

The Dangers of First Contact

The Moral Nature of Extraterrestrial Intelligence and a Contrarian Perspective on Altruism

BY DAVID BRIN

ON OCTOBER 6, 2006, AN EDITORIAL IN THE prestigious journal *Nature* commented on a recent meeting of the International Academy of Astronautics SETI study group regarding METI—or “Messages to Extraterrestrial Intelligence.” Also known as “Active SETI”—to distinguish it from the traditional passive listening program of the Search for Extra Terrestrial Intelligence—the loosely coordinated METI efforts have transmitted at least a dozen narrow, extremely powerful signals that were briefly many orders of magnitude brighter than the Earth’s normal background leakage into space.

Contrary to popular impression, that background of uncollimated radio and television has been shown to fade into noise beyond about one light year. In contrast, METI signals, and a few planetary radar surveys, have been coherent, narrow and vastly brighter at-target. Those who promote METI endeavors—many of them commercials or public relations stunts—routinely dismiss all concerns or pleas for discussion. In rejecting any need for pre-consultation, they cite untested assumptions such as the belief that all advanced extraterrestrial civilizations will inherently be altruistic, or that interstellar distances are so great that any thought of dangerous consequences can be dismissed as lurid sci fi paranoia.

The *Nature* editors noted that although the risks of bad outcomes may appear slim, “These small risks should nonetheless be taken seriously. When technologies offer radical new possibilities, the people who have the privilege of playing with them also have a duty to consult widely about what those possibilities might mean.” The reason for caution cuts to the heart of moral nature, and the fact that “It is not obvious that all extraterrestrial civilizations will be benign, or that contact with even a benign one would not have serious repercussions.”¹

In a more general sense, this is yet another example of the modern quandary—a plethora of low-probability risks with potentially major outcomes.

Any progress toward dealing with this class of risk must begin with a mature readiness to discuss and re-examine assumptions. We shall cover a few of these under-examined assumptions, here.

Altruism in the Natural World: Advantage and Satiation

Contact with “alien” others is not so uncommon as one might think. After all, animals from cephalopods to dogs to dolphins are in some sense alien—as are people who were raised in very different cultures. Past “first contact” events between diverse societies—e.g., when expansionist Europeans met native peoples of Africa, Asia and the Americas—illustrate how highly intelligent groups with different backgrounds can have severe difficulties establishing a relationship of mutual understanding. A clear-eyed view of our human past may help us remain realistic if we ever do encounter others beyond our planet.

Specifically, the search for extraterrestrial intelligence (SETI) provides an interesting case study—not so much of extraterrestrials, but of our own current Western attitudes towards how to approach a novel encounter between civilizations. Reflecting their almost entirely Western-liberal value system, supporters of SETI have generally taken for granted an axiom that *altruism*—a selfless imperative to assist others without expectation of reward—is likely to be a supreme attribute among advanced technological civilizations. The implication is that humanity should strive to display this attribute in communicating with extraterrestrial life forms that may be many centuries (or much more) ahead of us in development. Along these lines, a recent series of workshops² on how to craft and send a deliberate message from Earth into space was based on the supposition that we can dismiss any substantial likelihood of danger or bad outcomes, from transmitting messages into space.

Are these assumptions warranted, or do they

reflect the personal inclinations and wishes of a narrow group arising from a particular culture and era? I, for one, would feel more confident in the inevitability of alien altruism if that beneficent trait appeared more often in nature here on Earth.

Biologists consider reproductive fitness to be the coin of the evolutionary realm. They study how this coin is spent in games such as “Prisoner’s Dilemma,” which many animal species seem fully capable of playing. In simulations involving various kinds of rewards, you quickly get clear examples of the tug and pull of both cooperation and competition, depending on a pre-set payoff matrix. Emergent strategies such as cheating and stealing, as well as honest behavior that promotes trust also appear. A basic concept of *quid pro quo* seems to manifest even among lower animal species.

This kind of *pragmatic cooperation* is quite distinct from kinship based altruism, which in turn differs significantly from *pure altruism*.³ Alas, it seems often all too easy to conflate these three things.

In contrast to pragmatic cooperation, kinship altruism is neither temporary nor tentative, but one of the strongest forces in nature. Parental love, care and even sacrifice, for the sake of the next generation, is reinforced relentlessly by the payoff of genetic reproductive success. We see that the greatest and most prevalent forms of personal sacrifice—as for example, by a mother for her child—fall elegantly into place. An uncle who risks his life to save a nephew benefits by helping his close gene pool to thrive. Biologists have documented extensively a basic fact: that selfless generosity occurs less often, and with decreasing intensity, as individuals grow more distantly related. It is not shameful to admit that some of the most celebrated and beautiful human acts and attributes are deeply rooted in the wild nature out of which we emerged.

