Between the fringe and the mainstream

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Hundreds of experiments by scores of researchers around the world have generated compelling scientific evidence that certain psychic phenomena exist. US government, military and intelligence agencies have taken serious notice. Why haven't you heard about it?

From the center, everything looks like the fringe. Not long ago, it was common knowledge that the Martians built elaborate canals on Mars. Today, seriously entertaining the existence of Martian canals commits one to the lunatic fringe. Once the idea that the continents slip around like snowboards was laughable nonsense. Today every schoolchild is taught about continental drift. These and dozens of similar stories remind us that conventional wisdom is often hilariously and sometimes poignantly short-sighted. For those of us interested in what's on the horizon for science and society, we've learned to be mindful of our limited perspectives and pay close attention to certain so-called fringe topics, because like it or not, those uncertain realms contain the seeds of our future.

Fringe ideas are often short-lived amusements, like "pet rocks," or enduring ideas that ebb and flow, like "natural foods." Here we are interested in a third type of fringe: Controversial topics that are neither absorbed nor discarded, but persist in a strange netherworld between fringe and mainstream.

The topic at issue is psychic phenomena: Common human experiences suggesting an underlying, invisible interconnectedness binding us together in some strange way. From the cultural, religious, entertainment, and economic perspectives, psychic phenomena have been solidly mainstream for centuries. Yet from a modern scientific perspective, it stubbornly hangs on the fringe. Indeed, the prefix "para," as in paranormal, helps enforce the demarcation between what society takes as normal versus beyond normal. Scientists, being a particularly conservative lot, consider the fringe to be like a odd-looking skunk: There's a possibility of learning something quite new, but there's a better chance of raising a serious stink. There are no grants, tenure, or stable jobs available for scientists who seriously challenge the status quo.

This is not to say that science has been mute about psychic phenomena. To be sure, a few hyper-rationalists have crafted whole careers out of debunking frauds masquerading as psychics. What is less well known is that over the last two decades, a half-dozen, highly skeptical government-sponsored committees have closely studied the best available scientific evidence, and they've been completely stymied. A phrase that appears in published – but not widely advertised – government reports is that after detailed reviews of the best data from reputable laboratories, "no plausible normal alternatives" can be found. It looks like psychic phenomena have been captured in the lab.

This is astonishing, for it means that something profoundly mysterious has been witnessed in scientific laboratories, something that challenges basic ideas about who we are and the way that science thinks the world works. It suggests that our understanding about fundamental concepts like causality, space and time is incomplete. It raises the possibility of creating new applications in communications, health, and decision-making. We're not talking about hawking some goofy New Age elixirs or "miraculous devices," but the next wave of mainstream products and services made by brand-name companies. This won't happen overnight, but it will happen.

Many popular mainstream magazines and journals, like *Time* and *Science*, continue to rehash long outdated prejudices about parapsychology (the scientific study of psychic phenomena), or they focus on the wacky world of psychic entertainment. But changes are afoot. In 1993, the popular British science magazine, *New Scientist*, featured telepathy experiments in a cover story. In 1996, the *New York Times Magazine* published an article on a scientist who studied psychic phenomena. Interest has been quietly popping up in mainstream academia and in industrial research. To understand why, let's consider the case of telepathy.

Let's say you wake up one morning thinking about an old college chum you haven't heard from in over a decade. You pick up the phone, intending to track him down, and you find that someone is already on the line. To your astonishment, it's your friend. He was thinking about you and dialed your number at precisely the same time you were preparing to locate him. Is this simply a coincidence, or something more? While it's undeniable that all sorts of spectacular coincidences can occur purely by chance, the huge body of anecdotes about these sorts of meaningful coincidences seem to suggest that sometimes these synchronistic events are not just dumb luck.

Starting about a century ago, scientists interested in "thought transference" – today we call it telepathy – began to systematically examine the claim that a mind could gain information about the thoughts of another, distant mind. Many experimental techniques were tried, involving reproducing pictures that someone had drawn, guessing playing cards, describing where a distant person was located, mentally "sending" images into a sleeping person's dreams, and sending images to a person in a sensory isolation chamber.

