

平成28年度個別学力試験問題

英 語

(医 学 科)

解答時間 80分

配 点 100点

注意事項

1. 試験開始の合図があるまで、この問題冊子の中を見てはいけません。
2. 受験番号及び氏名を解答用紙の所定の欄に記入しなさい。
3. 解答は解答用紙の指定されたところに横書きで記入しなさい。
4. 試験時間中に問題冊子及び解答用紙の印刷不鮮明、ページの落丁及び汚損等に気がついた場合は、手を挙げて監督者に知らせなさい。
5. 問題冊子は持ち帰ってもかまいません。

1 次の英文を読み、以下の問いに答えなさい。

The variety of music-based treatment that Laurel received springs from a remarkable observation about people who have had a stroke. When a stroke affects areas of the brain that control speech, it can leave patients with a condition known as nonfluent aphasia, or an inability to speak fluently. And yet, as therapists over the years have noted, people with nonfluent aphasia can sometimes sing words they cannot otherwise say.

In the 1970s neurologist Martin Albert and speech pathologists Robert Sparks and Nancy Helm, then at a Veterans Administration hospital in Boston, recognized the therapeutic implications of this ability and developed a treatment called melodic intonation therapy in which singing is a central element. During a typical session, patients will sing words and short phrases set to a simple melody while tapping out each syllable with their left hand. The melody usually involves two notes, perhaps separated by a minor third (such as the first two notes of “Greensleeves”). For example, patients might sing the phrase “How are you?” in a simple up-and-down pattern, with the stressed syllable (“are”) assigned a higher pitch than the others. As the treatment progresses, the phrases get longer and the frequency of the vocalizations increases, perhaps from one syllable per second to two.

Each element of the treatment contributes to fluency by recruiting undamaged areas of the brain. The slow changes in the pitch of the voice engage areas associated with perception in the right hemisphere, which integrates sensory information over a longer interval than the left hemisphere does; as a consequence, it is particularly sensitive to slowly modulated sounds. ⁽²⁾ The rhythmic tapping with the left hand, in turn, invokes a network in the right hemisphere that controls movements associated with the vocal apparatus. Benefits are often evident after even a single treatment session. But when performed intensively over months, melodic intonation therapy also produces long-term gains that appear to arise from changes in neural circuitry — the creation of alternative pathways or the strengthening of rudimentary ones in the brain. In effect, for patients with severe aphasia, singing trains structures and connections in the brain’s right hemisphere to assume permanent responsibility for a task usually handled mostly by the left.

This theory has gained support in the past two decades from studies of stroke patients with nonfluent aphasia conducted by researchers around the world. In a study published in September 2014 by one of us and his group at the Beth Israel Deaconess Medical Center and Harvard Medical School, 11 patients received melodic intonation therapy; nine received no treatment. The patients who received therapy were able to string together more than twice as many appropriate words per minute in response to a question. That same group also showed

structural changes, assessed through MRI, in a right-hemisphere network associated with vocalization. The laboratory is now conducting studies to compare the benefits of melodic intonation therapy with other forms of therapy for patients with aphasia.

Because melodic intonation therapy seemed to work by engaging the right hemisphere, researchers then surmised that electrical or magnetic stimulation of the region might boost the therapy's power. In two recent studies that we conducted with our collaborators — one in 2011 at Beth Israel Deaconess and Harvard and the other in 2014 at the ARC Center of Excellence in Cognition and Its Disorders in Sydney, Australia — researchers stimulated an area in the right hemisphere called the inferior frontal gyrus, which helps to connect sounds with the oral, facial and vocal movements that produce them. For many participants, combining melodic intonation therapy with noninvasive brain stimulation yielded improvements in speech fluency after only a few sessions.

