はしがき

本書は*Science News*を題材にした英語教材です。*Science News*は科学知識の普及に努めるアメリカの非営利団体が発行する科学雑誌で、正確な読みやすい記事に定評があります。本書では理系・文系を問わず楽しめる「生物」「脳の働き」「天文学」「エネルギー」を含んだ15の記事を精選しました。

各章、短い内容紹介と**Brainstorming**を**Reading**の前に用意しました。「紹介」で喚起されたイメージを**Brainstorming**で活性化し、スムーズに**Reading**へ進むことを期待しています。**Brainstorming**の中央にあるのは本文の重要語（句）で、周りを囲むのがその語（句）から連想される表現です。連想を働かせることで本文との距離を縮めながら、表現内の空欄を埋めて英語表現を学ぶ仕組みになっています。

Readingは記事の原文です。明快な英語は、知的好奇心を刺激する話題—最新小型バッテリーの開発、地球外惑星探査機ケプラーの快挙、絶滅危惧種の現状報告など—をテンポよく読者に伝えます。学習の便宜を図るため、二つのパートに分け、側注（主として語注）と Extra Notes （簡単な事項説明）を付しました。

練習問題は読解力向上を意図した二段構えの設問です。まず**Comprehension — Storyline**では本文の流れに対する理解度を、続く**Comprehension — In Detail**では内容に踏み込んだ部分の理解度をそれぞれチェックします。**Summary Construction**は三つに分けられた節を並べ替え、指示された構成で本文の要約を作る問題です。各節にはヒントつき単語穴埋め問題も付けてあります。本文とテーマの再確認が狙いですが、読解力、文章構成力、単語力も総合的に問う形式になっています。

Feedback Forumは、架空の読者からのフィードバックを想定して、本文のテーマを角度を変えて批判的に眺める役割を果たします。

巻末には章単位で**VOCABULARY DRILL**を加えました。本文中の単語や表現を利用した四種類の問題で語彙の運用能力を磨きます。

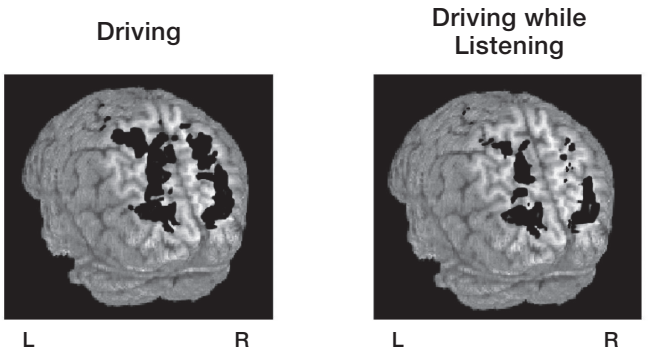
金星堂編集部の皆様には、出版までの長期間、数々の貴重な助言をいただきました。ここに記して厚くお礼を申し上げます。

2011年1月　　編著者

Contents

Unit 1 Shifting priorities at the wheel

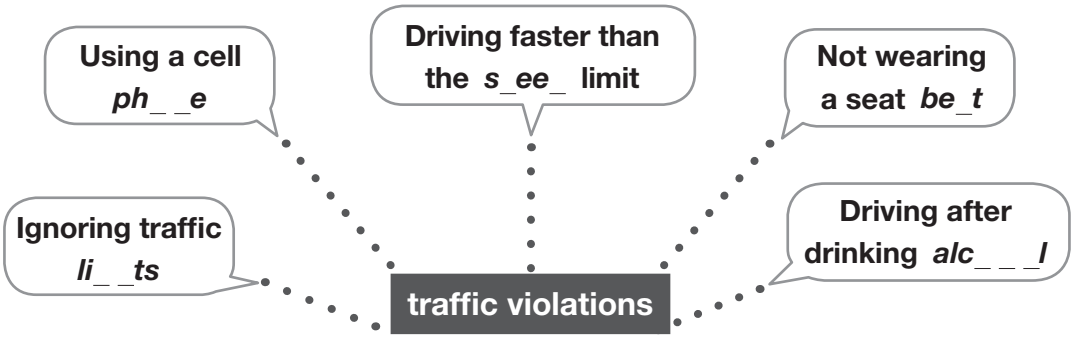
—運転中の優先事項の変化



日常的に行われている動作の同時進行。運転中には危険行為とみなされます。携帯電話をかけながらの走行は法律で禁止されました。ハンドル操作中に複数のタスクを課せられると脳の内部はどう反応するのか — シミュレーションで探ります。

Brainstorming

空欄を埋めて ■ 内の語句から連想される表現を完成させなさい。



Reading

Part I

CD 1-01

A special corner of hell is reserved for drivers who weave from lane to lane at a crawl while blithely chatting on their cell phones. Even a simple form of multitasking — driving while listening to someone else talk — disrupts the ability to navigate a car safely, a new study finds.

Using functional MRI to watch the brains of people during a driving simulation, researchers find that an intriguing neural response underlies vehicular mishaps associated with such distractions, say neuroscientist Marcel Just of Carnegie Mellon University in Pittsburgh and his colleagues. Attending to what someone is saying

weave「ジグザグに進む」
at a crawl「のろのろと」
blithely「楽しげに」

functional MRI = fMRI（p.2 l.33）⇒ Extra Notes

intriguing = interesting
underlies ~「〜の背後にある」
mishaps = unlucky accidents

galvanizes language-related brain areas while reducing activity in spatial regions that coordinate driving behavior.

People who combine relatively automatic tasks, such as speech comprehension with car driving, exceed a biological limit on the amount of systematic brain activity they can accommodate at one time, the researchers propose in the April 18 *Brain Research*. As a result, the less-ingrained skill — in this case, driving, which is learned long after a person grasps a native language — takes a neural hit.

