0046 Some People Who Appear to Be in a Coma May Actually Be Conscious

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1. Some People Who Appear to Be in a Coma May Actually Be Conscious

A few days earlier, at home, she had suddenly fallen unconscious. She had suffered a ruptured (体内组织) 破裂,爆裂 blood vessel in her brain, and the bleeding 出血 area **was putting tremendous 巨大的；极大的 pressure on** critical brain regions. The team of nurses and physicians at the hospital's neurological **intensive 短时间内集中紧张进行的；密集的;彻底的；十分细致的 care 特别护理病房；重症监护室 unit** /was looking for any sign /that Mazurkevich could hear them. She was on a mechanical 机械的 ventilator 呼吸器;通风设备；通风口 to help her breathe, and her **vital 对...极重要的;维持生命所必需的 signs** 生命体征（包括脉搏、呼吸、体温、血压等数据） were stable. But she **showed (v.) no signs of** consciousness.

One of us (Claassen) was on her medical team, and when he asked Mazurkevich to open her eyes, **hold up** two fingers /or wiggle (v.)（使）扭动，摆动 her toes, she remained motionless. Her eyes did not follow visual cues. Yet her loved ones still thought (v.) she was "in there."

She was. The medical team gave her an EEG 脑电图 —placing (v.) sensors 传感器,探测设备 on her head /to monitor (v.) her brain's electrical activity —while they asked her to "keep opening and closing your right hand." Then they asked her

to “stop opening and closing your right hand.” Even though her hands themselves didn’t move, her brain’s activity patterns /differed (v.) between the two commands. These brain reactions clearly indicated that /she **was aware of** the requests /and that those requests were different. And after about a week, her body began to follow her brain. Slowly, with minuscule 极小的；微小的 responses, Mazurkevich started to wake up. Within a year /she recovered fully /without major limitations 限制,局限 to her physical or cognitive abilities.

Example 1. 标题

intensive care

特别护理病房；重症监护室

- She needed **intensive care** for several days. 她需要几天的特别护理。

intensive care unit (ICU)

重症监护病房重症监护室

vital signs

生命体征, 生命特征（包括脉搏、呼吸、体温、血压等数据）

EEG

the abbreviation for ‘electroencephalogram’ (a medical test that measures and records electrical activity in the brain) 脑电图（全写为 electroencephalogram）

electroencephalogram

/ɪˌlek-troʊ-ɪn-ˈsefə-lə-græm/

minuscule

/ˈmməskjuːl/
几天前，在家里，她突然不省人事。她的脑部血管破裂，出血区域给关键的大脑区域，带来巨大压力。医院神经重症监护病房的护士和医生团队，正在寻找 Mazurkevich 能听到他们说话的任何迹象。她依靠机械呼吸机帮助呼吸，生命体征稳定。但她没有任何意识迹象。

我们中的一员（克拉森），在她的医疗团队中，当他要求马祖尔克维奇睁开眼睛、举起两根手指，或扭动脚趾时，她一动不动。她的眼睛没有跟随视觉线索。然而，她所爱的人仍然认为她“在里面”。

她的意识的确在大脑里面。医疗团队给她做了脑电图——在她的头上放置传感器，以监测她大脑的电活动——同时他们要求她“继续张开和合上你的右手”。然后他们要求她“停止张开和合上右手”。尽管她的手本身没有移动，但她的大脑活动模式，在这两个命令之间是不同的。这些大脑反应，清楚地表明她知道这些请求，并且这些请求是不同的。大约一周后，她的身体开始跟随她的大脑而能活动。慢慢地，随着微弱的反应，Mazurkevich 开始醒来。一年之内，她完全康复，身体或认知能力没有受到重大限制。

Mazurkevich had “covert 隐蔽的；暗中的 consciousness,” a state /in which the brain **reacts (v.) to** the outside world /with some comprehension, although the body does not respond. As many as 15 to 20 percent of patients /who appear to be in a coma or other unresponsive state /show (v.) these inner signs of awareness /when evaluated 评价；评估 with advanced **brain-imaging 脑成像，脑显像 methods** or sophisticated monitoring of electrical activity. Many of these techniques have only recently been refined 改进；改善；使精练. These methods are altering our understanding of coma and other **disorders 失调；紊乱，疾病 of consciousness**. Moreover, people /whose covert consciousness is detected early /**have a greater chance of** a full conscious and functional recovery, indicated by our studies at Columbia University.