The benefits of melodic intonation therapy were dramatic for Laurel. The stroke had destroyed much of her left hemisphere, including a region crucial for language production known as Broca's area. When she began therapy in 2008, she could not string together more than two or three words, and her speech was often ungrammatical, leaving her frustrated whenever she tried to communicate. Her treatment plan was intensive — an hour and a half a day for up to five days a week, with 75 sessions in all. By the end of the 15-week treatment period, she could speak in sentences of five to eight words, sometimes more. Over the next several years she treated herself at home using the techniques she learned during the sessions. Today, eight years after her stroke, Laurel spends some of her time as a motivational speaker, giving hope and support to fellow stroke survivors. Her speech is not quite perfect but remarkable nonetheless for someone whose stroke damaged so much of her left brain. Evaluation of the long-term benefits of combination therapy is next on researchers' agenda.

(注)

agenda : 課題

Broca's area : (脳の)ブローカ野

crucial : きわめて重要な

facial : 顔の

fluently : 流ちょうに

Greensleeves : グリーンスリーブス(伝統的なイングランドの民謡)

hemisphere : (脳の)半球

inability : できないこと

boost : 増加させる

collaborator : 共同研究者

evaluation : 評価

fluency : 流ちょうさ

frustrate : いらだたせる

implication : 影響

- 2 次の英文を読み、a～fの〔 〕内の語(句)を正しく並べ替え、本文中の【 (1) 】～【 (6) 】の適切な場所に入れなさい。ただし、文頭に来る語も小文字で示してある。(a, bなどの記号は書かず、並べ替えた英文を書くこと。)

Modern scientific capability has profoundly altered the course of human life. People live longer and better than at any other time in history. But 【 (1) 】 and dying into medical experiences, matters to be managed by health care professionals. And we in the medical world have proved alarmingly unprepared for it.

This reality has been largely hidden, as the final phases of life become less familiar to people. As recently as 1945, most deaths occurred in the home. By the 1980s, just 17 percent did. Those who somehow did die at home likely died too suddenly to make it to the hospital—say, from a massive heart attack, stroke, or violent injury—or were too isolated to get somewhere that could provide help. Across not just the United States but also the entire industrialized world, the experience of advanced aging and death has shifted to hospitals and nursing homes.

When I became a doctor, I crossed over to the other side of the hospital doors and, although I had grown up with two doctors for parents, everything I saw was new to me. 【 (2) 】 before and when I did it came as a shock. That wasn't because it made me think of my own mortality. Somehow the concept didn't occur to me, even when I saw people my own age die. I had a white coat on; they had a hospital gown. I couldn't quite picture it the other way round. I could, however, picture my family in their places. I'd seen multiple family members—my wife, my parents, and my children—go through serious, life-threatening illnesses. Even under dire circumstances, medicine had always pulled them through. The shock to me therefore was seeing medicine *not* pull people through. I knew theoretically that my patients could die, of course, but every actual instance seemed like a violation, as if 【 (3) 】. I don't know what game I thought this was, but in it we always won.

Dying and death confront every new doctor and nurse. The first times, some cry. Some shut down. Some hardly notice. When I saw my first deaths, I was too guarded to cry. But I dreamt about them. I had recurring nightmares in which I'd find my patients' corpses in my house—in my own bed.

“How did he get here?” I'd wonder in panic.

I knew I would be in huge trouble, maybe criminal trouble, if I didn't get the body back to the hospital without getting caught. I'd try to lift it into the back of my car, but it would be too heavy. Or I'd get it in, only to find blood seeping out like black oil until it overflowed the trunk. Or I'd actually get the corpse to the hospital and onto a gurney, and I'd push it down

hall after hall, trying and failing to find the room where the person used to be. "Hey!" someone would shout and start chasing me. I'd wake up next to my wife in the dark, clammy and tachycardic. I felt that I'd killed these people. I'd failed.

Death, of course, is not a failure. Death is normal. Death may be the enemy, but it is also the natural order of things. I knew these truths abstractly, but I didn't know them concretely—that they could be truths not just for everyone but also for this person right in front of me, for this person I was responsible for.

