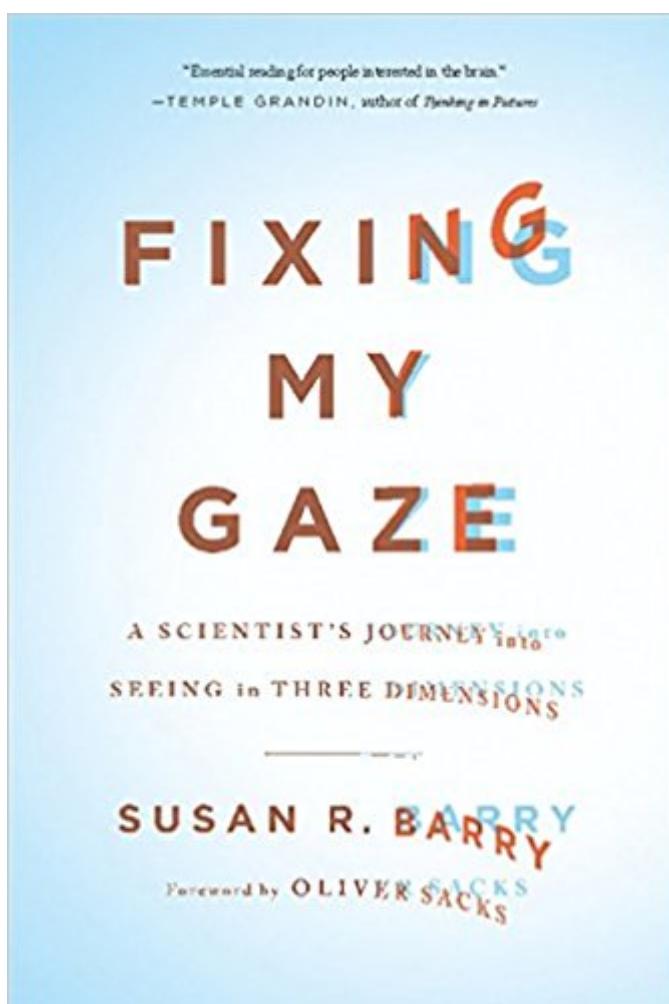


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# Fixing My Gaze: A Scientist's Journey Into Seeing In Three Dimensions



## Synopsis

When neuroscientist Susan Barry was fifty years old, she took an unforgettable trip to Manhattan. As she emerged from the dim light of the subway into the sunshine, she saw a view of the city that she had witnessed many times in the past but now saw in an astonishingly new way. Skyscrapers on street corners appeared to loom out toward her like the bows of giant ships. Tree branches projected upward and outward, enclosing and commanding palpable volumes of space. Leaves created intricate mosaics in 3D. With each glance, she experienced the deliriously novel sense of immersion in a three dimensional world. Barry had been cross-eyed and stereoblind since early infancy. After half a century of perceiving her surroundings as flat and compressed, on that day she was seeing Manhattan in stereo depth for first time in her life. As a neuroscientist, she understood just how extraordinary this transformation was, not only for herself but for the scientific understanding of the human brain. Scientists have long believed that the brain is malleable only during a “critical period” in early childhood. According to this theory, Barry’s brain had organized itself when she was a baby to avoid double vision and there was no way to rewire it as an adult. But Barry found an optometrist who prescribed a little-known program of vision therapy; after intensive training, Barry was ultimately able to accomplish what other scientists and even she herself had once considered impossible. A revelatory account of the brain’s capacity for change, *Fixing My Gaze* describes Barry’s remarkable journey and celebrates the joyous pleasure of our senses. Â

## Book Information

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## Customer Reviews

Barry, a neuroscientist at Mount Holyoke College, was born with her eyes crossed and literally couldn't see in all three dimensions. Barry underwent several surgeries as a child, but it wasn't until she was in college that she realized she wasn't seeing in 3-D. The medical profession has believed that the visual center of the brain can't rewire itself after a critical cutoff point in a child's development, but in her 40s, with the help of optometric vision therapy, Barry showed that previously neglected neurons could be nudged back into action. The author tells a poignant story of her gradual discovery of the shapes in flowers in a vase, snowflakes falling, even the folds in coats hanging on a peg. After Barry's story was written up in the *New Yorker* by Oliver Sacks, she heard from many others who had successfully learned to correct their vision as adults, challenging accepted wisdom about the plasticity of the brain. Recommended for all readers who cheer stories with a triumph over seemingly insuperable odds. Photos, illus. (June) Copyright © Reed Business Information, a division of Reed Elsevier Inc. All rights reserved. --This text refers to an out of print or unavailable edition of this title.

