ARTICLE

Searching for superhuman

Christopher C. French navigates the outer limits as he considers how psychologists should respond to extraordinary claims

How should a fair-minded rational person respond when confronted with claims of apparently superhuman abilities? Is it wise to simply reject any such claims that exceed your personal assessment of what is humanly possible? This article argues that it would be a mistake to do so without a proper consideration of the quality of evidence in their support. Although most such claims will not withstand proper critical scrutiny, a few will do so. Such cases highlight the responsibility that psychologists hold in terms of providing accurate information regarding the limits of human nature.

questions

What is best strategy for minimising both Type 1 and Type 2 errors in the context of claims of superhuman ability?

Is it always necessary to fully evaluate all available evidence relating to a particular claim of this kind before rejecting or accepting it?

resources

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Anomalistic Psychology Research Unit: www.goldsmiths.ac.uk/apru

The Skeptic magazine: www.skeptic.org.uk

The Skeptic's Dictionary: www.skepdic.com

> No testimony is sufficient to establish a miracle unless that testimony be of such a kind that its falsehood would be more miraculous than the fact which it endeavours to establish.
>
> David Hume, *Of Miracles*, 1748

What is the appropriate response to reports of superhuman powers? Back in 1748 the Scottish philosopher David Hume defined a miracle as an event that violates a law of nature, a definition that would include most, if not all, claims of superhuman powers. Hume went on to argue, however, that such testimony is, to all intents and purposes, never available. After all, the evidence that laws of nature are sometimes violated is, to say the least, thin on the ground. Most scientists would probably argue that it is nonexistent. In contrast, the evidence that people sometimes make mistakes or even deliberately deceive others is all around us. Therefore it is always more rational to assume that someone reporting a miracle, including the witnessing or even possession of superhuman powers, is either mistaken or lying.

Although Hume's argument is indeed powerful when applied to miracles defined as violations of laws of nature, it clearly begs a question: In the absence of a comprehensive and totally accurate understanding of such laws, how can we actually be sure that a law of nature has indeed been violated?

As the other articles in this issue clearly demonstrate, many of the feats achieved by those at the high extreme end of the distribution of normal human abilities might well initially be viewed with considerable scepticism, they appear to be so mind-boggling. But these abilities can be demonstrated repeatedly under well-controlled conditions, and so we must accept that any such initial reaction of knee-jerk rejection is unjustified.

Do extraordinary, innate talents exist? Howe et al. (1998) largely rejected the traditional view of innate talent, in particular finding little evidence for advance indications of domain-specific talents. Instead, they drew attention to other factors such as, with few exceptions (e.g. savants), high levels of performance requiring long-term practice and training. It should be noted, however, that not all commentators on this target article accepted their conclusions, and we can point to seemingly contradictory case studies. For example, Luria's (1968) classic *The Mind of a Mnemonist* documents the amazing memory feats of Solomon Shereshevsky, who lived from 1886 to 1958. Despite being of only average intelligence, Shereshevsky could memorise complex mathematical formulae, huge matrices of random numbers, or long poems in foreign languages in a matter of minutes. What is more, he could recall such information accurately several years later. His incredible memory appeared to be based largely upon exceptionally strong synaesthesia and *not* the result of deliberate practice with mnemonic techniques.

Regardless of the status of innate talent, many stunning mental feats, such as those demonstrated by many competitors in the World Memory Championships, do appear to be the result of natural ability plus expertise gained through many years of practice. Take Ron 'Suki' King's achievement of simultaneously playing draughts against 385 opponents in 3 hours and 44 minutes – and beating every single one of them! Whereas his opponents could ponder each move for some time, King could devote only about 35 seconds to each entire game (Myers, 2002). And would you believe that anyone could identify a piece of music merely by looking

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at the groove patterns on a vinyl record (younger readers please note: this was an ancient method for recording sounds)? Although it is hard to believe, Dr Arthur B. Lintgen possessed this very ability, as confirmed by none other than the arch-sceptic, James Randi (Carroll, 2003). The good doctor never pretended that his amazing ability was based upon anything other than his own vast knowledge of orchestral music from Beethoven onwards, combined with an ability to tell from the slight variations in texture such aspects as the duration and volume of a passage. This superpower is unlikely to form the basis of next summer's Hollywood blockbuster but it is still the case that few people would bet on such an ability being possible.

