

第6問 (配点 24)

- A Your English teacher has assigned this article to you. You need to prepare notes to give a short talk.

Belief Perseverance

There may be some out-of-date rules at your school. If you ask your teachers to update these rules, your ideas may be rejected. Of course, most of their objections will be reasonable, but some may be caused by **belief perseverance**, the psychological characteristic of maintaining an existing belief despite any new information. Although this tendency itself is neither good nor bad, it may cause conflicts ranging from personal problems to social phenomena.

A study published in 1980 by Craig A. Anderson and his colleagues describes this human tendency. In the first stage of their experiment, the participants were presented with evidence that led them to conclude that firefighters who were willing to take risks performed their jobs better. Surprisingly, even after the participants were told that the evidence was false, they were reluctant to change their conclusions. Why is it difficult to change our beliefs? This is partly because we have **confirmation bias**, a psychological tendency to look for information consistent with our existing beliefs. Also, in some cases, the more others attempt to prove our beliefs wrong, the more firmly we stick to them, which is called the **backfire effect**.

The case of Ignaz Philip Semmelweis demonstrates belief perseverance in one group in society. He was a 19th-century physician who wondered why more women died from a fever after giving birth in one place than in another. His data apparently indicated that handwashing could reduce the number of occurrences of the deadly fever. However, at that time, handwashing was not common among doctors. His potentially life-saving idea was ignored by the

medical community, and many doctors rejected it and even harassed him. Semmelweis' claim was eventually accepted long after his death. This episode demonstrates how a group of people with belief perseverance can become aggressive towards innovators and ground-breaking ideas. This social reaction was named the **Semmelweis reflex** after this incident.

Understanding belief perseverance can give us insights into the ways people behave. Imagine that you want to study abroad, and your family strongly opposes it because they believe that the city you plan to live in is dangerous. Even after showing them data on the city's crime rate, you may find out that your efforts end up only adding fuel to the fire. If you encounter this backfire effect, an alternative approach might be needed. You could ask your teacher to speak with your family on your behalf, taking advantage of a related behavior that people tend to trust the opinions of an authority.

If someone presents you with hard-to-believe information, be careful not to reject it immediately. If your internal voice warns you not to act on that information, it is time to remind yourself of belief perseverance. To be stubborn may not be good for you. However, in many cases, the persistence of existing beliefs is desirable or even necessary these days. Remember that the Internet conveys not only accurate but also unreliable information. Belief perseverance can also protect you from potentially fake information. In other words, take time to find out more before accepting new information. After all, we humans have developed belief perseverance over time to ensure our survival. Understanding human nature is one of the keys to keeping your life balanced.

Your notes:

Belief Perseverance (BP)

BP:

- is a tendency to maintain an existing belief despite any new information.
- can be 39.

Outline by paragraph

1. Introduction to BP
2. Experiment and explanation
3. 40
4. 41
5. Final remarks

Stories mentioned in the article

- The firefighters story shows us that 42.
- The Semmelweis story tells us that even a truly innovative idea with sufficient evidence can be initially rejected.

Practical lessons from the article

Learning about the nature of human psychology helps us to 43.

問 1 Choose the best option for 39 .

- ① a barrier which stops people from expressing their opinions
- ② a cause of positive or negative outcomes for anyone
- ③ a major disadvantage for people who are easily convinced
- ④ an obstacle preventing us from keeping our beliefs strong

問 2 Choose the best options for 40 and 41 .

- ① A story of a doctor who rejected handwashing
- ② An example of the social consequences of BP
- ③ An example showing the difficulty of understanding others
- ④ Application of BP knowledge when convincing others
- ⑤ Strategies for effectively countering new information
- ⑥ Tendency to search for advice from specialists

問 3 Choose the best option for 42 .

- ① BP appears to have an influence on anyone, even in situations one wouldn't expect
- ② confirmation bias is found when people want to believe new information
- ③ the backfire effect often happens when a stubborn person's opinion is rejected
- ④ the Semmelweis reflex is often observed in occupations where risks are common

問 4 Choose the best option for 43 .

- ① analyze historical discoveries from a scientific point of view
- ② make reasonable decisions when dealing with new information
- ③ recognize immediately whether given information is true or not
- ④ understand when it is appropriate or necessary to take risks

B You are preparing for a science fair presentation on a scientific discovery, using the following magazine article.

“Smart” Fabrics

Through the years, the fabrics we use have evolved to suit our changing lifestyles and needs. Linen, made from the fibers of a plant called flax, is one of the oldest textiles in the world. It naturally reflects away the sun and its intense heat, and allows better airflow than other types of fabric. Light and airy, linen has long been the ideal fabric for warm climates. With industrialization and population growth, however, cotton became more commonly used since it was suitable for mass production. Cloth made from cotton can be heavy and can trap body heat though, which may make people feel uncomfortable in very hot and humid weather.

