

# **Paranormal Perception?**

**A Critical Evaluation**

**Christopher C. French**

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## THE AUTHOR

Chris French is a Professor of Psychology and Head of the Anomalistic Psychology Research Unit in the Psychology Department at Goldsmiths College, University of London (<http://www.goldsmiths.ac.uk/apru>). Anomalistic psychology may be defined as the study of extraordinary phenomena of behaviour and experience, including (but not restricted to) those which are often labelled “paranormal”. It is directed towards understanding bizarre experiences that many people have without assuming *a priori* that there is anything paranormal involved.

Professor French is a Chartered Psychologist and a Fellow of the British Psychological Society. He has published over 80 articles and chapters covering a wide range of topics within psychology, including publications in the *Journal of Abnormal Psychology*, *The Lancet*, *Emotion*, the *Quarterly Journal of Experimental Psychology*, and the *British Journal of Psychology*. In addition to academic activities, such as conference presentations and invited talks in other departments, he frequently appears on radio and television, casting a sceptical eye over paranormal claims.

## Note

This monograph derives from a presentation at *Seeing how to see: A close look at perception*, a seminar organised by the Institute for Cultural Research and held at the Royal Society of Medicine, London, in February 2001.

# Paranormal Perception?

## A Critical Evaluation

### Abstract

The concept of extrasensory perception (ESP) implies that not all perception is dependent upon known physical sensory systems. General ESP is typically sub-divided into three types: (i) telepathy (i.e., alleged direct transference of thoughts), (ii) clairvoyance (i.e., alleged awareness of remote objects or events other than by use of the known sensory channels), and (iii) precognition (i.e., alleged knowledge of events before they occur, other than as a result of inference).

This essay will begin by briefly considering the philosophical problems raised by the notion of paranormal perception. Whether or not ESP exists is still an unresolved issue after more than a century of scientific research. What is certain, however, is that the human information-processing system is such that we should expect ostensibly paranormal experiences to be frequently reported even if paranormal forces do not exist. Several types of altered states of consciousness have been linked with the experience of ostensibly paranormal events. These include the near-death experience, the out-of-body experience, and sensations associated with sleep paralysis, such as a sense of presence and apparitional experiences. The role of 'top-down' processing (that is, the tendency to see what one expects to see) is often crucial in determining exactly what is experienced in such situations. Top-down processing is also responsible for the human tendency to perceive meaningful patterns in essentially random stimuli. This provides the most likely explanation for a host of ostensibly paranormal and other pseudoscientific phenomena. These include the so-called 'electronic voice phenomenon' (in which spirits are said to communicate via tape recorders), subliminal persuasion techniques (such as 'backward masking' which supposedly involves the embedding of reversed-speech Satanic messages in rock music), and pareidolia (an illusion in which a vague or obscure stimulus is perceived as a clear and distinct image, e.g., the face of Mother Theresa in a cinnamon bun). However, such biases are not restricted to the world of the (apparently) paranormal, and their effects are also to be found in the history of science. Examples of

‘pathological science,’ in which eminent scientists have been led astray by such biases, will be provided (e.g., the ‘canals’ on Mars and the discovery of N-rays).

## **Introduction**

Steady progress has been made in understanding the mechanisms of perception from the early studies of Sir Isaac Newton to the present day. Perception is now generally assumed to involve both ‘bottom-up’ and ‘top-down’ influences. Physical energy in various forms impinges upon sensory detectors in the eyes, ears, and other sensory channels and is converted into electrical impulses within the nervous system. The information is relayed to specialised areas of the brain and then a miracle occurs – we consciously experience the sights and sounds of the outside world. Although a full understanding of the nature of conscious experience still eludes us, it is widely believed that the explanation of this miracle almost certainly requires us to move beyond a consideration of the purely bottom-up processing of electrical impulses originating at the sensory transducers. Thanks to the pioneering work of Richard Gregory and others (e.g., Gregory, 1990), the necessary role of top-down processing is generally accepted. Top-down influences on perception reflect our pre-existing knowledge, beliefs and expectations about the world. An appreciation of the influence of top-down processing helps not only to explain the means by which the mind perceives the outside world in a generally veridical manner, but also those rare occasions when the mind is deceived by illusion and hallucination.

