

Questions 32-41 are based on the following passage and supplementary material.

This passage is adapted from John Bohannon, "Why You Shouldn't Trust Internet Comments." ©2013 by American Association for the Advancement of Science.

The "wisdom of crowds" has become a mantra of the Internet age. Need to choose a new vacuum cleaner? Check out the reviews on online merchant
 Line Amazon. But a new study suggests that such online
 5 scores don't always reveal the best choice. A massive controlled experiment of Web users finds that such ratings are highly susceptible to irrational "herd behavior"—and that the herd can be manipulated.

Sometimes the crowd really is wiser than you. The
 10 classic examples are guessing the weight of a bull or the number of gumballs in a jar. Your guess is probably going to be far from the mark, whereas the average of many people's choices is remarkably close to the true number.

15 But what happens when the goal is to judge something less tangible, such as the quality or worth of a product? According to one theory, the wisdom of the crowd still holds—measuring the aggregate of people's opinions produces a stable, reliable
 20 value. Skeptics, however, argue that people's opinions are easily swayed by those of others. So nudging a crowd early on by presenting contrary opinions—for example, exposing them to some very good or very bad attitudes—will steer the crowd in a
 25 different direction. To test which hypothesis is true, you would need to manipulate huge numbers of people, exposing them to false information and determining how it affects their opinions.

A team led by Sinan Aral, a network scientist at
 30 the Massachusetts Institute of Technology in Cambridge, did exactly that. Aral has been secretly working with a popular website that aggregates news stories. The website allows users to make comments about news stories and vote each other's comments
 35 up or down. The vote tallies are visible as a number next to each comment, and the position of the comments is chronological. (Stories on the site get an average of about ten comments and about three votes per comment.) It's a follow-up to his experiment
 40 using people's ratings of movies to measure how much individual people influence each other online (answer: a lot). This time, he wanted to know how much the crowd influences the individual, and whether it can be controlled from outside.

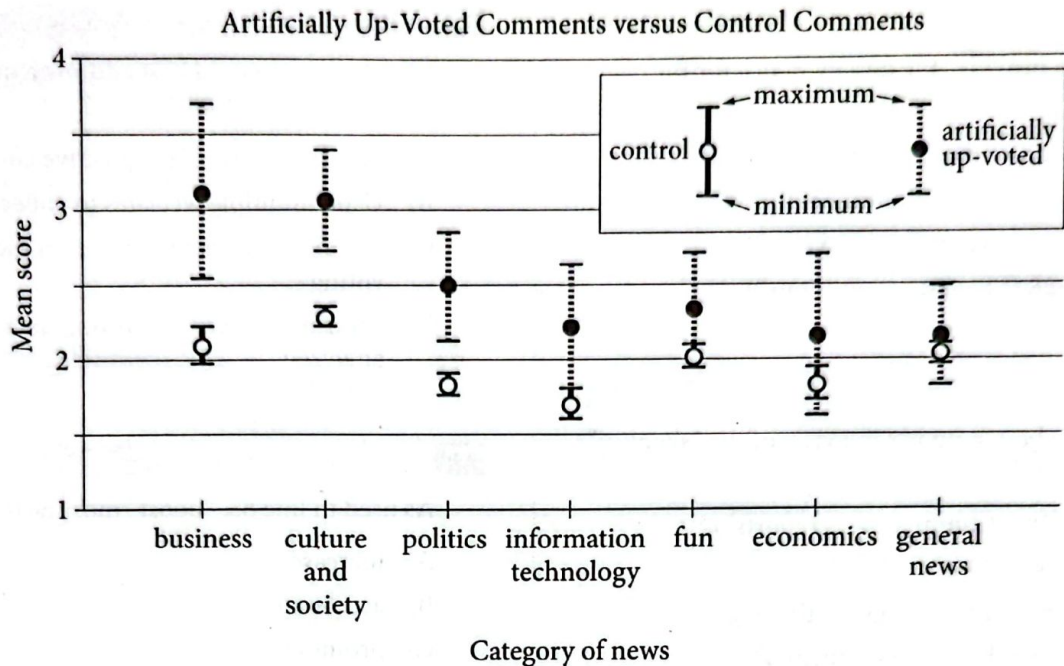
45 For five months, every comment submitted by a user randomly received an "up" vote (positive); a "down" vote (negative); or as a control, no vote at all. The team then observed how users rated those comments. The users generated more than
 50 100,000 comments that were viewed more than 10 million times and rated more than 300,000 times by other users.