Newer materials are always being developed as technology progresses, and “smart” fabrics are a recent scientific breakthrough in the textile industry. Weaving flexible synthetic fibers into cloth can provide additional functions for the fabric. For example, scientists at the Huazhong University of Science and Technology made a new fabric called “metafabric” that deflects heat to keep people cooler. Such fabric can be used to create clothes that ease the discomfort people suffer when the temperature rises. In their experiment, a participant wore a vest consisting of two halves—one half cotton and the other half metafabric—and was exposed to direct sunlight for an hour. Underneath the cotton, the skin temperature soared to 37°C. In contrast, underneath the metafabric, the temperature rose by just one degree, from 31°C to 32°C.

Another interesting example is a fabric that can detect sounds. The human ear picks up sound pressures, and the inner organs convert sound waves into mechanical vibrations and then into electrical signals. Similarly, “piezoelectric materials,” which are typically used for microphones or speakers, produce an electrical signal when mechanically bent.

Using this knowledge, a team of researchers at the Massachusetts Institute of Technology and the Rhode Island School of Design came up with a so-called “acoustic fabric.” The researchers wove a piezoelectric fiber into fabric and conducted a series of experiments. One experiment examined the fabric’s sensitivity to sound directions. They sewed two pieces of acoustic fabric onto the back of a shirt. Then, they clapped their hands at various angles away from the shirt. The fiber converted the sound first into mechanical vibrations, then into electrical signals that were stored on a device. The fabric was successfully able to pinpoint the angle of the sounds. This could lead to a useful application for individuals with hearing aids to identify the direction of a specific sound even in noisy surroundings.

In addition to functioning as wearable hearing aids, acoustic fabric can be used for other purposes such as tracking respiratory (lung), pulse, and cardiac (heart) conditions. Another experiment tested whether clothes with acoustic fibers could act as fabric stethoscopes to monitor a person’s subtle cardiac features. The research group attached a single fiber over the chest region on a shirt and found it accurately detected the wearer’s heart signals. Furthermore, this result indicated the possibility of utilizing the fabric in maternity clothes to check an unborn baby’s heartbeat.

Researchers see applications of smart fabrics beyond clothing. A smart fabric with cooling performance can be applied to various products for different purposes, such as tents, car covers, curtains, and sunshade products. Acoustic fabrics can be integrated with spacecraft coatings to monitor cosmic debris, or be used to help detect cracks or strains in buildings. They can even be woven into a net to check on fish in the sea.

As these examples of textile innovation suggest, new fabrics can enhance our lives in many ways. You may not believe this, but the coolest things about these fabrics are that you can get “smart” while wearing them and some of them are machine-washable!

Your slides:

Science Fair: A Scientific Discovery

44

1

Traditional Fabric

- Linen
- Cotton

Smart Fabric

- Metafabric
- Acoustic fabric

2

Metafabric Experiment

60 minute exposure



cotton

metafabric



Implication: 45

3

Acoustic Fabric Experiment 1

Procedure:

1. Acoustic fabric was woven into a shirt.
2. 46
3. Sound was converted into electrical signals.
4. 47

Results:

- The directions of the claps were identified.

4

Acoustic Fabric Experiment 2

Purpose:

- To see if the acoustic fiber works as a stethoscope

Results:

- The acoustic fiber heard the wearer's heartbeat.

Future benefits:

- 48
- Maternity clothing

5

Applications Beyond Clothing

49

- A. To find weak places in buildings
- B. To listen for debris in space
- C. To locate a crying baby
- D. To protect vehicles from the sun

6

問 1 Which is the best title for the presentation on Slide 1? 44

- ① Bio-Based Textile Innovation
- ② First Fabric That Addresses New Challenges
- ③ Great Advantages of Clever Textiles
- ④ The History of Fiber Design

問 2 What does the result of the experiment by the Huazhong University of Science and Technology imply on Slide 3? Choose the best option for 45.

- ① It is far easier to create an outfit that keeps you warm.
- ② Light-colored fabric is more suitable for reflecting the sunlight.
- ③ The newly invented fabrics can keep people comfortable in hot weather.
- ④ You should wear a shirt made of the metafabric over your other clothing.

問 3 You are summarizing the steps in conducting the acoustic study on the smart shirt on Slide 4. Choose the best options for 46 and 47.

- ① Mechanical vibrations were bent by the fabric.
- ② Sounds from various directions were made.
- ③ The acoustic fabric recorded the sounds.
- ④ The output from each fiber was saved.
- ⑤ The researchers moved a shirt to different places.
- ⑥ Various types of sounds were measured by a shirt.

問 4 What can be inferred as a possible benefit of wearing an acoustic fabric on Slide 5? Choose the best option for

48

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- ① A person with irregular cardiac activity can get help.
- ② Acoustic fabric can give a person directions on the street.
- ③ It can help a person breathe more deeply and easily.
- ④ It can reduce noise levels and answer phone calls.

問 5 You found an error on Slide 6. Which of the following should you remove?

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- ① A
- ② B
- ③ C
- ④ D