

Review of *The Invisible Gorilla: And Other Ways our Intuitions Deceive Us* by Christopher Chabris and Daniel Simons (New York: Crown, 2010, 306 pps.)

Ernest Davis

In 1999, Chris Chabris and Dan Simons, the authors of *The Invisible Gorilla*, carried out one of the most famous, and most hilarious, experiments in this history of cognitive psychology. Subjects were instructed to watch a one-minute video of a basketball game and to count the number of passes made by the team wearing white. In the middle of the video a woman wearing a gorilla costume walks into the middle of the scene, thumps her chest, and walks off. Astonishingly, half the subjects watching the video do not see the gorilla. Moreover, when asked afterward “Did you see the gorilla?” they are unable to believe that they had missed it, and are astonished when they watch the video a second time and see it. Some subjects accused the experimenters of switching the videos. Later eye-tracking experiments demonstrated that some of the subjects who don’t see the gorilla are in fact looking straight at it for a second at a time. The experiment has become very famous; it was featured on *Dateline NBC*, and discussed in a episode of *CSI*. Of course, misdirection of this kind has been used in magic tricks for centuries or millennia; but I suspect that even Houdini would have been surprised that one can make a gorilla in center stage invisible to half the audience simply by asking them to count basketball passes.

These two kinds of errors — gaps of various kinds in people’s cognitive abilities, and their own inability to recognize those gaps or even to believe their existence — are the theme of this book. Each chapter analyzes a different category of “illusion”: the illusions of attention, of memory, of confidence, of knowledge, of cause, and of potential.

Invisible Gorillas is very entertaining and readable, with a pleasant mixture of experimental studies and anecdotal information, much of it from criminal cases, where of course the issues of reliability of observation and of memory are of paramount importance.

The analysis of illusions in the first three chapters is of very great practical and social importance. The authors relate the *illusion of attention*, as illustrated in the gorilla experiment, to all kinds of situations, where someone involved obviously should have seen something but didn’t, because their minds were elsewhere: the many accidents involving car drivers using cell phones; the frequent cases where car drivers fail to see motorcycles and drive into them; a 2001 incident where a captain of a US submarine failed to see Japanese fishing vessel through a periscope and surfaced directly underneath it. The gorilla experiment sheds two kinds of light on these. First, it shows how easily people can miss things if their mind is occupied elsewhere. Second, in discussions or court cases after the fact, the claims “I didn’t see you,” and “You were looking straight at me!” are generally taken to be contradictory; if witnesses can corroborate the latter, the former is often taken to be perjury. The gorilla experiment shows that both statements may be entirely true.

The chapter on *illusion of memory* shows that people’s memories are much less reliable than they suppose, and that the vividness of their memory and their certainty of it are no guarantee of its correctness. This is, of course, of critical importance both in historical research and in criminal cases, and has been the subject of a large body of psychological research since the pioneering work of Elizabeth Loftus in the mid 1970’s. (It is astonishing, incidentally, that Loftus is mentioned only once, in passing, in this chapter.) The work of Loftus and others on the unreliability of memory, and its susceptibility to suggestion and other distorting influences played a large part in bringing an end to the evil “recovered memory” fad of the 1980’s and has had a substantive positive impact in court proceedings in promoting a more accurate view of the reliability of eye-witness testimony. I wish that literally everyone would read this chapter and be aware of this research, particularly anyone involved in the legal system, which, as jurors, witnesses, or litigants, is potentially all of us.

The *illusion of confidence* is the belief that witnesses, doctors, and so on who speak more confidently are more reliable. Again this is an almost universal belief: patients becomes nervous if their

doctor consults with a reference book or expresses any uncertainty; jurors give more credence to witnesses who sound sure of what they are saying. Again, the experimental evidence shows that it is largely an illusion. Statements *by any particular person* are generally more reliable when expressed more confidently, but this rule does not work in comparing one person to another.

Several of the experiments discussed in these three chapters are quite as vivid, as surprising, and as ingeniously designed, as the gorilla experiment. In one, the authors created a real-life “continuity error”. A confederate poses with a map, looking lost, and asks the unwitting subject for directions. While they are speaking, two more confederates barge through with a large wooden door, blocking their view. When the door is gone, the original lost pedestrian has been replaced by someone else, of different height, build, and clothes. Nearly 50 percent of the subjects failed to notice that anything strange had happened. (However if the sex or race changes, they do notice.)

