

Reviews

SuperCooperators: Altruism, Evolution, and Why We Need Each Other to Succeed. By Martin A. Nowak, with Roger Highfield. New York: Free Press, 2011. 352 pages. \$27.00.

Martin Nowak calls himself a “mathematical biologist.” That might surprise us, though “mathematical physicist” would not. Newton and Einstein used much math; Darwin used little. Still, dimensions of biology are quite mathematical, such as population genetics. Nowak hopes by mathematical analysis to show that evolution generates *SuperCooperators*. We find out: *Why We Need Each Other to Succeed*, with the prospect that such *Evolution* explains *Altruism*. Math will show how altruism is inevitable.

Nowak can explain this by reporting on his math but without here using any. He prefers storytelling, often his interacting with famous biologists—enjoying their feats, foibles, and idiosyncrasies. The writing is excellent; he is assisted by science writer Roger Highfield. The book is more like a stimulating after-dinner conversation than a state-of-the-field analysis, though that is what the reader is simultaneously getting. But Nowak seems unaware that these many delightful and insightful personal episodes undermine his fundamental claim. “The cosmos itself is mathematical; everything and anything that happens in it is the consequence of universal logic acting on universal rules” (p. 2). His storytelling indicates otherwise.

Nowak is swimming upstream. Current Darwinists claim: “We are motivated by self-interest alone. . . . Yet competition does not tell the whole story of biology. Something profound is missing. Creatures of every persuasion and level of complexity cooperate to live. . . . This is the bright side of biology” (pp. xii–xiv). “Cooperation is the master architect of evolution” (p. xviii). “I have accumulated a wide range of evidence that competition can sometimes lead to cooperation” (p. 14). “By cooperation, I mean that would-be competitors decide to aid each other instead” (p. xiv).

Humans decide, maybe also wolves. Ants deciding? (Chapter 8) Vampire bats? (p. 21). They do coact, cooperate, operate together, work together, their behaviors coordinated. But such seeming deciding might be just stereotyped in their genes. One has to make a good many allowances for metaphors in this book. “To succeed in life, you need to work together—pursuing the snuggle for existence, if you like—just as much as you strive to win the struggle for existence” (p. xvii). Helpful metaphors give insight into the math, but one also has to watch for slippage between the terms. We use the word “attraction” across a spectrum from gravity to sexual love, but the two are unrelated phenomena. Similarly “cooperation” from molecules to morals might be useful “anthropomorphism” (p. 130), or maybe just intellectual confusion.

Nowak is really a computer biologist. Some biological behaviors can be mimicked on computers. The most famous one is “prisoner’s dilemma.” Most *Zygon* readers know these games; they have been debated for decades. Two competitors often settle into a “tit for tat” strategy. A player starts cooperating and continues so as long as the opponent cooperates. If not, the player likewise switches to defect—until such time as the opponent may again venture cooperation.

These games are modified, often to recognize probabilities, randomness, mistakes, confusions, clumps of cooperators ostracizing noncooperators, public goods, punishments, operators in groups with fuzzy edges in the real world, migration between groups. A quite stable solution is “Generous Tit for Tat.” “Win Stay, Lose Shift” can replace that, although Nowak finds that if the players do not make simultaneous decisions, “Generous Tit for Tat” returns.

Nowak is actually rather open-ended here, or thinks the long-term and ongoing results may be open. Life is more like chess than tic-tac-toe. “Our analysis of how to solve the Dilemma will never be completed. This Dilemma has no end” (p. 49). With such a closing to Chapter 1, readers may wonder whether mathematics is showing us selection processes that are indeterminate. That worry continues up to the end: “Cooperation comes and goes, waxes and wanes. It has to be reborn in endless cycles” (p. 276).

Five mechanisms make us work together: direct reciprocity, indirect reciprocity (which involves reputation), spatial selection, multilevel selection, and kin selection (Chapters 1–5; p. 270). None of these really reach “altruism.” Reciprocity—you scratch my back; I’ll scratch yours—is misleadingly called reciprocal altruism. Nowak is doubtful whether kin selection or inclusive fitness can account for most of the cooperation found in nature. These concepts that dominated the field for decades have lately withered. His discussion of how language enriches cooperation (Chapter 9) would have been enriched by more attention to “theory of mind” (mentioned on p. 55).

Nowak favors the power of reputation. The Good Samaritan gains because he builds his reputation and the benefits of this can outweigh his losses in caring for the victim. Of course this is not yet altruism either, because the Good Samaritan’s behavior is in fact driven by the benefits he gets, even if the victim simultaneously benefits (Rolston, 2004).

Elliot Sober and David Sloan Wilson argue that tribes of “altruistic” cooperators will out-reproduce tribes of selfish cooperators, but there is no “universal benevolence.” “Group selection favors within-group niceness and between-group nastiness” (Sober and Wilson, 1998, p. 9). Nowak welcomes this work (p. 86). But he does not seem to realize this undermines his hope for universal SuperCooperators, a “crescendo of cooperation” (Chapter 14).