Moreover, science acknowledges important exceptions to the curve relating generosity to genetic payoff. The human ability to extend “kinship” in abstract (e.g., through patriotic self-sacrifice) can be prodigious. We have all seen well-publicized examples in which mothers of one species have seemed impelled to adopt and nurse surrogate offspring from another. Dolphins have pushed human castaways toward boats or islands. And today, upon hearing word that whales are stranded on some shore, people are frequently known to drop everything and race down to the beach to make a rescue effort. The purest form of altruism—in which individuals sacrifice advantage to benefit others without hope of recompense—does not at first appear to have anything



to do with a cost/benefits game matrix.

But pause for a moment and consider that example of humans racing toward stranded whales. The aim of those hurrying to the beach is to gently rescue rare, precious creatures. During most of our past, however, people hearing the same news would have rushed to the surfline with a different purpose in mind...lunch.

The difference is clearly based on two transformations—*education* and *satiation*. We now know more about cetaceans and can thus identify with them as fellow mammals. But above all, we no longer need their flesh to feed our hungry young. Satiation appears to be a critical element in the rising movement in Western nations to include some animals within the protection of law, and to elevate altruism above other culturally promoted ideals, such as tribal patriotism and glory-at-arms, that our ancestors considered paramount.

Note that not all human cultures have made such an agile shift from predation to inclusion. Not only satiation and knowledge, but also cultural elements—e.g., an eager readiness to practice inclusive “otherness”—are also necessary. Indeed, some other cultures consider this Western quality to be exaggerated, at best, and at worst to border on madness.

Group dynamics can also play a major role. We all recognize the emotions we feel when faced with discourteous or selfish public behavior. Along this vein, it has long been known that both animals and humans will often find ways to ensure that generosity is a widely exhibited trait by either overtly or subtly reprimanding or disciplining those who behave selfishly. These behaviors have been dubbed *altruistic punishment*. In a game situation, for example, the violation of certain rules can result in players ganging up, en masse, on defectors who play selfishly or fail to meet minimal standards of cooperation or beneficence. This occurs even when the act of punishing the defector adds costs and no benefits to the other players, and when any resulting altered behavior will help someone other than themselves.⁴

Is beneficent behavior that takes place in the shadow of altruistic punishment classifiable as true altruism? Uncomfortable to ponder, this question adds one more reason to worry about those who simply assume that generosity will be universal in the cosmos. At present, those pushing this assumption in the SETI community are largely idealistic astronomers and their eager fans, whereas the quite different, and more cynical field of *exobiology* is composed of biologists, who know that evolution does not predispose living creatures toward truly

selfless altruism any more than it does toward esthetics. It may be that our bent for altruism is a quirky, emergent property of our background as gregarious, exogamous and cooperative apes.

Perhaps our present fixation on altruism is chauvinistic and humano-centric. For contrast, consider what kind of moral systems you might expect to arise if lions independently developed sapience. Or solitary and suspicious tigers. Bears are omnivores, like ourselves, and yet their consistent habit of male-perpetrated infanticide seems deeply rooted. Meta-ursine moralists might later view this inherited tendency as an unsavory sin and attempt to cure it by preaching restraint. Or, perhaps they would rationalize and sacralize it, writing great literature to portray and justify the beauty of their way, just as we romanticize many of our own most emotion-laden traits. Anyone who doubts that intolerant or even murderous habits can be romanticized should study the religious rites of the ancient Aztecs and baby-sacrificing Carthaginians. If we are capable of rationalizing and even exalting brutally un-altruistic behaviors, might advanced extraterrestrials also be capable of such feats of mental legerdemain? Especially if their evolutionary backgrounds predispose them?

And yet, even if it is largely absent from the natural world, that fact alone does not render pure altruism irrelevant. I just mentioned emergent properties. Complexity theory teaches that new forms of order arise as systems gain intricacy. It may be no accident that the most complex society created by the most complex species on Earth has elevated altruism from a rare phenomenon to an ideal—something to be striven toward across the present and into future years. Furthermore, in another ironic twist, it is entirely by these recent, higher standards that we now project a higher level of altruism upon those we hope to find more advanced than ourselves.