From the foreword by Oliver Sacks —“Fixing My Gaze is a beautiful description and appreciation of two very distinct ways of seeing—| But it is also an exploration of much more. Sue is at pains not only to present her story, in clear and lucid, often poetic, language, but also, as a scientist, to provide understanding and explanation. She is in a unique position to do this, drawing on both her personal experience and her background as a neurobiologist|. Though Sue originally thought her own case unique, she has since found a number of other people with strabismus and related problems who have unexpectedly achieved stereo vision through vision therapy. This is no easy accomplishment. It may require not only optical corrections (proper lenses or prisms, for example), but very intensive training and learning—|in effect, learning how to align the eyes and to fuse their images, and unlearning the unconscious habit of suppressing vision which has been occurring perhaps for decades. In this way, vision therapy is directed at the whole person: it requires high motivation and self-awareness, and enormous perseverance, practice and determination, as does psychotherapy, for instance, or learning to play the piano. But it is also highly rewarding, as Sue brings out. And this ability to acquire new perceptual abilities later in life has great implications for anyone interested in neuroscience or rehabilitation, and, of course, for the millions of people who, like Sue, have been strabismic since infancy. Sue's case, and many others, suggest that if there are even small islands of function in the visual cortex, there may be a fair chance of reactivating and expanding them in later life, even after a lapse of decades, if vision can

be made optically possible. Cases like these may offer new hope for those once considered incorrigibly stereo-blind. Fixing My Gaze will offer inspiration for anyone in this situation, but it is equally a very remarkable exploration of the brain's ability to change and adapt, and an ode to the fascination and wonder of the visual world, even those parts of it which many of us take for granted.â• Temple Grandin, author ofâ• Thinking in Pictures â“Essential reading for people interested in the brain.â• Eric Kandel, Winner of the Nobel Prize in Physiology/Medicine; author ofâ• In Search of Memory â“Fixing My Gazeâ• is a magical book, at once poetic and scientific, that holds out great hope for all of us. Here Susan Barry recounts her discovery that through training she could acquire, in adulthood, the three dimensional vision she lacked in all her early years. Barry, an excellent brain scientist, illustrates through her personal experiences and the fascinating science of vision that the brain is a marvelously plastic organ that can continue to change its wiring and thereby its function throughout our adult life.â• David H. Hubel, Winner of the Nobel Prize in Physiology/Medicine; John Franklin Enders Professor of Neurobiology, Emeritus, Harvard Medical School â“It had been widely thought that an adult, cross-eyed since infancy, could never acquire stereovision, but to everyoneâ•â•s surprise Barry succeeded. Inâ• Fixing My Gaze, she describes how wonderful it was to have, step-by-step, this new 3-D world revealed to her. And as a neurobiologist she is able to discuss the science as an expert, in simple language." Brock and Fernette Eide, authors ofâ• The Mislabeled Child â“Beautifully written, deeply informative, and profoundly inspiringâ•â•|Fixing My Gazeâ• will appeal to anyone interested in the beauty of the nervous system, and should be required reading for every person involved with the education, behavior, and development of children.â• Michael Chorost, author ofâ• Rebuilt: How Becoming Part Computer Made Me More Human â“Fascinating and moving....Barry shows us that with healthy eyes and the simplest of tools, we can see the world in an entirely new way.â• Fixing My Gazeâ• made me wonder: What new things could any of us see, if only someone told us it was possible?â• Dr. Leonard J. Press, Optometric Director, The Vision & Learning Center â“Barryâ•â•s story is seemingly about stereovision, but the depth she probes goes well beyond three dimensions. No one reading her fascinating account will ever look at vision the same way again.â• Richard L. Gregory, editor ofâ• The Oxford Companion to the Mind â“It is rare to gain stereoscopic vision if born without it, but Susan Barry reveals that it happened to her.â• Fixing My Gazeâ• is the engaging story of her unusual adventure.â• Nigel Daw, Professor Emeritus of Ophthalmology and Neuroscience, Yale University; author ofâ• Visual Development â“Magnificent...It is not yet clear what percentage of patients may be like Barry,

