



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 and click on “*Science* Podcast.”

Music

Interviewer – Kerry Klein

Finally today, I’m Kerry Klein, and I’m here with online news editor David Grimm who’s going to give us a rundown of some of the recent stories from our daily news site. So in our first story today, Dave, we’re learning a little bit about why senior moments happen.

Interviewee – David Grimm

Right, Kerry. This story is about the kind of decline that happens with age. We forget where our keys are. We maybe don’t think as quickly as we used to. There are a variety of reasons this happens. This new study pinpoints a reason that’s only recently come to light and provides some evidence for it. It has to do with something called microbleeding, which is the bursting of small blood vessels in the brain. You lose blood flow to a particular region because of this and then tissue dies and then you lose cognitive function.

Interviewer – Kerry Klein

Now how would these microbleeds happen in the first place?

Interviewee – David Grimm

Well, the brain is a very blood hungry organ. Even though it only accounts for 2% of our body weight, it receives 15% of our cardiac output and consumes 20% of our oxygen, so it’s a very hungry organ. But rather than getting this oxygen in pulses, the brain needs a smooth continuous supply, so the aorta, which is the largest blood vessel that branches off the heart, smoothes out the blood pressure before it reaches the brain by absorbing the pressure within its flexible walls. But as people age, their aorta stiffens. This translates into higher blood pressure in the brain, especially during stress, and the higher the blood pressure, the more likely you are to have these bursting vessels and these microbleeds and theoretically the cognitive decline that goes along with them.

Interviewer – Kerry Klein

So the brain actually experiences a different blood pressure than the rest of the body?

Interviewee – David Grimm

It does. And it gets higher as we get older. Still leaves open the question, well, does that actually account for cognitive decline? That’s what this new study is all about. What the researchers did was they recruited about 500 people in Melbourne, Australia. These

people were from about 20 to 82 years old, and they measured what's called the central blood pressure. This is the blood pressure that is tied to the aorta, and is actually what's happening in the brain. This is not to be confused with the brachial pressure, which is the type of blood pressure you get when they put that cuff on your arm in the doctor's office. And what the researchers found was that central blood pressure and the stiffness of the aorta correlated very well with a person's cognitive ability so that the higher their central blood pressure and the higher the stiffness of their aorta, the worse these people tended to perform on tests of visual processing and memory. So although it's just a correlation, it's really the strongest evidence yet that this central blood pressure, and specifically the microbleeds that are caused by high central blood pressure, may be responsible for a lot of the cognitive decline that we experience as we get older.

Interviewer – Kerry Klein

So if this aorta stiffness, higher blood pressure, and microbleeds are really what's leading to cognitive decline in older age, what can we do about it?

Interviewee – David Grimm

Well one of the authors is working on whether a dietary supplement might do the trick. He proposes that the elasticity of the aorta could be preserved by maybe providing some fatty acids or antioxidants that help maintain its structure. Maybe you'd just be able to take a vitamin and that would help to stave off cognitive decline. That's pretty far away but at least one potential avenue for therapy.

Interviewer – Kerry Klein

Wow, how interesting. And our next story is a little bit less optimistic. It's about what happens to whales that get stuck in fishing gear.

Interviewee – David Grimm

That's right, Kerry. This story is really about how even whales that are freed from fishing gear may still be doomed to die. And it centers on a whale that was named Eg 3911 that was spotted on Christmas day of 2010 by a team of wildlife spotters. And what was the problem with this whale is she was actually caught up in 132 meters of commercial fishing rope, and this isn't an unusual problem for whales. Whales, especially in the north Atlantic, can become tied up in heavy-duty commercial fishing lines and even lobsters and crab traps – anything that's connected to the surface by long ropes. The whales can get tangled in there. They are not able to move around, they are not able to dive, and so they are not able to feed. It's actually a leading cause of death for Atlantic whales going back to 1970. But this new study asks the question of, you know, even if these whales are freed, how do they fare? And the reason they asked that question is because Eg 3911 was freed but by the time she was freed, she was 20% thinner than other right whales her age. And as soon as she was freed, she seemed like she was okay. She began swimming faster and diving deeper, but the problem was she had no way to bulk back up. These whales normally feed in cool northern waters during the summer, and the winter waters, by the time she was freed, had no food sources left for her. So she's tired, she's hungry, she's skinny, and she's not able to get the food that she needs because she's too far away from it. And indeed, just a few weeks later, she was found

dead sporting lethal shark attack wounds. The researchers suspect that she was, sort of, lethargically bobbing up at the surface. She was basically easy prey for predators. But they really wanted to figure out why did this whale die and why might other whales die even after they are free, and they actually took a lot of the same gear that she was trapped in and they dragged it behind a boat to figure out how much drag these traps were generating on the whale's body. And what they found is that Eg 3911 was burning up to twice as much energy as she would have normally while she was entangled. And that made her not only lose a lot of weight but really, sort of, exhaust herself so that even when she was free, she really wasn't able to get to where she needed to go to replenish her energy stores, replenish her food stores, and that's probably why she became so lethargic and became a victim of sharks.