For this reason—in a spirit of cordial, contrarian questioning—let me offer to play devil’s advocate. I intend to suggest that it may be foolish for us to beam any messages from this planet until we know a lot more. To do so will be like ignorant children, screaming “Hello!” at the top of their lungs, in the middle of a dark, unknown jungle.

Physical and Biological Contact

To start with, I would like to narrow the focus of discussion onto First Contact itself—the day we learn we are not alone. What dangers should we consider during the following days and months?

What possibilities should we keep in mind while seeking neighbors among the stars?

The initial question has to be, will First Contact be made in person, or will it be a mere exchange of greetings and information by radio? It is the latter scenario most SETI scholars predict, partly because of the vast distances of interstellar space, but also, naturally, because even the possibility of direct travel puts into question their “radio-only” premise. Nevertheless, let’s begin by briefly considering dangers that might arise if we ever met alien beings face to face.

Conquest and plunder—the grist of lurid movies—might be set aside to the “rather unlikely” shelf. But perhaps more plausible and fearsome might be disease. Until our recent AIDS epidemic, the concept of plague had grown strange to modern Westerners. Yet, history shows that infection was a major element in countless first-contacts between human cultures. Often, it played a crucial role. Anthropologist Alfred W. Crosby points out that the European conquest of the Americas and Oceania was facilitated by such Eurasian diseases as measles and smallpox—sometimes introduced intentionally, but more often quite inadvertently and, ironically, quite soon after both sides shook hands over treaties of friendship.

Some claim alien physiologies would be too incompatible... that extraterrestrial parasites would be unable to prey upon human organisms and our pathogens would certainly fail against our guests. But there is wide disagreement about this among biologists. Stanley Miller, one of the premier experts on the origins of life, offered a different opinion. Miller held that biological chemistry throughout the universe must involve the same small set of amino acids and nucleic bases that Earth life forms use. Those chemicals happen to be the most stable, the best at accumulating in rich reservoirs and forming the complex structures of enzymes and proteins.

On the other hand, arguing from earthly experience, it seems that cross-infection follows a curve not too dissimilar to that of interspecies altruism! The more genetically remote a given species is from us, the less likely it is to transmit a disease to us. A lot of the most lethal agents (e.g., HIV, monkey B virus) seem to have started off in other primates, albeit in modified form. But as you move away on the genetic continuum, these events are fewer. Once you leave mammals, you have parrot fever and various flu viruses from birds, and little or nothing from amphibians, reptiles or fish. Insects, which make up most of the eukaryotic biomass of the planet, serve

as carriers for a few things like malaria, but these are more vectors than fellow hosts. If you assume that ET is very far from us genetically, the likelihood of cross-infection seems low – and yet, a concern worth keeping in mind.

Suppose our extraterrestrial guests pass successfully through quarantine. There are still reasons to be nervous. For example, how are we to guarantee their safety? Would you risk letting alien tourists walk unguarded down our city streets? Ninety nine percent of the population might welcome them gladly. But most people also liked John Lennon. Human diversity is one of our treasures. Alas, it also means our mad fringe will be a persistent danger to visitors from space. This may be hard for guests to understand if they come from a homogeneous, uniform society.

And what about diversity among the extraterrestrials themselves? In both SETI and science fiction, we tend to envision each type as uniform in characteristics with little variation—a bad habit that is related to the evils of racism, sexism and stereotyping others by class. It is, in fact, quite possible that the first exemplars of communicating aliens that we meet will be atypical. Moreover, they may have reasons not to convey this fact to us. How do you know whether you’re dealing with a council of elders that have high tolerance and a low fear level, or an alienated alien teenager, or an ET dictator?

In the past, several human societies found themselves plunged into calamitous wars against European powers, precipitated by the actions of a few local hot-heads acting against the wishes of wise and cautious local chiefs, or else by the malevolent schemes of an unscrupulous occidental trader. Tension between individual and group interest will likely complicate any future contact situation, as well.

Propagation as Information

We have only touched lightly on the range of possible outcomes and drawbacks that might ensue from direct physical contact between ourselves and extraterrestrials. But let’s move on and consider now what most scientists think the more likely eventuality—communication with other worlds solely via radio or light waves, exchanging only information.

Only information? Surely no harm can come to either side from such an encounter!

Well, actually, we shouldn’t be too blithely certain about that. One has only to look again at the history of first contact between human cultures to see how much pain sometimes came about, not

from conquest or disease, but when one civilization encountered another civilization's ideas. What are some of the mistakes we might make if ever we encounter someone out there with something to say?

