



## Science Magazine Podcast Transcript, 30 August 2013

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### **Promo**

The following is an excerpt from the *Science* Podcast. To hear the whole show, visit [www.sciencemag.org](http://www.sciencemag.org) and click on “*Science* Podcast.”

### **Music**

Finally today, Kelly Servick, an intern for our online daily news site is here to give us a rundown of some of the recent stories. So Kelly, first up we have a story on how much a fetus can hear. I’ve heard the recommendation that pregnant women should talk to their fetuses, but a new study here looks at how much they are actually hearing.

### **Interviewee – Kelly Servick**

Right. It’s been known for a while that when a baby is in the uterus, they are actually experiencing a lot of what’s going on, and that’s where a lot of those recommendations came from that sound processing parts of their brain have already developed and they can hear, sort of, muffled sounds pretty well through the abdomen. So some studies have already looked at what babies are able to, sort of, recall from those early experiences, and one even showed that they could remember the theme song from their mother’s favorite soap opera.

### **Interviewer – Sarah Crespi**

So what’s the timing here? How old are these fetuses?

### **Interviewee – Kelly Servick**

These fetuses were in their last trimester so already pretty developed.

### **Interviewer – Sarah Crespi**

So this study uses a new method to test this idea, but before we get to that, can you talk about some of the other methods that have been used before and what they found?

### **Interviewee – Kelly Servick**

Sure. Those kinds of methods relied mostly on babies’ behaviors, which as you would imagine are kind of unreliable. But they showed in one study that babies were familiar with a sound because they were more likely to suck on this high-tech pacifier to hear more of the sounds that were associated with their native language than one that they would not have heard while they were in the womb.

### **Interviewer – Sarah Crespi**

So they were familiar with a sound, and they wanted to encourage it with a pacifier. What do they do differently here?

### **Interviewee – Kelly Servick**

This was an EEG study so they were actually looking at the electrical activity in the babies' brains, going direct to the source. And what they did was play recordings of this made up word "tatata" many times over during the woman's pregnancy so that these babies had heard this sound approximately 25,000 times, and then when the infants were born and they played that sound, their brains showed that they were recognizing this sound differently from other sounds.

**Interviewer – Sarah Crespi**

So it was important that it was a nonsense word then?

**Interviewee – Kelly Servick**

It was important that it was a nonsense word since it wasn't a part of their native language that wasn't really something that they would recognize in English but not if it were in Swedish.

**Interviewer – Sarah Crespi**

So what was different between the trained babies and the untrained babies?

**Interviewee – Kelly Servick**

Well the trained babies actually showed this brain response, this recognition, and interestingly, that response was strongest in the infants who had heard the recording most often.

**Interviewer – Sarah Crespi**

Should this result change anything about the way parents talk to their future babies when they are still in the womb?

**Interviewee – Kelly Servick**

Well the researchers point out that there's not much evidence that there's any long term benefit for healthy babies in hearing any particular sounds outside of what you'd normally hear in the womb, but what they do suggest is that this could be a treatment for children who are at risk for auditory processing disorders or dyslexia. But pregnant mothers shouldn't be so quick to put the headset up to their pregnant belly, because the researchers also warned that holding speakers too close to the fetus could actually cause damage or overstimulate the ears or disrupt the babies' sleep cycles.

**Interviewer – Sarah Crespi**

Next up, we have a story on how money relates to cooperation. Money is often tagged as the root of all evil, but as this study seems to show, it can strengthen trust in larger groups.

**Interviewee – Kelly Servick**

That's right. So economists have known for a long time that money does something very special in terms of changing the way people negotiate. Having, sort of, a symbolic token of value instead of just exchanging one good for another good makes really complicated swaps – like if I wanted to exchange a cow for a year's supply of bread, for example –

makes those swaps a lot simpler. And there's one theory that, sort of, an evolution of societies using money allowed people to cooperate and trade when they were in big groups where individuals weren't really able to trust each other – weren't really able to trust that you're going to return that year's supply of bread if I give you my cow right now.

**Interviewer – Sarah Crespi**

So how do we test this today? How can you look at the relationship between trust and group size and that kind of thing?

**Interviewee – Kelly Servick**

So the way that these researchers tried to tackle the question was by inviting a bunch of people to participate in this, sort of, bargaining and investing game. About 200 people came into a room full of computers and got divided up into groups of different sizes – two, four, eight, 32 people. And the people in these groups started out with a set number of units on the computer, and their goal was to maximize their earnings of units. And they actually got to take home real cash at the end based on how many units they had.

**Interviewer – Sarah Crespi**

How did trust come into play there?

**Interviewee – Kelly Servick**

So the idea was that the people in these groups were paired up, and one partner had the choice of whether they wanted to spend six of their units to help their partner get 12 units. If you do this, obviously you're taking a risk that this is not going to pay off later. But if you get that same partner later on and the tables are turned, they are more like to spend their six units to give you 12 units. That's the trust element.