The lesson here is simple. Do not rely solely upon your initial boggle rating as an infallible guide when you hear about some amazing feat. Being properly sceptical demands suspending judgement until you have had the chance to assess the evidence in support of a claim. On rare occasions, the outcome may surprise you.

Of course, the ghost of David Hume would be fully justified in pointing out that none of the examples given so far actually violate a law of nature (although the existence of Hume's ghost may well do so). My point here is that it is not immediately obvious that these feats are actually within the bounds of human capability. The rest of this article deals with alleged superpowers that, upon closer inspection, turn out to be not so super after all.

A sceptical friend of mine once did a fire walk while chanting 'burn in hell, burn in hell'

Non-superpowers

Sometimes we fall into the trap of attributing superpowers to individuals when the truth is that virtually anyone who is reasonably healthy would be able to perform the feats in question without any special training. Most of us have just never tried.

Perhaps the prime example of such an alleged ability is fire walking, the practice of walking on hot coals or cinders (Carroll, 2003; Leikind & McCarthy, 1991). This particular feat forms part of religious rituals in many parts of the world and has been embraced by members of the New Age movement as proof of the power of mind over matter. There is no doubt that the sight of someone calmly strolling across glowing embers with bare feet certainly looks impressive, and the embers are indeed extremely hot (typically between 1000° and 1200° F). Yet if the bed of hot coals has been properly prepared, this is something that anyone can do.

The explanation lies purely in the physics of the situation. Different substances at the same temperature contain different amounts of heat energy and also differ in terms of heat conductivity. Think of a cake baking in an oven. If you open the oven door, you'll feel a rush of warm air. If you quickly touch the cake to see if it is done, you will not get burned. But if your hand happens to make brief contact with the metal baking tin or oven rack, you will end up with a painful blister. The truth is that the air, the cake and the metal are all at the same temperature but they differ greatly in terms of the heat energy they can hold and their ability to conduct heat. Air can hold very little heat energy and is a poor conductor. Metal holds a lot of heat energy and is an excellent conductor. The glowing embers of a well-prepared fire walk do not contain as much heat energy as their red glow might lead us to believe. Provided that you walk across at a reasonable pace and you do not try to walk too far, your feet will not burn. There is no need to maintain the correct mental state by chanting a mantra such as 'cool wet grass, cool wet grass'. In fact, a sceptical friend of mine once did a fire walk while chanting 'burn in hell, burn in hell'!

A word of warning before readers rush out to prepare their own fire walks. Accidents can and do happen, sometimes because the coals have not been properly prepared. Last year, 21 people were treated for burns at a fire-walking event in California organised by motivational speaker, Tony Robbins. Some years ago, Professor Richard Wiseman collaborated with BBC1's *Tomorrow's World* programme to test the belief that successful fire walking is a paranormal phenomenon involving a protective 'force field' around the fire walker's body. Three fire walkers holding this belief put their faith to the test by attempting to walk across the coals for longer than physics dictates should be humanly possible. They jumped off the coals after about 20 feet, suffering burns to the soles of their feet (much to the amusement of the commentators).

Another example of a feat that strikes the casual observer as requiring extraordinary powers is one that is commonly featured in performances by stage hypnotists. The hypnotist will often give a susceptible volunteer the hypnotic suggestion that their body has become totally rigid. The volunteer's rigid body is then suspended horizontally between two chairs and, just for good measure, the hypnotist may then sit or stand upon the still-rigid body. The fact is that when subjects are positioned in the correct way

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they can support a much heavier weight than most of us would naturally assume – no hypnosis required (Barber et al., 1974).

It is often assumed that hypnosis can lead to superhuman levels of performance in a wide range of areas including improvements in memory, eyesight, strength and pain tolerance. In experimental studies, differences of this kind are typically only found when an inappropriate repeated-measures design has been employed (Wagstaff, 1999). The demand characteristics in such studies are pretty obvious: participants have a tendency to 'hold back' in the non-hypnotic condition and then try harder after being put through the hypnotic induction procedure. In between-group studies, volunteers who have been through a hypnotic induction procedure typically do not outperform properly motivated control groups.

Such findings are no doubt relevant when considering reports of amazing feats of strength or endurance in everyday life. There is only a limited amount of anecdotal evidence to support claims of superhuman strength (e.g. mothers lifting cars to rescue their children), but if such reports are accurate they may be another indication of extreme levels of performance in highly motivated individuals. Think of Bert Trautmann, goalkeeper for Manchester City, famously playing the final stages of the 1956 FA Cup Final with a broken neck.