Now although dreams, hallucinations and other altered states may give rise to perceptual experiences in the absence of bottom-up input, the generally accepted view amongst scientists is that veridical perception of the outside world must involve the use of the known physical sensory systems. However, many non-scientists simply do not believe this. Opinion polls repeatedly show high levels of belief in the general population in a form of perception that relies upon no known sensory channels, that is, extrasensory perception (ESP). General ESP is typically sub-divided into three types: (i) telepathy (i.e., alleged direct transference of thoughts), (ii) clairvoyance (i.e., alleged awareness of remote objects or events other than by use of the known sensory channels), and (iii) precognition (i.e., alleged knowledge of events before they occur,

other than as a result of inference). In a poll of a representative sample of 1000 people across the UK reported by the *Daily Mail* in 1998, 47% said they believed in telepathy and 14% said they had had direct experience of it. With respect to precognition, 40% believed in precognitive dreams, with 19% reporting direct experience of them. Unfortunately, data were not presented relating to clairvoyance, but in a similar poll of an American sample in 1991, 26% expressed belief in clairvoyance and a further 23% were 'not sure' (Gallup and Newport, 1991).

### **Philosophical problems**

The concepts of ESP raise serious philosophical problems mainly because, to date, no one has managed to solve the classic 'mind-body' problem. The dualist notion that mind and matter are completely different, although intuitively appealing, immediately presents the problem of how an immaterial mind could affect and be affected by a physical body. Although, as stated earlier, the nature of consciousness is far from being fully understood, a great deal of evidence is consistent with the idea that mental states are entirely dependent upon brain states. Some would even go so far as to say that mental states are identical to brain states (although this position raises its own philosophical problems). Whether mental states are simply dependent upon brain states or are literally identical with them, it is difficult to conceive of a mechanism whereby direct mind-to-mind contact could occur or which would allow the mind to have access to information at remote locations. Precognition presents even thornier philosophical problems. How could a future event (say, a disaster) which has not yet happened cause an event (say, a premonition) in the present? It is always possible, of course, that advances in our understanding of consciousness (and perhaps quantum mechanics) will render paranormal concepts less problematic but at present there are no obviously correct solutions available (for further discussion of the philosophical issues raised, see, e.g., Edge, 1986; Flew, 1987).

### **The scientific evidence**

Perhaps we need to take a step back – just how good is the scientific evidence that ESP exists in the first place? The answer depends upon whom you ask. After well over a century of systematic research into this question, no one could claim that the same

progress has been made with respect to understanding extrasensory perception as has been made with respect to normal perception. In fairness, the number of researchers who have devoted themselves to the latter vastly outnumbers those dedicated to the former. However, the truth is that the very existence of ESP is still hotly debated. Two recent book-length reviews reach radically different conclusions. Parapsychologist Dean Radin, for example, writes that:

... the effects observed in a thousand psi experiments are not due to chance, selective reporting, variations in experimental quality, or design flaws. They've been independently replicated by competent, conventionally trained scientists at well-known academic, industrial, and government-supported laboratories worldwide for more than a century ... (*Radin, 1997, p. 275*)

On the other hand, psychologist David Marks, a long-standing critic of parapsychology, after reviewing seven areas of parapsychological research, concludes, 'My own beliefs are as they are – toward the extreme of disbelief – because the evidence as I see it warrants nothing more.' (Marks, 2000, p. 308).

Time limitations preclude any attempt to fully evaluate the scientific evidence for and against ESP. My own position is somewhere between the two extremes represented by Radin and Marks. I find myself in fairly full agreement with the final paragraph of a third recent book-length review, this time by parapsychologist Harvey Irwin:

In the final analysis what fairly can be said of parapsychology? As far as spontaneous cases are concerned it seems likely that there are numerous instances of self-deception, delusion, and even fraud. Some of the empirical literature likewise might be attributable to shoddy experimental procedures and to fraudulent manipulation of data. Be that as it may, there is sound phenomenological evidence of parapsychological experiences and experimental evidence of anomalous events too, and to this extent behavioral scientists ethically are obliged to encourage the investigation of these phenomena rather than dismissing them out of hand. If all of the phenomena do prove to be explicable within conventional principles of mainstream psychology surely that is something worth knowing ...; and if just one of the phenomena should be found to demand a revision or an expansion of contemporary psychological principles, how enriched behavioral science would be. (*Irwin, 1999, p. 319*)

My own research efforts, and those of an increasing number of other psychologists, are in the area of anomalistic psychology. Anomalistic psychology aims to understand anomalous experiences that many people have without assuming *a priori* that there is anything paranormal involved. Even if, eventually, conclusive proof is forthcoming that paranormal forces really do exist, research in this area would still be valuable. After all, serious researchers on both sides of the ESP debate would agree that most instances of what people take to be evidence for the paranormal are best explained in non-paranormal terms. The remainder of this essay will attempt to provide non-paranormal explanations for a range of examples of ostensibly paranormal perception (see also French, 1992a).

