



YOUR HEALTH

## < Learning To See In Stereo

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ARI SHAPIRO, host:

This is Morning Edition from NPR News. I'm Ari Shapiro.

RENEE MONTAGNE, host:

And I'm Renee Montagne. Today in "Your Health," what happens to your body on the inside when you overeat? And while you're digesting that thought, we go first to a peculiar condition affecting vision. It's called amblyopia. You might have heard of it as lazy eye.

There are about a million Americans who have this, and one of them is NPR's Joe Palca. Recently Joe traveled to the optometry school at the University of California at Berkeley. Researchers there are developing new ways to help improve the vision of people with this condition.

JOE PALCA: I've known all my life that I have this vision problem that's hard for people to understand. And the reason it's tricky is that there's nothing wrong with my eyes. There's something wrong with my brain. You see, what happened was I was born cross-eyed. One eye turned in. And my brain then got two images of the world. And that didn't make any sense, so my brain just suppressed one of the images. Well, I had surgery to straighten out the eye, so I look reasonably normal. But my brain never figured out how to see two images at once, and that left me with a problem.

Dr. DENNIS LEVI (Dean, College of Optometry, University of California, Berkeley):  
Hi. Joe?

PALCA: Yes.

Dr. LEVI: Hi. Come on in.

PALCA: We're in the office of Dennis Levi. He's dean of the Optometry School at Berkeley. His lab is small and cluttered. The furniture is old. There's an eye chart taped to the wall.

Dr. LEVI: Let's just see what you can see.

PALCA: My problem is seeing things in 3D, what optometrists call stereo vision. To test my stereo vision, Levi hands me a book with a picture of a fly, and tells me to put on a pair of glasses like the kind you get in 3D movies.

Dr. LEVI: Can you grab the fly's wings.

PALCA: To me, it looks just like a picture of a fly. So I touch the page with my fingers.

Dr. LEVI: Pretty much flat on the page.

PALCA: Yeah.

Dr. LEVI: They're not sticking out?

PALCA: No, not at all.

Dr. LEVI: You are essentially stereo blind.

PALCA: In other words, my brain is incapable of getting an image from both eyes simultaneously and fusing them to get a sense of three dimensions. For people with stereo vision, the fly looks very different. To prove it, Levi hands the book to my producer Jane Greenhalgh.

JANE GREENHALGH: I'll put the magic glasses on.

Dr. LEVI: Yeah. Can you grab those (unintelligible) fly's wings.

GREENHALGH: Oh yeah. The fly's wings are right up here.

PALCA: Jane is grasping at a spot about two inches above the page. Traditional wisdom says past age seven or so, if brain paths crucial for vision aren't working, they'll never work. But Levi is part of a growing number of researchers who think you can teach an old brain new tricks, and he thinks he can help me with this stereo blindness problem. His colleague Susannah Chung(ph) takes me over to a box with two prisms mounted in front of a video screen. The idea is to adjust the prisms until two white boxes on the screen are superimposed.

Dr. SUSANNAH CHUNG (College of Optometry, University of California, Berkeley):  
So now, how many squares can you see?

PALCA: Oh. I see two. There's one over here and there's one over there.

Dr. LEVI: Can you get them closer by turning the knobs?

PALCA: I twiddled the knobs, but the two boxes stay stubbornly apart. If I could fuse them, it would be the first step in establishing stereo vision. Of course, if you've already got stereo vision it's easy. Once again, Jane demonstrates.

GREENHALGH: I mean, I can definitely see two squares. And now I see one square. Oh, Joe, this is so easy. I'm sorry.

(Soundbite of laughter)

PALCA: And yet, I persevere.

(Soundbite of laughter)

PALCA: Then the question is how much can the brain do? Is there a chance with work that I could get to the point where I could see with both eyes?

Dr. LEVI: It's possible.

PALCA: Levi encourages me to call a famous patient with an eye problem similar to

mine.

(Soundbite of telephone ringing)

PALCA: Hi. Is this Sue Barry?

Dr. SUSAN BARRY (Professor of Neuroscience, Mount Holyoke College, Massachusetts): Yes, it is.

PALCA: Sue Barry is probably the most famous amblyopia patient in America. There were profiles of her in New Yorker magazine and on NPR. Like me, she was born with a crossed eye. But working with optometrists, she was able to do the equivalent of fusing the boxes, and now she has full stereo vision. I asked her what that felt like. She said the world has a sense of space it never had before.

Dr. BARRY: A sense of space and a sense of immersion in that space. And that's what stereo vision gave me, this incredible sense of being immersed in the space around you as opposed to sort of being - looking in on it from a slight distance away.

PALCA: How hard was it?

Dr. BARRY: To gain stereo vision?

PALCA: Yeah.

Dr. BARRY: I went through procedures for about a year.

PALCA: And was it worth it?

Dr. BARRY: Absolutely. There's a complete revelation in what I could see.

PALCA: Sounds awfully tempting. Maybe I'll see if my old brain can learn new tricks. I'll let you know. Joe Palca, NPR News.

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