An impressive stunt demonstrating just what ordinary healthy adults can achieve without any special training was featured a few years ago in a wonderful documentary called *Guru Busters*, produced and directed by Robert Eagle. The programme followed the activities of the Indian Rationalists, a campaigning group of sceptics whose aim is to protect poor villagers from exploitation by the so-called 'god-men'. The god-men perform apparently amazing stunts, such as walking through fire, hanging themselves on hooks, and materialising objects out of thin air in order to convince the villagers that they possess superhuman powers. Once convinced, sick villagers pay for worthless and ineffective 'healing' for their ailments. The Rationalists turn up during performances by the god-men, proclaiming that the stunts are based upon nothing more than trickery. They repeat the stunts themselves, explaining the techniques that lie behind them. In one memorable sequence, two volunteers pull a heavy jeep along by means of two ropes tied to the vehicle and to hooks threaded through the skin on their backs.

So far we have considered amazing feats that only a few people could perform, followed by feats that in fact pretty much anyone could manage. Yet in both cases the 'superpowers' do involve what they appear to involve: you really could believe your own eyes. I will close will some examples of alleged superpowers that are not at all what they appear to be.

Superhuman strength? Bert Trautmann continued playing after suffering a broken neck in the 1956 FA Cup Final

You can't always believe your own eyes

There is no shortage of people around the world who claim to have miraculous powers and are eager to convince others of their claims. In general, such claimants fall into two broad categories: those who are deluding themselves (as well as others) and those who are simply deliberate con-artists. In the world of the psychic con-artists, these two categories are often referred to as 'shut eyes' and 'open eyes', respectively. In principle, there is a potential third category: those who genuinely possess superhuman abilities. However, given the general lack of individuals who appear to be able to demonstrate their superhuman powers reliably and repeatedly under well-controlled conditions, it seems quite likely that this may well be an empty set.

It is worth mentioning one other category in this context, that of magicians (also known as conjurors, illusionists, mentalists, etc.). Magicians can be described as engaging in 'honest deception'. As members of the audience, we know that what we are seeing is a trick that does not involve any true violations of the laws of nature even though we probably do not have the faintest idea how the effect is being achieved. We simply enjoy the surprising effects and the skill required to produce them.

Whereas experimental psychologists get excited about, say, a perceptual bias that results in the misperception of the length of a line by a few percentage points, magicians can apparently make elephants and even skyscrapers disappear! It is surprising therefore that it is only relatively recently (with a few notable exceptions such as Jastrow and Binet; see Hyman, 1989) that the psychology of magic has received the attention it deserves (see Kuhn et al., 2008; Lamont & Wiseman, 1999; Macnick & Martinez-Conde, 2010). It would certainly appear that psychologists might learn something useful about attention, perception and memory by considering the techniques used by magicians.

In particular, the theme of cognitive bias is key in magic and runs through anomalistic psychology in general. Although our cognitive systems perform amazing feats every second of our waking lives, we are also prone to systematic cognitive biases that can affect perception, memory and judgement. There is a large and growing body of research that such biases often lead individuals to believe that they have had a paranormal experience when in fact they have not (French, 1992; French & Wilson, 2007; French & Stone, in press). Perhaps the most pervasive cognitive bias is that of confirmation bias, the all-too-human tendency to favour

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evidence that supports beliefs that we already hold (Nickerson, 1998).

People are very poor intuitive statisticians. In many everyday situations, we make decisions based upon probabilities but we are simply not very good at doing so. Our intuitions often lead us astray. One classic example of this is the so-called Birthday Problem: How many randomly selected people would you need to have gathered together to have a 50/50 chance that at least one pair shared the same birthday (ignoring year of birth)? The actual answer is only 23, a number that strikes most people as being far too low. In many situations, therefore, we might feel tempted to reject 'mere coincidence' as an explanation for an ostensibly paranormal event and prefer instead to believe that we have tapped into some mysterious psychic superpower.

The same principle lies behind 'precognitive dreams': with over seven billion people on the planet, even if we only remember on average one dream each per night, that is a huge number of opportunities for the events in that dream to subsequently 'come true'. It would be more spooky if that never happened! Or consider so-called 'telephone telepathy', where we think of a friend we haven't heard from for ages, and at that precise moment they call us. Some claim this can be demonstrated under properly controlled conditions (e.g. Sheldrake & Smart, 2003). Yet my students and I have consistently failed to replicate such effects.