Example 2. 标题

Mazurkevich 拥有“隐性意识”，即大脑以某种理解力，对外界做出反应的状态，尽管身体没有反应。多达 15% 到 20% 的看似处于昏迷，或其他无反应状态的患者，在使用先进的脑成像方法，或复杂的脑电活动监测进行评估时，会表现

出这些内在意识迹象。其中许多技术, 最近才得到改进。这些方法正在改变我们对昏迷, 和其他意识障碍的理解。此外，我们在哥伦比亚大学的研究表明，早期检测到隐性意识的人, 更有可能完全恢复意识和功能。

The standard definition of a comatose (a.)不省人事的；昏迷的 patient /is someone who is unconscious, is unable to be awakened, and has no signs of awareness or the ability to interact with the environment. Patients in a coma /caused by severe brain injury /may look indistinguishable 难以区别的，难以分辨的 from someone in a deep sleep, **except that** most comatose patients cannot breathe (v.) on their own /and need support from a ventilator 呼吸器, with a tube **inserted into** their airway 气道.

Example 3. 标题

comatose

/'koʊmə-toʊs/

1.(medical 医) deeply unconscious; in a coma 不省人事的；昏迷的

2.(humorous) extremely tired and lacking in energy; sleeping deeply 困乏的；无精打采的；酣睡的

→ 来自coma, 昏迷。

昏迷患者的标准定义是: 失去知觉、无法被唤醒、没有任何意识迹象, 或与环境互动的能力。因严重脑损伤而处于昏迷状态的患者, 可能看起来与处于深度睡眠中的人没有区别，只是大多数昏迷患者无法自行呼吸，需要呼吸机的支持，呼吸机的气道中插入一根管子。

Some people think /comas are easy to recover from or —conversely 相反地；反过来 —a living death 活受罪；生不如死,活死人. Both are mistakes. Popular depictions in movies and elsewhere /may **be partly responsible for** this. Uma Thurman as **the Bride 新娘 in Kill Bill**: Volume 1 /awakens abruptly from a prolonged 持久的；长期的 comatose state, appears (v.) well nourished 有营养的 /**despite** not having any feeding tubes 喂食管 /and regains (v.) full **physical strength** within hours. The reality **is far more challenging**, with frequent **medical complications** 并发症, physical deterioration 恶化 /and **a long road of**

small steps forward /with many steps backward. Patients who survive coma /after severe brain injury /typically require feeding tubes for nutrition 营养；滋养；营养的补给, tracheostomies 气管切开术,气管造口术 that allow them to breathe /through a tube in the neck /and **weeks to months of** rehabilitation 康复，复原. Recovery is variable 多变的；易变的；变化无常的 and unpredictable, even in those who, like Mazurkevich, **ultimately 最终；最后 return to** independence. 主 **Overly 过度地；极度地 pessimistic 悲观的；悲观主义的 views of** coma patients 系 are also inaccurate 不精确的；不准确的 /because people may assume that /all such patients are **destined to die** /without emerging from their coma /or live with severe disability. Recovery of consciousness, communication and functional independence /is quite possible in some patients, even after a prolonged time.

Example 4. 标题

tracheostomy

/ˌtreɪ-kɪ-ˈɒstə-mi/ 气管切开术（Tracheostomy）是将气管软骨之间做横向切开, 以建立人工呼吸道的一种手术。 → From tracheo- + -stomy.

有些人认为, 昏迷很容易恢复，或者相反 ——活死人。两者都是错误。电影和其他地方的流行描述, 可能对此负有部分责任。乌玛·瑟曼在《杀死比尔：第1部》中饰演新娘，从长时间的昏迷状态中突然醒来，尽管没有任何喂食管，但看起来营养良好，并在数小时内恢复了全部体力。现实情况要困难得多，医疗并发症频繁，身体状况恶化，恢复健康的前进的步子很小，后退的步子也很大。从严重脑损伤后昏迷中幸存下来的患者, 通常需要营养喂食管、气管切开术, 以允许他们通过颈部的管子呼吸, 以及数周至数月的康复。恢复是多变, 且不可预测的，即使是像 Mazurkevich 这样最终恢复独立的人, 也是如此。 而对昏迷患者过于悲观的看法, 也是不准确的，因为人们可能会认为所有这些患者都注定要死去，而不是从昏迷中苏醒，或者带着严重的残疾生活。事实上, 一些患者的意识、交流和功能独立性的恢复, 是很有可能的，即使是在很长一段时间之后。

Views about coma and consciousness have changed /in the medical profession /over time. In the 1960s /neurologists 神经病学家；神经科医生 and neurosurgeons 神经外科医生 noted that /some comatose patients opened their eyes /but showed no interaction with the environment. Many of these people remained in this state /until death, leading some clinicians 临床医生 to believe that /consciousness, once lost in this way, was impossible to recover.