At least when it comes to comments on news sites, the crowd is more herdlike than wise.
 55 Comments that received fake positive votes from the researchers were 32% more likely to receive more positive votes compared with a control, the team reports. And those comments were no more likely than the control to be down-voted by the next viewer
 60 to see them. By the end of the study, positively manipulated comments got an overall boost of about 25%. However, the same did not hold true for negative manipulation. The ratings of comments that got a fake down vote were usually negated by an up
 65 vote by the next user to see them.

"Our experiment does not reveal the psychology behind people's decisions," Aral says, "but an intuitive explanation is that people are more skeptical of negative social influence. They're more
 70 willing to go along with positive opinions from other people."

Duncan Watts, a network scientist at Microsoft Research in New York City, agrees with that conclusion. "[But] one question is whether the
 75 positive [herding] bias is specific to this site" or true in general, Watts says. He points out that the category of the news items in the experiment had a strong effect on how much people could be manipulated. "I would have thought that 'business' is
 80 pretty similar to 'economics,' yet they find a much stronger effect (almost 50% stronger) for the former than the latter. What explains this difference? If we're going to apply these findings in the real world, we'll need to know the answers."

85 Will companies be able to boost their products by manipulating online ratings on a massive scale? "That is easier said than done," Watts says. If people detect—or learn—that comments on a website are being manipulated, the herd may spook and leave
 90 entirely.



Mean score: mean of scores for the comments in each category, with the score for each comment being determined by the number of positive votes from website users minus the number of negative votes

Adapted from Lev Muchnik, Sinan Aral, and Sean J. Taylor, "Social Influence Bias: A Randomized Experiment." ©2013 by American Association for the Advancement of Science.

32

Over the course of the passage, the main focus shifts from a discussion of an experiment and its results to

- A) an explanation of the practical applications of the results.
- B) a consideration of the questions prompted by the results.
- C) an analysis of the defects undermining the results.
- D) a conversation with a scientist who disputes the results.

33

The author of the passage suggests that crowds may be more effective at

- A) creating controversy than examining an issue in depth.
- B) reinforcing members' ideas than challenging those ideas.
- C) arriving at accurate quantitative answers than producing valid qualitative judgments.
- D) ranking others' opinions than developing genuinely original positions.

34

Which choice provides the best evidence for the answer to the previous question?

- A) Line 9 ("Sometimes . . . you")
- B) Lines 11-14 ("Your . . . number")
- C) Lines 17-20 ("According . . . value")
- D) Lines 25-28 ("To test . . . opinions")

35

Which choice best supports the view of the "skeptics" (line 20)?

- A) Lines 55-58 ("Comments . . . reports")
- B) Lines 58-60 ("And . . . them")
- C) Lines 63-65 ("The ratings . . . them")
- D) Lines 76-79 ("He . . . manipulated")

36

Which action would best address a question Watts raises about the study?

- A) Providing fewer fake positive comments
- B) Using multiple websites to collect ratings
- C) Requiring users to register on the website before voting
- D) Informing users that voting data are being analyzed

37

As used in line 85, "boost" most nearly means

- A) increase.
- B) accelerate.
- C) promote.
- D) protect.

38

As used in line 86, "scale" most nearly means

- A) level.
- B) wage.
- C) interval.
- D) scheme.

39

In the figure, which category of news has an artificially up-voted mean score of 2.5?

- A) Business
- B) Politics
- C) Fun
- D) General news

40

According to the figure, which category of news showed the smallest difference in mean score between artificially up-voted comments and control comments?

- A) Culture and society
- B) Information technology
- C) Fun
- D) General news

41

Data presented in the figure most directly support which idea from the passage?