The results of these telepathy studies strongly suggested that information in one person's mind had been successfully received by another, even when the receiver was completely isolated by distance or shielding. Cumulatively, the laboratory evidence strongly demonstrates that information can be exchanged between people in ways that defy conventional understanding. And this is precisely why telepathy and other psychic phenomena are identified with the fringe. Scientists don't like to work on phenomena they can't explain. But that doesn't mean the phenomena don't exist.

So let's examine the evidence for genuine telepathy. As tempting as it may seem, we shouldn't rely solely on amazing stories. Anecdotes often contain embellishments, or over-simplifications, or in some cases, complete fabrications. Instead, we'll pay attention to controlled experiments, conducted by qualified investigators at reputable university and industrial laboratories (e.g., Stanford Research Institute, Princeton, Cornell, Edinburgh). We should keep in mind, however, that the reason we're

studying telepathy is because throughout history, perfectly normal, well-adjusted people have reported approximately the same sort of experience.

What is this experience? "Mind reading" is probably not a good description, because people rarely report the literal thoughts of another person. Instead, they somehow know the intentions, emotions, or bodily feelings of a distant person beyond the reach of the ordinary senses.

To test whether a person can gain information by telepathy, we might try the following experiment: First, find two volunteers, Alice and Bob, and put them in a room. Ask Alice to turn her back while you point out an object in the room for Bob to hold in mind. Now you ask Alice to get an impression of what Bob is thinking, and for her to point out the object. We try this test a dozen times, and we are pleasantly surprised to find that our test subjects are reading each other's mind like gangbusters. We've proven that telepathy exists, and wonder what all the fuss is about.

Actually, this is a lousy experiment. Most people are highly adept at reading body language and unconsciously picking up on subliminal cues. In a proper experiment, you can't have the test subjects anywhere near each other, and certainly not within eye-shot regardless of the distance. Worse, Alice and Bob might have pre-arranged a secret communication code, like the gesture codes baseball coaches use to communicate with the pitchers, to fool you into thinking they were telepathic. These problems, called sensory leakage and subject fraud, were two of many design flaws discovered over the last hundred years as investigators tried to nail down telepathy in the lab.

So let's devise a better test. We'll deposit our test subjects in two different rooms on different floors of a building. We'll hire a magician and an electronic surveillance technician to inspect our lab setup to see whether the subjects might be able to cheat. When we get a clean bill of health from our hired consultants, we run this experiment a few times, and to our delight we still get evidence of telepathy. The champagne bottles are uncorked.

Ah, but prematurely. We've overlooked another common flaw. An easy way to explain it is to ask, I'm thinking of a number between 1 and 10. What is it? Most people will say 3 or 7. This sort of "response bias" is well known to magicians, and it forms the basis of many otherwise mystifying card tricks. And there are more subtle forms of this same flaw. For example, say that you ask two close friends to participate in such a study. You separate Bob and Alice in two rooms, and you are confident that they cannot cheat. Say that Bob is the telepathic "sender," and Bob is fond of sailing. In fact, he just returned from an enjoyable sailing trip, and the test laboratory is near a harbor. Alice will be our "receiver." Alice is well aware of Bob's love of sailing, she knew about his recent sailing trip, and her lab room has a window looking out over the harbor.

The experimenter, Ed, asks Bob to mentally pick something to send to Alice, then to speak out loud so those thoughts can be transcribed later. We can already guess that some of Bob's thoughts will be about sailing. Meanwhile, Alice has been asked to speak aloud what she guesses Bob is thinking about. It's an even better bet that she'll also think about sailing. Now, if an independent judge is asked to examine the transcripts of the two sets of spoken thoughts, what may seem like an amazing coincidence

is not telepathy at all. It's a result of common knowledge shared by Bob and Alice. In fact, combinations of shared knowledge and response biases are undoubtedly involved in many common experiences called telepathy. This is especially because the majority of cases of apparent telepathy occurs between people who know each other well.

But before we recork the champagne, fortunately there's an easy way to overcome this problem. Ed the experimenter simply selects a "target" – typically a photograph or short video clip – for Bob to send to Alice. Ed has to be careful not to introduce his own shared knowledge and response biases into the mix, so he uses a mechanical random number generator or a table of random numbers to make the selection for him. This ensures that both Bob and Alice cannot be swayed by knowledge of each other, or by knowledge of Ed's preferences.

