



Tricks of the Mind

The field of paranormal investigation, specifically the process of actively hunting for ghosts, can be at best an inexact science if indeed it can be classed as a science at all. At worst, it can provide the material for fully fledged flights of fantasy, even in the most apparently down-to-earth of characters. To this end, we present a brief overview of the most common misperceived events that may occur during an active investigation.

Belief and Expectation

The role of an investigator's expectations can colour their perception of events. Because of this we believe it is important for an investigator to be a "true" skeptic - neither a believer nor a disbeliever. Whilst it is important to approach an investigation with theories and background knowledge, approaching the field with strong beliefs one way or the other leaves the investigator open to the danger of misinterpreting events according to these set beliefs. It is as unconstructive to over explain events as having non-paranormal causes as it is to blindly believe that a phenomenon must have a paranormal cause.

Simple Misperceptions

Due to the unusual circumstances investigators find themselves in, for example it is unusual for anyone to sit motionless in the dark attending to any slight sound or feeling during their normal daily life, it can be easy to misperceive what are actually quite benign and common events. A commonly reported phenomenon is the sense of ghostly fingers running through one's hair. Whilst we must remain open to the possibility that this is indeed what is occurring, it must also be borne in mind that a common physiological process may also be at work. We have noticed on numerous occasions that an investigator has sat down in a darkened room, and removed an item of headgear for example a baseball cap or woolly hat, to make themselves more comfortable. Human hairs have touch receptors associated with them, and these are stimulated when the hair is bent. When the hat is removed, the hair, which has been bent over against the head, resumes its normal shape. This stimulates the touch receptors, and produces a sensation easily interpreted as ghostly fingers.

The "Sense of Presence"

One of the most commonly reported phenomena is the sense of presence - the feeling that there is someone or something in the room that can't be seen. This can simply be due to a sense of expectation - in a reputedly haunted house the investigator expects, indeed sometimes almost wills, a presence to appear. Coupled with a state of heightened suggestibility - being aware of the haunted reputation of the building - a sense of presence can be induced quite easily.

The beliefs of the investigators mental set can affect his behaviour and perceptions. If he believes that he will experience a paranormal phenomenon, he will unconsciously perceive events according to that belief. These beliefs can cause him to misperceive events, even if in reality this appears illogical. We try to create the evidence to fit the belief.

Conditions of quiet and darkness allow the investigator to detect faint stimuli that are ordinarily masked - these are interpreted in accord with a person's expectations and fears - in an environment with a

reputation for invisible presences the investigator's worries may transform innocuous sights, sounds, and feelings into hints of hidden menace. As an example, a simple draught through a room has been misperceived as a ghost passing through an investigator. If the same draught was felt in more innocuous surroundings, it would either not be perceived at all, as an unimportant stimulus, or it would be assumed to have a more normal cause, for example an open window. The fact that the draught was felt with no visual stimulus only increases the feeling of unease.

An example of these factors influencing perception occurred some years ago during an investigation when a sound subsequently discovered to be a bilge pump at a dock, was reported as being the "sound of a body being dragged". Expectation and belief transformed an innocent sound, whilst unusual and outside the investigator's previous experience, into something far more fanciful and sinister.

There are also physiological explanations for the experience of a sensed presence. Experiments by Michael Persinger in laboratory situations have shown that individuals with greater than normal metabolic activity in the temporal lobe region of the right hemisphere of the brain are more likely to report encountering invisible beings. It has been suggested that aspects of a person's own sense of self are generated in this brain region; when it becomes unusually active, the self-image of the right hemisphere intrudes upon the left hemisphere, which interprets it as the presence of an unseen external entity.

Another physiological cause that has been suggested for producing the sense of presence are extremely low frequency sound waves - infrasound. Exposure to infrasound has been proven to cause various physiological effects on the human body, including anxiety, shivering, breathlessness, and a feeling of an unseen presence. If a wave of 18Hz is present, the human eyeball can start to resonate with the wave, so causing a person to see hallucinations in their peripheral vision. These sound waves can be produced by electrical equipment, but may also be produced as a result of, for example, wind blowing through a window and down a corridor.