- A) The mean score of artificially down-voted comments is similar to that of the control.
- B) The patterns observed in the experiment suggest that people are suspicious of negative social influence.
- C) The positive bias observed in users of the news site may not apply to human behavior in other contexts.
- D) The type of story being commented on has an impact on the degree to which people can be influenced.

Questions 42-52 are based on the following passage.

This passage is adapted from Joshua Foer, *Moonwalking with Einstein: The Art and Science of Remembering Everything*. ©2011 by Joshua Foer.

In 2000, a neuroscientist at University College London named Eleanor Maguire wanted to find out what effect, if any, all that driving around the labyrinthine streets of London might have on cabbies' brains. When she brought sixteen taxi drivers into her lab and examined their brains in an MRI scanner, she found one surprising and important difference. The right posterior hippocampus, a part of the brain known to be involved in spatial navigation, was 7 percent larger than normal in the cabbies—a small but very significant difference. Maguire concluded that all of that way-finding around London had physically altered the gross structure of their brains. The more years a cabbie had been on the road, the more pronounced the effect.

The brain is a mutable organ, capable—within limits—of reorganizing itself and readapting to new kinds of sensory input, a phenomenon known as neuroplasticity. It had long been thought that the adult brain was incapable of spawning new neurons—that while learning caused synapses to rearrange themselves and new links between brain cells to form, the brain's basic anatomical structure was more or less static. Maguire's study suggested the old inherited wisdom was simply not true.

After her groundbreaking study of London cabbies, Maguire decided to turn her attention to mental athletes. She teamed up with Elizabeth Valentine and John Wilding, authors of the academic monograph *Superior Memory*, to study ten individuals who had finished near the top of the World Memory Championship. They wanted to find out if the memorizers' brains were—like the London cabbies'—structurally different from the rest of ours, or if they were somehow just making better use of memory abilities that we all possess.

The researchers put both the mental athletes and a group of matched control subjects into MRI scanners and asked them to memorize three-digit numbers, black-and-white photographs of people's faces, and magnified images of snowflakes, while their brains were being scanned. Maguire and her team thought it was possible that they might discover anatomical differences in the brains of the memory champs,

evidence that their brains had somehow reorganized themselves in the process of doing all that intensive remembering. But when the researchers reviewed the imaging data, not a single significant structural difference turned up. The brains of the mental athletes appeared to be indistinguishable from those of the control subjects. What's more, on every single test of general cognitive ability, the mental athletes' scores came back well within the normal range. The memory champs weren't smarter, and they didn't have special brains.

But there was one telling difference between the brains of the mental athletes and the control subjects: When the researchers looked at which parts of the brain were lighting up when the mental athletes were memorizing, they found that they were activating entirely different circuitry. According to the functional MRIs [fMRIs], regions of the brain that were less active in the control subjects seemed to be working in overdrive for the mental athletes.

Surprisingly, when the mental athletes were learning new information, they were engaging several regions of the brain known to be involved in two specific tasks: visual memory and spatial navigation, including the same right posterior hippocampal region that the London cabbies had enlarged with all their daily way-finding. At first glance, this wouldn't seem to make any sense. Why would mental athletes be conjuring images in their mind's eye when they were trying to learn three-digit numbers? Why should they be navigating like London cabbies when they're supposed to be remembering the shapes of snowflakes?

Maguire and her team asked the mental athletes to describe exactly what was going through their minds as they memorized. The mental athletes said they were consciously converting the information they were being asked to memorize into images, and distributing those images along familiar spatial journeys. They weren't doing this automatically, or because it was an inborn talent they'd nurtured since childhood. Rather, the unexpected patterns of neural activity that Maguire's fMRIs turned up were the result of training and practice.

42

According to the passage, Maguire's findings regarding taxi drivers are significant because they

- A) demonstrate the validity of a new method.
- B) provide evidence for a popular viewpoint.
- C) call into question an earlier consensus.
- D) challenge the authenticity of previous data.

43

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 8-12 ("The right . . . difference")
- B) Lines 12-16 ("Maguire . . . effect")
- C) Lines 17-20 ("The brain . . . neuroplasticity")
- D) Lines 20-26 ("It had . . . true")

44

As used in line 24, "basic" most nearly means

- A) initial.
- B) simple.
- C) necessary.
- D) fundamental.