Yet in the 1990s / 主 reports of patients in a “permanent” 永久的；永恒的；长久的 **vegetative 植物的；植物性的 state** /who returned to consciousness / 谓 began to surface (v.)浮出水面,露面 in the medical literature（某学科的）文献，著作，资料. In a vegetative 植物的；植物性的 state, unlike coma, people’s eyes may open and shut, but they still do not react in any deliberate 故意的；蓄意的 manner 举止；态度,方式；方法. The reports of recovery from this condition /pushed the fields of **neurocritical care** and **rehabilitation 康复，复原 medicine** to develop more fine-tuned 微调 classifications 类别 /such as the minimally 最低限度地；最低程度地 conscious state. **It is characterized 以……为特点的 by** nonverbal 不使用语言的，非言语的；不能说话的 responses, as when patients track (v.) objects with their eyes /or intermittently 间歇地 follow (v.) commands. A patient’s prognosis (n.)（对病情的）预断，预后, physicians 医师；（尤指）内科医生 learned(v.), was related to these states. For instance, someone who moved from a vegetative to a minimally conscious state /**had a greater chance of** further recovery.

Example 5. 标题

fine-tune

V-T If you fine-tune (v.) something, you make very small and precise changes to it /in order to make it as successful or effective as it possibly can be. 微调

prognosis

/prɑːgˈnoʊsɪs/ (n.)

1.(medical 医) an opinion, based on medical experience, of the likely development of a disease or an illness（对病情的）预断，预后

2.(formal) a judgement about how sth is likely to develop in the future 预测；预言；展望 SYN forecast
→ 来自pro-,向前，提前，-gn,知道，词源同know,cognizant.-osis,状态后缀。引申词义预断，预测。

- The prognosis is for more people to work part-time in the future. 预计将来会有更多人从事兼职工作。

随着时间的推移，医学界对昏迷和意识的看法, 发生了变化。在 1960 年代，神经学家和神经外科医生注意到，一些昏迷的患者睁开眼睛，但没有表现出与环境的互动。这些人中有许多人直到死亡都保持这种状态，这导致一些临床医生认为，一旦以这种方式失去意识，就不可能恢复。

然而在 1990 年代，关于处于“永久性”植物人状态并恢复意识的患者的报道开始出现在医学文献中。在植物人状态下，与昏迷不同，人的眼睛可能会睁开和闭上，但仍然不会有任何刻意的反应。"从这种情况中有病人恢复"的报告, 推动了神经重症监护, 和康复医学领域, 开发出更精细的分类，例如"最低意识状态"。它的特点是"非语言反应"，例如, 当患者用眼睛跟踪物体, 或间歇性地遵循命令时。医生了解到，患者的预后, 与这些状态有关。例如，从"植物人"状态转变为"最低意识状态"的人, 有更大的机会获得进一步康复。

主 Detecting (v.) and predicting (v.) recovery of consciousness [early on 在早期], in **the intensive care unit**, 系 **is often a matter 关乎…的事情 of** life or death. Families typically make decisions about continuing or stopping life-sustaining therapy /within 10 to 14 days of the injury —the time when **surgical 外科的；外科手术的 procedures** become necessary to support longer-term breathing and feeding. And a diagnosis 诊断；（问题原因的）判断 of **covert consciousness** /could affect (v.) clinical 临床的；临床诊断的 decisions about goals of care, pain management, **bedside** behavior of clinicians 临床医师 and family members, **and** management of depression and anxiety.

Example 6. 标题

matter
[sing.] a situation that involves sth or depends on sth 关乎…的事情

- 'I think this is the best so far.' 'Well, **that's a matter of opinion** (= other people may think differently) . "我认为这是迄今为止最好的。" "唔，仁者见仁，智者见智嘛。"

在重症监护室早期检测, 和预测意识恢复, 往往是生死攸关的问题。家庭通常会在受伤后 10 到 14 天内, 做出继续或停止维持生命治疗的决定 ——此时需要外科手术来支持长期呼吸和进食。对隐性意识的诊断, 可能会影响有关护理目标、疼痛管理、临床医生, 和家庭成员的床边行为, 以及抑郁和焦虑管理的临床决策。

So **what does** covert consciousness **look like** to clinicians and to the patient's family? **One can get some idea through** the lens 透镜；镜片 of **locked-in syndrome** 综合征；综合症状, in which /people may have normal or near-normal cognition /but are unable to control most motor (a.)肌肉运动的；运动神经的 movements. Locked-in patients illustrate (v.) 表明…真实；显示…存在 the limitations 局限；限度 of judging awareness, thinking abilities, and emotions /条件状 purely **based on** motor function.

