



Science Magazine Podcast Transcript, 23 August 2013

http://podcasts.aaas.org/science_news/SciencePodcast_130823_ScienceNOW.mp3

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 – Sarah Crespi

Finally today, we have David Grimm, online news editor for *Science*. He’s here to give us a rundown of some of the recent stories from our daily news site. I’m Sarah Crespi. So first up, we have a story on what kinds of stories we can tell from a wolf’s howl. I actually didn’t know that wolf howls were mysterious. What were they thought to be used for in the past?

Interviewee – David Grimm

Well they are mysterious. It’s one of the most common sounds you might associate with the great outdoors, but believe it or not, scientists actually don’t know why wolves howl. They have a few hypotheses. One is that they are trying to contact other members of their group. Sometimes the group gets separated during a hunt, and howling is a way for everybody to gather back together again. The other idea is that it’s sort of more of an involuntary response. Maybe they are just getting stressed out and, you know, an involuntary response to stress.

Interviewer – Sarah Crespi

So this is one of those great studies where someone observes something and becomes curious enough to actually do the research. Can you talk about the instigation for the work?

Interviewee – David Grimm

Yes, that’s right. I mean, this actually took place at a place called Wolf Science Center, which is in Austria, and actually, the people that work there noticed some interesting behaviors. They noticed that when they would take their wolves for a walk, the other wolves would start to howl. So they said, well, you know, maybe there’s a reason they are howling. Maybe it has something to do with this idea of wolves being separated and trying to reform the pack, but they had to do some experiments to actually figure out whether that was the case. The scientists there have actually been studying wolves for a long time. Not only have they been studying them but they have actually been hand raising them. So these wolves are fairly well socialized to people. They are not like dogs, but they are not as dangerous or as frightened as wolves would be in the wild. So you can actually get up close to them and do some experiments with them.

Interviewer – Sarah Crespi

So what was the setup? How did they study the wolf howl?

Interviewee – David Grimm

So what they did was they took some wolves. And they had this group of wolves, and first of all, they wanted to study the relationship between these wolves. There's always a dominant wolf so who's the dominant wolf? Which wolves are better friends with each other than other wolves? They actually have these, sort of, complex social relationships. And then what they would do was they would pick a wolf, take it out of the pack, and, sort of, lead it away and then they wanted to see what the other wolves would do. And the other wolves would howl, and it sounded a little bit like this. [Audio clip] And what they noticed, which was really striking, was that the wolves seemed to howl the most when it was the dominant wolf that was led away. And that wolves that had their friends led away also seemed to howl more than the other wolves did, and that suggested that it wasn't just, sort of, this reflexive response – that there was, sort of, meaning behind this response. Like, hey my friend is gone. Where is my friend? Or hey, our pack leader is gone. Where is our pack leader?

Interviewer – Sarah Crespi

Right. So it was tied to the social relationships?

Interviewee – David Grimm

Exactly.

Interviewer – Sarah Crespi

So they took another step to rule out stress as a factor in howling. Can you talk about that?

Interviewee – David Grimm

Right. Well, again, something you could only do with tame or semi-tamed animals was they actually stuck cotton balls in the mouths of these wolves to test the levels of cortisol, which is a stress hormone. And what they found was they didn't see a relationship between stress and the howling. In other words, the wolves weren't getting stressed out when they were howling, which also indicates it wasn't just an automatic response to stress – that the wolves were actually, sort of, thinking about what they were doing. They were really assessing the situation, and what this all, sort of, combines to show is that it really provides support for this hypothesis that wolves are calling to, sort of, reform the pack – that when the pack gets separated, howling is a way to bring everybody back together again.

Interviewer – Sarah Crespi

Right. So can they make that determination with a purely captive population like this?

Interviewee – David Grimm

That's a great question, and obviously these wolves are somewhat compromised because they have been raised by humans. They are not going to have identical behaviors as they would have in the wild, so that's the one limitation of this study is that we don't know

whether this holds true for wild populations. But at least it's the strongest evidence yet that's sort of cracking this mystery of why wolves howl.