The late surgeon Sherwin Nuland, in his classic book *How We Die*, lamented, "The necessity of nature's final victory was expected and accepted in generations before our own. Doctors were far more willing to recognize the signs of defeat and [(4)]." But as I ride down the runway of the twenty-first century, trained in the deployment of our awesome arsenal of technology, I wonder exactly what being less arrogant really means.

You become a doctor for what you imagine to be the satisfaction of the work, and that turns out to be the satisfaction of competence. It is a deep satisfaction very much like the one that a carpenter experiences in restoring a fragile antique chest or that a science teacher experiences in bringing a fifth grader to that sudden, mind-shifting recognition of what atoms are. It comes partly from being helpful to others. But it also comes from being technically skilled and able to solve difficult, intricate problems. Your competence gives you a secure sense of identity. For a clinician, therefore, nothing is more threatening to who you think you are than a patient with a problem you cannot solve.

[(5)], which is that we are all aging from the day we are born. One may even come to understand and accept this fact. My dead and dying patients don't haunt my dreams anymore. But that's not the same as saying one knows [(6)]. I am in a profession that has succeeded because of its ability to fix. If your problem is fixable, we know just what to do. But if it's not? The fact that we have had no adequate answers to this question is troubling and has caused callousness, inhumanity, and extraordinary suffering.

This experiment of making mortality a medical experience is just decades old. It is young. And the evidence is it is failing.

[注]

abstractly : 抽象的に	adequate : 十分な
antique : アンティークの	arrogant : 傲慢な
arsenal : 宝庫	awesome : 素晴らしい
callousness : 冷淡, 無神経さ	carpenter : 大工
clammy : 嫌な, 気味が悪い	clinician : 臨床医
competence : 能力	corpse : 死体
deployment : 配置, 展開	dire : 悲惨な, 恐ろしい
fragile : 壊れやすい	gurney : 台車付き担架
haunt : つきまとう, よくあらわれる	hospital gown : 病衣
intricate : 複雑な, 難解な	isolate : 孤立させる, 隔離する
lament : 嘆く	massive : 重度の
mortality : 死ぬ運命, 死を免れないこと	nursing home : 老人ホーム
overflow : あふれる	profoundly : 大いに
recur : 繰り返される	runway : 道
seep : 染み出す	surgeon : 外科医
tachycardic : 頻脈の	theoretically : 理論上は

- a. [anyone / never seen / I / die / had certainly]
- b. [arrogant / them / less / denying / far / about]
- c. [tragedy of / no / is / escaping the / life / there]
- d. [cope / cannot be / how / mended / with what / to]
- e. [the processes / scientific / aging / turned / advances have / of]
- f. [thought / playing by / we / broken / the rules I / were / were]

3 次の英文の(1)～(8)に入る最も適切な語を下の語群から選び、必要に応じて適切な形にして書きなさい。(ただし、同じ語を2度以上使わないこと。)

“Now tell me again how this happened.”

My hand rested on the teenager’s ankle, carefully feeling for a pulse. It was still there, strong and bounding. Reassuring, considering the obvious fracture of his right femur.

EMS had just brought him in from one of the local high schools. He had been (1) ing the 440 in a track meet and had suddenly gone down with a little over a hundred yards to go.

One of the paramedics replied. “His coach said he heard a scream and looked just in time to see Ben grab his leg and fall to the ground.” He had gone on to (2) the obvious angulation of the boy’s right thigh. He and his partner had immediately placed him in traction, started an IV, and brought him to the ER.

This still didn’t make sense. Ben Stevens was a healthy, muscular fourteen-year-old with a fractured femur. There must have been something more to this injury — maybe a pothole in the track or an awkward plant of his foot with a sudden twisting of his leg. This kind of thing just didn’t happen out of the clear blue.

“It was like I said, Doc. I was trying to (3) up my speed, close strong, and then I felt a snap. Heard it too. And I went down.”

We had given him something for the pain and he was lying comfortably on the trauma-room stretcher. His mother stood beside him, gently stroking his forehead, her own forehead furrowed. She was chewing one corner of her lip and didn’t take her eyes off her boy.