The term "locked in" was coined 创造（新词语） in 1966 /by neurologists Fred Plum and Jerome Posner /in their monograph 专论；专题文章；专著 **The Diagnosis 诊断；（问题原因的）判断 of** Stupor （尤指由于醉酒、吸毒或震动而出现的）神志不清，恍惚，麻痹状态 and Coma. They **refer to** 提到；谈及；说起 the description of M. Noirtier De Villefort **as** "a corpse 尸体 with living eyes" in Alexandre Dumas's classic **The Count 伯爵 of Monte Cristo** 基督山伯爵 (1844–1846). In clinical practice 实践；实际行动, locked-in patients do not move their extremities 身体末梢(如手脚), but many can reliably 可靠地；确实地 move their eyes up and down /in response to verbal commands. Some can blink (v.) /or show (v.) other subtle 不易察觉的；微妙的 facial movements.

The experience of **living in** a locked-in state /was poignantly 深刻地；令人辛酸地 illustrated by Jean-Dominique Bauby, an editor at Elle magazine who, in 1995, **suffered a stroke** 中风 /that blocked (v.) signals **traveling from** the motor cortex 运动皮质；皮质区 in his brain **to** his **spinal 脊的；脊柱的；脊髓的 cord** 脊

髓 and limbs. Without the ability to speak or move his extremities, he began to **communicate with** his speech therapist（某治疗法的）治疗专家 /using eye movements.

Example 7. 标题

locked-in syndrome

N a condition in which a person is conscious /but unable to move any part of the body except the eyes: results from damage to the brainstem 闭锁综合症

illustrate

(v.) to show that sth is true or that a situation exists 表明…真实；显示…存在 SYN demonstrate

- The incident illustrates (v.) the need for better security measures. 这次事件说明了加强安全措施的必要。

stupor

/'stu:pər/ [sing.U] a state in which you are unable to think, hear, etc. clearly, especially because you have drunk too much alcohol, taken drugs or had a shock（尤指由于醉酒、吸毒或震动而出现的）神志不清，恍惚，麻痹状态 → 来自拉丁语 stupor,恍惚，麻木，神志不清，来自 stupere,震惊，困惑，词源同 stupid.

poignant

/'pɔɪnjənt/ (a.) having a strong effect on your feelings, especially in a way that makes you feel sad SYN moving 令人沉痛的；悲惨的；酸楚的
→ 来自古法语poignant,锋利的，尖锐的，来自拉丁语pungere,刺，词源同 pugnacious,point.

- Her face was a poignant reminder of the passing of time. 她的容颜显示青春已逝，令人感伤。

cortex

/'kɔ:rteks/ (anatomy 解) the outer layer of an organ in the body, especially the brain 皮层；皮质；（尤指）大脑皮层
→ 来自PIE*sker, 切，词源同carnal, shear. 原指树皮，后词义引申为大脑皮质。
spinal cord
脊髓

cord
[UC] strong thick string or thin rope; a piece of this （结实的）粗线，细绳；一根粗线（或细绳）

- a piece/length of cord 一根/一段粗线

那么，对于临床医生和患者家属来说，隐性意识是什么样子的呢?人们可以从"闭锁综合症"的角度来了解一些情况，"闭锁综合症"患者, 可能有正常或接近正常的认知，但无法控制大多数运动。闭锁病人说明了"单纯基于运动功能来判断意识、思维能力和情绪"的局限性。1966年，神经学家弗雷德·普拉姆和杰罗姆·波斯纳, 在他们的专著《麻木和昏迷的诊断》中, 创造了“锁定”这个词。他们指的是亚历山大·大仲马的经典作品《基督山伯爵》(1844-1846)中, 对诺瓦蒂埃·德·维尔福先生的描述，即“一具长着活眼睛的尸体”。在临床实践中，闭锁患者不能移动他们的四肢，但许多人可以根据口头命令, 来可靠地命令他们上下移动他们的眼睛。有些人会眨眼, 或表现出其他微妙的面部动作。

Elle 杂志的编辑让-多米尼克·鲍比 (Jean-Dominique Bauby) , 生动地描述了生活在锁定状态下的经历，他在 1995 年中风，这阻止了从大脑运动皮层到脊髓和四肢的信号传输。由于无法说话或移动四肢，他开始使用眼球运动, 来与语言治疗师交流.

