



## Science Magazine Podcast

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### **Promo**

The following is an excerpt from the *Science* Podcast. To hear the whole show, visit [www.sciencemag.org](http://www.sciencemag.org) and click on “*Science* Podcast.”

### **Music**

#### **Interviewer – Kristy Hamilton**

Finally today we have David Grimm, online news editor for *Science*. He’s here to give us a rundown on some of the recent stories from our daily news site. I’m Kristy Hamilton. So, Dave, first up we have a story on probing so-called near-death experiences in the brain. Some people have experienced these moments as floating above their body watching themselves from outside. How did scientists go about studying the brain during the brink of death?

#### **Interviewee – David Grimm**

Well, they couldn’t study humans for obvious reasons so they turned to rodents, specifically rats. And they anesthetized a bunch of rats and they induced cardiac arrest, which essentially shut off their heart. And then they probed what their brain activity was between that last heartbeat and when the rats actually died. And they saw some pretty interesting stuff.

#### **Interviewer – Kristy Hamilton**

So what did they find?

#### **Interviewee – David Grimm**

Well, what they saw was they actually used an EEG, which is an electroencephalogram, and these EEGs revealed a highly organized brain response in the seconds after cardiac arrest. It didn’t seem like random brain activity, it actually seemed like there was some sort of conscious thought going on. And what they saw specifically were oscillations in the low gamma frequency, which previous human research has linked these gamma waves to waking consciousness, meditative states, and even REM sleep so you can think about potentially dreaming. They also saw what they called top-down signaling in the brain activity of these rats, which is associated in humans with conscious perception and information processing. This increased eightfold compared to the waking state of these animals. And when you put all this together it suggests that the dying brain is hyperactive in its final seconds. It’s producing meaningful conscious activity, at least in these rats, and if the same holds true for people could help explain a lot of the near-death experiences people have.

#### **Interviewer – Kristy Hamilton**

So is there any indication that what the rats are experiencing is the same thing that humans experience as well?

**Interviewee – David Grimm**

Well, that's the billion dollar question. We really have no idea what's going on in the brain of any animal, much less an animal that's having a near-death experience. So even though we're seeing this highly organized brain activity we really have no way to say that these rats are seeing the light at the end of the tunnel, that they're seeing all their dead rat relatives, we just don't know what's going on. So that's really the big black hole here is even though researchers are seeing what looks like highly organized brain activity, we really don't know what's going on in the minds of these creatures.

**Interviewer – Kristy Hamilton**

So are humans next?

**Interviewee – David Grimm**

Well, that's a good question, too, and what the researchers say is they could actually start monitoring brain activity in people undergoing brain surgery. It involves cooling the brain and reducing the blood supply to the brain. This procedure has produced near-death experiences in the past, so it might be a good way to show that if people are having these experiences and the researchers can link up specific brain activity with those experiences, they could show that there actually is a scientific basis for near-death experiences.

**Interviewer – Kristy Hamilton**

Alright. Next up we have a story on why we shouldn't trust the Internet. I already don't trust the Internet, but now researchers have given us some evidence for why not.

**Interviewee – David Grimm**

That's right. And it's not necessarily just the Internet as a global thing, but more specifically reviews on the Internet. Whether it's Amazon or Yelp or whatever, we're always a lot of us look at reviews on the Internet, we put a lot of faith in them whether it's to buy a product or potentially go to a restaurant. This study suggests that these reviews are highly subject to manipulation, so you might not want to trust those reviews as much as you think you can.

**Interviewer – Kristy Hamilton**

So how did they go about testing this then?

**Interviewee – David Grimm**

Well, what they did was they actually looked at a news site, a real-world site that aggregates news stories, and then readers can comment on news stories and then users can actually review those comments. So the comments that get a lot of positive reviews tend to go up in visibility, where those that get a lot of negative reviews tend to go down in visibility. And what the researchers said is can we manipulate this? Can we get people to be more positive about a comment or potentially even more negative about a comment by sort of gaming the system?

**Interviewer – Kristy Hamilton**

And could they?

**Interviewee – David Grimm**

They could. And what they found was that if they – at least they could halfway that that was true actually. What they found was that if they gamed some of the comments, so they gave them a lot of up votes, that users were 32% more likely to also give a positive vote to that comment. They didn't see the same thing with negative votes. If they put a lot of negative votes on a comment, that didn't necessarily make other users want to also put a negative vote on that comment. And the researchers think that has a lot to do with human psychology, that people are more skeptical of what they call negative social influence, but that they're more willing to go along with positive opinions from other people.

