

#NEUROSCIENCE

Brain Practices New Info While Sleeping

Scientists believe that this replay of neuronal firing during sleep is how the brain practices newly learned information, which allows a memory to be consolidated that is converted from a short-term memory to a long-term one.



Why do people sleep? Scientists have debated this question for ages, but a new study adds fresh clues for solving this mystery.

Scientists studying laboratory animals long ago discovered a phenomenon known as 'replay' that occurs during sleep, explains Daniel Rubin, lead author and a neurologist at the Massachusetts General Hospital's Centre for Neurotechnology and Neurorecovery. Replay is theorized to be a strategy the brain uses to remember new information. If a mouse is trained to find its way through a maze, monitoring devices showing a specific pattern of brain cells or neurons that will light up as it traverses the correct route.

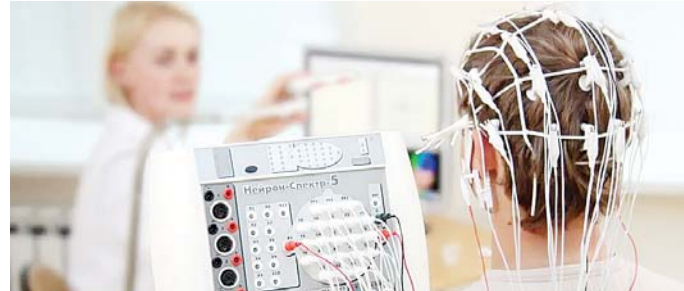
"Then later on while the animal is sleeping you can see that those neurons will fire again in that same order," Rubin says.

Scientists believe that this replay of neuronal firing during sleep is how the brain practices newly learned information, which allows a memory to be consolidated that is converted from a short-term memory to a long-term one. However, replay has only been convincingly shown in lab animals.

"There's been an open question in the neuroscience community: To what extent is this model for how we learn things true in humans? And is it true for different kinds of learning?" asks neurologist Sydney S. Cash, co-director of the Centre for Neurotechnology and Neurorecovery at MGH and co-senior author of the study. Importantly, Cash says, understanding whether replay occurs with the learning of motor skills could help guide the development of new therapies and tools for people with neurologic diseases and injuries.

To study whether replay occurs in the human motor cortex - the brain region that governs movement - the research team enlisted a 36-year-old man with tetraplegia (also called quadriplegia), meaning he is unable to move his upper and lower limbs; in his case due to a spinal cord injury. The man identified in the study as T11, is a participant in a clinical trial of a brain-computer interface device that allows him to use a computer cursor and keyboard on a screen.

The investigational device in development by the BrainGate consortium, a collaborative effort involving clinicians, neuroscientists and engineers at several institutions with the goal of creating technologies



Followed Avani's inspirational story. That she has overcome hardship shows her resolve: Abhinav Bindra on Avani Lekhara



Abhinav Ajit Bindra is, by nature, reticent. He hates publicity and, during the course of a lengthy interview in Mohali, requested that nothing be presented in a manner to suggest mileage was being sought either for himself or the Abhinav Bindra Foundation.

Among the most well-dressed of athletes, always, Abhinav is best remembered for winning gold in the 2008 Beijing Olympics. It was only last August that Neeraj Chopra became the second Olympian from India to bring home an individual gold.

Excerpts from the interview...

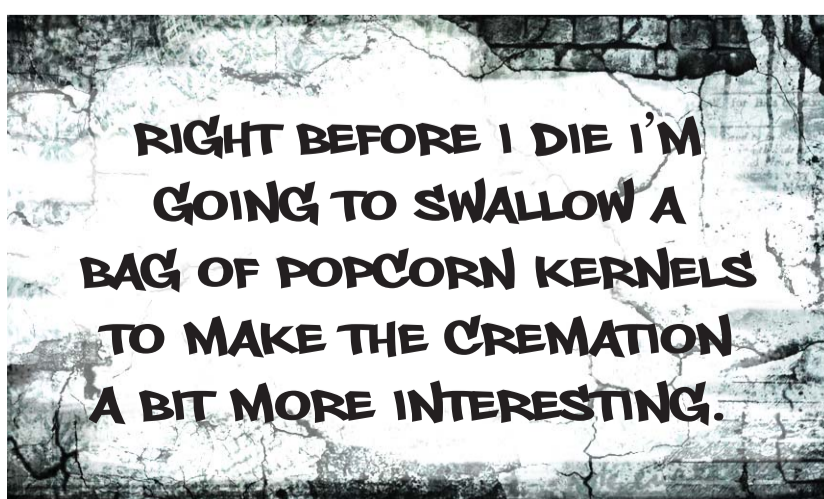
Q: Neeraj has been the cynosure ever since his javelin gold in Tokyo, but you remain in an excited position. Fourteen years after you scripted history, will you reflect on the impact of that gold?

