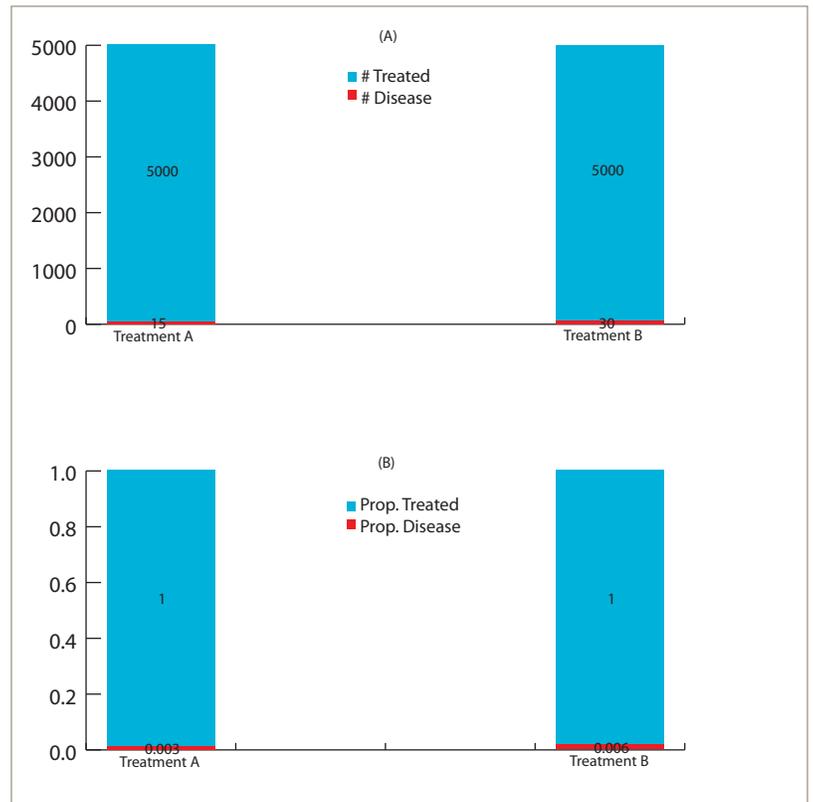


Figure legends

1. Bar graphs emphasizing relative risk using (A) frequencies of disease for two treatments and (B) proportions of disease for the same treatments.
  2. Stacked bar graphs emphasizing absolute risk using (A) frequencies of disease for two treatments and total treated (B) proportions of disease for the same treatments and total treated.
- Note that, in this case, choosing bar graphs to display relative risk, rather than absolute risk, makes it more evident that Treatment A is more effective. On the other hand, Figure 2 shows that there is little absolute difference in the effectiveness of the two treatments.

or negligible outcomes being compared in a simple bar graph can easily escape notice, due to the tendency to focus on the relative size of the bars and not on the numbers on the Y-axis (e.g., .003 and .006). People can take the numerical details into account but must be alerted to the key qualitative contrasts (i.e., .003 is smaller than .006).

- **Cue the retrieval of health-related knowledge and values.** Reminders of basic facts and values are useful for increasing risk perceptions in people of all ages and experience levels (Adam & Reyna, 2005; Reyna & Adam, 2003). When they are not cued to do so, even physicians fail to retrieve facts they know quite well (such as remembering to consider even syphilis and

gonorrhea when estimating the overall probability that a patient has a sexually transmitted disease).

#### Further Resources

Laboratory for Rational Decision Making: <http://www.human.cornell.edu/hd/reyna/index.cfm>

The Dartmouth Institute's Center for Informed Choice <http://www.dartmouth.edu/~cecs/cic/index.html>

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Development of this publication was supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed here are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.