Interviewer – Kerry Klein

So it sounds like getting entangled in this fishing gear, while the experience itself may not be lethal, it's just totally wiping these whales out and permanently weakening them.

Interviewee – David Grimm

Right. As one of the outside experts says, the impact of humanity on these creatures does not end when they go out of sight.

Interviewer – Kerry Klein

And moving on, our third story is about the social smarts of man's best friend.

Interviewee – David Grimm

That's right, Kerry. Dogs have changed a lot since they were domesticated from wolves. They are comfortable around us, they pay close attention to us, they follow orders most of the time – these are things that wolves don't do. And so scientists have usually said that dogs are socially smarter than wolves. They deal better in social situations. They have a lot of social intuition that wolves don't have, and it's because of this social intuition that they've become such a close companion of man. But this new study debunks that a bit.

Interviewer – Kerry Klein

So in the past, we've had a little bit of a human-centric notion that things that behave more like us maybe are a little bit socially smarter.

Interviewee – David Grimm

Right. And one of the big tests that researchers have used is this so-called pointing test. When you point your finger at, say, a cup that maybe has a treat under it and there's maybe some other cups nearby, dogs typically look at what you're pointing at and they are able to find the treat, whereas wolves really fail miserably at this test. And so that's been evidence that dogs have a so-called theory of mind, which is sort of an ability to intuit what we're thinking. When we point at something, that means we want the dog to go there, whereas wolves don't have that. But what these researchers found – these were researchers who were studying wolves and dogs at the Wolf Science Center which is outside Vienna in Austria – they found that there were instances where wolves actually

did better than dogs in social situations. For example, when they threw out some food for a pack of wolves or a pack of dogs, even though the wolves fought each other a lot, every wolf got a little bit of the food. They were able to work together enough that they were all able to get some food. Whereas with dogs, the alpha dog really monopolized the food source. He got all the food to himself, and the other dogs didn't get anything. And the researchers actually devised an experiment to further test the social smarts of wolves and dogs. What they did was they locked a food treat inside a box and then they taught a dog how to open the box. And then they had a bunch of wolves or a bunch of dogs watch this dog open the box, so theoretically, they could learn how to open the box and get the food by watching this dog. And what they found was that the wolves were very good at this. All of the wolves were able to open the box, and most of them were able to do it by using the same method the trainer dog had used, whereas the dogs were miserable at this task. Most of them couldn't open the box, and the few that did, didn't do it the same way the trainer dog had done, which suggests they weren't even learning from this dog how to do it.

Interviewer – Kerry Klein

So perhaps there's more than one kind of social intelligence here. There's learning from others of your own species and there's learning from humans, the ones that have trained you and domesticated you.

Interviewee – David Grimm

Exactly. And that's what the researchers say. There isn't really one type of social intelligence. As you pointed out earlier, we tend to be a little bit biased that the animals that act a little bit more like us, we consider them smarter. Where in this case, for wolves, it makes a lot more sense for them to be socially smart with other wolves, because those are the animals they deal with for the vast majority of their lives so they've got to learn from each other. Whereas with dogs, they don't really have to learn that well from each other, because really, the creature they are spending most of their time with is us.

Interviewer – Kerry Klein

So it seems like the dogs have, sort of, traded off one kind of sociability for another.

Interviewee – David Grimm

Exactly.

Interviewer – Kerry Klein

Alright. And what else have we had on the site this week, Dave?

Interviewee – David Grimm

Well, Kerry, for *ScienceNOW*, we've got a controversial story about what may be the earliest bird fossil ever found and how it may shed light on how dinosaurs became birds, although there are some questions about the providence of the fossil. There is also a cool story about predicting autism with some new genetic tests. And for *ScienceInsider*, our policy blog, we've got a story about whether one scientist is hampering the fight against a

lethal new virus by patenting it. Also a story about a kerfuffle over lavish furnishings at a Texas cancer center that was having financial problems. Finally for *ScienceLive*, our weekly chat on the hottest topics in science, this week's *ScienceLive* is about the ethics of studying chimpanzees in captivity. And next week's *ScienceLive* is about the challenges of human exploration of Mars. And we'll have a very special guest, Buzz Aldrin, the second man on the moon. So definitely tune in for that. Both of these are video chats. So be sure to check out all of these stories on the site.

Interviewer – Kerry Klein

Great. Thanks, Dave.

Interviewee – David Grimm

Thanks, Kerry.

Interviewer – Kerry Klein

David Grimm is the online news editor of *Science*. You can check out all of our news at news.sciencemag.org, including daily stories from *ScienceNOW*, science policy from *ScienceInsider*, and *ScienceLive*, live chats on the hottest science topics every Thursday at 3 p.m. U.S. Eastern time.