

平成26年度

愛媛大学医学部一般入試（前期日程）試験問題

外国語(医学科)

(14:10~16:10)

注意事項

- (1) 試験開始の合図があるまでは、次の頁を開いてはいけません。
- (2) 解答は、解答用紙の指定のところに横書きすること。
- (3) 受験番号は、解答用紙1枚ごとに、欄内に算用数字で横書きすること。
- (4) 問題冊子は、表紙を含めて12枚、解答用紙は4枚あります。

問題 1. 次の文章を読み、後の設問に答えなさい。なお、「*」のついた単語については本文の後ろに語注がついているので参考にしなさい。

When we talk about memory, we mean not only all that we remember but also our capacity for remembering. You might think that an optimal memory is a huge database that faithfully records and securely stores all that you have learned and experienced in your life. ①But actually, that wouldn't be optimal at all.

Not all memories are created equal. Some are meant to be retained for just a short time and then discarded. Imagine if you carried in your head every phone number you ever dialed or the time and location of every movie you ever saw. These memories would *clutter your mind and, like outdated clothing in the closet or junk accumulated in the garage, they would make it harder for you to find the things that you need.

Memories that are important or emotionally powerful are stored in the brain for the *long haul. This information is so *ingrained that it is a part of you—images, experiences, and knowledge that have become intrinsic aspects of your psychological and social identity. Your memory includes facts and images, like the names of close friends and the faces of loved ones. It also includes procedures and skills, like how to drive a car or swing a golf club, and the specialized knowledge that you use for your work. It's when we start to forget these important things that most of us begin to worry.

The process of learning new information, storing it, and then retrieving it involves a complex interplay of brain functions. Understanding this process can help you appreciate why some memories endure and others fade away. Different parts of the brain play a role in whether you remember something over the short term or the long term.

Short-Term Memory

Short-term memory is information that you need to remember for just a few seconds or minutes. After that, it vanishes. It's the date and time of an appointment you just made—and must remember until you write it down in your calendar or personal digital assistant (PDA). ②Working memory is a form of short-term memory that's a bit more complex. Working memory comprises information that you hold in mind for a brief time to use for some specific purpose. Think of working memory in terms of your computer—as information that you need to keep up and running in an attentional window.

Working memory comes into play, for example, when you have to consider certain options and then make a decision fairly quickly. Let's say you're in the supermarket and

you're trying to decide whether it's more economical to buy the large size or the medium size of laundry detergent. You remember the price of each and then do a mental calculation of the price per ounce to decide which item to buy. By the time you turn down the next aisle, you've probably forgotten the prices because you no longer need this information.

Short-term memories are supposed to be *fleeting. ③They turn over at a high rate because new ones are continually replacing them, and there is only so much information you can keep in mind at once. Research shows that most people can hold only about five to nine unrelated bits of information in mind. That's why it's easier to remember a seven-digit phone number than a much longer number, such as the account number on your credit card.

The fleeting nature of short-term memory is actually beneficial because it allows you to discard unnecessary information. If you kept every short-term memory, your mind would become so overloaded with trivia that you would have trouble retrieving memories that are really important.

In his 1968 book, *The Mind of a Mnemonist: A Little Book About a Vast Memory*, the famous Russian neuropsychologist A. R. Luria describes a case in the scientific literature of a man (whom he calls S) who had a seemingly limitless capacity to remember detail—but this talent undermined his ability to lead a normal life. S retained so much information that he could not organize it into meaningful categories. He was utterly unable to set priorities, establish goals, and, really, live his life. ④In the end, S is a tragic figure, inhabiting a confusing world *crammed with useless information and devoid of the meaningfulness and social connectedness that make life worth living.

Aside from having limited capacity, the brain system that handles short-term memory is also functionally fragile. Like a bubble that pops in a gentle breeze, a short-term memory is easily disturbed by interruptions. If you're trying to remember a phone number and someone walks into the room and asks you a question, chances are that you'll forget the phone number and have to look it up again. That additional information (the question) is sufficient to make the short-term memory vanish. To borrow another metaphor from computer technology, when new information enters the brain's short-term "buffer," older information is nudged out of the buffer and into cyberspace.

Long-Term Memory

Long-term memory consists of bits of information that your brain stores for more than a few minutes and then retrieves when needed. Put another way, long-term memory is

the sum total of what you know: a *compendium of data ranging from your name, address, and phone number and the names of friends and relatives to more complex information, such as the sounds and images of events that occurred decades ago. It includes the routine information that you use every day, like how to make coffee, operate your computer, and carry out all of the intricate behavioral sequences involved in performing your job or running your household.

