平成31年度入学試験問題（一般入試）

英　　語

16：00～17：40

注　意

1. 問題冊子は，指示があるまで開かないこと。
2. 問題冊子は6ページ，解答紙は2枚である。「始め」の合図があったら，それぞれページ数および枚数を確認すること。
3. 解答開始前に，試験監督者の指示に従って，すべての解答紙それぞれ2ヵ所に受験番号を記入すること。
4. 解答は，黒色鉛筆(シャープペンシルも可)を使用し，すべて所定の欄に記入すること。欄外および裏面には記入しないこと。
5. 試験終了後，監督者の指示に従って，解答紙の順番をそろえること。
6. 下書き等は，問題冊子の余白を利用すること。
7. 解答紙は持ち帰らないこと。

〔1〕 次の英文を読んで，文中の(ア)～(コ)に入れるのに最も適当な英語一語をそれぞれ書きなさい。

People cry to express a range and degree of emotions—(ア) happiness after doing well on a difficult exam to grief after the death of a friend. Some people wear their hearts on their sleeves and cry for the slightest reason; (イ) suppress their tears in emotional situations. Crying can even be related to behaviors that seem to contradict each other—think "tears of joy." What causes this complex behavior in the first place?

Two key factors can help (ウ) why we cry. The first is our crying threshold*1—the point at which a feeling becomes so intense that it makes us cry. This threshold varies from person to person. Some have a low threshold and may need only a small push, such as missing the bus to work or being insulted by a friend. But for those with a high threshold, it may take a significant event—the (エ) of one's child or the death of a loved one—to produce strong enough emotions. These thresholds may vary throughout a person's lifetime or even within a single day. Being very physically tired, for example, can make a person more likely to cry.

The other central factor is (オ) intensely an individual reacts to a situation, known as emotional reactivity.*2 Certain people may be emotionally intense most of the time, but such strong feelings will not necessarily bring a person to tears. In other words, whether someone cries (カ) on how he or she responds to a situation, not necessarily the person's typical emotional state.

It is quite likely that these two factors—threshold and reactivity—interact*3 along a scale. At one end of the scale, an individual with a high threshold who is non-emotional may rarely feel the need to cry, whereas on the other (キ), a person with a low threshold who is very sensitive may be brought to tears easily.

Interestingly, a tendency to display behaviors that are not in harmony with each other may also influence whether we cry. My colleagues and I recently found that someone who expresses feelings in two distinct forms—such as tears of happiness as well as tears of (ク)—is more likely to cry in a wide range of situations, regardless of the strength of the emotion. But we also discovered that behaviors that are not in harmony—(ケ) as wanting to pinch a cute baby's cheeks—occur more often when a person has intense feelings about something and could help make the extreme feeling more neutral.

Overall, (コ) is not a simple reaction but rather a complex behavior that can indicate how we process and control our feelings and how we experience the world around us.

【Adapted from "Why Do We Cry?," by Oriana Aragón, *Scientific American Mind*, Vol. 28, No. 2, March/April, 2017, p. 74】

〔注〕 ＊1 threshold：閾(値)(ある感覚や反応を起こすのに必要な，最小の刺激の強さ)
＊2 reactivity：反応性 ＊3 interact：相互に作用する

〔2〕 次の英文を読んで設問に答えなさい。

What would make a smoker more likely to quit, a big reward for succeeding or a little penalty for failing? That is what researchers wanted to know when they assigned a large group of employees of a drug company and their relatives and friends to different smoking cessation*1 programs.

The answer offered a surprising understanding of human behavior. (1) Many more people agreed to register for the reward program, but only a small proportion of them could actually quit smoking. A far smaller number agreed to risk the penalty, but those who did so were twice as likely to quit.

The purpose of (2) the experiment was to test whether offering people financial incentives*2 could lead to better health, using more than 2,500 people. Researchers found that offering any kind of financial incentive was much more effective in getting people to stop smoking than the traditional approach of giving free smoking cessation help, such as counseling or chewing gum or medicine. They also found, however, that the chances of success were nearly double if they required a $150 deposit that would be lost if the person failed to stay off cigarettes for six months.

