

Many believe there are some people ("sensitives" or "psychics") who can receive the thoughts of others, and even transmit their own thoughts to others. This direct mind-to-mind communication is often said to be instantaneous and independent of distance. Proponents sometimes claim all people have this ability to some degree, and that this explains many curious events in daily life, such as apparently pre-cognitive dreams. The catch-all term for this alleged ability is extra-sensory perception, or ESP (sometimes called "psi," like the Greek letter). Parapsychology is the term used for the serious study of such claims. So far, parapsychology seems to be a science that cannot even demonstrate that its subject matter exists, let alone offer explanations for it.

### **The claims for ESP fall into four general categories:**

Telepathy -- a person's awareness of another's thoughts, without any communication through normal sensory channels.

Clairvoyance -- knowledge acquired of an object or event without the use of the senses.

Precognition -- knowledge a person may have of another person's future thoughts, or of future events.

Psychokinesis -- a person's ability to influence a physical object or an event, by merely thinking about it. (Some researchers consider psychokinesis a part of psi, but not strictly extra-sensory "perception").

The evidence cited for ESP is usually anecdotal. Sometimes it is claimed, however, that scientific tests at respected research institutions have conclusively demonstrated that ESP exists; or government tests have proved it; or, that the Russians are "working hard" on it, etc. Sometimes proponents cite specific experiments as having confirmed the existence of ESP. In fact, it is the essentially unanimous opinion of psychologists that the existence of ESP has not been shown. All procedurally valid and reproducible experiments have failed to demonstrate the existence of ESP.

(See Hansel, Alcock, Marks and Kammann, and Druckman and Swets for detailed reviews of the best-known experiments.) We will first consider why the existence of ESP is such an extraordinary claim, given the current state of our knowledge about the world, and then review the major experiments claimed to support the existence of ESP.

### **The inconsistency of ESP claims and scientific knowledge**

Questions can be raised about every aspect of ESP. The existence of ESP ability in humans (or animals, for that matter) would not be consistent with anything we know about nature -- either from the standpoint of physics or of human physiology. Let's consider the physiological aspects first.

All the higher animals show the same fundamental organization of their sensory systems. The specialized cells (neurons) that form the central nervous system (CNS) of man and other higher animals are themselves insensitive to sensory stimuli. For each kind of important stimulus in the environment, animals have evolved highly specialized sensory organs. Each such sense organ contains unique, highly adapted cells that are sometimes called "transducers". Each stimulus in the environment involves a special kind of cellular activity. Vision involves direct detection of particles of light (photons). Hearing involves direct detection of organized wave motion of air molecules. Smell and taste involve direct detection of molecular shapes. Sensory organs (eyes, ears, nose) support the cells specialized to detect photons, molecular motion, and molecular shapes directly. These cells generate impulses that travel along nerve fibers and which are then processed in intermediate switching and coding areas, finally reaching the brain in a form that the brain can interpret.

The brain itself is insensitive to sensory information. If one opened a skull and exposed the living brain to light, sound, heat, smells, etc., the brain would be totally unaware of the application of these stimuli directly to its tissues. For obvious reasons, the sensory organs containing the transducers cells are located at or near the surface of the body in all animals, including humans. When we apply this universal rule of nature about informational input into the brain to claims for telepathy, we come up short on all accounts. Assume that a person's brain radiates some kind of "something" as she thinks. How would another person's brain ever know about it? Nowhere on the surface of the body is there a specialized organ that appears to lack a function, and which contains transducer cells sensitive to "unknown forces". Nor, contrary to popular myth, is there any large area of the brain whose function is unknown, and which might be responsible for reception and interpretation of signals from the hypothetical ESP organ.

Furthermore, in the course of evolution many kinds of animals have developed extremely acute senses of one kind or another (i.e., compared to those of humans). Dogs have much more highly developed sense of smell than do humans; hawks and eagles, more acute eyesight; bats, much wider range of hearing, etc. Where is the animal that has a much more highly developed ESP sense than humans? The ability to sense the presence of predatory animals that could not have been seen, heard, or smelled would confer such enormous advantages for its possessors that evolution should have made ESP as common as fur, claws, and moist noses. It has not happened. Could it be that no such sense organ exists because there is no stimulus for the organ to detect?

Some persons argue that only human beings are capable of ESP communication; or, that only certain, special persons are so endowed. Comparative anatomy fails to show any evidence for the former contention. There is no information concerning the second notion.

A proponent of ESP could argue that telepathy differs from all other senses in that the brain itself is the telepathic sense organ. In this case the detected stimulus would require the penetrating power of x-rays or nuclear radioactivity in order to get through the skull to reach the brain! This brings us to the realm of physics, where ESP falls down as badly as in the realm of physiology.

Physicists have found, in 400 years of searching, only four fundamental forces in nature:

gravity, electromagnetic force, and the strong and weak nuclear forces. All interactions between one bit of matter and another can be understood and precisely described in terms of just these four forces. Because these are now well understood, we know none of them could be responsible for the hypothetical ESP stimuli. What then, about a new force, unknown to science? A force sufficient to account for ESP is almost certain not to exist for the same reason that you can be fairly certain that there is no elephant in the room with you as you read this. There is not any room for it! If such a force existed, everything would be different from how we now see it, because the force would affect everything in some way. (To claim that it would have no observable effect is equivalent to claiming that it does not exist). Furthermore, all interactions in physics diminish as the inverse square of the distance between the interacting objects (or even more rapidly than that). All these interactions propagate at or below the speed of light. Proponents, in effect, say ESP violates these universal laws.