With covert consciousness, the lack of outward movement is complete (a.)（用以强调）完全的，彻底的, even more so than with locked-in patients. But this does not mean the absence of inner life. In 2006 neuroscientist Adrian M. Owen, now at Western University in Ontario, and his colleagues /examined a young woman /who had experienced a severe traumatic 痛苦的；极不愉快的;创伤的；外伤的 brain injury /and was believed to be in a vegetative state. The health-care team assessed her /with a type of imaging scan /called **functional MRI** 功能核磁

共振, which traces blood flow through the brain /to reveal active areas. During this scan /the clinicians 临床医生 asked her to imagine playing tennis /and to imagine walking through the rooms of her house. To the surprise of Owen and his colleagues, the woman showed activation within her brain /**comparable 类似的；可比较的 to** that seen in healthy volunteers. What's more, the brain-activation patterns for the tennis task /**were distinct 清晰的；明显的 from** 截然不同的；有区别的 the patterns in the walking task, indicating that /she could deliberately change (v.) her brain activity.
Covert consciousness was subsequently 随后；后来 identified in patients around the world, with varying types of brain injuries. In 2017 it was detected in seemingly 看似；貌似；表面上 unaware patients /who had just been admitted 准许…进入（某处）,（常指勉强）承认 to the intensive care unit /at Massachusetts General Hospital /with severe brain injuries, indicating that /the covert phenomenon can occur in people /who had very recently been hurt, **not only** after patients have been "out" for weeks.

To diagnose the covert state, clinicians use different behavioral 行为的 tasks, **such as** asking the patient to open and close their hands /or imagine (v.) swimming /while recording their brain reactions /with an EEG or functional MRI. These responses have been reproduced (v.) by multiple research groups worldwide /despite differences in methodology（从事某一活动的）方法，原则;方法论，一套方法. Patients with covert consciousness /can deliberately alter (v.) their brain patterns /when told to move parts of their bodies /or to envision (v.) 展望；想象 an activity. But outwardly 表面上；外表上, **in terms of** 在……方面,用……来表示,从……的角度body movements, they show (v.) no signs of following any prompt 提词，提示.

Example 8. 标题

FMRI

MRI(磁共振成像) 可以在身体的任何地方使用，而fMRI(功能性磁共振成像) 的研究则集中在大脑上.

comparable

~ (to/with sb/sth) similar to sb/sth else and able to be compared 类似的；可比较的

- The situation in the US **is not directly comparable to** that in the UK. 美国的情况与英国的不能直接相比。

对于隐蔽意识，完全没有向外运动，甚至比闭锁患者更是如此。但这并不意味着没有内在生命。 2006 年，安大略省西安大略大学的神经科学家 Adrian M. Owen, 和他的同事, 检查了一名年轻女性，她遭受了严重的脑外伤，据信处于植物人状态。医疗保健团队使用一种称为"功能性核磁共振成像"的成像扫描, 对她进行了评估，这种扫描可以追踪流经大脑的血流, 以揭示活跃区域。在扫描过程中，临床医生让她想象打网球, 和穿过她家的房间。令欧文和他的同事们惊讶的是，这名妇女的大脑活动, 与健康志愿者的活动相当。更重要的是，"网球任务"的大脑激活模式, 与"步行任务"的模式截然不同，表明她可以有意地改变她的大脑活动。

随后, 在世界各地患有不同类型脑损伤的患者中, 也发现了隐性意识。 2017 年，在麻省总医院刚被送入重症监护病房的重度脑损伤患者身上, 检测到这种现象，这表明, 隐蔽现象可能发生在最近受伤的人身上，而不仅仅是在患者接受治疗后。 “出去”了几个星期。为了诊断隐蔽状态，临床医生使用不同的行为任务，例如要求患者张开和合上双手, 或想象游泳，同时, 用脑电图或功能性 MRI, 记录他们的大脑反应。尽管方法不同，但世界各地的多个研究小组, 都重复了这些反应。具有隐性意识的患者, 在被告知要移动身体的某个部位, 或设想一项活动时，可以故意改变他们的大脑模式。但从表面上看，就身体动作而言，他们没有表现出遵循任何提示的迹象。

主 This state of being /in which **cognitive function** exceeds (v.)超出；超越（限制） **motor expression** / 谓 is still poorly understood, and both the EEG and functional MRI techniques /have limitations. The methods may not detect intentional brain activity in some patients /who later regain consciousness. Both techniques may also be confounded 证明…有错;使困惑惊讶 by sedative 镇静剂 medications 药物, which are required for safety or comfort /in most critically ill patients. Furthermore, functional MRI requires a specialized imaging room, and 主 **moving** (v.) unstable patients **from** the intensive care unit **to** the MRI scanner / 谓 may put them at risk.

Yet another problem is that /the MRI provides only a snapshot of a patient's level of consciousness /during a short period /because it cannot easily be repeated. An EEG can be done frequently /at the patient's bedside —capturing snapshots at different times —but the method has its own shortcomings. Its readings (n.) can be altered (v.) by electrical noise /created by other machines in intensive care rooms, which can cause the test **to reflect (v.) artifacts** 非自然存在物体，假象;人工制品 instead of reality.