### **The phenomenology of ESP**

The first question that might reasonably be asked is, 'What does ESP feel like?' The answer is that apparent ESP can be experienced as being anywhere on the continuum from 'just guessing' to the most profound experience in an individual's life. Usually, however, it feels like 'just guessing.' Parapsychologists have carried out hundreds of thousands of trials in which one individual has attempted to telepathically transmit information to another. Often such experiments involved the use of a standard pack of 25 cards known as Zener cards, consisting of five each of five different symbols. The receiver in such experiments would be expected on average to get five right just by chance, but a significantly higher hit rate might be taken as evidence for ESP. To the receiver, however, it is not obvious when ESP is operating on a trial-by-trial basis. Each response feels like a pure guess – it is only when the results are tallied at the end that he or she may feel that they had demonstrated any kind of psychic prowess. And even then, you cannot tell which trials involved 'real ESP' and which were just 'lucky guesses.'

One needs to be careful, however, even using this apparently straightforward technique. If you stand before a large audience of more than, say, 30 people you can amaze them by appearing to telepathically transmit messages into their heads. You simply say to them that you will transmit a number between one and ten directly into their minds ('But not three, because that's too obvious.'). Ask them to write down the first number that comes to mind as you

appear to concentrate for a few seconds. Point out that you would expect around one tenth of the audience to get the number right purely on the basis of guessing – and also that you would not expect the entire audience to be correct, as telepathy is one of those abilities that cannot be turned on and off like a tap. But wouldn't it be amazing if a lot more people got the right answer than could be explained on the basis of mere guesswork? Having prepared your audience, tentatively ask them to raise their hands if they thought of the number '7.' I guarantee that around a third of your audience will raise their hands.

Amazing evidence of ESP? Unfortunately not. It does not matter what number you were thinking of (or even if you were thinking of a number at all!), around one third of your audience will think of the number '7.' This effect relies upon a phenomenon known technically as 'population stereotypes' (French, 1992b; Marks, 2000). We tend to assume that in situations such as that described above we are making a free choice and that therefore responses will be distributed more or less evenly across the response options available. In fact, however, responses will tend to cluster around certain options (in this case, '7'). There are several other ways to demonstrate population stereotypes (for example, try to 'transmit' a simple line drawing – around one tenth of your audience will draw a little house). No one really knows why responses cluster in this way, but there is no doubt that this is a situation in which paranormal forces may appear to be operative when in fact they are not.

### **Ganzfeld studies**

However, ostensible ESP does not always feel like pure guesswork. Many parapsychologists would argue that ESP reflects a very weak signal within the information-processing system and that it is therefore important to dampen down the background noise from external stimuli to maximise the chances that the signal will be received. The so-called ganzfeld technique involves putting participants into a state of mild perceptual deprivation in which they view a uniform field of, say, red light, listen to 'white noise' over head-phones, and lie or sit in a comfortable position. Under such conditions, most people find that they begin to daydream and experience imagery more vividly than usual. At pre-arranged times in such studies, a remotely located sender will attempt to

telepathically transmit information from a static image (or a video clip) randomly selected from, say, a set of four. At these times, the receiver will describe the thoughts, feelings and images that they experience and these descriptions are carefully recorded. At the end of the trial, the receiver, and possibly independent judges, will rate each stimulus in terms of how well it appears to match the description produced. By chance, the actual target should be chosen as the best match on one occasion in four but a hit rate of one in three is often claimed.

A very influential paper by Daryl Bem and Charles Honorton in 1994 claimed that ESP could be reliably demonstrated under tightly controlled conditions across 11 different experiments using this technique. In 1999, however, Julie Milton and Richard Wiseman presented a meta-analysis of 30 new ganzfeld studies from seven independent laboratories which had employed the same stringent methodological guidelines. In this series, participants were found not to score above the level of chance expectation. The debate will no doubt continue.

