Science Magazine Podcast
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Promo
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Music

Interviewer – Kerry Klein
Finally today, I'm Kerry Klein, and I'm here with online news editor, David Grimm, who is going to give us a rundown of some of the recent stories from our online daily news site. So Dave, in our first story, we're looking at quantifying pain.

Interviewee – David Grimm
Right. Well, Kerry, if you've ever gone to the doctor's office in pain, sometimes they make you fill out that chart – that one to 10 of, sort of, frowny faces to smiley faces – how much pain are you in? Well, the problem with that is that's all really subjective, and doctors would love a way to, sort of like, they take your temperature and they get a number, look at something in your brain, maybe a scan of your brain, and be able to tell actually quantitatively how much pain you're in. Nothing's really come close to that. Some FMRI studies, FMRI, you know, looks at activity in the brain, have shown that certain regions of the brain light up when people think about painful thoughts or social rejection. But that's not really the same as physical pain, and that's really what the researchers were trying to get at in this study.

Interviewer – Kerry Klein
Right. And so that could also determine, you know, kind of a yes or no about thinking or experiencing pain, but how do we actually quantify it?

Interviewee – David Grimm
Well, what the researchers did was they took about a hundred or so healthy participants and they, and they induced some pain. They had what was basically a hot plate connected to the volunteers arms, and they were cranking up the temperature. At first they started with about 44 degrees Celsius, which is not too bad, and that went up to 49 degrees Celsius, which is kind of like a hot cup of coffee, so it started to get painful. And what the researchers noticed is they increased the temperature and therefore increased the pain, they were seeing various regions of the brain light up. And what was really important was these regions didn't really light up when people thought about social rejection, when they thought about maybe their ex-girlfriends or boyfriends. So this wasn't emotional pain; this was physical pain that the brain was responding to.

Interviewer – Kerry Klein
So were the researchers actually able to correlate the amount of pain to the parts of the brain that were lighting up?

Interviewee – David Grimm
Yes, they found that the pain signature, as they call it, scaled with the increase in temperature. So the more pain the subjects were feeling, the stronger the pain signature. What they also found was that when they gave subjects a pain relieving chemical, this pain signature went away. So again, it really suggested this was really tied to physical pain as opposed to other types of pain.

Interviewer – Kerry Klein
So what's a situation in which we might actually take advantage of this kind of technology?

Interviewee – David Grimm
Well, you know for one thing, again, you know doctors really wanted this non subjective measurement of pain. It also could help them determine how much drugs to administer and also for people that aren't verbal, doctors could still be able to determine how much pain they are in without actually having to talk to them. So there's really a lot of uses here. This is still kind of a small study so the researchers clearly want to do some more work but a really promising result for our researchers that wanted to objectively quantity how much pain we're in.

Interviewer – Kerry Klein
And our next story is all about the relationship between sight and communication.

Interviewee – David Grimm
Well, Kerry, this story has to do with how much eye contact influences our development early in life. There's been some anecdotal evidence that if we don't have eye contact with our parents, especially our mothers, very early in life when we're babies, that we can develop a lot of social disorders. For example, children that are severely neglected in orphanages or children that are born blind are more likely to have traits of autism. They have a hard time forming social attachments. They tend to be more hyperactive. They even have cognitive impairment. And that's not a surprise because researchers have long thought that this loving gaze between mother and child helps build social skills that can last a lifetime. But these are pretty extreme examples. And for the new study, the researchers wanted to see if can we get a better sense of how much eye contact really matters in these early stages of life.

Interviewer – Kerry Klein
So how did they tackle that question?

Interviewee – David Grimm
Well, instead of looking at blind babies, they looked at blind mothers. They actually studied five babies that were born to mothers that couldn't see. They studied various aspects of the children's visual, motor, and language skills at various stages of development from six to 10 months, 12 to 15 months, and 24 to 47 months. And what they found, which was really surprising, was that the children of blind mothers did just as

well on all these tests that the researchers gave them as the children that were born to mothers with normal vision.

Interviewer – Kerry Klein
Wow. So what does that say about the, the way in which we learn and develop – eye contact and eyesight?

