

What the Blind See (and Don't) When Given Sight

A humanitarian project in India helps to answer long-standing questions

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In September 1678, a brilliant young Irish scientist named William Molyneux married the beautiful Lucy Domville. By November she had fallen ill and become blind, and the doctors could do nothing for her. Molyneux reacted by devoting himself to the study of vision. He also studied vision because he wanted to resolve some big philosophical issues: What kinds of knowledge are we born with? What is learned? And does that learning have to happen at certain stages in our lives? [In 1688 he asked the philosopher John Locke](#): Suppose someone who was born blind suddenly regained their sight? What would they understand about the visual world?

In the 17th century, Molyneux's question was science fiction. Locke and his peers enthusiastically debated and speculated about the answer, but there was no way to actually restore a blind baby's sight. That's no longer true today. Some kinds of congenital blindness, such as congenital cataracts, can be cured.

More than 300 years after Molyneux, another brilliant young scientist, Pawan Sinha of the Massachusetts Institute of Technology, has begun to find answers to his predecessor's questions. Dr. Sinha has produced a substantial body of research, culminating [in a paper last month](#) in the Proceedings of the National Academy of Sciences.

Like Molyneux, he was moved by both philosophical questions and human tragedy. When he was growing up, Dr. Sinha saw blind children begging on the streets of New Delhi. So in 2005 he helped to start Project Prakash, from the Sanskrit word for light. Prakash gives medical attention to blind children and teenagers in rural India. To date, the project has helped to treat more than 1,400 children, restoring sight to many.

Project Prakash has also given scientists a chance to answer Molyneux's questions: to discover what we know about the visual world when we're born, what we learn and when we have to learn it.

Dr. Sinha and his colleagues discovered that some abilities that might seem to be learned show up as soon as children can see. For example, consider the [classic Ponzo visual illusion](#). When you see two equal horizontal lines drawn on top of a perspective drawing of receding railway ties, the top line will look much longer than the bottom one. You might have thought that illusion depends on learning about distance and perspective, but the newly sighted children immediately see the lines the same way.

On the other hand, some basic visual abilities depend more on experience at a critical time. When congenital cataracts are treated very early, children tend to develop fairly good visual acuity—the ability to see fine detail. Children who are treated much later don't tend to develop the same level of acuity, even after they have had a lot of visual experience.

In the most recent study, Dr. Sinha and colleagues looked at our ability to tell the difference between faces and other objects. People are very sensitive to faces; special brain areas are dedicated to face perception, and babies can discriminate pictures of faces from other pictures when they are only a few weeks old.

The researchers studied five Indian children who were part of the Prakash project, aged 9 to 17, born blind but given sight. At first they couldn't distinguish faces from similar pictures. But over the next few months they learned the skill and eventually they did as well as sighted children. So face detection had a different profile from both visual illusions and visual acuity—it wasn't there right away, but it could be learned relatively quickly.

The moral of the story is that the right answer about nature versus nurture is...it's complicated. And that sometimes, at least, searching for the truth can go hand-in-hand with making the world a better place.