"What's exciting is that now we have a biological account of how multitasking affects driving behavior," Just says.

Carnegie Mellon University ⇒ Extra Notes
galvanizes「刺激する」
language-related brain areas「脳の言語関連領野」
coordinate「調整する」
combine A with B「A と B を結びつける」

accommodate「対応する」
Brain Research ⇒ Extra Notes
less-ingrained「身についている度合いが低い」
grasps「理解する」
takes a neural hit「神経に打撃を受ける」

Part Ⅱ

CD 1-02

Cell phones are particularly problematic, Just notes. So as not to appear rude to an unseen listener, a driver will give the conversation constant attention. Just suggests that other activities may also dent the ability to maneuver a car: listening to a radio, eating, monitoring children and conversing with a passenger.

"Listening to talk radio or to spoken directions from a navigation system while driving probably have similar effects to what we found," Just says. "Multitasking puts high demands on the brain." Psychologist David Strayer of the University of Utah in Salt Lake City agrees, adding that the new results offer a conservative estimate of the neural impact of multitasking on driving. Strayer and his colleagues have documented steep declines in skill during simulated driving, as well as a marked drop in driving speed among volunteers using handheld or hands-free cell phones.

Just's team studied 29 adults, ages 18 to 25. Each participant lay in an fMRI scanner equipped with a screen that displayed a simulated driving exercise. These

So as not to ~「～しないように」

dent「損なう」

maneuver「巧みに操作する」

talk radio ⇒ Extra Notes
spoken directions「音声案内」
have similar effects ...
found「私たちの発見と同じような結果をみせる」
puts high demands on ~「～に大きな要求を課す」
the University of Utah ⇒ Extra Notes
conservative estimate「控えめな見積もり」
steep declines「急激な低下」
marked drop「著しい減少」

equipped with ~「～を備え付けた」

machines measure blood-flow changes in the brain, signaling rises and falls in neural activity.

Extra Notes

functional MRI (p.1 l.6) 機能的磁気共鳴映像法（functional magnetic resonance imaging）。装置を利用し脳や臓器の機能を画像化する方法。 **Carnegie Mellon University** (p.1 l.10) カーネギーメロン大学。ペンシルバニア州（Pennsylvania / PA）南西部の都市ピッツバーグ（Pittsburgh）にある工科大学。1912年創立。***Brain Research*** (p.2 l.8) 神経系の構造、機能など脳科学の基礎研究を扱う国際的学際ジャーナル。1966年創刊。 **talk radio** (p.2 l.21) トークラジオ。DJ と電話をかけてきたリスナーとのトーク番組。**University of Utah** (p.2 l.25) ユタ大学。ユタ州（Utah / UT）北部の州都ソルトレイクシティ（Salt Lake City）にある州立総合大学。1850年創立。

Comprehension—Storyline

本文の内容に即して各コメントが正しいかどうかを判定し、TかFかを選びなさい。

Part Ⅰ

1 （T/F）The researchers observed the workings of a multitasker's brain by using functional MRI.

2 （T/F）The researchers completely proved how difficult tasks improve driving behavior.

Part Ⅱ

1 （T/F）The neuroscientist Marcel Just suggested that activities in addition to cell phone use could disrupt driving ability.

2 （T/F）Just's team measured the changes in blood flow in the brain that occurred while subjects were driving a car.

Comprehension—In Detail

A ～ C からそれぞれ適切なものを選んで、本文の内容に合うコメントにしなさい。

1 Language-related areas in the brain will (　　) when you are eager to listen to someone talk.

A activate　　**B** stabilize　　**C** decline

2 Listening to directions given by a mobile navigation system can (　　) your driving skill.

A function as a substitute for
B make a neural impact on
C result in marked improvement in

3 Deeply-rooted skills, for example (　　), are not as affected by distractions as are other skills.

A driving a vehicle
B performing a combination of automatic tasks
C speaking one's native language

Summary Construction

下のような構成で本文のサマリーを作りたい。A ～ C のパラグラフ中の単語を完成し、ついで各節を適切な順番に並べ替えなさい。

[　　] As had been expected, [　　] What is more, [　　]

A Cell phones were shown to be very problematic for drivers. Activity in the driving skill region of the (***br***), as measured by blood-flow changes, (***dec***) when the language-center of the brain became activated.

B It seems that other activities — such as listening to directions from a mobile (***nav***) system — may also (***dis***) the ability to operate a vehicle.

C Researchers examined 29 adults. Each adult had to lay still in an MRI (***sca***). The researchers then watched the subject's brain at work as he or she (***simu***) the act of driving.

Feedback Forum

CD 1-03

この論説文に対する読者の批評です。下線部分に適切な前置詞を書き入れなさい。(　　)の空所には選択肢から適切な語句を選んで記号を書き入れなさい。

This is a very interesting study. It is logical that if we concentrate ①_____one thing then we will have less ability to understand ([1]　　). Dr. Just's brilliant experiment provides clear evidence that the brain has a limited capacity ②_____ "paying attention." His team noticed that blood flows away from an active ([2]　　) when a research subject focuses on a new matter. The conclusion is that there is a definite biological limit ③_____ our ability to use different parts of the brain at the same time.

Also, I was especially impressed ④_____ the idea that being polite is the ([3]　　) reason driving skill decreases when talking. In order to be polite in a conversation, you have to be very attentive ⑤_____ the other person. But the more attention a driver pays to the other person in the conversation, the less he or she can concentrate on the ([4]　　). It thus seems that the best thing would be to never talk ⑥_____ the phone while driving, don't you agree?

Dr. Charles Ashton, Neuroscientist
Cambridge, England

a most important	**c** region of the brain
b our surroundings	**d** task of driving