



## Science Magazine Podcast

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### *Promo*

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### *Music*

#### **Interviewer – Kerry Klein**

Finally today, I’m here with online news editor David Grimm, who’s here to give us a rundown of some of the recent stories from our online daily news site. So David, our first story, we’ve got an unexpected astronomical companionship.

#### **Interviewee – David Grimm**

That’s right, Kerry. Well, black holes, as most of us know, are pretty violent things. They’re these, you know, giant monsters out there in the universe that swallow stars and gas and a whole bunch of other stuff. And they’re also thought to be pretty antisocial, the idea being that you couldn’t have two black holes in the same cluster of stars, that they’d be so violent and aggressive that they would essentially kick each other out or one would kick the other one out. And that’s why this new study is so surprising. Astronomers say they’ve actually found two black holes in the same cluster of stars.

#### **Interviewer – Kerry Klein**

So what’s the evidence of this unexpected finding?

#### **Interviewee – David Grimm**

Well, basically what astronomers did is they took some observations with what’s called the Very Large Array, which is located in Socorro, New Mexico. And these observations revealed two objects whose radio spectra resemble those of black hole systems. And they were able to take this spectra and identify these couple of black holes. Now what was interesting is the team of astronomers that detected them didn’t actually see any x-rays coming from the systems, which is usually a marker of black holes. But for some experts, there’s actually sort of a knock against the finding because they say there probably should be x-rays, and maybe these aren’t black holes; maybe these are other objects that are sort of giving off similar emissions but actually aren’t black holes.

#### **Interviewer – Kerry Klein**

Right. I would imagine that if this is an unexpected finding and the evidence doesn’t 100% point to them being black holes, you know, I imagine there must be some other possible explanations.

#### **Interviewee – David Grimm**

Exactly. The expert in the story says that, you know, it could just be a star. But the astronomers that made the discovery are pretty sure they've got black holes. And what they say is actually based on some of the observations that they're making, that it actually could be actually more than two black holes in this cluster; there actually could be a whole bunch of them there, which would really sort of contradict this theory that black holes can't exist together within these clusters. And it may force astronomers just to revise their ideas about just how antisocial black holes are.

**Interviewer – Kerry Klein**

Right. And so if this actually turns out to be true, it could be a very big deal.

**Interviewee – David Grimm**

Exactly.

**Interviewer – Kerry Klein**

Well, alright. And our second story begins with an experiment with a hermit crab and a toy octopus.

**Interviewee – David Grimm**

Right. This is actually a really fun one. A marine biologist stuck a toy octopus in a tank of water and tried to scare a hermit crab. And you actually can see a video of this happening on the site. So the question is why are they trying to scare these poor little hermit crabs with toy octopi? And the answer has to do with ocean acidity. And one of the big concerns with climate change is that, you know, we're pumping so much carbon dioxide into the air with our burning of fossil fuels and other human activities, and the ocean actually absorbs a lot of this carbon dioxide. Now that's kind of a good thing, because it means that the earth is warming slower than it would otherwise because the ocean's absorbing the carbon dioxide rather than the atmosphere, which would trap heat. But the problem is that as the ocean absorbs carbon dioxide, it becomes more acidic. And in fact, studies have found that there's been a 30% increase in the surface waters of the ocean in the last few years, which is really troubling. And the reason it's troubling is because there's a lot of creatures that live in the water that depend on a very balanced pH. And as the ocean becomes more acidic, this pH decreases. And one concern is it could corrode the shells of creatures like clams, crabs, and shrimp.

**Interviewer – Kerry Klein**

And hermit crabs.

**Interviewee – David Grimm**

Exactly, like hermit crabs. And another concern is that it could actually change the behavior of some marine organisms maybe by disrupting their brain development. And so that all gets back to, well, why are we trying to scare a hermit crab with an octopus? And the question is, you know, if hermit crabs live in more acidic waters, are they going to become less attuned to their predators? And octopi are one of the big predators of hermit crabs.

**Interviewer – Kerry Klein**

Oh, so this was not so much an experiment about the effects of acidification on shells, but about the actual, you know, personalities, so to speak, of the creatures affected.

**Interviewee – David Grimm**

Right. The question was, you know, can acidification not just affect the shells, but actually also affect the personality, and affect it in bad ways? Basically what they did is they vacuumed up a bunch of hermit crabs from about 900 meters down using a robotic submarine. This was off the coast of California. And they brought the crabs back to the lab, and they put them in two separate tanks. Some of them lived in tanks filled with seawater with the pH of about 7.6 – and that’s pretty typical of what the crabs experience in their deep sea home. In the other tank they made the waters much more acidic. The pH was about 7.1. And this would be like the acidity of the ocean water some time in the future if the oceans keep on absorbing CO<sub>2</sub> at the present rate. And what they found was that the crabs that lived in the more acidic water tended to flick their antennae less often and they were slower to sniff out food, which indicates some changes in their behavior which might be sort of detrimental, both to their ability to find food, but also potentially to their ability to notice predators. That being said, what they found was both groups of hermit crabs responded very similarly to the octopus. Both of them fled into their shells at sort of the same frequency. So at least according to this study, there isn’t actually a big difference in how hermit crabs are avoiding predators, regardless of the acidity of the water.