The difference between short-term and long-term memory isn't just a matter of persistence but is also one of capacity—how much information the brain can handle. Although the brain can juggle only a few short-term memories at a time, its capacity for long-term memories is virtually limitless. ⑤Barring disease or injury, you can always learn and retain something new. Long-term memories are also less fragile than short-term memories, which means that they remain more or less intact even when something interrupts your train of thought. I'll say more about the "more or less" aspect a little later on in the book. ⑥But as a preview, let me say that long-term memory is not like a video recording, such that a moment is captured and *inscribed, forever unchanging, to be replayed identically the tenth time as well as the one thousandth. Memory for specific events and experiences is dynamic; it tends to change in both subtle and critical ways over time. As new experiences *accrue and new memories are formed, older memories seem to shift and reconfigure, kaleidoscopically.

For example, you may have first encountered your future *spouse decades earlier in an everyday interaction—a brief business meeting involving her company and yours. You were preoccupied with finalizing a major contract with a new client and barely noticed the woman sitting across the table. Three months later, you were introduced at a party and fell head over heels in love. You began dating and then married two years later. It's now your twentieth wedding anniversary, and you're reminiscing about how you met. You think back to the first encounter in the business setting—only when you think of it now, your memory is of being *love-struck at that moment.

How you remember something is largely determined by who you are. Who you are reflects the interplay among a huge number of variables that form your personality. Add to that the totality of your lifetime of experiences and associated memories. To make matters even more complex, who you are changes to some extent across time. So what you remember and how you remember it will also change.

How you experience and then remember something is also shaped by your relative position in an unfolding event—your observational *perspective. Your perspective is critical in determining what aspects of an event you attend to, as well as how you interpret them. Two people involved in an interaction are witnessing it from different

perspectives. The specific observational perspective as well as the unique psychological makeup of each person will have a lot to do with how each participant perceives and remembers the interaction. This phenomenon has been *dubbed the ⑦ *Rashomon effect*, in acknowledgment of Akira Kurosawa's 1950 cinematic masterpiece *Rashomon*, which tells the story of an event from the perspective of four people who participated in it, each with a fundamentally different recollection of what happened.

Not all long-term memories last forever, even in a shifting state. Some long-term memories that go unused or become irrelevant fade over time. Have you ever read a book that you loved but years later found that you couldn't remember much more than the title? That's probably because you hadn't thought of the plot and characters in a long time. On the other hand, some long-term memories are amazingly persistent, no matter how infrequently you use them. Many adults I know are surprised by their ability to remember minute details of their childhood—an unjustified punishment they received, a fifth-grade science project, a room where they slept during a family vacation.

Your long-term memories fall into either of two general categories: ⑧ *declarative memory and procedural memory*. Remembering the time and place of your lunch appointment next week (declarative memory) is different from remembering how to ride a bicycle (procedural memory). Declarative memory is more *vulnerable to the effects of age, as well as of brain illnesses (such as Alzheimer's disease), than procedural memory.
出典：「The Harvard Medical School Guide to Achieving Optimal Memory」

Aaron P. Nelson, Ph.D. 著 2013年

注)

clutter	混乱させる
long haul	長期にわたる
ingrained	染み付いて
fleeting	つかの間
crammed with	ぎゅうぎゅう詰め
compendium	大要
inscribed	刻まれる
accrue	積算する
spouse	配偶者
love-struck	恋に夢中になること
perspective	視点
dubbed	呼ばれる
vulnerable	影響を受けやすい

[設問 1] 下線部①について、なぜそうなのか、句読点を含めて100字以内で答えなさい。

[設問 2] 下線部②について、working memory とはどのようなものか、句読点を含めて50字以内で答えなさい。

[設問 3] 下線部③を日本語に訳しなさい。

[設問 4] 下線部④を日本語に訳しなさい。

[設問 5] 下線部⑤について、他の単語に置き換えるとするどどれが最も適切か、番号で選びなさい。

1. Because of
2. Nevertheless
3. Without
4. In spite of
5. Some of

[設問 6] 下線部⑥を日本語に訳しなさい。

[設問 7] 下線部⑦Rashomon effect について、句読点を含めて50字以内で答えなさい。

[設問 8] 下線部⑧について、2つの記憶の具体的な例 (本文に記載されている以外の) を、それぞれ2つずつ挙げなさい。

問題 2. 次の文章を読み、図を参考にして後の設問に答えなさい。なお、「*」のついた単語については本文の後ろに語注がついているので参考にしなさい。

The population is aging rapidly in high-income countries. For example, Japan's total *fertility rate was 1.37 in 2009, while the average *life expectancy was 77.1 years for males and 84.4 years for females. People aged 65 or older accounted (a) 23.1% of the total population in Japan in 2010. This figure will increase to 38.7% in 2035 and represents the greatest proportion of elderly among high-income countries.

