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Letters

Digging deeper into reason

I really enjoyed "Roots of Reason" (SN: 1/29/94, p.72), but I want to point out three errors. First, there is the experiment where volunteers are asked to verify the rule "If a card has a D on one side, then it must have a 3 on the other side," and they are shown four cards displaying D, F, 3, and 7. They must turn over D and 7, as you stated, but they must also turn over F: If there is a D on the other side, this, too, is a violation of the rule.

Second, in the "ing" and next-to-last-letter "n" question, it occurred to me that the asker might be mentally separating words into groups such as "ends in 'ing,'" "does not end in 'ing' but next-to-last letter is 'n,'" and "other words." In that case, my guess would be the same as the students'.

Finally, the bank teller-feminist and false positive questions that are rephrased as frequentist questions are both cheats. The extra wording in the new questions provides a roadmap for solving the problems correctly; it even does the math. In the false positive

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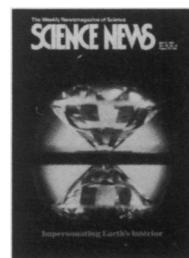
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Cover: A diamond anvil, two gem-quality stones squeezed together, can create pressures and temperatures mimicking those deep within Earth. (Photo: H. K. Mao and R. J. Hemley/Carnegie Institution of Washington)



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experiment, the rewording rephrases the question to explain its effect: "Out of every 1,000 people who are perfectly healthy, 50 of them test positive for the disease [italics added]."

Small wonder that drawing attention to this critical fact and making sure the subject has this in mind when answering the next question results in more correct answers.

Anthony M. Castaldo
San Antonio, Texas

The full text of the first experiment states that a clerk at a high school must make sure student documents conform to the rule "If a person has a 'D' rating, then his documents must be marked code '3.'" The directions state that each of four cards bears a letter on one side and a number on the other.

Regarding your second point, Tversky points out that this experiment required volunteers to estimate the total number of words ending in "ing" and the total number with a next-to-last "n." If individuals excluded "ing" words from the next-to-last "n" class, Tversky attributes that mistake to a cognitive bias that treats a familiar group of words as more numerous than the less

accessible class of words it belongs to.

Several readers argued that Cosmides and Tooby's frequentist version of the disease-detection problem merely provided a more lucid description of what "false positive" means and omitted the test's true positive rate.

In their series of experiments, the researchers included a true positive rate (100 percent accuracy for those who actually have the disease) and controlled for problem comprehensibility. In single-case versions based on the original Harvard study, clarifying the meaning of "false positive rate" yielded no improvement in problem solving. That clarification plus provision of the true positive rate yielded a success rate of 36 percent, still far below the 76 percent success rate for a frequentist version containing the same information phrased in the same way.

Correct estimates on this problem deviate by about .04 percent from a solution worked out in an explicitly mathematical way, as some readers point out. But Cosmides and Tooby only argue that a frequentist perspective harnesses the mind's "intuitive statistics," which work remarkably well in the absence of scratch pads, calculators, and mathematical theorems. — B. Bower

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