Example 9. 标题

exceed

(v.) to be greater than a particular number or amount 超过（数量） - The price will not exceed ￡100. 价格不会超过100英镑。

confound

to prove sb/sth wrong 证明…有错

→ con-, 强调。-found, 流，倾泻，词源同confuse, foundry. 即流到一起的，难以区别而困惑的。

- to confound expectations 证明期望有误

对这种"认知功能超过运动表达"的状态. 我们仍然知之甚少，脑电图和功能性 MRI 技术, 都有局限性。这些方法可能无法检测到一些后来恢复意识的患者的故意大脑活动。这两种技术, 也可能被镇静药物混淆，镇静药物是对大多数危重病人的安全或舒适, 所必需的。此外，功能性 MRI 需要专门的成像室，将不稳定的患者从重症监护病房转移到 MRI 扫描仪, 可能会使他们面临风险。另一个问题是, MRI 只能提供患者短时间内意识水平的快照，因为它不容易重复。脑电图可以在患者床边经常进行 ——捕捉不同时间的快照——但这种方法有其自身的缺点。它的读数可能会被重症监护室中其他机器产生的电噪声所改变，这可能导致测试反映出伪影, 而不是现实的状态。

Neurologists 神经病学家 are trying to develop a test /that can identify which patients are likely to be in a state of covert consciousness /and thus should undergo (v.)经历，经受（变化、不快的事等） advanced EEG and functional MRI

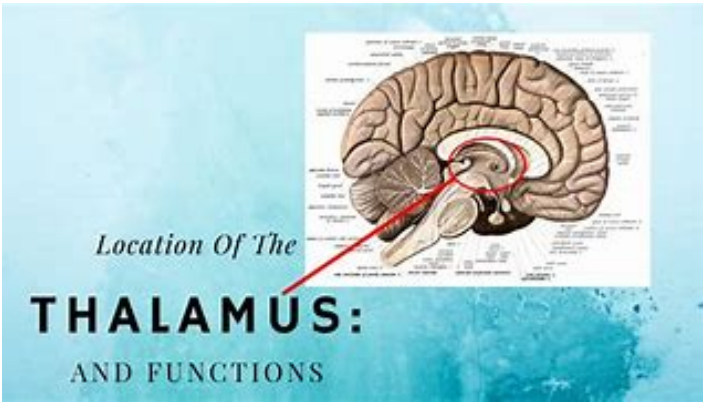
assessments 评定；核定；判定. Laboratories around the world /are working to develop such screening methods, but progress has been slow /because 主 the structural and functional mechanisms /that underlie covert consciousness / 系 are uncertain, so clinicians do not know exactly /what to look for.
Recent studies suggest that /brain injuries disconnecting (v.)切断 the thalamus 丘脑 —a region that relays (v.)接转，转送，转发（信息、消息等） movement signals and sensory 感觉的；感官的 information /between the body and brain — from **the cerebral cortex** 大脑皮层 , which **is responsible 有责任；负责；承担义务 for** higher-level cognitive functioning, **may be responsible for** the condition 健康状况;（因不可能治愈而长期患有的）疾病.

Yet it is likely that /**not** a single type of lesion (n.)（因伤病导致皮肤或器官的）损伤，损害 /**but rather** various 各种不同的 combinations of lesions in several locations /could cause (v.) motor dysfunction /while allowing 使可能 covert consciousness. Further complicating 使复杂化 clinical efforts to detect covert consciousness /is that patients with severe brain injuries /often **have fluctuating 波动；（在…之间）起伏不定 levels of** consciousness. Such swings mean that /**a single assessment** could miss (v.) important signs; perhaps patients need to be tested multiple times.

Example 10. 标题

thalamus

/'θæləməs/ 丘脑
→ 来自拉丁语 thalamus,内室，卧室，来自希腊语 thalamos,内室，卧室，来自 thalos,拱顶，拱 形建筑，词源同 hypothalamus.后引申词义花托，人体大脑部位丘脑等，因形如屋子而得名。



lesion

/'liːʒ(ə)n/ (n.) (medical 医) damage to the skin or part of the body caused by injury or by illness （因伤病导致皮肤或器官的）损伤，损害
→ 来自拉丁语laedere,击，伤害，词源同elide,collide.