Interviewer – Sarah Crespi

Next up, we have a story on biomarkers for suicide. Usually when we want to investigate someone's mental state, we're stuck with just asking, so, tell me how you feel? But that might change.

Interviewee – David Grimm

Right. The problem with suicide is it's not like a heart attack. You don't go to your doctor often and say, I'm thinking about committing suicide. Maybe you'd go to your psychiatrist and say that, but if you didn't say that, your doctor has no way, or your psychiatrist has no way to tell whether you might be contemplating suicide. It's not like a heart attack where, you know, your cholesterol levels could be checked or your stress levels could be checked or your blood pressure or things like that. We really don't have any biological markers, what people call biomarkers, to tell whether somebody might be at risk for killing themselves.

Interviewer – Sarah Crespi

So in order to fish out these biomarkers, the researchers first focused on a tiny swath of the population. How did they narrow things down?

Interviewee – David Grimm

Well what they wanted to do is they wanted to measure suicidal thoughts in single people, in individual people, over time. So they had to find people that not only were contemplating suicide but people that went from contemplating suicide to not contemplating suicide to going back to contemplating suicide again. That's obviously a pretty hard population to find. The researchers started with a whole bunch of people and eventually narrowed it down to nine men who were experiencing this extreme shift from zero suicidal thoughts to what they call high suicidal ideation. And ideation basically just means thoughts ranging from feelings of worthlessness to actually specifically planning for suicide.

Interviewer – Sarah Crespi

And so all those men had bipolar disorder. That's how they found them?

Interviewee – David Grimm

Yes, that's right.

Interviewer – Sarah Crespi

What did they find out about these nine men?

Interviewee – David Grimm

Well, they did a screen for a lot of different proteins circulating in these men's blood, and what they found was that there was one protein, which is made by a gene called *SATI*, which is involved in cellular damage and stress. It's also been found to increase in

response to a number of stressors to the body, such as toxins and infection. They found that this *SATI* protein was really elevated in these men when these men were thinking about killing themselves.

Interviewer – Sarah Crespi

So they started out by comparing it within a person – high levels in this person when they are thinking of suicide, low levels when they are not. But did they next, actually confirm this in suicide victims?

Interviewee – David Grimm

Right. Obviously they weren't going to wait for these men to kill themselves, and so what they did was they actually looked at some samples from bodies of people that had killed themselves. And what they found was really high levels of *SATI* in the blood of these deceased people.

Interviewer – Sarah Crespi

So were they actually able to make predictions about behavior based on these markers?

Interviewee – David Grimm

They were. They actually, they looked at another population. They did a long term study of 42 men with bipolar disorder and 46 men with schizophrenia, and what they found was that when combined with other psychological measures such as anxiety and mood, the biomarkers were more than 80% predictive of future hospitalization for suicide.

Interviewer – Sarah Crespi

So, okay. Time for the caveats. Would this work as a cold test without any other information – you just take a blood sample from a person?

Interviewee – David Grimm

No, the researchers are really being cautious about this. They're saying this isn't, sort of, a one shot test. You would need to combine this information with information about mood, potentially information about drugs or medication that these patients are on. This would just be one more variable you would add to the mix.

Interviewer – Sarah Crespi

So this study almost exclusively focuses on people who have mental disorders already. Is it going to be able to be expanded out past that?

Interviewee – David Grimm

Well that's one of the other caveats. Not only is this a really small sample, it's only men. It's only men with bipolar disorder. You're really not getting a representative sample of the entire population, so this really needs to be tested in a lot more people, a lot more studies have to be done – a lot more long term studies. And again, this particular protein by itself is not going to be predictive of suicide. It's going to need to be combined with other measures.