Ok, we'll try again. We isolate Bob, Alice and Ed from each other, select our targets randomly, and run the experiment again. And we still get a successful result. We are tugging on the champagne's cork when someone asks, What does it mean to get a successful result in this experiment? Successful as compared to what?

We explain that success means that Alice correctly guessed that Bob was trying to send her one particular target. It didn't happen every time, but often enough to be interesting. The problem is that we didn't define a clear way of formally measuring "often enough" to be convincing. So we revise our test a bit. As before, Bob sends a random target to Alice. Then, after 20 minutes or so of sending, Alice is presented with four targets – the actual target sent by Bob and three decoys. If Alice didn't get any telepathic information during the experiment, then her chances of selecting the one correct target would be 1 in 4, or a 25% chance "hit rate." Now we have a way to calculate the exact odds that Alice was guessing according to chance.

We run an experimental session, and Alice selects the correct target. A direct hit. The odds against chance are 4 to 1. Not bad. We run another session. Again she gets a hit, for combined odds of 16 to 1. We run another session. Whoops, she missed this time. Ok, so she's not batting a thousand. Even Mickey Mantle got a base hit only 30% of the time. We keep running these sessions, first dozens, then hundreds, then thousands of times. When we tally up the final scores, we find that instead of getting an overall 25% hit rate, as expected by chance, we are seeing ordinary people in the lab regularly get a 35% average hit rate. And some special subjects, like creative artists and musicians, are achieving twice the chance rate, or 50% hits. The overall odds against chance have now risen to a million to 1. This is definitely not chance, and we are poised to pour the champagne.

Still, there's a nagging problem. Scientists are human, and humans make mistakes. Sometimes scientists even cheat or fabricate data. So if a claim is exceedingly surprising, as telepathy would be to many scientists, then it's not a good idea to just trust any one laboratory's results.

This brings us to the topic of replication, the key to understanding what counts as scientific evidence. It is not enough to show that there've been a few properly conducted studies with huge odds against chance. We must show that independently conducted studies have repeatedly demonstrated a claimed

effect. Moreover, we want repeated studies that are not exactly the same, but conceptually the same. Conceptual replication is important to ensure that experimental findings are really sound, and not just some artifact that everyone keeps repeating by doing exactly the same flawed experiment.

It turns out that when the literature is examined, we find that over the last few decades something like 15 laboratories from 10 countries have conducted telepathy experiments. The combined results of more than 2,500 trials provide odds against chance of a million billion (i.e., 10^{15}) to 1. Well, that should settle it. Surely now we can celebrate?

Well, as expected, there are some subtle points that have to be taken into account. The main issues involve "selective reporting" practices in science, and inevitable variations in experimental quality. Both problems can affect the assessment of whether a batch of experiments have been properly replicated, but fortunately these issues have been studied in great detail, and they do not explain away the results.

So why isn't telepathy a well-accepted scientific fact? With successful replications reported by major laboratories from around the world, one would think that the existing evidence ought to do the trick. But of course, it doesn't. Lurking behind every rational argument lay the prejudices of faith. Many scientists are intensely uncomfortable with the idea that telepathy might be real. Rather than see these phenomena as curious puzzles revealing something wonderful about the world we live in, they see them as threats: Threats to privacy, to authority, to strongly held beliefs. When faced with the awful possibility of having to amend one's beliefs about the so-called Laws of Nature, about the only thing that would convince a diehard skeptic is running a successful telepathy experiment.

Where do we find these skeptics with the time and motivation to drop everything and seriously try to replicate something they don't believe in? The answer is we don't. Most skeptics have never conducted a properly controlled telepathy test. Hence, they never need to worry about the possibility of upsetting their faith. More extreme skeptics have tried to make sure that nothing upsets their faith. They haven't been content to just wait around to see what will develop, but have waged active campaigns to prevent this research from taking place at all.

I've briefly sketched the current scientific evidence for telepathy. There are equally strong arguments for several other types of psychic phenomena. While there aren't many scientists actively studying these phenomena today, the data continue to compound and a growing crop of younger scientists are becoming increasingly interested. Some day, historians will agree upon a signal event that catalyzed the transition of psychic phenomena from fringe to mainstream. Based on the strength of the existing data, and without resort to precognition, I am comfortable predicting that this event will occur early in the 21st century.