### **Remote viewing**

A related parapsychological technique is known as 'remote viewing'. As with the ganzfeld technique, the receiver sits in the laboratory with an experimenter. Another experimenter, possibly accompanied by one or two other senders, visits randomly selected sites such as bridges, parks, airports, etc. This team tries to telepathically transmit information about the site to the receiver at predetermined times. In a variation of this basic approach, no senders are involved and the receiver tries to pick up the information using clairvoyance on the basis of, say, map coordinates. The receiver describes any impressions that he or she picks up. These impressions are transcribed and given to independent judges who visit each site and rate the degree to which the site matches the transcribed impressions. The receiver may also subsequently visit the site to assess the degree of match. Initial impressive results appear to have been due to errors in methodology such as leaving clues in the transcripts concerning the sequence of trials (Marks, 2000) but many parapsychologists (e.g., Radin, 1997) argue that positive results have been found in properly controlled studies.

Marks (2000) describes his own attempts, in collaboration with

Richard Kammann, to replicate effects reported by parapsychologists using the remote viewing technique. Although their efforts were completely unsuccessful, they noted that there often appeared to be a striking illusion of details corresponding between target sites and transcripts – even when the transcript and site were later discovered to not correspond to each other. This led on several occasions to great excitement as judges or receivers convinced themselves that ESP must have been operating for a particular correspondence to have occurred, when in fact it was based purely on coincidence. Marks refers to this tendency as ‘subjective validation’: ‘This occurs when two unrelated events are perceived to be related because a belief, expectancy, or hypothesis demands or requires a relationship’ (Marks, 2000, p. 41). In certain forms of psychosis, a tendency to see profoundly meaningful connections between unrelated events and stimuli is often found. Conrad (1958) coined the term *apophenia* to describe this way of perceiving the world (cited by Brugger, in press, where further discussion and examples can be found). The main difference between subjective validation and apophenia would appear to be that the former reflects a ‘seek and ye shall find’ tendency, a confirmatory bias to which we are all prone to a greater or lesser extent. With apophenia, on the other hand, the perceived connections ‘jump out’ at the perceiver without any attempt to seek them out.

We (French, Herrmann, Hales, & Northam, 1996) have shown that the tendency for subjective validation in a remote viewing context is stronger in believers in the paranormal than in disbelievers. Believers and disbelievers were asked to evaluate evidence ostensibly obtained from remote viewing experiments. Participants believed that they were judging the degree of match between sets of photographs of sites visited by a telepathic sender and transcripts of descriptions of those sites produced by a telepathic receiver. In fact, all transcripts were produced by the experimenters and thus the degree of match was under experimental control. Believers rated the degree of match and the probability that ESP was operating higher than disbelievers, even when any match between photographs and transcripts was entirely coincidental. This effect applied only when believers were under the impression that the transcript was paired with the actual target, not when they were told that the transcript was a control transcript. In other words, the

believers literally saw more correspondences between pictures and transcripts only when they expected to find them.

### **Precognitive dreams**

Another type of ostensibly paranormal perception occurs in precognitive dreams. We are all familiar with the nature of dreams. Is it possible that on those occasions when the events depicted in a dream bear a striking match to real life events that follow, we have actually paranormally perceived the future? Perhaps. But American mathematician John Allen Paulos (1988) illustrates the fact that we would expect numerous reports of apparently precognitive dreams every year purely on the basis of coincidence. For the sake of argument, let us suppose that we define a dream as ‘apparently precognitive’ if the chances of the dream matching some future event in one's life are as low as one chance in 10,000. Surely, all of us would be impressed if we were the person who had such a dream. Again, we will simplify matters by assuming that each person has one dream per night (in fact, we all have a lot more). The probability that any one dream will not be apparently precognitive is high (.9999). The probability that over a whole year, one will not have a dream which appears to predict the future is given by

$$(.9999)^{365} = .9642 \text{ (approximately)}$$

In other words, even over a whole year the chances are that you will not have such a dream. But around 3.6% of the population will have at least one such dream! This amounts to 9 million people in the USA alone. Furthermore, any single person, over a 19-year period, will have a slightly better than even chance of one such dream. Even if you think that 1 in 10,000 is too high, and opted say for odds of 1 in 100,000 before classing a dream as ‘precognitive’, you would still have 900,000 reports per year in the USA without any need to invoke psychic powers whatsoever. In fact, of course, it is likely that other non-paranormal factors are often involved in people having ostensibly precognitive dreams, e.g., dreaming of an elderly relative dying when one already knows that they are ill.