45

Which question was Maguire's study of mental athletes primarily intended to answer?

- A) Does the act of memorization make use of different brain structures than does the act of navigation?
- B) Do mental athletes inherit their unusual brain structures, or do the structures develop as a result of specific activities?
- C) Does heightened memorization ability reflect abnormal brain structure or an unusual use of normal brain structure?
- D) What is the relationship between general cognitive ability and the unusual brain structures of mental athletes?

46

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 27-29 ("After . . . athletes")
- B) Lines 33-37 ("They . . . possess")
- C) Lines 38-43 ("The researchers . . . scanned")
- D) Lines 52-54 ("What's . . . range")

47

As used in line 39, "matched" most nearly means

- A) comparable.
- B) identical.
- C) distinguishable.
- D) competing.

48

The main purpose of the fifth paragraph (lines 57-65) is to

- A) relate Maguire's study of mental athletes to her study of taxi drivers.
- B) speculate on the reason for Maguire's unexpected results.
- C) identify an important finding of Maguire's study of mental athletes.
- D) transition from a summary of Maguire's findings to a description of her methods.

49

According to the passage, when compared to mental athletes, the individuals in the control group in Maguire's second study

- A) showed less brain activity overall.
- B) demonstrated a wider range of cognitive ability.
- C) exhibited different patterns of brain activity.
- D) displayed noticeably smaller hippocampal regions.

50

The passage most strongly suggests that mental athletes are successful at memorization because they

- A) exploit parts of the brain not normally used in routine memorization.
- B) convert information they are trying to memorize into abstract symbols.
- C) organize information into numerical lists prior to memorization.
- D) exercise their brains regularly through puzzles and other mental challenges.

51

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 66-72 ("Surprisingly . . . way-finding")
- B) Lines 72-73 ("At first . . . sense")
- C) Lines 79-81 ("Maguire . . . memorized")
- D) Lines 85-87 ("They . . . childhood")

52

The questions in lines 74-78 primarily serve to

- A) raise doubts about the reliability of the conclusions reached by Maguire.
- B) emphasize and elaborate on an initially puzzling result of Maguire's study of mental athletes.
- C) imply that Maguire's findings undermine earlier studies of the same phenomenon.
- D) introduce and explain a connection between Maguire's two studies and her earlier work.

STOP

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**

Writing and Language Test

35 MINUTES, 44 QUESTIONS

Turn to Section 2 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage below is accompanied by a number of questions. For some questions, you will consider how the passage might be revised to improve the expression of ideas. For other questions, you will consider how the passage might be edited to correct errors in sentence structure, usage, or punctuation. A passage or a question may be accompanied by one or more graphics (such as a table or graph) that you will consider as you make revising and editing decisions.

Some questions will direct you to an underlined portion of a passage. Other questions will direct you to a location in a passage or ask you to think about the passage as a whole.

After reading each passage, choose the answer to each question that most effectively improves the quality of writing in the passage or that makes the passage conform to the conventions of standard written English. Many questions include a "NO CHANGE" option. Choose that option if you think the best choice is to leave the relevant portion of the passage as it is.

Questions 1-11 are based on the following passage.

Prehistoric Printing

Paleontologists are using modern technology to gain a greater understanding of the distant past. With the aid of computed tomography (CT) scanning and 3-D printing, researchers are able to create accurate models of prehistoric fossils. **1** These models have expanded

1

At this point, the writer is considering adding the following sentence.

Fossils provide paleontologists with a convenient way of estimating the age of the rock in which the fossils are found.

Should the writer make this addition here?

- A) Yes, because it supports the paragraph's argument with an important detail.
- B) Yes, because it provides a logical transition from the preceding sentence.
- C) No, because it is not directly related to the main point of the paragraph.
- D) No, because it undermines the main claim of the paragraph.

researchers' knowledge of ancient species and **2** swear to advance the field of paleontology in the years to come.