What if a government manages to slap a TOP SECRET classification on the discovery, sequestering knowledge of contact for the benefit of some group or nation here on Earth. We cannot know for certain that this hasn't already happened (and UFOlogists are certain that it has!). Just because an idea has been worked to death in bad dramas doesn't mean that it is completely impossible. America's NSA (National Security Agency) is just one group already possessing far more sophisticated listening apparatus than all of the world's SETI teams put together. If SETI discovers a point source in some portion of the sky next week, can we know for certain that the NSA did not pick it up first, perhaps many years ago?

Sequestration of information is a clear danger to be guarded against. Only now—in the spirit of contrarian criticism—I want to turn around and warn about the opposite trend, the growing assumption that absolutely everything about First Contact should automatically and unquestionably be released right away, into the direct spotlight of mass media. This, too, could cause severe problems. Take, for instance, the way the press turns some events into “media circuses.” During the early phases of a discovery—while scientists are still trying to verify that it's “contact,” and not some fluke or natural phenomenon—premature media attention could do great harm. I am reminded of the events surrounding detection of the first pulsar, which was initially thought to be an interstellar beacon because of its uncannily regular radio pulsation. If there had been an Internet back then, perhaps the false alarm might have aborted the entire SETI enterprise! How many such events can a program survive before it turns into a laughing stock? For this reason, we must expect some caution while responsible researchers triple check their data and discreetly seek verification from colleagues around the world.

Remember that researchers are people, with families and obligations. Their employers—for instance, NASA—may have operational rules and internal procedures that scientists are expected to follow, before any public announcement is made. It would be unfair to shout “coverup!” just because a little bureaucratic paperwork delays the big press conference by a few days. Alas, this may mean the first announcement won't be made by responsible,

careful scientists, but by a person on the periphery, perhaps a lurker in the rumor loop, someone with an appetite for headlines. Those who grab the front pages may not be the ones most qualified or deserving to represent us during the critical stages of First Contact.

Then there is the matter of the alien information itself. We should recall that it is only very recently that a few cultures began ascribing to the notion of freely exchanging ideas. Throughout history, nearly every tribe or nation held instead to the more traditional notion—that some concepts are too dangerous (or valuable) to be let loose among common folk.

Were all those cultures entirely wrong to believe this?

I happen to believe they were. I hold to my own culture's central tenet that openness is good. The best way to protect people from bad ideas is to let them experience the entire range of human concepts while developing critical, even skeptical, habits, gradually learning for themselves to judge wheat from chaff. But then, honesty compels me also to admit I might be wrong. My culture's central assumption could be mistaken. Every other human culture may have been right instead, when they posited that ideas are inherently dangerous.

It is the height of arrogance not to at least ponder this possibility, instead of simply assuming that a very recent set of upstart principles are automatically and obviously true. The possibility of receiving information that could, in its own right, prove dangerous is exemplified by the ease by which our computers are infected by software viruses. But a prudent civilization might well also pay some attention to how humans, themselves, can also host infectious memes.

How much worse might these problems be if the extraterrestrials are responding to an ill considered message of our own? Whether they do so inadvertently, or out of deliberate malice, it will be within the power of alien communicators to use words and symbols in unhelpful ways. History suggests caution.

While we're on the topic of dangerous ideas -- is it possible that we may be the infectious ones? Before dismissing the idea out of hand, consider that the apparent silence out there could have any number of possible reasons. We who are so new to understanding the depth and potential of syntactical information flow—are we the best judges of what is possible, let alone dangerous to others? Would it really hurt to spend a little while advanc-

ing our knowledge in those areas, before ecstatically and impulsively shouting in all directions?

How about those wonders of technology we hope to acquire, once we begin learning under the remote tutelage of our wise and beneficent predecessors? There has been talk about solving many of the problems that dog us—e.g., energy crises, disease and unsafe transportation—by sharing solutions that were discovered long ago by others. They might even know answers to biological and sociological quandaries that today threaten our very survival.

Suppose we do start receiving a wad of generous schematics for all sorts of wonders. What if there are technologies we're not ready for? Like a simple way to make antimatter using common household materials and wall current? It may be that 99.9% of the population will behave responsibly and refrain from blowing us up, while the remaining 0.1% would kill us all.