**Interviewer – Sarah Crespi**

So in the second experimental set up, they introduced this concept of tokens. Those were a stand-in for money?

**Interviewee – Kelly Servick**

Exactly, yes. This was, sort of, a virtual form of money, and everyone started out with two tokens. And you could spend a token – pay your partner a token – so that they would help you out using their units to get you more units.

**Interviewer – Sarah Crespi**

And so how did that introduction of this metaphorical money affect small groups and large groups and their ability to trust each other?

**Interviewee – Kelly Servick**

Well, in smaller groups, using these tokens actually eroded that sense of trust, and people's cooperation dropped. But in bigger groups where people were less likely to trust each other before, now using this symbolic monetary system, they cooperated almost twice as often, and everyone ended up with a bigger payoff at the end.

**Interviewer – Sarah Crespi**

So all the subjects in this study were used to using money. They grew up with it around them. So how generalizable is this result? Can we actually take this and say something about the history of culture and money?

**Interviewee – Kelly Servick**

That's a good question. That's what the researchers are trying to do. They are trying to say that maybe when money got introduced, it, sort of, drove early cultures to have bigger populations that could cooperate. They say that that's something they would like to try and do with more isolated groups like tribes in the Amazon, but obviously there are some logistical issues and they would have to, sort of, change this computerized format to make that happen.

**Interviewer – Sarah Crespi**

So finally, we have a story on funny faces. Our brains get used to seeing the same things day in and day out, and they actually create normalcy for us.

**Interviewee – Kelly Servick**

That's right. So it's a pretty well-known strategy in the brain that once you see something over and over, your brain starts to devote less energy to it so that you can focus on new things, and that's really crucial to our ability to perceive and interpret the world around us. And this new study looks at this really bizarre phenomenon called visual adaptation where if we see a distorted face over and over, it will make a normal face start to look odd.

**Interviewer – Sarah Crespi**

This study actually looks at the relationship between this phenomenon you described, visual adaptation, and memory. Why do they think those two things might be related?

**Interviewee – Kelly Servick**

Well they wanted to find out whether visual adaptation is, kind of, a prelude to forming memories. So they decided to look at how sleeping, which we know is involved in consolidating our memories, plays a role in visual adaptation.

**Interviewer – Sarah Crespi**

So they did use some weird faces in this study. Who did they distort?

**Interviewee – Kelly Servick**

They chose two particular weird faces. These were George Clooney and Angelina Jolie, and they, sort of, compressed and stretched the faces in various ways so they looked kind of like fun house mirror versions of their celebrity selves.

**Interviewer – Sarah Crespi**

And then people were exposed to those weird versions of their faces for a long time?

**Interviewee – Kelly Servick**

That's right. They saw these different stretched out versions over and over and then some of those people got to go home and go to sleep, and some of them stayed awake for 12 hours and looked at the faces again.

**Interviewer – Sarah Crespi**

And what was the effect of sleep on their results?

**Interviewee – Kelly Servick**

So the people that went to sleep and came back were actually more likely when they looked at normal faces to perceive them as being distorted compared to the people that didn't sleep.

**Interviewer – Sarah Crespi**

Those are people who went home and went to bed. There could be other things going on there like time of day or they saw a lot of weird things on TV so...

**Interviewee – Kelly Servick**

That's right. So the team tried to control for that with a second test where people saw the faces and then some of them took a 90 minute nap while their brain activity was recorded with EEG sensors, and the other group did not get to take that nap. And they saw the same effect, that the people who took the nap were more likely to see normal faces and think they were stretched out, and people who had spent more time in REM sleep, this sort of very important memory consolidating phase of sleep, had an even bigger distortion effect.

**Interviewer – Sarah Crespi**

So it looks like there is some kind of link between sleep and visual adaptation and possibly memory. What's the takeaway here?

**Interviewee – Kelly Servick**

Well the researchers think that this visual adaptation might be, sort of, an early stage of the memory process, so now they want to look more into how we consolidate memory during sleep – whether we're removing things that we don't need or sort of replaying things over and over and which of those might be accounting for this weird new normal that we create.

**Interviewer – Sarah Crespi**

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

**Interviewee – Kelly Servick**

So we also have stories about global warming – how it might be on a temporary hiatus. And also new findings about what happens in our brain to cause memory loss as we age. This week on *ScienceInsider*, our policy blog, we have several stories including one about the probable cause behind hundreds of dolphin deaths along the east coast. And

*ScienceLive*, the weekly live chat on Thursdays, starts back up for the fall on September 19<sup>th</sup>, so check back for more on that.

**Interviewer – Sarah Crespi**

Thanks, Kelly. Kelly Servick is an intern for *Science*'s online daily news site. You can check out the latest newest and the policy blog, *ScienceInsider*, at [news.sciencemag.org](http://news.sciencemag.org).