The number of Japanese physicians is low (2.15 per 1,000 population) compared with other high-income countries in the *Organization for Economic Co-operation and Development (OECD; mean = 3.00). Because population aging drives healthcare demand, the physician shortage in Japan will likely become a bigger problem in the future.

The Japanese government strictly restricts physician supply, and Japanese medical schools impose a maxim level on medical school *enrollment. As a result, a shortage of physicians, especially *obstetricians and gynecologists, has emerged as a serious social issue. ①Physicians' refusing to see high-risk patients and "bouncing" patients to other hospitals have attracted public concern. Medical school enrollment has risen 16% (1,221 students) from 2008 to 2011 by the Japanese Government. The Japanese Government predicts that the number of physicians per 1,000 population will rise in the future. However, the *Japan Medical Association and some researchers warn that ②the increase in physician numbers could lead to a *surplus of physicians in the future and ③*physician maldistribution should be solved.

However, these predictions are associated (b) ④several problems. First, overwork of physicians has not been considered. Japanese male physicians work an average (c) 70.6 hours per week (85 hours for those in their late 20's and 48 hours for those in their 60's). ⑤Japanese physicians have been reported to experience exhaustion, sudden death, and suicide from overwork. It is important to restrict working time from the point of view of patient safety and physicians' health. In Europe, working hours of junior doctors are limited to 48 hours per week by the EU *Working Time Directive from 2009. In the United States, the *Accreditation Council for Graduate Medical Education implemented duty hour limitations in 2003, contributing (d) improvement of patient safety, resident safety, and education.

Second, changes in sex and age composition have not been considered when discussing (e) physicians' working hours. The number of practicing female physicians was 10,218 (9.3%) and 51,997 (18.1%) in 1965 and 2008, respectively.

Female doctors work fewer hours than their male counterparts (78 vs. 85 hours in their late 20 s and 40 vs. 48 hours in their 60 s). The supply of and demand for Japanese physicians have not been projected based on the actual physicians' *workforce and patient/physician age structure.

An aging population is a common problem in high-income countries, and ⑥Japan will likely become a model of future healthcare systems. To forecast the balance between physician supply and healthcare needs, we *simulated changes in age/sex composition of the population, *fatalities (the number of fatalities for the *consecutive five years), and number of physicians from 2010 to 2035. Two indicators were defined: fatalities per physician and fatalities by physician working hour, based on the data of the working hours of physicians for each *tuple of sex and age groups. We estimated the necessary number of physicians in 2035 and the number of new physicians to maintain the indicator levels in 2010.

The number of physicians per 1,000 population is predicted to rise from 2.00 in 2010 to 3.14 in 2035. The number of physicians aged 60 years or older is expected to increase from 55,375 (20% of physicians) to 141,711 (36%). In 2010 and 2035, fatalities per physician were 23.1 and 24.0 for the total population, and 13.9 and 19.2 for 75 years or older, respectively. Fatalities per physician working hour are predicted to rise from 0.128 to 0.138. If working hours are limited to 48 hours per week in 2035, the number of fatalities per physician working hour is expected to be 0.196, and the number of new physicians must be increased by 53% over the current pace.

The number of physicians per population continues to rise, but the estimated supply will not fulfill the demand for healthcare in the aging society. ⑦Strategies to increase the number of physicians and improve working conditions are urgently needed.

出典 : PLoS One. 2012;7(11):e50410.