### **Out-of-body and near-death experiences**

On occasions, ostensibly paranormal perception feels nothing like guesswork, daydreaming or even actual dreaming. It can feel like

the most profound and ‘real’ experience that a person has ever had. In particular, out-of-body experiences (OBEs), either in isolation or as part of a near-death experience (NDE), can often have this ‘realer than real’ quality which, to the percipient, is convincing evidence that their experience was truly paranormal. The evidence that OBEs can result in the acquisition of accurate information from remote locations is generally unconvincing, however, even in those who claim to be able to have an OBE at will. Susan Blackmore has argued that the OBE is best conceived of as an altered state of consciousness in which, often due to reduced or disrupted sensory input, the cognitive system adopts a model of reality which is actually based upon memory and imagination (e.g., Blackmore, 1996a). In other words, when bottom-up processing is disrupted, top-down processes take over. Other components of the NDE can also be conceived of as reflecting disruption of normal processing under very abnormal conditions (Blackmore, 1996b).

Other examples of what appear to the experient to be very vivid examples of paranormal perception will on at least some occasions simply be hallucinations. Often people will deny that what they perceived was ‘just an hallucination’ but all definitions of the word emphasise that hallucinations are indistinguishable from true perceptions. A great deal of research is consistent with the idea that individuals who suffer from hallucinations are less proficient at source monitoring than those who do not (see, e.g., Bentall, 2000). In other words, they are less able to distinguish between perceptual experiences based upon incoming sensory information and perception-like experiences generated internally as a consequence of imagery-based top-down processes.

### **Sleep paralysis**

One particular type of hallucinatory experience that is often interpreted in paranormal terms is that which is associated with sleep paralysis. Sleep paralysis is a distressing experience in which the sleeper, either while entering or leaving sleep, becomes aware of the fact that they cannot move. The muscles of the body are paralysed during so-called REM sleep (i.e., rapid eye movement sleep) when the eyes of the sleeper can be seen moving rapidly beneath the eyelids. Periods of REM tend to occur during episodes of dreaming and it is thought that the body is paralysed in order to prevent the sleeper from acting out the movements of the dream.

During sleep paralysis, however, one becomes consciously aware of the fact that one is paralysed. As if this is not frightening enough, sleep paralysis is often associated with a strong sense of an evil presence and various hallucinations. These include apparitional experiences, a feeling of pressure on the chest, and other auditory and tactile hallucinations. Needless to say, sufferers find the whole experience absolutely terrifying.

The role of top-down processing is very well illustrated by the fact that the type of imagery experienced appears to be influenced by the sufferer's particular culture (see, e.g., Hufford, 1982). In Newfoundland, for example, tales are told of the Old Hag who comes and presses on sleepers' chests until they suffocate. In centuries past, tales of incubus and succubus used to be told. These were sex-crazed demons that would have their wicked ways with sleepers against the latter's will. There is no doubt at all that many alleged nocturnal attacks by spirits can be explained in terms of sleep paralysis, including reports of *kanashibari* from Japan and *kokma* from St Lucia. The latter are believed by sufferers to be caused by the spirits of dead, unbaptised babies who jump onto the chest and strangle the sufferer. Nowadays, of course, sufferers in the USA and UK are likely to interpret the same core experience in terms of alien abduction.

### **Pareidolia**

Many other ostensibly paranormal perceptions can be explained in terms of top-down processing. Robert Todd Carroll, in his excellent *Skeptic's Dictionary* (visit <http://www.skepdic.com>), defines pareidolia as 'a type of illusion or misperception involving a vague or obscure stimulus being perceived as something clear and distinct'. He also provides links to various examples. It is very noticeable that faces are the most often perceived example and, not surprisingly, the face of Jesus Christ appears to top the league table. According to a recent aerial photograph, Jesus was discovered to have moved in at Selhurst Park, the home of Crystal Palace FC, where the patterns of light and dark shading on the turf could readily be perceived as representing our Western notion of Christ's image. In fact, of course, no one knows what Christ really looked like.

Perhaps one should expect images of Christ and the Virgin Mary to be perceived often in holy places such as churches and cathedrals

– and they are, in shadows, in the grain of wood, in patches of damp. But they are also often perceived in stranger places, such as clouds, sliced tomatoes and aubergines, or even the discolourations of a burnt tortilla. God clearly moves in mysterious, some would say bizarre, ways. An image of Mother Theresa was recently even found in a cinnamon bun!