Pareidolia

Another way that external stimuli may be misperceived is termed pareidolia. A common example is when we "see faces" in clouds. The human brain tries to make sense of the world around it, when it is presented with a stimulus it will try and match it to something it has encountered before, again with respect to the person's beliefs and expectations.

Sensory Deprivation

Commonly during ghost investigations, participants are sitting in conditions of near sensory deprivation, with low light levels and no sound. An effect commonly seen is the autokinetic effect - the misperception of movement in a stationary object or source of light.

When light enters the eye, the lens focuses the light into an image of the light source, projected onto the retina at the back of the eyeball. This image changes its position on the retina if either the object or the eyeball moves. Under ordinary conditions, it is easy to tell what sort of movement has occurred. If the eyes are moved, all the images on the retina move, when an object moves, its retinal image changes location relative to the other objects being focused on the retina.

The eye contains two types of photosensitive cells, rods and cones, which convert light energy into signals that are carried to the brain by the optic nerve. Rods are very light sensitive, and give us black and white vision but they produce quite a low-resolution image. Cones, on the other hand, give very high resolution, colour images, but they are not as sensitive to light.

In the middle of the retina is a small dimpled region called the fovea. This contains only cone cells, so in ordinary light we would look straight at an object to produce the best picture. In dim lighting, the rod cells are better for imaging, and the largest concentration of these occurs near the outer edge of the

eye. This means that we can see objects in low light better out of the corner of our eyes. These cells also give us the best motion detection, so we can see movement best out of the corner of our eyes.

The investigator sitting in a darkened room might perceive a small point of light, maybe from an item of technical investigation equipment. It can be seen more clearly out of the corner of the eye, but no detail can be perceived. To compensate for this, the investigator attempts to look straight at the object to try and resolve it. But when we constantly focus on one point of light, we begin to lose a proper perception of it as the chemical in the cone cells, iodopsin, becomes bleached out. To try and overcome this, our eyes do what is called saccadic scanning, which basically means our eyes make small rapid movements, of which we are unaware. This saccadic movement is misinterpreted as movement of the light source, rather than movement of the eye, as there are no other objects visible to relate the movement to. This is what is called the autokinetic effect, and differs between individuals - some people see small movements, whereas others see the light source moving up to 8 inches. So a small stationary point of light has suddenly turned into a moving ball of light - is this a ghost manifestation occurring? It is important to remember also that, just as when we focus on a point of light in a darkened room the eye needs to keep moving to keep perceiving it, the same is true of the rods and our peripheral vision - we will no longer be able to perceive a stationary object at the periphery of our vision unless we keep moving our eyes.

Ideoretinal Light

This describes the phenomenon of flashes of light or colour that may appear in the field of vision in the absence of sensory stimulation. They can cover a wide range of optical phenomena, from simple lines and patterns, through so-called "wallpaper patterns", right up to full scenes. These effects are a form of entoptic phenomena.

Entoptic Phenomena

Entoptic phenomena are sensations produced by the structure of the visual nervous system. They can relate to perception of objects actually within the structure of the eye, a common example being "floaters" - bits of debris floating in the vitreous body of the eye. The vitreous humour is a jelly like substance that fills the eyeball. As we move our eyes, this jelly "sloshes about" within them, and as a consequence of this movement, and also the fact that the jelly shrinks with age, cells and fibres within the eye can break off. These cells and fibres cast a shadow on the retina, and as the eyes are moved they can be seen as semi-transparent, irregular lines floating across the vision - hence the name "floaters". If these cells break off from around the optic nerve, they can form a circular shape with a clear middle, reminiscent of the "orbs" and "lightballs" reported on digital photographic images. These floating objects can be misperceived as external objects, seen as outside the eye rather than within it.

Scheerer's Phenomenon

Light passes through several layers of retinal cells to reach the light-sensitive receptor cells - these layers are nourished by a capillary network of blood vessels. If a bright, steady light enters the eye (for example a light source in a dark room), it is sometimes possible to see streaking points of light and shimmering webs of light in the field of vision, caused by the blood flow in front of the receptors. Because the eyes are constantly in motion, either voluntary or saccadic scanning, a sense of motion may be imparted to these entoptic effects.