A: Fine question and I'd like to retire from active sport in 2016 and am now able to look back at my career more dispassionately than when I was still competing. While I was at it, I had that single tunnel vision. When I look back, I don't stop at my Olympics gold or the other wins. Rather, I look back on the relationships I built, starting with my parents (Ajit and Bahli). Also, the relationships built with my coaches and other support staff. Even relationships built with competitors! What stays alive is not what the gold did to me, but the sort of person I became in winning that medal.



Abhinav Bindra with the 10-m rifle event gold in the Beijing Olympics, 2008.

THE WALL



BABY BLUES



Sarcoma Awareness Month

Every year thousands of people are diagnosed with sarcoma, a type of cancer that forms in the connective tissues of the body including fat, blood vessels, nerves, etc. Sarcoma is a rare form of cancer, but no less deadly for that. Research continues on what causes sarcoma and why certain people develop it. Sarcoma Awareness Month was created to help raise awareness about this disease and all the people it affects.

based Paralympian shooter Avani Lekhara's career?

A: Followed Avani's inspirational story, certainly. That she has overcome hardship shows her resolve. Society can learn much from Avani, as also other Paralympians.

Q: Could shooting become a less expensive sport?

A: Any sport at the highest level is expensive and shooting will remain in the niche category, not become a mass sport like cricket or football. But if you go to a National event, you'll find shooters from different segments of society. The participants aren't only from an elite background... There are now more shooting ranges in India, equipment is more accessible. There was a time when shooting was elitist. Not today.

Q: Badminton has been bringing much joy to us in India. From the outside, what do you think has driven success?

A: I'm not involved, so maybe I'm not the right person to talk. However, from the outside, my view is that the effort has been collective. Prakash Padukone early on, then Pillela Gopichand much later, have played their part. The quality of coaches and academies has contributed as well. The Badminton Association of India and its president (Assam CM Himanta Biswa Sarma) have been proactive, which must have helped. To succeed, you have to follow a process. Cannot be overnight.

Q: What's needed to succeed?

A: You've got to embody integrity and be honest in everything you do. To succeed, you also need to stay on the right path, not develop habits which can pull down your performances.

Q: Is there a sport you follow with some interest?

A: Urban sport, especially after witnessing them during the Youth Olympics in Argentina... Some of the disciplines used in the urban sport umbrella, like breakdancing, find a place in slums too, where zero investment is required. You don't need infrastructure... Streets and slums suffice. One has to move with the times. While traditional sport will always have a handsome following, the time to enjoy urban sport isn't far off. The International Olympic Committee (IOC) has, by the way, added breakdancing in the Paris Olympics in 2024. Moreover, the 2028 Olympics in Los Angeles will feature three urban sport - skateboarding, surfing, sports climbing.

Q: You also follow tennis, don't you?

A: Roger Federer and Rafael Nadal, in particular. I've enjoyed their rivalry, enjoyed their Grand

#SHOOTING

not ignore this reality.

Q: Till Neeraj's gold, had you been feeling lonely at the top?

A: Sure, I wanted to win gold in the Olympics, but I didn't want to be the only Indian with that medal around his neck. Wherever I went in the world, I'd be introduced as India's only individual gold medalist in the Olympics. That had almost become embarrassing. I was delighted with Neeraj's achievement and hope more will follow. We're on the right track.

Q: Do you still have a pet beagle?

A: I have three pets: Henry (beagle), Lana is my lab and Tecno the cocker spaniel.