The preponderance of faces probably has more than a little to do with the fact that the brain is hard-wired to recognise faces, not surprisingly, given the immense importance of such stimuli for human survival. But many other types of stimuli are perceived as well. One of my favourite examples is provided by Colman (1987). He describes how a psychiatrist was very impressed by a mysterious ‘swirl’ that had appeared inexplicably on an eight-millimetre film which had been shot by a young man claiming to be a psychic. The psychiatrist discovered many things hidden in this enigmatic swirl: ‘moving faces, a portrait of Jesus, a UFO, a woman’s torso, a nipple, a breast, a thigh, and a baby being born’ (p. 196). What he did not know was that the alleged psychic was in fact a conjuror taking part in a project to see how easy or difficult it would be to fool psychic investigators using simple conjuring techniques. The psychiatrist must have been a bit embarrassed when it was revealed that the swirl had actually been produced by the non-psychic means of the ‘psychic’ spitting on the camera lens!

There is evidence to suggest that those who believe in the paranormal are more likely to see meaning in random stimuli than non-believers. Brugger, Regard, Landis, Cook, Krebs and Niederberger (1993) presented random dot patterns very briefly to participants, telling them that the experiment was an investigation of subliminal perception and that about half of the stimuli would contain ‘some meaningful information’. Participants were not told in what way the material would be meaningful and were not required to report what meaning, if any, they saw. Believers reported seeing ‘something meaningful’ on significantly more trials than non-believers.

Top-down processing exerts the strongest influence on perception when the bottom-up input is impoverished in some way. Thus, you are more likely to see a ghost in a haunted house under dim lighting than in broad daylight. Again, we might expect differences to be found between believers and non-believers with respect to the tendency to report seeing things under poor viewing

conditions. Blackmore and Moore (1994) have presented evidence supporting this in a study involving the brief presentation of series of pictures ranging from indistinct blobs to clear outlines of identifiable objects. After each brief presentation, subjects were asked if they had seen anything and, if so, what. As predicted, believers reported seeing forms earlier in the series than disbelievers, but were in fact no more accurate in their attempts at identification.

### **Electronic voice phenomenon**

Needless to say, such effects are not only found with respect to visual perception. A good example in the auditory domain is the so-called ‘electronic voice phenomenon’ (EVP). It is claimed (e.g., Raudive, 1971) that by leaving a tape-recorder in record mode or by recording from a radio set between stations, messages from the spirit realm can be recorded. While it is possible that some genuine voices are recorded as a result of extraneous sounds or weak transient radio broadcasts, these claims have been most severely criticised because of the entirely subjective nature of the interpretations of the vague sounds recorded (see, e.g., Smith, 1972; Ellis, 1975).

You can sample the delights of EVP for yourself at various websites but one of my favourites is at <http://www.ghostwave.com/>. If you visit the site, you might like to try a little experiment. Play a random selection of the sound files to a friend. At first, let your friend read on the screen what it is that they are supposed to hear. Thanks to the influence of top-down processing, you will find that they usually can hear the alleged message quite clearly. They may well describe the experience (as my research assistant did) as ‘Really spooky!’ Then try playing them some sound files without telling them in advance what they are supposed to hear. Ask them what they hear the ‘voices’ saying. This time, you will find that the voices rarely sound clear at all and often do not even sound like voices!

On the basis of evidence like this, EVP is an idea that really should have died out back in the 1970s. But it is still going strong, no doubt given a boost by the existence of the internet itself. Sarah Estep, President of the American Association – Electronic Voice Phenomena, claims to have recorded 20,000 samples of voices of spirits and aliens by this method. She claims that her group has

members in 40 states and her web-site has links to numerous other EVP groups both nationally and internationally.

### **Backwards satanic messages**

A similar explanation would apply to claims that rock music often contains satanic messages when played backwards. Again, the internet allows you to hear the evidence for yourself. Visit the *Skeptic's Dictionary* at <http://www.skeptdic.com>. From there, select 'backward (satanic) messages'. This page will provide you with links to various sites which allow you to play selected samples of music both forwards and backwards. I would urge you to try initially listening to the reverse samples before you know what it is that you are supposed to hear. Although you may pick up the odd phrase that sounds a bit like 'Satan,' most of the time you will hear nothing but gibberish. However, as soon as you know what it is you are supposed to hear, you will probably be able to hear it quite clearly. An absolutely stunning example of this is Led Zeppelin's track, *Stairway to Heaven*. I will not spoil the effect for you by telling you what you are supposed to hear in the reverse music. Suffice it to say that this provides one of the most impressive demonstrations of the influence of top-down processing that I have ever come across.