Interviewee – David Grimm
Well, it suggests that this eye contact itself is not the ultimate determiner of our development of these social skills. Again, it's only five children – it's a small study. But it suggests that other things can be equally as important – a loving touch, caressing, talking to – things like that. Another really interesting thing about this study was not only did these children seem to do just as well as children born to sighted mothers, but in some cases, they actually did better. A lot of them did better on verbal tests. They outscored their peer's individual tasks such as remembering the location of a hidden toy or switching their attention from one toy to another. So that was really interesting, and the researchers think it could be analogous to children that are born to parents that speak two different languages. Studies have shown that children that grow up bilingual also have some advantages. And this is sort of bilingual, you know, learning how to deal with an adult that has sight and an adult that doesn't have sight causes these children to switch between various modes of communication early in development, and that can actually give them some advantages.

Interviewer – Kerry Klein
Well, very cool. And finally, our third story here presents some really interesting findings from dinosaur eggs.

Interviewee – David Grimm
Kerry, this story also has to do with early development, but this is even earlier in development than the example we were talking about in the previous story. This is embryonic development, and it's not humans – it's dinosaurs. This story has to do with a dinosaur called *Lufengosaurus*, which lived about 200 million years ago in the Yunnan Province in Southern China. What was really cool about these dinosaurs is they were the biggest creatures around at the time. This was during the Jurassic period. They were nine meters long. And what researchers have long wondered was how did these animals get so big?

Interviewer – Kerry Klein
Not having been present in the Jurassic period, how can we begin to answer that?

Interviewee – David Grimm
Well, thankfully we have fossils, and actually in this study, they had some really interesting fossils. They had what was essentially a bone bed of fossils from dinosaur embryos that had been scattered by various floods. Now usually that's a bad thing when you have scattering of all these bones. It's difficult to match up, you know, what bones belong to which individual. But here actually, that turned out to be an advantage,

because the researchers knew they were dealing with a lot of different embryos of the same species of dinosaur. And what was cool is because these floods kept on rushing into these nest beds, they were really killing these dinosaurs and these embryos at various stages of development. So these researchers were really able to see how fast these dinosaurs grew in their eggs. And what they noticed –

Interviewer – Kerry Klein
Bad for the dinosaurs, good for us.

Interviewee – David Grimm
Bad for the dinosaurs, good for us. And what they noticed was that looking at the sizes of the femur bones of the dinosaurs, also looking at what's called the vascular spaces – these are spaces where blood vessels and other tissues can grow into – what they were noticing was that these dinosaurs were growing incredibly fast – faster than any other known dinosaurs on record and faster, actually, than any other bird species or any other animal that scientists have studied.

Interviewer – Kerry Klein
So this is really making a link between embryo development and the final size of the organism.

Interviewee – David Grimm
Exactly. And what's really cool about this study is that the interesting results don't end there. The researchers, when they bombarded these bones with powerful x-rays, they actually found traces of what they suspect is organic matter inside the bones, which is really rare to find especially in fossils this old. Now, there's been organic matter found in dinosaur fossils before. It's always been controversial. There's never been conclusive proof that these organic remains, sometimes which seemed to be the remains of proteins, which may be the case here too, are not just contamination. But if it actually is true organic matter belonging to these dinosaurs, it would be the oldest organic matter on record and would really potentially shed some more light on what these dinosaurs were really made of.

Interviewer – Kerry Klein
Oh, how interesting. I can't wait to hear more about this.

Interviewee – David Grimm
Stay tuned.

Interviewer – Kerry Klein
So what else have we had on the site this week?

Interviewee – David Grimm
Well, Kerry, for *Science*NOW, we've got a story on how new music rewards the brain. Also, a very cool photograph and a ghostly green bubble in space. For *Science*Insider, our policy blog, the big story this week is President Obama's 2014 science budget – just

which agencies are going to be the winners and losers of that, some of the big programs that are going to be cut, which programs are going to stay. We'll have continuing breaking news and analysis of that on the site. Finally, for *Science*Live, our weekly chat on the hottest topics in science, this week's *Science*Live is about Jurassic Park – speaking of dinosaurs – Jurassic Park 20 years later. I know I told you guys last week that we were having that chat. We had some technical difficulties. We are re-running it again this week, and we are hoping that it will be a video chat. We've got one of the world's most famous dinosaur experts, Jack Horner, on who's been a consultant for all of the Jurassic Park movies, so be sure to check that out. Also, next week's *Science*Live will be on genetic privacy. Just how much control should we have over our own genetic information? So be sure to check out all 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 *Science*NOW, science policy from *Science*Insider, and *Science*Live, a live chat on the hottest science topics every Thursday at 3pm, U.S. eastern time.