Q: It's not unusual for athletes to seek guidance before major competitions. What do you tell them?

A: I don't give advice. Everybody has to craft their own course, their own journey. What I do offer and share are my

Q: Really? That's a massive admission...

A: Well, yes... I achieved big goals, but not my fullest potential. I was too one-dimensional in striving to win... Was too obsessive, which led to a lack of balance. A different pathway may have produced better results.

Q: Believe in destiny?

A: Whatever is in store, is in store. More than destiny, I've believed in hard work. Destiny plays a part, but depend on hard work for success.

Q: What did you make of Neeraj, the person, when he called on you after Tokyo?

A: I'd met Neeraj once before... He loves his discipline, loves his craft and the process of what he does.



Abhinav Bindra with IOC president Thomas Bach.

The shortest way to success is hard work and Neeraj has done that. I found him interested in improving, in honing his craft. That being Neeraj's attitude, he will continue to do well. He's young (24).

Q: You gifted Neeraj a puppy. Why not something else?

A: Frankly, I didn't know what to present Neeraj with... I did some checking and spoke to Manisha Malhotra (head of Sports Excellence at JSW Sports). I learnt he was looking for a puppy, so I gifted a golden retriever, Tokyo.

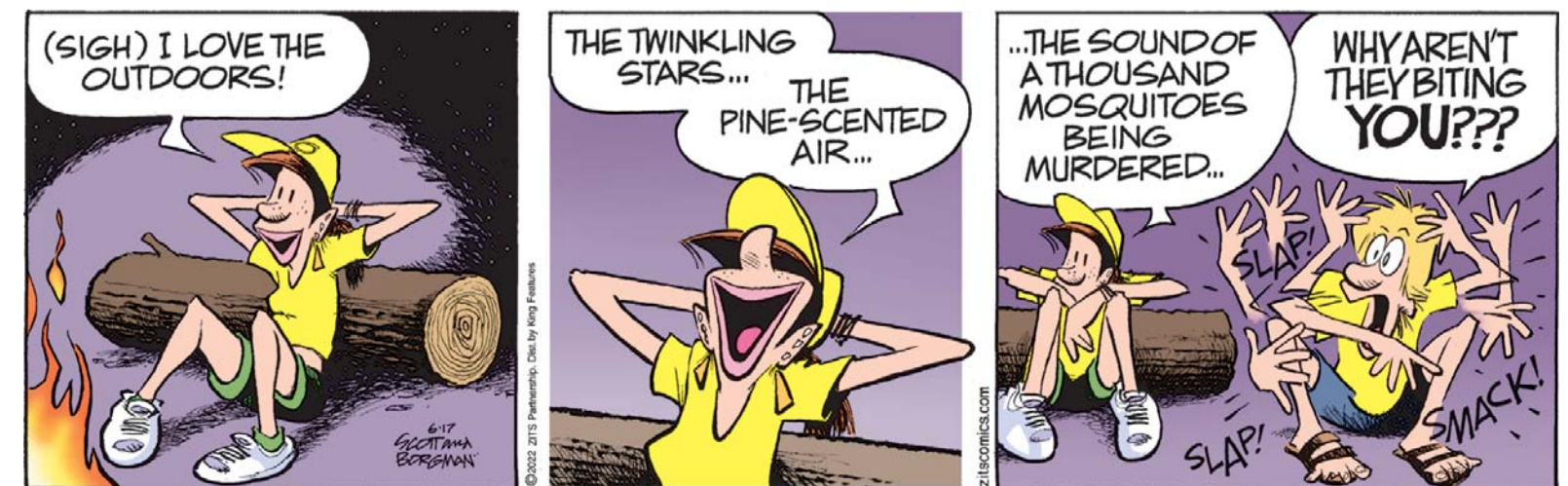
Q: Looking ahead, who is the one shooter who may make headlines like you did?

A: I'm spoilt for choice, it's impossible to pick one. The depth of talent in India is immense, which augurs well. Naturally, the shooters need to be well looked after, as they're in the stage of development. Tokyo was unfortunate, but should be treated as a learning experience. There were errors in preparation before the Olympics, other errors as well. Maybe certain things were taken for granted. Remember, at the top level, it's impossible to have a mindset sans pressure.