However, the quality of the evidence presented is very uneven, and many of the arguments are much weaker. The authors discuss at some length the silly Joshua Bell stunt in which the violinist played his Stradivarius at the entrance of a subway stop, and was ignored by all but a few of the passers-by. The authors analyze this in terms of the illusion of attention. But there is no reason whatever to suppose that Bell was invisible to the commuters in the sense that the gorilla was invisible to the subjects watching the video; all the “experiment” proves is that commuters hurrying home are generally not at leisure to stop and listen to a violin recital. At most, it sheds a sad light on the pressures of 21st century life.

The chapter on the illusion of confidence discusses a survey the authors carried out, showing that 63% of Americans think that they are of above average intelligence. I find that statistic remarkably unimpressive for a number of reasons. First, 50% of Americans *are* more intelligent than the average American, so assuming (as is clear from the discussion here) that few people make the mistake in the reverse direction, only 13% here were wrong; 87% were right, which is a large percentage. Second, the 50th percentile of IQ scores is 100; the 37th percentile is 95. Therefore, the people who were wrong were only misjudging their IQ scores by 5 points, which is a small mistake. (Whether or not IQ is a valid measure of intelligence is irrelevant; the point is that, however you define or measure intelligence, the difference in intelligence between the 50th and 37th percentile is not huge.) Third, intelligence is a vague quality with many aspects, and people undoubtedly tend to value those forms of intelligence that they themselves possess. So it is almost certainly true that most people *are* more intelligent, and more ethical, and have a better sense of humor, and so on, than the majority of other people, on the scale in which they themselves evaluate those qualities.

The third point above is countered in another study that shows that chess players on average consider that their ranking should be 100 points higher than it is. Here there is no ambiguity about what is being measured. But here one is dealing with a population consisting of some of the world’s most competitive people. I am not arguing that people don’t overestimate their own intelligence; of course they do. But I don’t see that either of these studies is in the least surprising, or substantially contributes to our understanding of this error.

The last three chapters, on the illusions of knowledge, of cause, and of potential, are much weaker. The prevalence of illusion of knowledge, that people, including experts, think they know more than they do, will not come as news to anyone, and the examples given are not particularly compelling. The first example in the chapter discusses at length an incident in the year 2000 in which geneticists were asked to estimate the number of genes in the human genome. The estimates varied widely from about 26,000 to about 153,000. The current estimate is about 20,000, so no one was right, and some were very far wrong. It is hard to see what is surprising about this story or what point it illustrates. The scientists were invited to guess; the evidence at the time was inadequate; so their guesses were wrong. What of it? None of them is quoted as having expressed any unjustified degree of confidence in their guess.

In general, there is a tendency in this book to assume that any error is a foolish mistake due to an illusion; they say, for example (p. 102) that “any country that voluntarily initiates a war and then loses must have suffered from the illusion of confidence, since negotiation is always an option”. But obviously that isn’t true. A country may have good justification for thinking that it will probably win (or, more precisely, that its expected outcome of going to war is greater than the expected outcome of not going to war) and then end up being wrong, for one reason or another. Losing is not necessarily a sign of a foolish decision, any more than winning is a sign of a wise one. As an comparable example that is more easily quantified and less fraught, consider a bridge player who can choose between two lines of play: Plan A, which has a $2/3$ chance of success and plan B, which has a $1/2$ chance of success. The uncertainty reflects the fact that he does not know the distribution of cards in his opponents’ hands. The player chooses A, loses, and a post-mortem reveals that if he has chosen B he would have won. The player has not been irrational, just unlucky. Even if he chooses B, loses, and it turns out that he should have chosen A, he probably has not been acting under the spell of some deep illusion, any more than he has been motivated by a neurotic need to lose; probably, he simply miscalculated. In more complex situations of this kind, where it is mathematically impossible to compute the optimal solution in reasonable time, we cannot even say that his choice was irrational; he may have followed a strategy that was perfectly reasonable, given that he could not afford to spend centuries thinking about it.