Interviewer – Sarah Crespi

Finally, we have a story on how biggest isn't always best. The big question is, when the biggest horns or the most glorious tail attract the best mates, why is there such a variety of male horn size or tail size in these populations?

Interviewee – David Grimm

Right. The big question, Sarah, is why aren't all these animal populations just filled with super males. Because the question is, I mean, over evolutionary time, the males that are bigger, the males that are stronger, the males that are faster; those are the ones that are going to get more mates. They are going to have more offspring, and essentially, their genes are going to be more likely to be passed down to the next generation. So you would assume that over time, every male in the population is going to be this super amazing male, but that's not what we see.

Interviewer – Sarah Crespi

Right. That's a really big question, so let's narrow it down to sheep.

Interviewee – David Grimm

Well, the thing with sheep is that they have, as you alluded to, they have, some of them have these really big horns, but some sheep have these really small horns that aren't as effective and aren't going to be as attractive to females because they don't appear as strong. This is one of those studies where researchers had access to a really interesting population. This is a population of sheep that live on an island off Scotland's coast. They've been studied for decades, actually, so researchers know a whole lot, not just about the biology of these animals but about their behaviors, their relationships. And so a team was actually able to go in. They studied 1,750 sheep on this island over two decades. And what they found was that there was actually two, what are called, alleles or versions of the horn gene that gives these sheep their variety of horns. And some sheep carry two alleles for big strong horns and some sheep carry two alleles for, kind of, weaker, smaller horns and some sheep carry one of each which, sort of, gives them a, sort of, intermediate type of horn. And what they found was, as you expect, the males with the big horns and the genes for these big horns did really well. They had a lot more mates. They sired a lot more offspring. But what was interesting is that even the sheep with the small puny horns still sired offspring. They just sired a lot less.

Interviewer – Sarah Crespi

Okay, so what about the middle guys – the ones who have a little bit of big and a little bit of small?

Interviewee – David Grimm

Well those guys, sort of, got the best of both worlds, because they were able to sire a fair number of offspring. But what they and the guys that had the two alleles for even the puny horns were able to do was because they're not spending all this time fighting other males and they don't have these big harems of females that they have to take care of, they are actually to spend a lot more time eating, sort of, taking care of themselves, and they actually tend to live a lot longer. And why that's significant is because as they live

longer, they have more chances to mate. So even though they are not siring a whole lot of offspring in a short amount of time as the big powerful males are, over a long amount of time, they are siring a lot of offspring, which explains why their genes are persisting in the population and why we still have a lot of, sort of, weaker males mixed in with the super tough guys.

Interviewer – Sarah Crespi

So what's the larger message that we can take away from this study?

Interviewee – David Grimm

Well this study really shows why we have this kind of diversity in the population – why you wouldn't just have these populations composed of super males – because there are advantages to those genes that convey big horns but there are also disadvantages as well. And it helps maintain a lot of variety in these populations, which is really important. You can even think about in humans, some people have genes that protect against malaria but also make them susceptible to sickle cell anemia. That's a very classic example in biology, and the reason those genes have stuck around is because even though they are deleterious in some respects, they are also protective in others.

Interviewer – Sarah Crespi

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

Interviewee – David Grimm

Well, Sarah, for *ScienceNOW*, we've got a story about why male humpback whales sing. Also a story about how feral cats in places like Australia may not be as much of an invasive species as some scientists have thought. And for *ScienceInsider*, our policy blog, we've got a story about how a diplomatic flap between the EU and Israel is threatening research collaborations between the two countries. Also a story about whether free scientific articles are the future of scientific publishing. So be sure to check out all these stories on the site.

Interviewer – Sarah Crespi

Thanks, Dave.

Interviewee – David Grimm

Thanks, Sarah.

Interviewer – Sarah Crespi

David Grimm is the online editor for *Science's* daily news site. You can check out the latest news and the policy blog, *ScienceInsider*, at news.sciencemag.org. I'm Sarah Crespi.