Awareness of Imagery

Imagery is the phenomenon of visual experiences in the absence of any visual stimulus from the outside world. An example of this is day-dreaming. If you can try and imagine a white, sandy beach, with clear blue skies, a beautiful blue sea with waves lapping at the shore. You should have been able to produce quite a clear mental image of this scene. There is some evidence to suggest that we use these

sorts of mental images all the time. Think of when you have been driving a car and need to make a decision - should I overtake the car in front? You will use imagery to construct a mental picture of the consequences - you will not actually stop seeing the road, but your brain has created a mental image.

We are unaware that this is happening - we wouldn't be able to function without it, but we also wouldn't be able to function if we were constantly aware of it. In the scenario of mild sensory deprivation (quiet and dark), it is possible to become aware of this imagery as there is nothing else to focus the conscious attention on. Because it is something not normally consciously perceived, it is possible to externalise this imagery and interpret it as something occurring external to the body, rather than produced within the mind.

Illusions and Hallucinations

There is a difference between these two phenomena - an illusion is a mistaken perception of an object, there is something to be perceived but it is perceived incorrectly. A hallucination is a perception-like experience in the absence of any external stimuli. It can be difficult to separate the two - an illusion (a flapping curtain is misperceived as a ghost) can turn into a hallucination (the ghost is heard to speak). It can also be difficult to separate illusions from ordinary perceptions - we assume we are perceiving the world as it actually is, whereas in reality we perceive it according to our beliefs, expectations and prior experience.

The ideal situation for illusions to occur is again the mild sensory deprivation conditions commonly encountered during the "ghost hunt" - dim lighting, an object that is not clearly viewed and is only seen briefly, an observer with impaired perceptual functioning (tired, excited or both), and observer with a suitable mental set.

If the observer is accompanied by other witnesses, a collective illusion is possible. If the group share a common expectation, for example that a ghost will appear, and the people in the group communicate with each other either during or after the experience, they can unintentionally fine tune their mutual interpretations, and therefore create a closely matched illusory perception.

Auditory Illusions

Human speech consists of a combination of frequencies and rhythms. The sounds of letters - t, k, f, sh, p, s - are combinations of clicks, swishes, hisses, squeaks and a myriad of other noises. All these sounds exist in the world outside of human speech. Because of this, and the fact that speech is so important to human beings, it is possible to misperceive sounds such as the creak of a door, as a human voice. This phenomenon can be quite marked in a noisy environment, also if the observer is expecting to hear a ghostly voice it is far easier to misinterpret natural sounds as speech.

Perceiving Objects and Events

Assuming an observer has witnessed an event, how sure can we be that it will be reported accurately? Perception is not just a process that is carried out in the eye, ear, nose etc., the important bit happens in the brain. Most of the information we use in the process of perception is not consciously recognised. It is also possible to look straight at an object, so an image is formed on the retina, but it isn't actually perceived. Think how many road accidents have occurred where the driver says "I didn't see him". He might have looked straight at the person he has just run over, but his brain did not perceive it.

This phenomenon is called selective attention - we have to function this way as there is too much information available for us to be aware of it all. During an ordinary day we can carry out daily tasks such as leaving the house and getting in the car to go to work, without consciously noticing the colour of the path, the make of car, the colour of the front door. If however a large oil stain has appeared on the path we might consciously perceive this, as something has changed from the normal course of events, and

also it may be quite important to register this information - the car may have a large oil leak.

We are quite good at recognising familiar cues - an example would be the “cocktail party” effect - in a large group of people, all of whom are having conversations, these separate conversations are not normally consciously perceived. However, as soon as someone mentions your name, you immediately become aware of hearing it - it is something quite important to you and is flagged up as such in the brain, and you notice it.

Even when an observer is sitting in a dark and quiet room, they may still be filtering out anything that the brain does not perceive as important. If the observer is then presented with two unusual stimuli, only one may be perceived and not the other. If both events are perceived, the order in which they occurred may be misperceived - if two events happen simultaneously, the event the observer paid attention to will be perceived as happening first. An earlier unattended event may even be recalled as occurring after the attended event.