- skin/brain lesions 皮肤/大脑损伤

fluctuate

/'flʌk-tʃueɪt/
→ fluctu(-flu-)流 + -ate动词词尾

神经科医生正在尝试开发一种测试，可以识别哪些患者可能处于隐蔽意识状态，因此, 应该进行高级脑电图和功能MRI评估。世界各地的实验室, 都在努力开发这样的筛查方法，但进展缓慢，因为隐性意识背后的结构和功能机制, 尚不确定，因此临床医生并不确切知道该寻找什么。最近的研究表明，大脑损伤切断了丘脑与负责高级认知功能的大脑皮层之间的联系，丘脑是在身体和大脑之间传递运动信号和感觉信息的区域，这可能是导致这种情况的原因。然而，很可能不是单一类型的病变，而是不同部位病变的各种组合, 可能导致了运动功能障碍，同时使"隐蔽意识"发生。使检测隐性意识的临床工作进一步复杂化的是，严重脑损伤的患者, 通常有波动的意识水平。这样的波动意味着, 单一的评估可能会错过重要的信号;也许患者需要进行多次检测。

2. <pure> Some People Who Appear to Be in a Coma May Actually Be Conscious

A few days earlier, at home, she had suddenly fallen unconscious. She had suffered a ruptured blood vessel in her brain, and the bleeding area was putting tremendous pressure on critical brain regions. The team of nurses and physicians at the hospital's neurological intensive care unit was looking for any sign that Mazurkevich could hear them. She was on a mechanical ventilator to help her breathe, and her vital signs were stable. But she showed no signs of consciousness.

One of us (Claassen) was on her medical team, and when he asked Mazurkevich to open her eyes, hold up two fingers or wiggle her toes, she remained motionless. Her eyes did not follow visual cues. Yet her loved ones still thought she was "in there."

She was. The medical team gave her an EEG—placing sensors on her head to monitor her brain's electrical activity—while they asked her to "keep opening and closing your right hand." Then they asked her to "stop opening and closing your right hand." Even though her hands themselves didn't move, her brain's activity patterns differed between the two commands. These brain reactions clearly indicated that she was aware of the requests and that those requests were different. And after about a week, her body began to follow her brain. Slowly, with minuscule responses, Mazurkevich started to wake up. Within a year she recovered fully without major limitations to her physical or cognitive abilities.

Mazurkevich had "covert consciousness," a state in which the brain reacts to the outside world with some comprehension, although the body does not respond. As many as 15 to 20 percent of patients who appear to be in a coma or other unresponsive state show these inner signs of awareness when evaluated with advanced brain-imaging methods or sophisticated monitoring of electrical activity. Many of these techniques have only recently been refined. These methods are altering our understanding of coma and other disorders of

consciousness. Moreover, people whose covert consciousness is detected early have a greater chance of a full conscious and functional recovery, indicated by our studies at Columbia University.
The standard definition of a comatose patient is someone who is unconscious, is unable to be awakened, and has no signs of awareness or the ability to interact with the environment. Patients in a coma caused by severe brain injury may look indistinguishable from someone in a deep sleep, except that most comatose patients cannot breathe on their own and need support from a ventilator, with a tube inserted into their airway.

Some people think comas are easy to recover from or—conversely—a living death. Both are mistakes. Popular depictions in movies and elsewhere may be partly responsible for this. Uma Thurman as the Bride in Kill Bill: Volume 1 awakens abruptly from a prolonged comatose state, appears well nourished despite not having any feeding tubes and regains full physical strength within hours. The reality is far more challenging, with frequent medical complications, physical deterioration and a long road of small steps forward with many steps backward. Patients who survive coma after severe brain injury typically require feeding tubes for nutrition, tracheostomies that allow them to breathe through a tube in the neck and weeks to months of rehabilitation. Recovery is variable and unpredictable, even in those who, like Mazurkevich, ultimately return to independence. Overly pessimistic views of coma patients are also inaccurate because people may assume that all such patients are destined to die without emerging from their coma or live with severe disability. Recovery of consciousness, communication and functional independence is quite possible in some patients, even after a prolonged time.

Views about coma and consciousness have changed in the medical profession over time. In the 1960s neurologists and neurosurgeons noted that some comatose patients opened their eyes but showed no interaction with the environment. Many of these people remained in this state until death, leading some clinicians to believe that consciousness, once lost in this way, was impossible to recover.

Yet in the 1990s reports of patients in a “permanent” vegetative state who returned to consciousness began to surface in the medical literature. In a vegetative state, unlike coma, people’s eyes may open and shut, but they still do not react in any deliberate manner. The reports of recovery from this condition pushed the fields of neurocritical care and rehabilitation medicine to develop more fine-tuned classifications such as the minimally conscious state. It is characterized by nonverbal responses, as when patients track objects with their eyes or intermittently follow commands. A patient’s prognosis, physicians learned, was related to these states. For instance, someone who moved from a vegetative to a minimally conscious state had a greater chance of further recovery.