Many westerners believe in the free competition of ideas—letting the fittest survive in open argument. We tend—quite rightly I believe—to see any attempt to restrict that openness as a direct threat. And yet, returning to an earlier point, there may be ways, quite conceivable ways, in which information from the stars could prove harmful, as in “virus” computer codes that infect a mainframe or microcomputer, proceeding to gobble up memory space, ruin data, and then spread to other hosts.⁵ So far, most inimical programs have proved fairly primitive—nothing compared to the voracious, computer-eating monsters depicted in some science fiction stories. And yet, those stories were correct in predicting computer viruses in the first place. And they are getting more sophisticated, all the time.

A software “invader” needn't be intentional. On Earth there are endless stories of programs interfering destructively with other programs. What, then, of sophisticated code from an alien culture, taken in through our antennas and suddenly introduced into a data-handling system for which it wasn't designed? Any message from the stars is likely to include error correction modules, designed to repair damage done to the message during transit through the dust and plasma of interstellar space. Once the code is embedded in an active computing medium, such modules would “wake up”—much like a hibernating animal aroused from sleep—and would then begin using available computing resources to restore the integrity and function of the message.

As bizarre as this concept may sound at first, it isn't science fiction. This is how the world's best in-

formation specialists say *they* would design any complex code meant to be beamed at the stars! Under normal circumstances, an extraterrestrial message may be completely harmless. But what is “normal” for alien software? There is no guarantee such a program won’t inadvertently take over more of an unfamiliar host system than anyone ever imagined. This accident might be made even worse if the program suffered “mutation” in transit.

Giving It All Away

Today, SETI scientists worry far more about lurid headlines (SCHOLARS THINK EXTRATERRESTRIAL PROGRAMS MIGHT EAT US!) than about warding off infection by self-replicating alien software. And they are probably right. After all, nobody believes virus codes really represent a high probability hazard to us or our civilization. But the wrong type of publicity, even misquoted, is a sure way to see your grant slashed. With that, and far more imminent dangers always looming nearby, it’s no wonder that talk of potential hazards from First Contact rates far down most researchers’ list of priorities.

And yet, is it wise to go into this enterprise simply assuming there’s no danger at all? That’s called “success-oriented planning,” and it was used extensively by the U.S. Space Shuttle Program. Need I say more?⁶ In this modern world, we keep coming up with low-probability but huge-outcome situations that challenge the normal practice of risk analysis. Even if each particular scenario seems very unlikely, the sheer number of these “black swans” almost guarantees that a few of them (and some we haven’t yet imagined) will come true. Finding a mature and prudent way to deal with such quandaries—without stifling human progress—will be a challenge of this and coming generations.

But even if First Contact turns out to be “safe,” that wouldn’t mean that we could relax. For even in a civilized setting, life can still be dangerous if you don’t know the rules. (Don’t believe me? Try investing in Wall Street without any experience!)⁷

What, after all, is the most common peaceful enterprise of human beings? Commerce, of course. And what is likely to be the main commodity—perhaps the only commodity—of commerce on an interstellar scale?

It will almost certainly be information. Perhaps not the malign, dangerous information we spoke of earlier, but useful information—neat inventions and brilliant innovations, even—especially—art and literature. Anything novel and original. Whatever’s fresh and new.

How will most of us respond if the first thing we’re asked by aliens is, “Send us your music and your art!” The Voyager spacecraft carried disk recordings of samples of Earth culture, along with graphic instructions how to read the information. In the spirit of the United Nations, it simply never occurred to any of the people planning this gesture that the album should have carried a *price tag* as well.

It’s all very well to speak of altruism and of the joys of free exchange, but we should always remember that is a very recent concept in human affairs. *Quid pro quo*, as we saw earlier, is a more venerable theme. Throughout human history, in most of our daily lives, and even among the higher animals, the real rule for civilized relations is not “be generous.”

It is “be fair.”

Make no mistake, there is a difference! Nice as they may be, extraterrestrials will almost certainly engage in trade. And their stock in trade will be information. We may seek from them the answers to our ultimate questions. They, in turn, may reply, “Great. We’ve got some answers. But surely you have something to offer in exchange?”

What can we offer? All we may have is ourselves—our art, our music, our books and drama. Forget physical resources. The true wealth of humanity lies in our culture. That is what we have to trade. It is our treasure.

It is also the very first thing we are likely to beam to the stars, in gigabytes, within days after First Contact! Given the spirit of the times, and our ecstatic enthusiasm for contact, it’s what would seem only natural as we eagerly seek to “share with” (or impress) our newfound neighbors. And that very admirable rush to share—proving our altruism in an orgy of transmission—might turn out to be the worst mistake of all time.