but Fixing My Gaze will encourage eye care practitioners to go ahead and find out, with definite benefits to their patients. Moreover, the book is fascinating reading. *Publishers Weekly* “Barry tells a poignant story of her gradual discovery of the shapes in flowers in a vase, snowflakes falling, even the folds in coats hanging on a peg. Recommended for all readers who cheer stories with a triumph over seemingly insuperable odds.” *Discover magazine* “Barry’s buoyant journey into stereovision is an eye-popping ride.” *Booklist* “An exemplary and informative testimony to the probably lifelong plasticity of the brain.” *SeedMagazine.com* “Barry’s transformation captures the sometimes-indescribable nature of perception.” Her tour of the science behind her experience underlines the amazing precision of our senses and how easily we can take them for granted. *BookPage* “A testament both to human physiology and spirit that permits someone to live with and then change a uniquely altered view of the world.” This book opens up the possibility that people can change their physical limitations, and that it is never too late to try. *Optometry & Vision Development* “This book is a marvelous ode to what can be accomplished when doctor and patient encourage one another to aim higher and further.” *New England Journal of Medicine* “One axis of [Barry’s] book is a graceful and grateful appreciation of a newly acquired ability to see the volume of space between objects and to see each object as occupying its own space.” “revelations that allowed her to live among and in the things of this world and gave her first movements of snow falling, trees branching, and a faucet arcing out of the sink.” The book’s main contribution, however, is exposing the wrong-headed dogma that acuity and binocular vision can be restored only during a critical developmental period. *Times Higher Education Supplement* “The book is a joy to read.” *Optometry and Vision Science* “Fixing My Gaze provides a fascinating, informative, and beautifully written account of [Barry’s] acquisition of stereopsis after vision therapy at the age of 48 years.” Barry’s insights about her own vision provide wonderful insights into what it means to not have stereopsis, and the profound, life-changing effect of acquiring it. *Stereo World* “In Fixing My Gaze, neuroscientist Susan Barry explains for the rest of us in fascinating detail just what a truly and completely flat world is like to live in for 48 years.” *Nature Neuroscience* “[E]nticing. [Barry] combine[s] a vivid and poetic account of her recovery with a detailed description of her treatment and the underlying science.” *The Journal of Clinical Investigations* “[A] fascinating account.” In addition to recounting her personal

triumph, Barry clearly explains the visual and clinical science needed to understand the significance of this achievement. [T]his engaging book will leave both readers knowledgeable in the field, as well as those just looking to understand something about the visual process, pondering what else there is left to see. *Curled Up With A Good Book* "Barry's book is great for anyone interested in learning more about the fascinating and complex biology of seeing, as well as those seeking hope and inspiration in overcoming a brain-centered disability thought to be incurable. Perception" [C]ombines in an elegant way biography and science. This is an excellent book. --This text refers to an out of print or unavailable edition of this title.

**FIXING MY GAZE** is an outstanding book -- like a journal of this scientist coming out of the vision she had into the world of stereo vision. What a tribute to optometric vision therapy. The rewiring of an adult brain to learn to correct vision defects/difficulties is astounding. The descriptiveness of the book is rich -- like the seeing of a snowflake fall in a snowfall for the first time in stereo after being stereoblind for her entire life. The chapter sounds like music titles and the writing is done the same way -- easily flowing and easy to understand. *Stereoblind, Mixed-up Beginnings, School Crossings, Knowing Where to Look, Fixing My Gaze, The Space Between, When Two eyes See as one, Nature and Nurture, Vision and Revision*. She tackles an extremely difficult situation and details it very well. To see in 3D is a gift for some and not for others. Stereo Sue's three dimension vision change shows that sometimes hard work, dedication, not taking no for an answer can all really pay off. **HIGHLY RECOMMEND**

I read this book for the sake of my sister, with amblyopia, and my daughter, with visual processing problems and a very mild strabismus. Susan Barry writes like an intelligent person without medical training, so there's a lot of very useful information without the medical jargon (she explains "amblyopia" and "strabismus"). The content was earth-shaking for me. At the time I read it, I was in the unique situation of being in the middle of what has to be a program the same as or similar to the one Susan Barry did with my 6 year old daughter. I can't say I really understood what my daughter was being asked to do or why it might be successful before reading this book. I do now. The brain is incredible. The writing was clear and engaging. I strongly recommend this book to anyone with vision problems, their family members, and anyone interested in neurology and neuroplasticity at a layman's level.