The result is likely to get the attention of large companies as they try to decide what types of benefits to offer employees in an era of rising health care costs. Most large employers now offer incentives for health-promoting behavior in the form of exercise and diet programs, but until now they have not had much evidence about what types of programs actually work. They spend an average of $800 per employee per year, but in ways that often ignore normal human psychology.

The experiment was intended to change that. The people who participated were assigned at random to various programs and were allowed to decide whether they wanted to participate. About 14 percent of people assigned to the penalty program accepted it, compared with about 90 percent of people assigned to the reward program.

The penalty program required participants to deposit $150; six months later, those who had quit smoking would get the deposit back, in addition to a $650 reward. In the reward program, the people were simply offered an $800 payment if they did not smoke cigarettes for six months.

The success rate for those who joined the reward group was low, about 17 percent, compared with more than 50 percent for the penalty program, though the figures had to be adjusted to account for the possibility that those who chose the penalty might have already had more motivation to quit.

(3) Even after adjusting for that factor, those who registered for the penalty were nearly twice as likely to quit smoking as those who chose rewards, and five times as likely to quit as those who only got free counseling. Even so, the largest overall effect was among the group that was assigned to pure rewards, simply because so many more people took part.

Over all, most of the people who participated in the study could not succeed. More than 80 percent of smokers in the popular reward group were still smoking at the end of the study. Even so, their success rate was far greater than that of the people who got the traditional treatment, indicating that there could be substantial public health*3 benefits in offering financial incentives. Even a small decline in smoking could have a big health effect. Smoking is the largest cause of preventable death in the United States. Diseases linked to it kill more than 480,000 Americans a year.

【Adapted from "Study Asks if Carrot or Stick Can Better Help Smokers Stop," by Sabrina Tavernise, *The New York Times Online*, May 13, 2015】

〔注〕 ＊1 smoking cessation：禁煙　　＊2 financial incentive：報奨金
＊3 public health：公衆衛生

〔設 問〕

1. 下線部(1)を日本語に訳しなさい。

2. 下線部(2)について，この結果が大企業の注目を集める可能性があるのはなぜか，本文の内容に沿って100字程度の日本語で書きなさい。

3. 下線部(3)について，文中の that factor の内容を明らかにしながら日本語に訳しなさい。

4. 本文の内容に関する次の文(1)~(5)を読み，正しいものには○，間違っているものには×を，それぞれ記入しなさい。
   (1) Free smoking cessation help was more effective than a penalty for failing to quit smoking.
   (2) Approximately 14% of the people joined the penalty group, whether they wanted to or not.
   (3) The gain for those who could achieve the goal of the penalty program would be five times more than what they had deposited.
   (4) Even though most of the smokers in the incentive program could not stop smoking, it achieved better results than traditional programs.
   (5) The annual amount of deaths related to smoking is estimated to be at least 480,000 in the United States.

〔3〕 次の英文を読んで設問に答えなさい。

Over the last 20,000 years, the human brain has gotten smaller by about the size of a tennis ball. Scientists found this out when they measured the skulls*1 of our ancient ancestors and realized they were larger than the modern brain. This is a remarkable discovery, since for most of our evolution the human brain has been getting larger.

Small brains are generally not associated with intelligence in the animal kingdom. Animals with large brains are more flexible and better at solving problems. As a species, humans have exceptionally large brains — about seven times larger than should be expected, given the average body size. (1) The finding that the human brain has been getting smaller over our recent evolution is contrary to the generally held view that we are smarter than our ancestors because bigger brains equal more intelligence. After all, the complexity of modern life suggests that we are becoming more clever to deal with it.

Nobody knows exactly why the human brain has been getting smaller, but it does raise some interesting questions about the relationship between the brain, behavior and intelligence. First, we make lots of assumptions about the progress of human intelligence that we cannot prove. We assume that our ancestors must have been backward because the technologies they produced seem so primitive by modern standards. But what if basic human intelligence has not changed much over the past 20,000 years? What if they were just as smart as modern man, only without the benefit of knowledge that was gathered over thousands of generations? We should not assume that we are fundamentally more intelligent than an individual born 20,000 years ago. We may have more knowledge and understanding of the world around us, but much of it was learned from the experiences of others that went before us rather than the result of our own effort.