Q: Have you followed Jaipur-

By Rick Kirkman & Jerry Scott

ZITS



By Jerry Scott & Jim Borgman



Abhinav Bindra with niece Naintara and pet Tecno.



Neeraj Chopra and Abhinav Bindra, with the puppy gifted by the latter.

Slam wins. Both have been great masters of their craft... Different types of players, but having enormous respect for each other. Sport teaches you to respect.

Q: What's a normal day for you like?

A: I believe in having a routine and following it. That keeps my mind fresh. My Foundation and my businesses keep me busy. I'm on the Athletes Commission, so there's work there. Plus, things I'm passionate about keep me busy too.

Q: The branding of your mighty impressive office in Mohali, says 'Abhinav Futuristics'. That must be one of your businesses...

A: 'Abhinav Futuristics' is working on transitional health care.

Q: There was, at one point, talk of an Abhinav Bindra Academy...

A: I don't have any academy with my name... I do, however, have projects in Odisha.

Q: Why Odisha and not any other State?

A: Let's say the concerned people in Odisha were proactive, not that I wouldn't like to be engaged in projects in other States as well. In Odisha, the push is towards empowering society through sport.

Q: You've been passionate about working with refugee shooters...

A: In partnership with Niccolo

Campiani... Till the three shooters became Olympians in Tokyo, they only had the status of refugee. Now, each one of them is an Olympian. Today, therefore, they have a different identity. It's a project I felt strongly about.

Q: This is the 75th year of India's Independence. Is there a pledge which needs to be taken?

A: The demographics are such that India is a young nation and the youth consumes more sport... I'd like the young to draw inspiration from sport, the values of sport... I've already mentioned integrity and honesty being pillars of success. Add respect and the setting of goals... If everything falls in place, India will be a richer and healthier nation.

Q: Was your family affected by Partition?

A: Yes, of course.

Q: Your take on the India of 2022 and beyond?

A: (Passionately) I'll answer in the context of sport... I believe the next two decades will belong to sport and its impact on society much more meaningful.

Q: As we end this Q&A... You'll turn 40 in September. Isn't there 'pressure' from the family to take the plunge?

A: Sometimes, my parents do talk to me about marriage... I'll take that road when the time is right.

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#MARINE-LIFE

Whales Learn Songs From Each Other



"By listening to the Australian humpback population, we were able to see if the songs changed in any way when sung by the New Caledonian whales," Dr Allen said.

University of Queensland led the study that has found humpback whales can learn incredibly complex songs from whales of other regions.

Dr Jenny Allen, whose doctoral work at UQ's School of Veterinary Science led to the study, said researchers had found New Caledonian humpback whales could learn songs from their counterparts from Australia's east coast with remarkable accuracy.

"This really indicates a level of 'cultural transmission' beyond any observed non-human species," Dr Allen said. The study looked closely at the song patterns of male humpback whales from each region between 2009 and 2015, to examine how culture transmits between the populations works. Dr Allen said the complexity of the songs was determined by measuring both the number of sounds the whales made and the length of the sound patterns.

"By listening to the Australian humpback population, we were able to see if the songs changed in any way when sung by the New Caledonian whales," Dr Allen said. "We found they actually learned the exact sounds without simplifying or leaving anything out."

"And each year we observed them as they sang a different song, so it means humpback whales can learn an entire song pattern from another population very quickly, even if it's complex or difficult."

The findings supports the idea that songs are being learned by whales on shared migration routes like New Zealand or shared feeding grounds like Antarctica.

"It's rare for this degree of cultural exchange to be documented on such a large scale in a non-human species," Dr Allen said. "We hope these findings provide a model for further study into understanding the evolution of cultural communication in animals and humans."

While humpback whales have recently been taken off the endangered species list, Dr Allen said their populations still need to be carefully managed and these findings could help. "Having an in-depth understanding of a species is known to have greatly improved the efficacy of conservation and management methods," Dr Allen said.

"We now have a more holistic picture of the behaviours, movements and intentions of different humpback whale populations, including how they transmit culture. It means we're better equipped to protect them against many threats they face as our climate and planet continue to change."