A number of questions arise. Do rock groups really deliberately embed hidden messages in their music? In fact, a number of rock groups, such as ELO and Pink Floyd, *have* deliberately and mischievously put reversed messages into their albums. They are fairly easy to spot – they are the bits that quite clearly sound like reverse-speech gibberish when the track is played forwards! In the case of tracks that have reasonably intelligible lyrics forwards (I say 'reasonably' because we are often talking about heavy metal music here), the hidden messages are almost certainly the result of top-down processing on the part of the listener. Bear in mind that the few famous examples you will find repeatedly cited have been selected from thousands of hours spent listening to backwards rock music. A strong case can be made that these people really ought to get out more.

Why would rock bands want to record satanic messages in this way in the first place? According to American fundamentalists it is because they are active satanists and this technique of persuasion is likely to be very powerful in turning young listeners from the path

of true righteousness. It is claimed that the subconscious mind readily perceives the backwards messages which are able to bypass the conscious censor and thus exert their evil influence even more strongly. There is no evidence whatsoever to support such claims (McIver, 1988). However, this did not prevent the parents of two teenage American boys from taking the band Judas Priest to court alleging that the boys had shot themselves, in one case fatally, as a result of a hidden message telling the boys to 'Do it' in a Judas Priest track. Fortunately, the judge in the case found in favour of the defendants.

### **David Oates' reverse speech theory**

Another example of reverse-speech pseudoscience is the recent claim by David Oates (1991) that human speech actually contains two messages. What is consciously heard by the listener is the message produced by the speaker's left hemisphere. In contrast, the speaker's right hemisphere is said to simultaneously produce a message that can only be heard by the conscious mind if the forward speech is reversed. This message is, however, readily understood by the listener's unconscious mind even in its original reversed form. Furthermore, the reversed message is said to unconsciously reveal the speaker's true feelings and intentions. For example, Oates claims that when Clinton was giving evidence during the Lewinsky scandal, one of his reversed speech utterances was 'Kiss the lying ass'. Oates makes grandiose claims with regard to possible applications of his amazing discovery. His technique, he claims, would be invaluable to police investigators, therapists, negotiators, interviewers, and so on. What is more, he offers to train you in this amazing technique at seminars costing a mere \$850 to \$1,500. Needless to say, he presents no convincing evidence that his technique actually has any validity and recent critiques by Byrne and Normand (2000) and Langston and Anderson (2000) show pretty conclusively that it does not.

### **Pathological science**

You should not, however, get the impression that such biases only affect credulous believers in the paranormal. For they are to be found within the very heart of science. Irving Langmuir coined the term 'pathological science' in an influential lecture about fifty years ago. Langmuir discussed various scientific claims that had caused

great excitement when they were first announced only to subsequently be rejected and forgotten. Wolpert (1992) summarises Langmuir's criteria as follows:

The maximum effect observed is very small, near the limit of detectability; the magnitude of the effect seems independent of the cause; claims of great accuracy; usually a fantastic theory; and criticisms are met by ad hoc excuses. (*Wolpert, 1992, p. 137*)

Such cases are worth considering further for the light that they cast upon the human face of science. Scientists are, after all, only human, despite the impersonal nature of scientific writings. Scientists do become very wedded to particular theories, especially if they had a substantial input into the development of the theory in question. Whilst science as a collective enterprise might be good at rejecting theories in the light of the evidence, this does not apply universally at the level of individual scientists.

One early example concerns the canals of Mars, first reported by Giovanni Schiaparelli in 1877. Other astronomers, such as Nicolas Flammarion and, most notably, Percival Lowell, also reported seeing the canals. Lowell, in fact, was so convinced by what he saw that he argued that the canals must have been produced by an advanced Martian civilisation. Worryingly, the canals never appeared upon photographs and, technically, they were beyond the resolution of the telescopes then in use. In fact, they did not exist. Furthermore, there are not even any physical features upon the surface which could be mistaken for canals. They were entirely figments of the imagination.

Another classic case of pathological science occurred in France early this century. In 1895, X-rays had been discovered and other forms of radiation were discovered soon after this. It was thus quite plausible to the scientific community when, in 1903, Rene Blondlot, a distinguished French physicist, reported that he had discovered yet another form of radiation which he called N-rays. N-rays were reported to possess several interesting properties, such as increasing the brightness of an electric spark. Other researchers, mainly French, confirmed the existence of N-rays and reported other properties of the new form of radiation. The sun, flames and incandescent objects were all sources of N-rays as was the human nervous system. In fact, parts of the nervous system which were relatively more active produced relatively more N-rays. Certain

materials were identified as 'secondary' sources of N-rays, in that they would absorb the rays and re-emit them. The fluids of the eye were said to do this leading to the discovery that exposing the eye to N-rays enhanced the ability to see in dim light.