**Interviewer – Kristy Hamilton**

So what does this all mean then?

**Interviewee – David Grimm**

Well, it means that you might not want to trust some of those comments on the Internet, especially if they're positive comments. The applications for companies are a little less clear. Researchers have shown that if users feel that a company is manipulating a rating online, they're much less likely to trust it.

**Interviewer – Kristy Hamilton**

Finally we have a story on bone-eating worms found in Antarctic waters. So what can you tell us about these boneworms?

**Interviewee – David Grimm**

Well, they are worms that eat bones, hence their name. They're actually technically known as *Osedax*, and they've only been known since about 2004. And these are really strange creatures. You actually can see a picture of them on the site. Basically what they look like is they are threadlike worms. They vary from about 0.6 millimeters to 15 millimeters in length. They are mouthless and gutless, yet they're still able to feed on the skeletons of dead animals, including whales, birds, fish, and even cows – assuming they sink to the bottom of the sea. And previous studies have shown that they actually are pretty widely spread throughout the world, but we didn't know until this new study that they're actually also found in Antarctica.

**Interviewer – Kristy Hamilton**

So if they don't have mouths how do they eat bone?

**Interviewee – David Grimm**

That is a great question. And what they do is they form large colonies of elongated females, and in these reddish wavy plumes that function as gills while their greenish root-like structures release an acid that enables them to tunnel into the bone. And, again, you should really check out a picture of these guys, they're really freaky looking.

**Interviewer – Kristy Hamilton**

So how are boneworms different to shipworms?

**Interviewee – David Grimm**

So shipworms are another really weird ocean creature, and they're actually not worms despite their name, they are actually mollusks. And they were first found in the 1700s because they were devouring wooden pilings the Dutch used to protect their lowlands from flooding. These are naked cylindrical creatures, which bear a pair of tiny shells at one end of their bodies that they use to grind into wood and then they actually digest that wood. And you can actually see a picture of these guys too on the site. And they have also been found pretty widely throughout the world.

**Interviewer – Kristy Hamilton**

Okay. So what did the researchers find in this study then?

**Interviewee – David Grimm**

Well, what the researchers did which was really kind of cool and kind of crazy was they outfitted these two old deepsea landers, which are these platforms that are designed to carry equipment and other materials to the sea floor, and they loaded them up with wooden planks and whale bones. And what they were hoping to find – and they basically dropped them to the bottom of the ocean – and what they were hoping to find was whether they would find shipworms and boneworms in Antarctic waters which is where they put some of these skeletons. And lo and behold, when they pulled the whale bones back up, they were covered in boneworms, but when they pulled up the wood they didn't find any shipworms.

**Interviewer – Kristy Hamilton**

So what does this all mean?

**Interviewer – David Grimm**

Well, what it all means for boneworms is that they are very widely spread throughout the world, even in Antarctic waters which is pretty cold. What it means for shipworms is they don't appear to be in Antarctic waters, and there's sort of a nice silver lining for that because there are a lot of potentially very famous shipwrecks off the coast of Antarctica. For example, the famous Antarctic explorer Ernest Shackleton, his ship *Endurance* sank in 1915 in western Antarctic waters. And what's great about potentially not having shipworms in these waters is these shipworms wreak havoc, as you might expect, on shipwrecks because they eat the wood. So it suggests that there may be a lot of famous shipwrecks that still may be down there in the waters off Antarctica.

**Interviewer – Kristy Hamilton**

So what else is on the site this week, Dave?

**Interviewee – David Grimm**

Well, speaking of wood, we've got a story about how scientists are trying to take wood out of the equation when it comes to creating biofuels of the future. Also a story about the super massive black hole in the center of our Milky Way galaxy, and some new insights into why it's not eating as much as it should be eating. For *ScienceInsider*, our policy blog, we've got a story about why activists have destroyed a genetically modified rice field in the Philippines. Also a story about whether a White House science committee needs an ethical review. So be sure to check out all these stories on the site.

**Interviewer – Kristy Hamilton**

Thanks, Dave.

**Interviewee – David Grimm**

Thanks, Kristy.

**Interviewer – Kristy Hamilton**

David Grimm is the editor of *Science's* online daily news site. You can check out the latest news, and the policy blog, *ScienceInsider*, at [news.sciencemag.org](http://news.sciencemag.org).