CT scanners use X-rays to map the surface of a fossil in minute detail, recording as many as one million data points to create a digital blueprint. A 3-D printer then builds a polymer model based on this blueprint, much as a regular computer printer reproduces digital documents on paper. **3** Whereas the head of an ordinary computer printer moves back and forth while printing ink onto paper, the corresponding part of a 3-D printer moves in multiple dimensions while squirting out thin layers of melted polymer plastic. The plastic hardens quickly, **4** it allows the printer to build the layers of the final model. Compared with older ways of modeling fossils, scanning and printing in this way is extremely versatile.

2

- A) NO CHANGE
- B) subscribe
- C) vow
- D) promise

3

The writer is considering deleting the underlined sentence. Should the sentence be kept or deleted?

- A) Kept, because it helps explain why X-rays are used in CT scanners.
- B) Kept, because it provides details to illustrate how a 3-D printer works.
- C) Deleted, because it contradicts the passage's information about digital blueprints.
- D) Deleted, because it creates confusion about how researchers gather data.

4

- A) NO CHANGE
- B) this
- C) which
- D) that

[1] One significant benefit of 3-D printing technology is its ability to create scale reproductions of fossils. [2] But now 3-D scale models can be rearranged with ease, which is a huge boon to scientists. [3] A team led by Drexel University professor Kenneth Lacovara is making models of dinosaur bones one-tenth the bones' original sizes **5** in order to learn how they fit together when the animals were alive. [4] In the past, such research was limited by the weight and bulk of the fossils as well as **6** its preciousness and fragility. [5] In many cases, scientists had to rearrange bones virtually, using artists' renderings. **7**

Because CT scanners can map objects that are impossible to excavate, CT scanning and 3-D printing can also be used to reproduce fossils that scientists cannot observe firsthand. **8** By contrast, researchers

5

- A) NO CHANGE
- B) in order for learning
- C) so that one is learning
- D) so to learn

6

- A) NO CHANGE
- B) it's
- C) their
- D) there

7

To make this paragraph most logical, sentence 2 should be placed

- A) where it is now.
- B) before sentence 1.
- C) after sentence 4.
- D) after sentence 5.

8

- A) NO CHANGE
- B) Nonetheless,
- C) Besides,
- D) For example,

from the National Museum of Brazil **9** has relied on this technique to study a fossilized skeleton that was discovered protruding from a rock at an old São Paulo railroad site. **10** The fossil was too delicate to be removed from the rock. Because of the fossil's delicate nature, the team dug up a block of stone around the fossil and brought it to their lab. With the aid of a CT scanner and a 3-D printer, they were able to produce a resin model of the fossil. Examining the model, the researchers determined that **11** one had found a new species, a 75-million-year-old crocodile. While not every discovery will be as dramatic as this one, paleontologists anticipate further expanding their knowledge of ancient life-forms as CT scanning and 3-D printing continue to make fossils more accessible.

9

- A) NO CHANGE
- B) relied
- C) will rely
- D) is relying

10

Which choice most effectively combines the underlined sentences?

- A) The fossil could not be removed from the rock on account of it being too delicate; moreover, the team dug up a block of stone around it and brought it to their lab.
- B) The team thought the fossil was too delicate to remove from the rock, and their next decision was to dig up a block of stone around the fossil and bring it to their lab.
- C) The fossil was too delicate to be removed from the rock, so the team dug up a block of stone around the fossil and brought it to their lab.
- D) In removing the fossil from the rock, the team found it was too delicate; then they dug up a block of stone around the fossil and brought it to their lab.

11

- A) NO CHANGE
- B) he or she
- C) they
- D) it

Questions 12-22 are based on the following passage.

Thomas Nast, the Crusading Cartoonist

"Stop them pictures!" Legend has it that the corrupt politician William "Boss" Tweed once used those words when ordering someone to offer a bribe to Thomas Nast, an artist who had become famous for cartoons that called for reforms to end corruption. **12** As a result, Tweed's attempt to silence the artist failed, and Nast's cartoons, published in magazines like *Harper's Weekly*, actually played a key role in bringing Boss Tweed and his cronies to justice.