Thus we have a situation where the existence of the rays was confirmed by dozens of independent studies carried out at several different laboratories, many from highly respected scientists such as Blondlot. The only problem is that there is no such thing as N-rays.

Other physicists, especially those outside France, were unable to replicate the effects and were concerned by the fact that all of the studies of N-rays were dependent upon subjective measures such as brightness judgement or reports that one's vision was clearer. Objective measurement failed to confirm the subjective impressions of those scientists convinced that N-rays existed (and at least some of the reports of enhanced vision under dim illumination were due to nothing more mysterious than dark adaptation).

The final proof that N-rays did not exist came when an American physicist named Robert W. Wood visited Blondlot's laboratory in 1904. Wood took advantage of the dim illumination required to study the alleged rays to alter experiments in which he took part in crucial ways. For example, in one experiment, Wood was supposed to block the path of the N-rays with a piece of lead. On trials when the lead was absent, the N-rays could supposedly illuminate a card with luminous paint on it. On trials when the lead was present, of course, this was not supposed to happen. Wood simply removed the lead when he was supposed to have it in place and vice versa. Blondlot's reports of whether or not the card was illuminated were a function of his belief about its presence or absence not the actual situation. In another study, Wood surreptitiously removed an aluminium prism from a piece of apparatus. The prism supposedly produced a spectrum of N-rays of different wavelengths, like light passing through a glass prism. Blondlot continued to describe a spectrum even though no prism was present. Blondlot's assistant became suspicious of Wood and so Wood pretended to remove the prism whilst leaving it in place. The assistant reported that he could no longer see the spectrum. Similar results were found in studies of the alleged influence of N-rays upon light sensitivity. Subjects' beliefs determined their reports, not the presence or absence of an N-ray source.

Following Wood's report in *Nature* in 1904, reports of N-rays diminished, but Blondlot continued to believe in them until his

death in 1930. One can see clearly that this episode fits perfectly with Langmuir's definition of pathological science and it is worth noting the non-falsifiability of the claim. Critics who did not report finding the effects of N-rays were simply dismissed by the believers as not being sensitive enough to detect them.

## **Conclusions**

In this brief overview, I have tried to achieve three main goals. First, I have tried to describe what paranormal perception feels like to those who claim to have experience of it. Examples illustrate the fact that such perception can feel, at one extreme, like nothing more than guessing right through a continuum up to the other extreme, where paranormal perceptions can feel 'realer than real.' Second, I have offered some outlines of non-paranormal accounts for these ostensibly paranormal perceptions. It may be that some instances of alleged ESP really do involve the use of paranormal powers, but personally I feel that such a conclusion would be premature on the basis of currently available evidence. However, we can only gain by taking reports of ostensibly paranormal experiences seriously. If paranormal forces really do exist, we should acknowledge them and study them systematically. If they do not, we are likely to learn a lot about human nature from our investigations. Third, the role of top-down processing has been emphasised throughout.

Top-down processing exerts a powerfully biasing effect not only on perception, the focus of this essay, but also on memory. This is particularly important when we bear in mind that in the area of anomalistic psychology we are often dealing with *reports* of unusual experiences which have taken place in the past, rather than concurrent descriptions of the experiences themselves. Although the role of top-down processing in influencing such reports would easily provide enough material for another monograph, I would like to finish by offering a simple everyday demonstration of how our expectations can bias our memory of a very familiar stimulus. Next time that you notice that a friend or relative has a watch or clock with the numbers represented as Roman numerals, ask them to tell you, *without looking at the watch or clock*, how the number '4' is represented. The chances are that they will reply 'IV.' This is a perfectly reasonable answer given that this is how '4' is usually represented in Roman numerals – *except on watches and clocks, where the vast majority of the time it is represented as 'IIII'* (see

French & Richards, 1993). People may have looked at their watches and clocks several thousand times without ever noticing that the four is represented in this rather unusual way and when they are asked to recall what they saw, their expectations of the typical format will reliably influence their memory. Thanks to the influence of top-down processing, in many different situations we are likely to see what we expect to see and remember what we thought we saw!

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