Detecting and predicting recovery of consciousness early on, in the intensive care unit, is often a matter of life or death. Families typically make decisions about continuing or stopping life-sustaining therapy within 10 to 14 days of the injury—the time when surgical procedures become necessary to support longer-term breathing and feeding. And a diagnosis of covert consciousness could affect clinical decisions about goals of care, pain management, bedside behavior of clinicians and family members, and management of depression and anxiety.

So what does covert consciousness look like to clinicians and to the patient’s family? One can get some idea through the lens of locked-in syndrome, in which people may have normal or near-normal cognition but are unable to control most motor movements. Locked-in patients illustrate the limitations of judging awareness, thinking abilities, and emotions purely based on motor function. The term “locked in” was coined in 1966 by neurologists Fred Plum and Jerome Posner in their monograph The Diagnosis of Stupor and Coma. They refer to the description of M. Noirtier De Villefort as “a corpse with living eyes” in Alexandre Dumas’s classic The Count of Monte Cristo (1844–1846). In clinical practice, locked-in patients do not move their extremities, but many can reliably move their eyes up and down in response to verbal commands. Some can blink or show other subtle facial movements.

The experience of living in a locked-in state was poignantly illustrated by Jean-Dominique Bauby, an editor at Elle magazine who, in 1995, suffered a stroke that blocked signals traveling from the motor cortex in his brain to his spinal cord and limbs. Without the ability to speak or move his extremities, he began to communicate with his speech therapist using eye movements.

With covert consciousness, the lack of outward movement is complete, even more so than with locked-in patients. But this does not mean the absence of inner life. In 2006 neuroscientist Adrian M. Owen, now at Western University in Ontario, and his colleagues examined a young woman who had experienced a severe traumatic brain injury and was believed to be in a vegetative state. The health-care team assessed her with a type of imaging scan called functional MRI, which traces blood flow through the brain to reveal active areas. During this scan the clinicians asked her to imagine playing tennis and to imagine walking through the rooms of her house. To the surprise of Owen and his colleagues, the woman showed activation within her brain comparable to that seen in healthy volunteers. What's more, the brain-activation patterns for the tennis task were distinct from the patterns in the walking task, indicating that she could deliberately change her brain activity.

Covert consciousness was subsequently identified in patients around the world, with varying types of brain injuries. In 2017 it was detected in seemingly unaware patients who had just been admitted to the intensive care unit at Massachusetts General Hospital with severe brain injuries, indicating that the covert phenomenon can occur in people who had very recently been hurt,, not only after patients have been "out" for weeks. To diagnose the covert state, clinicians use different behavioral tasks, such as asking the patient to open and close their hands or imagine swimming while recording their brain reactions with an EEG or functional MRI. These responses have been reproduced by multiple research groups worldwide despite differences in methodology. Patients with covert consciousness can deliberately alter their brain patterns when told to move parts of their bodies or to envision an activity. But outwardly, in terms of body movements, they show no signs of following any prompt.

This state of being in which cognitive function exceeds motor expression is still poorly understood, and both the EEG and functional MRI techniques have limitations. The methods may not detect intentional brain activity in some patients who later regain consciousness. Both techniques may also be confounded by sedative medications, which are required for safety or comfort in most critically ill patients. Furthermore, functional MRI requires a specialized imaging room, and moving unstable patients from the intensive care unit to the MRI scanner may put them at risk. Yet another problem is that the MRI provides only a snapshot of a patient's level of consciousness during a short period because it cannot easily be repeated. An EEG can be done frequently at the patient's bedside—capturing snapshots at different times—but the method has its own shortcomings. Its readings can be altered by electrical noise created by other machines in intensive care rooms, which can cause the test to reflect artifacts instead of reality.

Neurologists are trying to develop a test that can identify which patients are likely to be in a state of covert consciousness and thus should undergo advanced EEG and functional MRI assessments. Laboratories around the world are working to develop such screening methods, but progress has been slow because the structural and functional mechanisms that underlie covert consciousness are uncertain, so clinicians do not know exactly what to look for. Recent studies suggest that brain injuries disconnecting the thalamus—a region that relays movement signals and sensory information between the body and brain—from the cerebral cortex, which is responsible for higher-level cognitive functioning, may be responsible for the condition. Yet it is likely that not a single type of lesion but rather various combinations of lesions in several locations could cause motor dysfunction while allowing covert consciousness. Further complicating clinical efforts to detect covert consciousness is that patients with severe brain injuries often have fluctuating levels of consciousness. Such swings mean that a single assessment could miss important signs; perhaps patients need to be tested multiple times.