The door to trauma (4) open and a middle-aged man took two steps into the room, glanced around, then walked quickly over to the stretcher.

“Ben, are you alright?”

The man looked down at the boy, then over to his mother, and finally at me.

“Is he okay? What happened? Is he going to need surgery? What about —”

“It’s okay, Dad — I’m going to be fine.” Ben (5) out a hand to his father. “Just a broken bone. Nothing serious.”

John Stevens took his son’s hand in both of his own and looked over at me again. “How did this happen? I thought he was at a track meet.”

I told him what I knew, and Ben filled in the rest. While we were talking, two lab technicians came into the room and prepared to draw some blood. He would be going to the OR and we would need some basic lab work.

“Type and cross for four,” I told them. A fractured femur can bleed a lot and he was

going to need some blood.

Amy Connors stuck her head into the room. "They're ready for him in X-ray, and the orthopedist on call is on the way down."

Ben's femur was obviously fractured and I had (6) sure he didn't have tenderness anywhere else.

"Just the femur, right?" Amy called out again, raising her eyebrows at me.

"Yeah, that's all we need."

Ben coughed a couple of times and the rattling caused me to spin around.

"When did that start? The coughing?"

He looked up at me and shook his head. "I'm not sure. It's just a cough."

"I noticed it a couple of days ago." His mother stopped stroking his forehead and looked over at me. "Nothing bad, or anything. Just an occasional cough, mainly at night."

"Any chills or fever?" I looked at her and then at Ben.

He shook his head. "No, I've been fine."

I turned and faced Amy. "Let's get a chest X-ray too, PA and lateral."

"Got it." The door closed behind her and she was gone.

"Ben, have you had any broken bones before?"

"No, not that I can remember." He looked over at his mother, and she shook her head.

"How about your index finger?" His father interjected. "When you fell out of the tree house. Remember?"

"Oh, yeah." Ben smiled and nodded his head. "That was nothing, just a little crack." He held up his left hand and pointed to the ceiling. "See. Fine."

"No medical problems or any medications?" I was still (7)ing to understand why this had happened.

"No, nothing like that." His mother put a finger to the side of her face. "We *did* take him to his pediatrician a month or so ago. He was having some leg pain." She paused and looked down at her son's splinted right leg. "I think it was this one, wasn't it?"

Ben put a hand on his injured thigh and nodded.

"He told us it was just '(8)ing pains,' and nothing to worry about."

"It was getting better, wasn't it, son?" His father leaned closer to the stretcher. "You haven't said anything about it lately."

Ben was silent, and his hand remained on his thigh. He took a deep breath and sighed.

"It was getting better, right?" his father repeated.

The door opened and two radiology techs walked into the room.

"Ready to go to X-ray? This shouldn't take very long."

[注]

angulation : 屈曲	Doc : =doctor
EMS : 救急医療班 (=emergency medical service)	
ER : 救急処置室 (=emergency room)	femur : 大腿骨
fracture : 骨折(する)	furrow : しわが寄る
interject : 言葉をさしはさむ	IV : 点滴 (=intravenous drip)
lab technician : 検査技師	lateral : 側面の
medication : 薬の処方	muscular : 筋肉隆々とした
OR : 手術室 (=operating room)	orthopedist : 整形外科医
out of the clear blue : 唐突に	PA : 前後方向の (=posterior-anterior)
paramedic : 救急医療隊員	pediatrician : 小児科医
pothole : 地面にできた穴	radiology tech : 放射線技師
rattling : ガラガラいう音	reassure : 安心させる
splint : 添え木を当てる	stretcher : 担架
tenderness : 圧痛	thigh : 太もも, 大腿部
track meet : 陸上競技会	
traction : (骨折治療などで手足などを)けん引する治療装置	
trauma : 外傷	

[語 群]

burst	describe	grow	make
pick	reach	run	struggle