The same applies to an entire gamut of claimed superpowers – psychic healing, dowsing, psychokinetic metal-bending, divining the contents of sealed envelopes, levitation, bilocation (i.e. being in two places at once), inedia (i.e. surviving without eating), stigmata, serpent-handling, prophecy, and thoughtography (i.e. the alleged ability to psychically produce images on film). If you would like to learn more about these and many other fascinating claims of superpowers, books by James Randi (e.g. 1982a, 1982b, 1987, 1990) and Joe Nickell (e.g. 1993, 2013) are a good place to start. Suffice it to say that neither of these veteran investigators has yet been convinced that they have witnessed a miracle.

With great power...

It is not unreasonable to adopt a sceptical stance when you hear claims of amazing abilities, provided that your stance is one of scepticism in the true sense of the word: adopting an attitude of open-minded doubt towards all unproven claims until you have had the opportunity to properly assess the evidence. It is not about dismissing claims simply because they exceed your personal 'boggle threshold'. Very occasionally, amazing claims do turn out to be true – but more often than not, they don't.

We, as psychologists, to a certain extent define what is considered to be 'human nature' and therefore what is 'beyond human nature'. This means that we carry great responsibility for informing the public about what is and is not 'miraculous' when examining claims of superhuman powers. All too often, even with respect to less controversial claims, we fail to adequately test alternative explanations for our findings, preferring instead to explain results in terms of our favoured hypothesis. It may surprise many psychologists to learn that parapsychologists are often much more rigorous in this respect, as they know that their sometimes controversial findings will be subjected to rigorous critical scrutiny. To apply Hume's advice properly, we must have a clear understanding of the bounds of human nature. How else can we know when they have been violated?

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The 'mind readers'

Psychic readers, whether they channel the spirits of the dead or tune in to vaguely defined 'psychic vibes', can apparently tell strangers all kinds of personal information about themselves. Yet despite typically claiming to be at least 90 per cent accurate in their readings, the performance of psychics and mediums under properly controlled conditions falls woefully short of that (for a couple of recent examples, see French, 2009, 2012). Why the difference?

The answer may be that these apparently impressive performances under less well-controlled conditions involve a mixture of cold reading and hot reading. Cold reading is a technique that you could use to convince complete strangers that you know all about them, a very useful skill to have if you want to pretend that you are psychic (Hyman, 1977; Roe & Roxburgh, 2013; Rowland, 2002). The most basic type of cold reading depends upon the Barnum effect, named after the entertainer whose shows were said to have 'something for everyone'. A typical Barnum profile consists of statements which, although they sound very perceptive, actually apply to just about everyone, e.g. 'You have a lot of unused potential that you have not used to your advantage' and 'You have found it unwise to reveal too much of yourself to others'. Typically, when people are presented with profiles consisting entirely of Barnum statements, they are impressed by their accuracy.

Of course, if the cold reader is directly interacting with the sitter, many more sources of information can be exploited. A skilled cold reader can tell a lot about a person by simply observing them and will vary the reading according to whether their sitter is old or young, male or female, upper class or working class, and so on. But it is a mistake to think that you can deduce lots of detailed and specific information about a person by picking up on subtle non-verbal communication cues – even if Sherlock Holmes and Derren Brown appear to be able to do so! The success of cold reading relies much more upon the clever use of language than the rather unreliable art of decoding such cues. For example, psychics ask a very large number of direct questions of their clients but do so in a subtle way that implies that they are just asking for confirmation of something they already know.

It is important to point out that many, perhaps most, self-professed psychics are probably not deliberate con-artists and instead genuinely believe that they do possess a special psychic gift. Those who are sincere appear to be picking up on the same sources of information as the deliberate fraudster but in a rather less systematic way (and hence their readings are typically less impressive). Many psychic fraudsters are not content to rely upon the somewhat hit-and-miss approach of cold reading and instead resort to hot reading – that is, doing their background research on their sitters before the reading even begins. Traditionally, such techniques have included surreptitiously going through the contents of a sitter's handbag, using stooges to feedback information from members of the audience, or simply using Google, Facebook and Twitter. The challenge with hot reading is often to ensure the reader does not appear *too* accurate! Their credibility is enhanced by occasionally getting things wrong. After all, if the performance was just based upon trickery, they would get it 100 per cent right, wouldn't they?