**Interviewer – Kerry Klein**

Well even so, even if the behaviors of these hermit crabs aren’t actually being affected, I mean, their shells are still going to become more difficult to grow, right?

**Interviewee – David Grimm**

Exactly. Well, you know, a lot of the shells they rely on could actually start dissolving if the water gets to acidic. And one of the researchers joked at the meeting – this was actually presented at a marine science meeting last week – that instead of Habitat for Humanity, we might need Habitat for Hermanity for these crabs if conditions get so bad. So it’s still a big warning sign for the future.

**Interviewer – Kerry Klein**

Certainly. And onto our third story now, where we’re talking about the longevity of primates.

**Interviewee – David Grimm**

Right. And this story actually also has to do a little bit with personality. Now we’re moving onto primates and whether a personality is a big factor in longevity. And stated succinctly, do nice primates live longer? A study was carried out with a group of wild baboons at a reserve in Botswana. And these baboons have been observed for almost 20 years, so scientists have a lot of data on their behaviors, their personalities. And some previous research has suggested that females live longer when they have close, long-lasting relationships with other females. And that’s sort of characterized by them

spending more time together and grooming each other. And the question in this study is, is that linked to sort of what we would call niceness? Do the females that live longer and have these closer and long-lasting relationships, are they actually what we would call nicer to each other, as human beings? And as you can imagine, that's a pretty tricky thing to suss out, you know. We have a pretty good gauge of whether human beings are nice to each other, but how do you really determine whether other animals are being nice to each other?

**Interviewer – Kerry Klein**

Right. And so how do we determine if they're being nice to one another?

**Interviewee – David Grimm**

Well, what the researchers did was they looked at a few key behaviors. These included how often the females were alone, how often they touched other females, and how often they behaved aggressively, how often they were approached by others. And one interesting one was how often they grunted when approaching other females. And grunting is actually a sign of goodwill. It's actually sort of like, hey, I like you, you know, something like that.

**Interviewer – Kerry Klein**

Hey, what's up?

**Interviewee – David Grimm**

Exactly. So it's not an aggressive move. And what the researchers found is that the females that scored highly on these measures of what they were calling niceness also tended to be friendly to all other females. So there was this connection between females that were sort of close to each other, and also sort of exhibited these nice behaviors. And what all this means is, you know, sort of taking this all together, since we already know that females that spend more time together and sort of have these tighter bonds with other females live longer, and now correlating niceness with this, it all suggests that nicer primates tend to also live longer.

**Interviewer – Kerry Klein**

Well, now, this is only in reference to female primates, is that right? I mean, there have been a lot of other studies showing, you know, the other important factors in males' lives.

**Interviewee – David Grimm**

That's right, because with males, it doesn't seem like niceness is really the criterion for whether males live longer. In fact, it tends to be their status, their rank on the social totem pole. In fact, alpha male baboons – the ones at the top of the totem pole – tend to live longer than males that rank lower. So with females, niceness seems to be key. With males, dominance seems to be key.

**Interviewer – Kerry Klein**

And so I wonder how much this may reflect back on human societies.

**Interviewee – David Grimm**

Well that's, of course, what everybody wants to know, you know, how much does this relate to us? And that is going to have to be determined by future studies.

**Interviewer – Kerry Klein**

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

**Interviewee – David Grimm**

Well, Kerry, for *ScienceNOW*, we've got a story about a new fanged dinosaur – and that's got a pretty neat picture with it, which I encourage everybody to check out on the site. Also, an update on the Curiosity rover on Mars – just what is Curiosity picking up and finding out about the red planet that we didn't know before? For *ScienceInsider*, we've got a story about the current state of Russian science – what's going on in Russia. Also, a story about what causes more scientific retractions. Is it misconduct or is it mistakes? And finally, for *ScienceLive*, this week's *ScienceLive* is about turning warring societies more peaceful. How can we turn pitchforks into plowshares? And next week's *ScienceLive* is about new therapies for mental illness. And that *ScienceLive* is going to be at a special time: 3:00 Wednesday on October 10th. 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](http://news.sciencemag.org), including daily stories from *ScienceNOW* and science policy from *ScienceInsider*. While you're there, be sure to check out *ScienceLive*, a live chat on the hottest science topics every Thursday at 3 p.m. U.S. Eastern time, but next week on Wednesday.