



Science Magazine Podcast Transcript, 6 September 2013

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Music

Interviewer – Sarah Crespi

Finally today, Erik Stokstad, staff writer for *Science Magazine* and *ScienceNOW*, is here to give us a rundown of some recent stories from our daily news site. I’m Sarah Crespi. So first up we have a story on Richard III. The body of Richard III, who ruled England from 1483 to 1485, was recently uncovered under a parking lot and he wasn’t alone.

Interviewee – Erik Stokstad

That’s right, Sarah, and it was actually might not be what you would have expected. Researchers who’ve gone through the grave and the remains after it was discovered last year found traces of roundworms. So it looks like during his life before he got the back of his head lopped off with a halberd, he may have suffered from an infection of roundworms.

Interviewer – Sarah Crespi

So how do they know that these roundworms came from the body and were not just in the surrounding soil?

Interviewee – Erik Stokstad

That’s a great question. The reason is that they found the eggs of these roundworms, and roundworms can lay apparently 200,000 eggs a day during their life for an entire year. They found a concentration of eggs in the area where his intestines would have been in the grave and very few of them elsewhere. So that really suggests that this is something that came from his life and not from a subsequent contamination of the soil.

Interviewer – Sarah Crespi

So how did a King of England get roundworms?

Interviewee – Erik Stokstad

Probably the same way that people today get them in other parts of the world. It’s most likely—because they would have been killed by cooking—that it would have been through raw vegetables, water, something that would have been contaminated by human feces out in the fields.

Interviewer – Sarah Crespi

And would this type of infestation have actually affected his health?

Interviewee – Erik Stokstad

There are symptoms from it – abdominal pain. Apparently the worms can burrow through the heart and lungs, so he might have coughed blood every once in a while – not pleasant.

Interviewer – Sarah Crespi

Yeah.

Interviewee – Erik Stokstad

An interesting thing about this research is that in addition to learning more about his bloody end, we're learning more about his life.

Interviewer – Sarah Crespi

Next up we have this story on the highly specific calls of titi monkeys. It's been known for a long time that animals like monkeys warn each other of danger, but is that all they are really saying, just watch out?

Interviewee – Erik Stokstad

These are monkeys that live in the trees of the Atlantic Rainforest in Brazil. They eat fruit and they swing around a lot. They're about a half a meter long. And researchers knew that they were saying at least two things with these soft, chirpy alarm calls. One was, "Hey, there's a bird that might be a predator." And another is "Look out, there's a cat." So by doing an experiment with stuffed animals, researchers have figured out more about exactly what they're saying.

Interviewer – Sarah Crespi

So what's the setup here? How did they use the stuffed animals to test what these guys are talking about?

Interviewee – Erik Stokstad

They did a little bit of swapping around. They put a stuffed cat on the ground and they heard the call you would expect – "Cat on the ground." And they put a raptor, a bird of prey, in the trees and they got the call, "Watch out, bird of prey in the trees." But then they swapped them around. They put the cat in the tree and they got a new call, which meant look out, there's a cat in the tree. I think it was actually backwards, it was tree and a cat, which was a reversal of the other pattern.

Interviewer – Sarah Crespi

So it was a combination of two calls that were swapped out.

Interviewee – Erik Stokstad

Right. So what these monkeys are doing that hadn't been observed in a primate before is saying what kind of predator to watch out for and exactly where it is.

Interviewer – Sarah Crespi

You said this is the first time it's been observed in primates. Has it been seen in any other animals?

Interviewee – Erik Stokstad

These kinds of calls have been seen in chickadees and also in meerkats, which are a relative of the mongoose that lives in Africa. And we should say, of course, humans are other primates that have alarm calls too.

Interviewer – Sarah Crespi

Finally we have a story on building up brains using video games. Learning games have been around for a long time and we've all heard about the brainy benefits of crossword puzzles. But now scientists are looking to see if the effects of video games on memory and attention can be quantified.

Interviewee – Erik Stokstad

So just to clarify, what we're talking about here in this new research is games that are designed for the aging brain. These are not Baby Mozart-type games. One thing that these games focus on is improving memory, recall, and also focusing attention.

Interviewer – Sarah Crespi

Right. So these are video games actually designed by neuroscientists. What would a video game designed by a neuroscientist look like?