Second, the link between brain size and intelligence is too simple for many reasons. It is not the size that matters but how you use it. There are some individuals who are born with little brain tissue or others with only half a brain as a result of disease and surgery, but they can still think and perform within the normal range of intelligence because they effectively use whatever brain tissue they do have left. Moreover, what is critical is the connections inside the brain, not the size. Brain volume based on fossil*2 records does not tell you how the small internal structures were organized or operating.

Structural arguments aside, (2) why would such a vital organ as the human brain, one that has been expanding for the majority of our evolution, suddenly begin to reduce in size around 20,000 years ago? One theory is related to diet. As we changed from being hunters who ate meat and wild plants to farmers who cultivated crops, the change in our diet over this period might have been responsible for the brain change. However, this seems unlikely. Farming only recently arrived in Australia and yet they also experienced the same decline in brain size

over this period. Also, agriculture first appeared in Asia around 11-12,000 years ago, long after the human brain had begun to change.

Environmental scientists point out that once the climate warmed up around 20,000 years ago, marking the beginning of the end of the Ice Age,*3 we no longer needed large bodies to carry heavy amounts of fat reserves. As our bodies got smaller, our brains might have gotten smaller in the same way. Big brains require lots of energy, so a decrease in body size would have enabled our ancestors to reduce the size of the brain, too. But that fails to explain similar periods of climate change that also took place during the 2 million years when hominid*4 brains were still increasing in size.

(3) One other theory about why the brain is getting smaller may seem quite strange — that the human brain is smaller because we have become domesticated.*5 Domestication*6 was originally a biological term to describe artificial selection*7 and breeding of plants and animals. Charles Darwin was very interested in domestication and indeed many of his arguments for his theory on the origins of species were based on the effects of selective breeding by humans of plants and animals. But unlike natural selection, domestication has an intention: with the invention of farming and animal raising some 12,000 years ago, humans deliberately controlled the selection process of both plants and animals to eventually modify the various species they wanted to use. We bred the aggressive character out of animals by selecting individual animals that were easier to manage, and, in doing so, we changed the nature of their behavior.

This is how we also began to domesticate ourselves to live together in larger communities. It was *self*-domestication. We have been domesticating ourselves so that certain characteristics that were more acceptable to the group than others became common because individuals who possessed them were more successful in surviving and having children. In this sense we have been self-domesticating through the invention of culture and practices that ensure that we can live together.

Something about the domestication process produces deep and permanent physical changes. When wild animals are domesticated, their bodies and brains change along with their behavior. The brains of all the approximately thirty animals that have been domesticated by humans have decreased in volume by about 10-15 percent in comparison with their wild ancestors — the same reduction observed over the last 1,000 generations of humans.

【Adapted from *The Domesticated Brain*, by Bruce Hood, Pelican Books, 2014, pp. 3-7】

〔注〕 ＊1 skull：頭蓋骨　　＊2 fossil：化石
＊3 Ice Age：氷河時代，氷河期
＊4 hominid：(ヒトとその祖先を含む)ヒト科
＊5 domesticated：家畜化された，(動物が)飼い慣らされた
＊6 domestication：家畜化，栽培化　　＊7 selection：淘汰

〔設　問〕

1. 下線部(1)を日本語に訳しなさい。

2. 下線部(2)の理由が，気候変動であるとは考えられない根拠を，本文の内容に沿って日本語で書きなさい。

3. 下線部(3)について，本文の内容に沿って120字程度の日本語で説明しなさい。

4. 本文の内容に関する次の文(1)~(5)を読み，正しいものには○，間違っているものには×を，それぞれ記入しなさい。

(1) The contemporary human brain has gotten smaller to about the size of a tennis ball.

(2) Compared to the size of the body, the human brain is much larger than would be expected.

(3) We modern humans learned much of what we know from the experiences of our ancestors.

(4) No matter how many connections there are inside the brain, brain volume is the major factor in human intelligence.

(5) Charles Darwin invented domestication and adopted it in his theory of evolution.

〔4〕 (英作文)

近年の異常気象の影響で，今後実施を見直す必要があると思われる行事について考え，100語程度の英語で書きなさい。