There is also an entirely unfair swipe at TV stock picker Jim Cramer. I am no great fan of Cramer’s but it is not anything like correct to write that he “tells you to ‘buy buy buy’ . . . rather than to analyze investment ideas.” On his show, Cramer constantly urges the need to research the companies one is investing in, and in his books, he gives detailed advice on how to carry out that research. This is not the only case in the book where the application of theories to real-world situations is rather shallow and glib.

I found the chapter on the *illusion of cause* very disappointing. Reversing cause and effect, confusing cause with correlation, and so on, is one of the most common and dangerous of errors; but the treatment here is slipshod. The authors, wearing their doctrinaire experimentalists’ uniform, proclaim (p. 161) “The only way — let us repeat, the *only way* — to definitively test whether an association is causal is to run an experiment.” So tainted wells do not cause cholera, and tectonic movement does not cause earthquakes. The difficulties in deducing causality from observational studies are profound and well-known, but it often must be done, and ignoring this does a serious disservice to readers. They do go on to say, “Epidemiological studies . . . in many cases . . . are the best way to determine whether two factors are associated, and therefore have at least a potential causal connection,” but the whole thrust of the remainder of the chapter is that, if you haven’t done an experiment, you can’t make a causal claim.

Much of this chapter is given over to decrying parents who refuse to have their children vaccinated, because of the supposed relation to autism. Chabris and Simons characterize this decision entirely as an instance of the illusion of cause. This is a sad and angering story, but the causes are by no means as one-sided as Chabris and Simons present them. Certainly, cognitive illusions play a role; but there are many other factors, including, notably, a well-founded public distrust of the pharmaceutical industry and a well-founded suspicion that the medical establishment is substantially in the industry’s pocket.

It is not at all clear how the *illusion of potential* relates to the other illusions, or why the authors consider it important, except that it happens to be a *bête noire* of theirs. (I have to admit that I did enjoy the debunking of the theory that listening to Mozart makes you smarter.) After all, one can spin out categories of self-flattering human error indefinitely. There is the *illusion of innocence*, that any fight with your spouse is entirely their fault (hard to beat in terms of eliciting anger when the cognitive error is pointed out); there is the *illusion of power*, that the sports team you were rooting for lost because you left the TV to go get a snack; there is the *illusion of victimhood*, that the

universe and the powers that be have selected you as the chosen target for their slings and arrows; and so on.

As a warning to all of us to be guarded in trusting our own memories and to be uncertain that we will see what is right in front of our face, and as a plea for us to be patient and understanding when others fail in these ways, the first three chapters of this book are immensely valuable. As a popular exposition of research in cognitive psychology, the book seems to me much less satisfactory. The line between what people get wrong and what they get right, between what they see and what they miss, is very fine, and the book rarely and inadequately engages with the question of what makes the difference. For example, the authors do raise the point that, though talking on a cell phone distracts a driver from the road, talking to a fellow passenger does not; but the explanations they advance are not very satisfying. One can substitute one stranger asking directions for another behind a wooden door, but if you substitute a glass of beer for a cup of coffee that the subject is drinking, no one will miss it. A car driver may not see a motorcycle, but a timely loud honk on the horn is often very effective at making oneself visible. More than that: Often the unexpected is startlingly apparent even if it is small and outside the current focus. A friend of mine was once travelling by train, and suddenly realized that the person across the aisle, whom she had not been looking at or paying attention to, had three fingers on one hand. The night my dog died, my wife was woken from a deep sleep by the sound of his not breathing. We all have such experiences, where something wrong on the periphery of vision or something that is barely audible but strange suddenly grasps our attention. These are the reverse of the gorilla effect, and probably no less important, though harder to elicit in the laboratory. The formula, repeated several times in this book, that people do not see what they are not expecting to see, is far too crude; the complexities of the reality are largely undiscussed.

Because of the experimental methodology, there is a tendency in cognitive psychology to focus on errors. Errors are easily measured, they are vivid, and it is easy to get experimental subjects to commit them. It seems to me, however, that to focus too heavily on errors is itself to miss the gorilla. For what is really most amazing in these experiments and most in need of explanation is what is most quotidian: that people can see and understand a basketball game; that they can converse with a stranger and give him directions. The strange errors they sometimes make while carrying out these immensely complicated cognitive tasks, and their misconceptions about these errors, though fascinating, are ultimately of secondary importance.