13 There were powerful political organizations in the 1860s and the 1870s. The organizations were known as "political machines" and started taking control of city governments. These political machines were able to pack legislatures and courts with hand-picked supporters by purchasing **14** votes, a form of election fraud involving the exchange of money or favors for votes. Once a political machine had control of enough important positions, its members were able to use public funds to enrich themselves and their friends. Boss Tweed's Tammany Hall group, which controlled New York **15** City in the 1860s—stole more than \$30 million,

12

- A) NO CHANGE
- B) Therefore,
- C) Furthermore,
- D) DELETE the underlined portion.

13

Which choice most effectively combines the underlined sentences?

- A) Powerful political organizations in the 1860s and the 1870s started taking control of city governments, and they were known as "political machines."
- B) Known as "political machines," in the 1860s and the 1870s, political organizations that were powerful started taking control of city governments.
- C) City governments were taken control of in the 1860s and the 1870s, and powerful political organizations known as "political machines" did so.
- D) In the 1860s and the 1870s, powerful political organizations known as "political machines" started taking control of city governments.

14

- A) NO CHANGE
- B) votes, being
- C) votes, that is
- D) votes, which it is

15

- A) NO CHANGE
- B) City in the 1860s,
- C) City, in the 1860s,
- D) City in the 1860s

the equivalent of more than \$365 million today.

16 Tweed had been elected to a single two-year term in Congress in 1852. Tammany Hall was so powerful and

17 corrupt that, the *New York Times*, commented

“There is absolutely nothing . . . in the city which is beyond the reach of the insatiable gang.”

Given the extent of Tweed’s power, it is remarkable that a single cartoonist could have played such a significant role in bringing about his downfall. Nast’s cartoons depicted Tweed as a great big bloated thief. One of the artist’s most **18** famous images showed Tweed with a bag of money in place of his **19** head. Another featured Tweed leaning against a ballot box with the caption “As long as I count the votes, what are you going to do about it?” These cartoons were so effective in part because many of the citizens who supported Tweed were illiterate and thus could not read the newspaper accounts of his criminal activities. Nast’s cartoons, though, widely exposed the public to the injustice of Tweed’s political machine.

16

The writer is considering deleting the underlined sentence. Should the sentence be kept or deleted?

- A) Kept, because it introduces the quote from the *New York Times* in the next sentence.
- B) Kept, because it adds a vital detail about Tweed that is necessary to understand his power.
- C) Deleted, because it blurs the focus of the paragraph by introducing loosely related information.
- D) Deleted, because it contains information that undermines the main claim of the passage.

17

- A) NO CHANGE
- B) corrupt, that the *New York Times* commented,
- C) corrupt that the *New York Times* commented,
- D) corrupt that the *New York Times*, commented

18

- A) NO CHANGE
- B) famous and well-known
- C) famous and commonly known
- D) famous, commonly known

19

Which choice adds the most relevant supporting information to the paragraph?

- A) head; like many other Nast cartoons, that one was published in *Harper’s Weekly*.
- B) head; Nast would later illustrate Tweed’s escape from prison.
- C) head, one depiction that omits Tweed’s signature hat.
- D) head, an image that perfectly captured Tweed’s greedy nature.

Nast's campaign to bring down Tweed and the Tammany Hall gang was ultimately successful. In the elections of 1871, the public voted against most of the Tammany Hall candidates, greatly weakening Tweed's power. Eventually, Tweed and his gang were

20 persecuted for a number of charges, including fraud and larceny, and many of them were sent to jail. In 1875 Tweed escaped from jail and fled to Spain and unwittingly **21** brought about one final **22** pinnacle for the power of political cartoons: A Spanish police officer recognized Tweed from one of Nast's cartoons.

Consequently, Tweed was sent back to jail, and Nast was hailed as the man who toppled the great Tammany Hall machine.

20

- A) NO CHANGE
- B) persecuted on
- C) persecuted with
- D) prosecuted on

21

- A) NO CHANGE
- B) bringing
- C) brings
- D) has brought

22

- A) NO CHANGE
- B) triumph
- C) culmination
- D) apex