I ordered this new book just after meeting the inspirational Dr. Barry at this year's meeting of the Vision Sciences Society. The book arrived this last Friday and I spent the day reading it. I confess to be blown away by her story, as well as the scientific and clinical implications of her work. Add me to the list of people who loved the book! Sue Barry's astonishing development of stereopsis at age 48 changed - profoundly - the way that many scientists (me included) view visual development and plasticity. Somehow we had tuned out, en masse, one hundred years of successes using vision therapy (including the extensive work of Frederick Brock). The stuff of vision therapy was ignored, relegated to the fringes of sensible vision care. Instead, several generations of us took the Nobel Prize winning research of Hubel and Wiesel as gospel truth, going beyond the data by wrongly concluding (perhaps unlike the Nobel laureates) that stereopsis could only develop during a critical period during infancy. It took Barry, a well-established neuroscientist and keen observer, to bring us to our senses. And yet now, having read her new book, I see that the story is much deeper and profound than I thought. First off, she's a very entertaining storyteller in her own right. The human drama escalated as she went through frightening surgeries as a child (including an encounter with a deceptive anesthesiologist); as she experienced shock and disappointment at being exposed as stereoblind; as she had her vision problems dismissed by one ophthalmologist as a psychiatric disorder; as she experienced stereopsis bursting out at her for the first time; as she gained steam and knowledge, recognizing the scientific, clinical, and human implications of her story; as she brought celebrity neuroscientists on board. And so it is a story of empowerment for Barry the patient, Barry the scientist, Barry the teacher, and Barry the instiller of hope. I believe that Susan Barry has demonstrated for many of us that stereopsis is, indeed, important. I, for instance, was trained to believe that binocular vision and any advantage it afforded us wasn't that big a deal. Sure, I loved stereo viewers and all that... But as an undergrad at Berkeley in the early '80s, I recall a visit by Bela Julesz, of cyclopean vision fame. Two of my academic heroes, Russ and Karen De Valois rose to challenge Julesz, eventually (as I recall) suggesting that two eyes really aren't that much better than one. As I read Barry's book, as well as her descriptions of the consequences of her visual deficit, I realized that my early academic training (as I had encoded it) was quite wrong. The book makes it clear that lack of stereopsis, and having two eyes that don't fuse images properly, has profound consequences for people like Barry (e.g., her driving, her energy level, and her sense of efficacy). Moreover, it is fair to say that Barry is an extraordinary observer of stereoscopic experience, and that she uses her newfound, developing perceptual ability to achieve scientific and clinical insights that are elusive to us who grew up with normal stereopsis. One of the epiphanies for me was when I read and grasped the following paragraph: "Just as I could not

imagine a world in stereo depth, an individual with normal normal stereopsis cannot experience the worldview of a person who has always lacked stereopsis. This may be surprising because you can eliminate clues from stereopsis simply by closing one eye. What's more, many people do not notice a great difference when viewing the world with one eye or two. When a normal binocular viewer closes one eye, however, he or she still uses a lifetime of past visual experiences to re-create the missing stereo information."People interested in stereopsis will find excellent coverage of the basic issues and the key scientific figures past and present (e.g., Wheatstone, Hering, Helmholtz, Eileen Birch, Shin Shimojo, Denis Levi, Uri Polat, Chris Tyler). It is nice, if not surprising, to learn that the already positive, cool Oliver Sacks played a positive, cool role in Susan Barry's story.If you have strabismus or some other disorder of binocular vision, you will find what you need here. You will find out how to find an appropriate vision therapist. You will find extensive, understandable information about the theory and science of binocular vision. More importantly, you will learn in marvelous detail about the experiences and practices that can in some instances lead to acquiring stereopsis late in life. My guess is that vision therapy patients will use this book as a guide for years to come. One last thing: I recommend listening to two NPR interviews (2006, 2009) featuring Sue Barry, as well as other key scientific figures in the story, including Sacks, Hubel, Levi, and, briefly, the heroic Theresa Ruggiero. The NPR programs are available online and go quite well with the book.Two thumbs up! (one with uncrossed disparity; one with crossed disparity).

Good stuff for the science and stereo newbie. You don't need to know much about how it should go and it gives good insights into what might go wrong when assessing stereo pictures. The nature of driving a dominant eye or forcing stereo vision through contrast was a great insight. Stereo vision is extremely forgiving and I never had a good sense of why, this book has given me some excellent directions to explore.

This amazing story tells the struggles and triumphs of a woman who just wouldn't give in to incredible challenges or negative medical opinions. She is an inspiration to all. I got it for my wife, Rachel, who is battling a genetic disorder which has collapsed her airways over 90% in the past two and a half years. She is a 34 year old American who was once awarded a spot in the prestigious Royal Ballet in London and who has danced at the Kirov in St. Petersburg, Russia, and other prestigious companies both in the US and abroad. But now her only hope of survival is a rare procedure to re-grow her airways from her own stem cells and transplant the new trachea to replace her damaged tissue. Her story is at (...) This book helped inspire her to fight on in this seemingly

impossible battle. You can never give up simply because some doctor says you can't overcome something. You have to press the edges of conventional wisdom and personally take charge of your own health care. That message comes through loud and clear in "Fixing My Gaze" and it is more than a title. It is an anthem declaring that each of us must develop a similar single minded sense of purpose to see our goals as being achievable in spite of what stands in our way. Buy it. Read it! Never mind if you have the same condition or not - we all face situations in life that require us to reach deep within ourselves to create our own answers. Or, as someone once said, Move, and the Universe moves with you!"

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