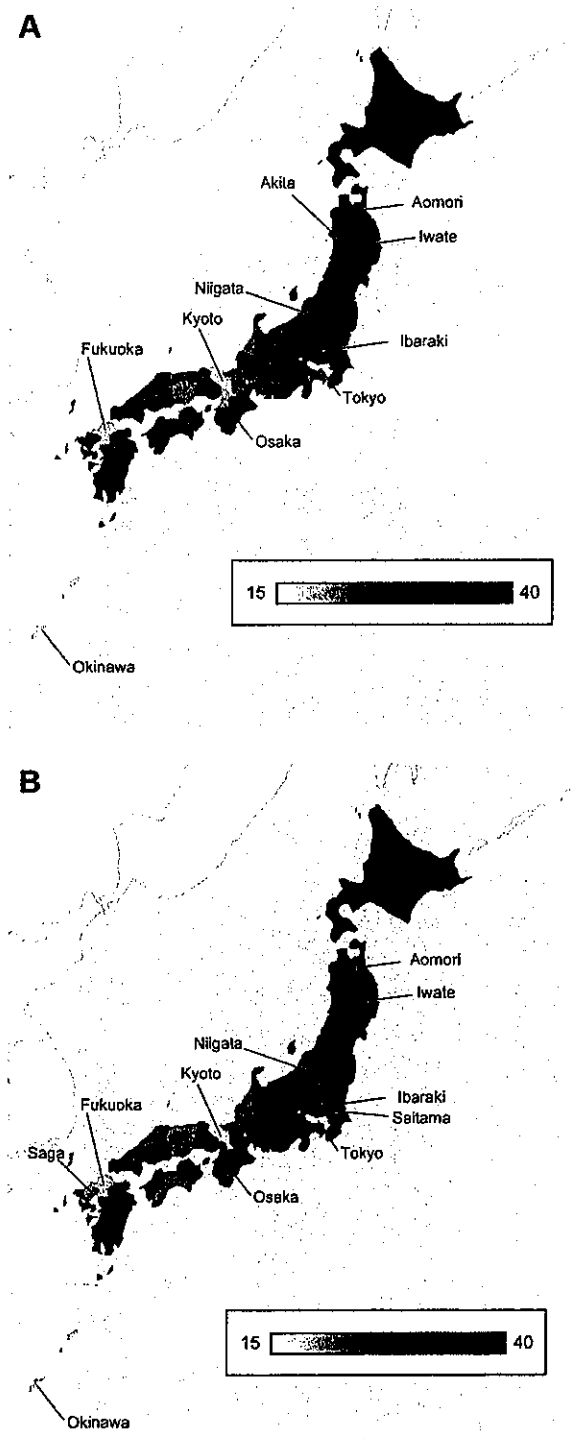


Figure: ⑧ Number of fatalities per practicing physician for the entire population by prefecture. Values for 2010 are calculated and mapped (panel A). The indicator for all of Japan is 23.1. The best five prefectures are Tokyo (15.8), Okinawa (16.5), Kyoto (17.7), Fukuoka (18.2), and Osaka (19.1). The worst five prefectures are Aomori (35.2), Iwate

(34.8), Akita (34.3), Niigata (34.2), and Ibaraki (32.7). Values for 2035 are calculated and mapped (panel B). The indicator for all of Japan is 24.0. The best five prefectures are Tokyo (15.7), Kyoto (17.3), Okinawa (17.3), Fukuoka (17.9) and Saga (20.0). The worst five prefectures are Saitama (38.2), Aomori (36.9), Ibaraki (36.1), Niigata (34.1), and Iwate (32.6).

注)

fertility rate 出生率

life expectancy 平均余命

Organization for Economic Co-operation and Development 経済協力開発機構

enrollment 入学

obstetricians and gynecologists 産婦人科医

Japan Medical Association 日本医師会

surplus 過剰の

physician maldistribution 医師偏在

Working Time Directive 労働時間指令

Accreditation Council for Graduate Medical Education 卒後医学教育認定評議会

workforce 労働力

simulate シミュレーションを行う

fatality 死亡者数

consecutive 連続する

tuple 組

[設問 1] 本文の内容に沿う日本語の題を 25 字以内で答えなさい。

[設問 2] 下線部①を日本語に訳しなさい。

[設問 3] 下線部②は具体的に何を指しているのか、句読点を含めて 25 字以内で答えなさい。

[設問 4] 下線部③は医師偏在を指しているが、具体的にはどんな偏在なのか、2つ述べなさい。

[設問 5] 下線部④は具体的に何を指しているのか、句読点を含めて 30 字以内で答えなさい。

[設問 6] 下線部⑤を日本語に訳しなさい。

[設問 7] 下線部⑥は、日本が将来の医療システムのモデルになるであろうと述べているが、なぜその様に考えられているのか具体的に述べている箇所を、句読点を含めて 80 字以内でまとめなさい。

[設問 8] 下線部⑦についてあなた自身の考えや工夫点を、句読点を含めて 200 字以内で述べなさい。

[設問 9] (a) ~ (e) に適当な前置詞を埋めなさい。ただし、不要である場合は、X としなさい。

〔設問10〕図を見て、下記の表を完成させ、下線部⑧が反映されるように、句読点を含めて25字以内でタイトルをつけなさい。

タイトル ()

	2010年		2035年	
	都道府県	人数	都道府県	人数
1				
2				
3				
:	:	:	:	:
:	:	:	:	:
45				
46				
47				