Dealing with climate change, Nowak fears the tragedy of the commons, but hopes that “game theory can save the world” (p. 215). “I believe that climate change will force us to enter a new chapter of cooperation” (p. 278). “Although we are teetering on the brink of disaster, we are also on the brink of advancing to the next level of cooperation” (pp. 277–78).

Nowak does not seem to realize that, although his account might show the natural history of how cooperation evolved, it is powerless to explain how a universal ethic could be produced or kept in place, as promoted, for example, by

a missionary faith. Disciples, genetically unrelated to the proselytizers, enjoy the same survival advantage. There is no differential genetic benefit to the Samaritans or to related or unrelated others whom they convert. Universalist religion with its capacity to generate this generous altruism still needs adequate explanation.

Cultural nongenetic traits can help produce more offspring. Parents who build fires stay healthier in winter and have more healthy babies. But everyone else is soon building fires too, and the differential survival advantage is lost to particular individuals, their families, tribes, or even nations. Similarly, “Do to others as you would have them do to you” helps us to cope. Spread globally, it helps us cope *equally*. Without differential survival of genes in the next generation, Darwin is out of business.

But that is where Nowak hopes to end up with his “crescendo of cooperation,” SuperCooperators so inclined to assist each other that among them there is no differential survival benefit. Perhaps what we learn, alas, is that such clusters of SuperCooperators can be forever invaded by resurgent Darwinian self-interest. “The degree of cooperation in a society will fail as inevitably as it will rise again” (p. 282). So does mathematical biology give us SuperCooperators or not?

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Journey of the Universe. By Brian Swimme and Mary Evelyn Tucker. New Haven, CT: Yale University Press, 2011. 164 pages. \$25.00.

The new book written by Brian Swimme and Mary Evelyn Tucker is a thin volume that aims to narrate the story of the universe. This narration is primarily the story of the universe that contemporary science has told for us since the basic structure of the book is to follow the components of scientific research that put together create for us a whole, a full narrative. Thus, the story is a journey since the scientific story paints a picture of the universe that is constantly in motion. It is, therefore, a story that cannot have an end in the standard way since not only do we have much still to learn but we also know that all things are in motion through a whole set of intersecting processes. We have a sense that the universe has set out on an adventure as if the universe were itself a personality. Of course, we do not think

of the universe in this way ordinarily, but perhaps this telling of the narrative is fashioned in this way since the story is integrated with bits and pieces of other universe narratives, mostly drawn from the religious, cultural stories of past and present.

To tell such a story is not a new enterprise. Many have set out to do something like this in our current conversation between specialists in the sciences and religion scholars. Among such efforts is the work of Ursula Goodenough, who is among those who have already offered their praise for this book. Perhaps she sees in this effort something like what she has tried to do in constructing what she calls naturalistic religion. Still, the tale woven by Swimme and Tucker is not really of the same vein. There is no clear effort to suggest that any tale is preferable or that the religious views are somehow lacking. Indeed, there is little effort in the book to actually assess the relationship between the various religious accounts and the main story of the book drawn from the sciences.

There are other concerns that with close scrutiny emerge for the reader. For one thing, any of the many scholars involved in religion and science conversations will find very little that is surprising or dramatically new in this text. There are ideas that challenge standard ways of thinking about space and time, but most will know these details already. While the story is, as always, captivating, the reader who is knowledgeable will be dealing with the familiar. Among the dominant themes of the text, for example, is the idea of self-organizing systems that produce self-emergent properties and phenomena. This is a fascinating spin on the standard models of understanding, but the ideas have already been thought through thoroughly by others even as such notions are still not fully understood and researched at several levels.

The reader will also notice that the various references to the religions are done in a scattered way. To be sure, they are integrated into the scientific narrative in ways that make sense, but there is no similar effort to tell a continuous religious narrative setting the bits and pieces into complex wholes of religious worldviews. In addition, there is little or no actual effort to compare or contrast the different religious worldviews that give fuller meaning to any of the religious narratives. Clearly Tucker knows this as a specialist in this field, but the point does not seem to be to actually conduct a science and religion conversation at least in any analytical way. Instead, the reader is challenged to do that on their own, perhaps enticed to explore more fully any of the many rich religious stories of the universe.

Still, this book is captivating in its own right. It is elegantly written and draws further and further into the sense of awe and respect for the tale that is being told. The book is short so that even the details that are given are an enticement to study more, but they are actually integrated into the flow of the story that takes over the reading so that the meaning is the whole picture, the journey, and not so much in the details. Perhaps this is what makes the book so valuable as much as anything. There is no sense of the struggle or conflict that many see in the linking of religion and science. Instead, the book draws us toward the majesty of the whole. This makes this book a wonderful possibility for introducing students to the more detailed work of dialogue. One can hardly resist the idea that it all fits so well together and marvelously. Like the child staring at the glory of the night

sky, this book has us staring at the images set in our minds. It truly takes us on a journey.

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