筑波大学　理工学群　社会工学類
平成２９年度私費外国人留学生入試
小論文問題

【注意事項】

１．試験開始の合図があるまで、この問題の中身を見てはいけません。

２．すべての解答用紙と下書き用紙の定められた欄に、志望する「学群・学類」、「氏名」、「受験番号」をすべて記入すること。

３．問題冊子は表紙を含め５ページあります。

４．解答は、下記の通り、必ず３枚の解答用紙（マス目用紙）を使用すること。
　　設問１～３・・・解答用紙１枚目
　　設問４～６・・・解答用紙２枚目
　　設問７　　・・・解答用紙３枚目

５．解答に際しては、設問番号を明記してから解答を作成すること。

６．試験終了後、解答用紙と下書き用紙を別々に集めます。問題冊子は持ち帰ってください。

次のページ以降の英文は、2016年11月19日付The Japan Timesに掲載された脳と記憶に関する記事です。この英文を読んで、次の7つの設問に日本語で答えなさい。

設問1
本文中に記述されている2種類の記憶の特徴を100字程度で述べなさい。

設問2
下線(1)を日本語に訳しなさい。

設問3
下線(2)の根拠となる内容を100字程度で述べなさい。

設問4
下線(3)を日本語に訳しなさい。

設問5
下線(4)を日本語に訳しなさい。

設問6
下線(5)の根拠となる内容を150字程度で述べなさい。

設問7
脳への外部刺激によって記憶に関して何かしらの効果が得られるようになった場合、どういった利用法が考えられるか。この記事の内容を参考にして、あなたの意見をその根拠とともに300字程度で述べなさい。

Manipulating the brain to hasten learning

For some athletes, success has come from a dedication to practice and the repetition of a particular routine. Baseball icon Ichiro Suzuki or English soccer star David Beckham are two examples that immediately spring to mind.

Ichiro, for example, recalls hitting around 500 pitches per day as a child practicing with his father. These days, his daily routine includes weight training to maintain strength and flexibility. Beckham, meanwhile, says he must have practiced taking tens of thousands of free kicks as a child.

Author Malcolm Gladwell popularized the idea that a person can perfect a technique if they practice a particular task for 10,000 hours. Others, however, argue that such practice needs to be concentrated on a particular task in order to improve. What's more, they say, 10,000 hours is the average amount of time that people spend perfecting a technique.

University of Tokyo neuroscientist Daichi Nozaki has been attempting to discover how the brain learns new skills. His research shows that "motor memories" — also called "muscle memories" — are associated with specific skills and formed according to the state of the brain at the time of learning. Nozaki can also show that such muscle memories can be manipulated.

"I guess the reason why a lot of athletes try to perform a routine is to put the brain into a particular state," Nozaki says. His latest work could point to a method of training motor skills by manipulating the brain state and, therefore, improving performance.

Motor memories are almost impossible for the human body to forget. Riding a bicycle is the most obvious example of this at work — but once you've learned how to ride a bike, you never forget.

The other kind of memories — details such as people's names, historical events or even the facts in this story — are called "episodic memories." They can be emotionally important to us, but are ultimately forgettable.

"It wasn't so long ago that we didn't know there was a difference in the brain between these two kinds of memory. The breakthrough was made in 1962 when a Canadian psychologist from McGill University in Montreal published one of the 20th century's most important papers on the human brain.

Brenda Milner had been working with a man called Henry Molaison, known in the scientific literature as "patient HM." Molaison suffered from severe epilepsy and, as a last resort, a surgeon removed part of the temporal lobe of Molaison's brain in 1953. The epilepsy disappeared, but so did Henry's ability to form new memories. Each day, he said, "was like waking from a dream — every day is alone in itself."

Milner had Molaison draw a line between two outlines of a star while watching his

出典

Rowan Hooper, Manipulating the brain to hasten learning, November 19, 2016 < http://www.japantimes.co.jp/news/2016/11/19/national/science-health/manipulating-brain-hasten-learning/#.WGx0M6KLRBw >

注

- manipulate: 制御する
- hasten: 加速する
- popularize: 世に広める
- neuroscientist: 神経科学者
- motor: 運動、運動の
- ultimately: 最終的に
- epilepsy: てんかん（脳に起きる異常な神経活動のための反復性の発作）
- last-resort: 最終手段
- temporal lobe: 側頭葉（脳の側面部）
- intact: 損傷を受けていない
- electrode: 電極
- scalp: 頭皮
- sensation: 感覚
- authorize: 許可する
- counteract: 対抗する

[redacted]

Larry R. Squire, Neuron 2009; 61(1): 6–9 より抜粋。

[redacted]

Daichi Nozaki et al., eLife 2016; 5: e15378< https://elifesciences.org/content/5/e15378-download.pdf >より抜粋。一部改編。