This brings us to another point that is seldom understood by proponents of ESP. We know electromagnetic radiation exists over a vast range of frequencies and wavelengths that we are blind to because we have no sensory organs that will detect such radiation. Our knowledge of the existence of such radiation does not depend upon the accidental birth of "sensitives" who are somehow able to detect radio waves directly. No one can detect these waves directly; there are no sensory organs for them in any animal. We build mechanical transmitters and detectors for radio waves; we can build them to be as sensitive and flexible as we wish.

If ESP radiation existed, the questions of whether or not humans could detect it would be irrelevant. It could be studied far more precisely and carefully with sensitive scientific instruments than it could with human beings who are easily fatigued and often moody. Yet believers in ESP never try to use such instruments. Could it be that the signals sought do not exist except in the minds of certain people who have been conditioned to believe that something should come through such channels? It is a characteristic of all pseudoscience, not just ESP studies, that no actual physical process ever is uncovered or studied. What is usually studied are the unverified, anecdotal claims of Madam Whiffle, the medium, or Uri Geller, the Israeli stage magician, or Aunt Tillie who remembers this funny thing that once happened to her.

Instead of looking for ESP in the universe of real phenomena, ESP believers tend to look in the same old places: in stories about how Aunt Maude "just knew" Uncle Bruce was in trouble, and sure enough, he was in jail; or in games of guessing playing cards in which any amateur magician can score highly using nothing but subtly disguised sensory perception. But anecdotes and parlor games are not experiments. What have been the results when persons allegedly showing ESP ability are tested under proper scientific protocols?

The experimental evidence for ESP

The experimental problem for ESP research is that even its proponents concede there is no clear and affirmative evidence for its existence. Rather, the existence of ESP has come to be defined negatively, as the absence of any alternative explanation for a statistical departure from a chance baseline. Subjects tested for ESP ability are typically asked to guess the outcome of random events under conditions where they should have no sensory knowledge of the actual event. Accurate data collection, elimination of experimenter bias, adequate randomization, proper controls and correct statistical analysis thus become critical. The major ESP studies

have still not met these minimal criteria:

The Rhine Experiments: Joseph Banks Rhine, a botanist at Duke University, conducted ESP experiments in the 1930's. Rhine made the "ESP cards" famous by his use of them in guessing experiments. Rhine claimed in his 1934 book, *Extra-Sensory Perception*, to have found overwhelming evidence of ESP. However, other psychologists were unable to replicate his results, and it is now generally conceded that Rhine's experiments were poorly designed and allowed leakage of information between subject and tester.

The SRI remote-viewing experiments: In the 1970's, physicists Harold Puthoff and Russell Targ conducted experiments at SRI International that they claimed showed subjects could essentially "see" a remote place through the eyes of another person. The target team would randomly visit sites such as a shopping center or airport, while the experimenter asked the subject to describe his impressions.

Obviously, deciding whether the subject's impressions matched the target scene involved some subjective decisions.

Methodological flaws also plagued the research, and other experimenters were unable to replicate the results. As the National Research Council report puts it: "By both scientific and parapsychological standards, then, the case for remote viewing is not just very weak, but virtually nonexistent." (Druckman and Swets, p. 184).

Research on random-number generators: Electronic random-generators (RNG's) have been used in ESP research both to test clairvoyance or precognition, or, most commonly, to test the psychokinetic ability of a subject to mentally bias the output of an RNG so that it produces a non-random sequence. The latter would indeed be remarkable, given what we know about the laws of physics.

However, many of these experiments produce results in excess of chance expectation, so some effect is operating. From the point of view of the skeptics, all of the experiments are questionable because of the inadequacy of the randomization of the RNG outputs. That is, the random-number generator itself is not ideally random, and its bias must also be measured and taken into account. The National Research Council Report concludes that after 15 years of research, only one of hundreds of experiments met the minimal criteria of scientific acceptability, and that one experiment yielded results of just marginal significance.

The Ganzfeld experiments: These experiments are named after the term used by Gestalt psychologists to designate the entire visual field. Test subjects wear halves of ping-pong balls over their eyes while white noise plays in earphones. In this state of sensory deprivation, a sender attempts to psychically communicate a randomly selected target to the subject. The subject is later asked to match his perceptions to the targets. Ganzfeld experiments have probably been the most carefully conducted -- and carefully scrutinized -- of all ESP experiments. Still, the research has failed to produce results that convince psychologists that ESP exists.

In summary, the existence of ESP has not been demonstrated in either everyday life or the laboratory. Further, the claims for ESP run counter to well-established, well-tested laws of nature. To be consistent with the rules by which reality is regulated, ESP would require elaborate, highly specialized organs for sending and receiving ESP radiation -- organs that are not evident. The ESP radiation should be detectable directly and capable of study by sensitive instruments. Such instruments do not exist because such radiation does not exist in any recognizable form. The more closely ESP has been studied in the laboratory, the smaller the effects become. ESP, if it does exist, is plainly very weak. It is becoming more difficult for its proponents to distinguish between non-existence and an effect that is so vanishingly small that it could have no practical consequences.

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### Suggested Reading:

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