The opposite to this effect is a situation where the brain perceives something that is not actually there. On being presented with an incomplete object, the brain automatically fills in the missing pieces according to our previous memory and experience. There are many examples available of common optical illusions to illustrate this.

Perceptual Memory

Perceptual memory is unreliable. The human eye can distinguish between thousands of different colours, but studies suggest that we can only distinguish between 17 in memory. The images in our mind are never as clear as the actual scene, if you image a room in your house you can probably picture everything in it and where everything is, but the picture is markedly less detailed than the actual image.

Memory also stores perceptual information in a verbal form, rather than as a picture, so if an observer sees a pink elephant he will retain the words pink and elephant rather than a picture of the actual elephant. On being asked to recall it, the picture of the elephant would be reconstructed in the mind, and any gaps in the information would unconsciously be filled in. If the observer has talked to other witnesses, information from them may also be unconsciously incorporated into the image.

Circadian Rhythms

The body has around 100 circadian rhythms; these cycles influence the body’s functions - temperature, hormone levels, heart rate, blood pressure. These are all regulated from an area of the brain called the suprachiasmatic nucleus, which is in the hypothalamus. Body temperature drops after midnight, and is at its lowest level at about 4am. Sleep is most likely to occur when body temperature is at its lowest, so an observer watching all night for paranormal happenings will be struggling to stay awake. Hands and feet will also be starting to feel colder, as peripheral cooling is a method used by the body to induce sleep. Once we are asleep, our bodies start to warm up, so as the observer is forcing themselves to stay awake they will be feeling colder and colder (sleep deprivation studies on rats have shown that rats who died due to sleep deprivation suffered a death similar to hypothermia).

Microsleeps

An overtired individual will probably find themselves suffering episodes of microsleep. These are periods of sleep that last for a short time, usually less than a minute. The observer will not be aware that these have occurred.

Myoclonic Jerk

On drifting off into a microsleep, a myoclonic jerk may be experienced. This is an involuntary jerking of

the muscles, caused by a harmless misfiring of nerve cells. It can be misinterpreted as being touched or grabbed by an unseen presence.

Hypnogogic State

A hypnogogic state occurs at the boundary between sleep and wakefulness (hypnogogic refers to the phenomenon occurring whilst falling asleep, hypnopompic refers to the phenomenon occurring on waking up). In this state, hypnogogic dreams may be experienced, which are quite unlike ordinary dreams. During these dreams, realistic images and sounds may be experienced - a common phenomenon is of hearing one's name called, also commonly reported is hearing the sound of the television, but upon arising from bed and investigating, there is no television on, it was a hypnogogic hallucination. Form constants are often seen - these are geometric images produced by the visual system rather than by any external stimuli (as an aside, a good way to experience this phenomenon is to play the computer game Tetris for a few hours before going to bed. On going to bed, as the half awake, half asleep stage is reached, very vivid images of the game will be perceived). If this phenomenon occurs during a microsleep, the imagery may be confused with perceptions of the external world.

Sleep Onset REM

REM (rapid eye movement) sleep is the stage of sleep during which dreaming occurs, and usually manifests approximately 60 minutes after falling asleep. In some conditions, for example sleep deprivation, REM sleep may occur as soon as the individual dozes off. Paralysis of the body during REM sleep occurs as a protective mechanism, to prevent an individual acting out their dreams and thereby causing harm to themselves. During this sleep onset REM sleep, the individual may experience an episode of sleep paralysis, this usually occurs when a person is sleeping on their back and happens when they are falling asleep or waking up. The paralysis that occurs during REM sleep continues after the individual has started to wake up. The body will feel heavier and heavier, the observer will be aware of their environment, but be unable to move or speak (the eyes can usually still be moved). The heart rate will increase, the observer may have difficulty breathing, and strong feelings of dread and fear may be experienced. The previously described hypnogogic imagery may also be experienced, ranging from hearing a voice to a terrifying feeling of presence and perception of strange figures.

A range of different phenomena has been described; all or none of these may be experienced during an investigation. However, knowledge of the effects will hopefully afford some forewarning and thereby prevent investigators misinterpreting normal occurrences as paranormal.