Interviewee – Erik Stokstad

Well, you'd have electrodes stuck all over your scalp. Sorry, that's an extra key you have to buy. What's different about these games – and there have been other games designed by neuroscientists – they were really trying to focus on what we know about how the brain works with memory and recall. What this game does is it combines two types of tasks. One is observing symbols that get flashed onto the screen, and since that doesn't sound like a whole lot of fun there's also a driving portion of it where you're controlling a car and trying to keep it on the road while you see these symbols flashing up on the screen.

Interviewer – Sarah Crespi

And, of course you're, all these measurements we're taking from your brain as you're playing. So they first looked at how the video game affected young and old brains. What did they see in those comparisons?

Interviewee – Erik Stokstad

Well let me just add one thing, that the reason the electrodes were on the brain, that's not part of the game itself, that was really designed to evaluate how well it's working. So in order to do that, in order to figure out how much of a difference this might be making, the first thing that they did was they tried out the game on 20-year-olds, 30-year-olds, 40-year-olds, all the way up to 70-year-olds and see if they could see differences. Then they took a subset of the older group in the 60s and 70s and they trained them on it. They sent them home with the game and they spent one hour a day three days a week for a month, I

think – it was a total of about 12 hours of elapsed time on the game. Then they brought them back into the lab, retested them, and looked to see if there were any differences.

Interviewer – Sarah Crespi

And so what did they see, how effective was this training on the older brains?

Interviewee – Erik Stokstad

What they saw was that the adults had improved in their ability to multitask. So when the symbol test was added on top of the driving test making things harder, their ability to deal with that was better than it had been when they started out before the training. One fun part of the results is that the 60- to 70-year-olds after they were trained, their performance was, in fact, better than 20-year-olds who were trying out the game for the first time. So take that, grandkids! And what's also pretty neat and remarkable is that they kept that improvement for six months after the training stopped when they came back into the lab. So it looks like it really did persist.

Interviewer – Sarah Crespi

Did they actually see any changes in the brains?

Interviewee – Erik Stokstad

Well that's where the electrodes come in. There's a part of the brain called the midline frontal theta, and this is a part of the brain that is associated with memory and attention. And they saw that the firing of neurons in that part of the brain was strengthened after the training. Now that's really consistent with the performance change that they saw as well.

Interviewer – Sarah Crespi

And so what about outside the context of the video game? They weren't just trained to be better at a video game, right? This is supposed to apply outside.

Interviewee – Erik Stokstad

That's the real hope of these games. And the thing that makes this study notable is that they saw that the training translated into an improvement in recall of working memory – that's where you have to keep something, say, like a phone number or where you just set your car keys down – that working memory, they found an improvement in recall from that of about 100 milliseconds, which is fairly significant.

Interviewer – Sarah Crespi

How strong is this effect? Would it have a big impact on someone who maybe was headed for a nursing home?

Interviewee – Erik Stokstad

We don't know that yet. So that's going to take a bigger study with more adults and a look at whether this training translates to more everyday tasks as opposed to specific cognitive tests.

Interviewer – Sarah Crespi

Okay. So what else is on the site this week, Erik?

Interviewee – Erik Stokstad

There's a really neat study about dolphins and bats, and it shows that these two very different types of animals evolved the ability to echolocate through the same steps of genetic changes. We've also got a story about the number of viruses that might be lurking out in nature as yet undiscovered. This was a study of flying foxes that came up with an estimate that there might be more than 300,000 unknown viruses out in mammals worldwide. And on *ScienceInsider*, two stories that we're following. One is a story about a labor strike that's paralyzed the world's largest radio telescope in Chile. And we're also following a battle between the US House of Representatives and the Environmental Protection Agency here in Washington over the release of some confidential health data if it underlies air pollution regulations.

Interviewer – Sarah Crespi

Great. Alright, Erik, thanks so much.

Interviewee – Erik Stokstad

Fun to talk with you, Sarah.

Interviewer – Sarah Crespi

Erik Stokstad is a staff writer for *Science Magazine* and for *Science's* daily news site, *ScienceNOW*. I'm Sarah Crespi. You can check out the latest news and the policy blog, *ScienceInsider*, as news.sciencemag.org.