They may be nice. They may operate under rules we would call fair. But nobody expects to pay for a free gift! It could be that history will speak of no worse traitors to humanity than those who, with all the best intentions, cast out to the skies our very heritage, asking nothing in return, thereby impoverishing us all.

Across the years, I have found that this point has been among the most difficult I ever had to explain. Hence, please bear with me as I reiterate: Nature is mostly tooth-and-claw. At the opposite end are some glimmers of genuine altruism, exhibited by apes and dolphins now and then, an occasional dog, plus a large number of recent human beings who want to be much better than they are. Our great opportunity for improvement shines at this

end of the spectrum. I hope we make it. But as yet there is no guarantee. There is hardly even a trend.

What is more firmly based in both nature and human experience is something that lies midway along the spectrum between predation and total beneficence—our concept of fairness in dealing with each other on a basis of reciprocal advantage. Many animals seem to understand the basic notion of exchanging favors, tit-for-tat, making a deal.

Unlike pure altruism, pragmatic cooperation stands on much firmer ground, rooted solidly in observed nature. Moreover, one can easily imagine how to portray fair trade in a message. There is every chance that intelligent aliens will understand this concept, even if they find “altruism” incomprehensible.

Because of this, let me humbly suggest that a fair and open approach based on cautious *quid pro quo* should be our central theme as we take measured steps toward First Contact, while all the time remembering that we are new and small and weak in a vast universe that seems mysterious—especially in its chilling silence. If aliens truly are benignly altruistic, they will forgive us this precaution, this vestige of pragmatic self-interest. Noble beings will bear in mind our recent difficult experience. They will understand.

Conclusion

Despite many years spent professionally contemplating the notion of alien life, in a myriad of variations, I personally don't expect Contact to happen in my lifetime. When it does, I hope and predict that our grandchildren will be a whole lot wiser and far better able to deal with it than we are. Our top priority should not be rushing toward Contact, but preparing our heirs to be ready for it.

A parallel might be the way we sometimes screen our calls, listening to messages instead of answering right away. What we almost never do (past the age of 12), is just punch random numbers into the phone, jabbering at anyone who happens to be out there, telling them our names and where we live. We certainly don't go roaming about, shouting in the darkest part of an unknown jungle or town.

Optimistic scientists may be right that we have nothing to fear from that eventual encounter with wise beings from the stars. Indeed, I support the continuing effort to keep listening and sifting and learning from what the sky above can tell us. Still, we cannot be reminded often enough to look back on our own history of contact among humans here on Earth, a litany of dire cautionary tales. We are, all of us, descended—only a few generations back—from folk who suffered horribly because they weren't ready for the challenges brought on by new vices, new technologies, new diseases, new ideas, new opportunities, new people. And those ancestors were the lucky survivors! Many peoples and cultures—including every species of hominids other than our own—left no descendants at all.

I would rather bet on a horse that I know—human improbability and progress—than on salvation from some hypothetical super-beings high above. We have tried that route, countless times before, and the lesson has always been that we should rely (mostly) on ourselves. The worst mistake of first contact, made throughout history by individuals on both sides of every new encounter, has been the unfortunate habit of making assumptions.

Let's hope it is a habit that we, or our grandchildren, manage to break. If so, we may pass a crucial test when the time comes to meet and greet beings from the stars.. **S**

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3. Alcock, James. 2003. "Animal Behavior: An Evolutionary Approach." *Journal of Mammalogy*, 84(1), 324-325.
4. Fehr, E., and S. Gächter. 2002. "Altruistic Punishment in Humans." *Nature*, 415(6868), 137-140; Henrich, J., McElreath, R., Barr, A., Ensminger, J., Barrett, C., Bolyanatz, A., et al. 2006. "Costly Punishment Across Human Societies." *Science*, 312(5781), 1767-1770.
5. Brin, David. 1997. *The Transparent Society: Will Technology Make Us Choose Between Privacy and Freedom?* New York: Basic Books/Perseus.
6. Success-oriented planning is actually the most reasonable thing to do in many cases, where there isn't a large asymmetry or irreversibility in the payoff matrix. First Contact with an unknown life form does not meet the criterion, however. Potential downsides of failure are immense and irreversible. This makes success-oriented planning truly irresponsible.
7. The most effective con artists are the least rapacious-seeming folks you will probably ever have the misfortune to meet. Kenneth Galbraith once said that we experience big financial cons about every 20 years, because we let our guard down. We can afford several-year setbacks every 20 years. What we can't afford is a millennia-scale setback, simply because we didn't argue about something for while before acting.