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Ganzfeld Phenomena

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The ganzfeld procedure is a mild sensory isolation technique that was first introduced into experimental psychology during the 1930s and subsequently adapted by parapsychologists to test for the existence of psi--anomalous processes of information or energy transfer such as telepathy or other forms of extrasensory perception that are currently unexplained in terms of known physical or biological mechanisms. Parapsychologists developed the ganzfeld procedure, in part, because they had become dissatisfied the card-guessing methods for testing ESP pioneered by J. B. Rhine at Duke University in the 1930s. In particular, they believed that the repetitive forced-choice procedure in which a participant repeatedly attempts to select the correct "target" symbol from a set of fixed-alternatives failed to capture the circumstances that characterize reported instances of psi in everyday life.

Historically, psi has often been associated with meditation, hypnosis, dreaming, and other naturally occurring or deliberately induced altered states of consciousness. For example, the view that psi phenomena can occur during meditation is expressed in most classical texts on meditative techniques; the belief that hypnosis is a psi-conducive state dates all the way back to the days of early mesmerism; and cross-cultural surveys indicate that most reported "real-life" psi experiences are mediated through dreams .

There is now experimental evidence consistent with these anecdotal observations. For example, several laboratory investigators have reported that meditation facilitates psi performance (Honorton, 1977) . An analysis of 25 experiments on hypnosis and psi conducted between 1945 and 1981 in 10 different laboratories suggests that hypnotic induction may also facilitate psi performance (Schechter, 1984) . And dream-mediated psi was reported in a series of studies conducted at Maimonides Medical Center in New York and published between 1966 and 1972 (Ullman, Krippner, & Vaughan, 1989). Ganzfeld experiments are the direct successors to the dream studies.

The dream studies tested for the existence of telepathy, the transfer of information from one person to another without the mediation of any known channel of sensory communication. Two participants, a "receiver" and a "sender," spent the night in a sleep laboratory. The receiver's brainwaves and eye movements were monitored as he or she slept in an isolated room. When the receiver entered a dream state--signaled by the onset of rapid eye movements (REM)--the experimenter pressed a buzzer that signaled the sender to begin a sending period. The sender would then concentrate on a randomly chosen picture (the "target") with the goal of influencing the content of the receiver's dream.

Toward the end of the REM period, the receiver was awakened and asked to describe any dream just experienced. This procedure was repeated throughout the night with the same target. A transcription of the receiver's dream reports was given to individuals not involved in the experimental sessions who served as outside raters. These raters rated the similarity of the night's dreams to several pictures without knowing which of these had served as the target. In some studies, these ratings were also obtained from the receivers themselves. Across several variations of the procedure, dreams were judged to be significantly more similar to the target pictures than to the control pictures in the judging sets.

Collectively, the results of the meditation, hypnosis, and dream studies suggested the hypothesis that psi information may function like a weak signal that is normally masked by the sensory "noise" of everyday life. The diverse altered states of consciousness that appear to enhance an individual's ability to detect psi information may do so simply because they reduce interfering sensory input. It was this hypothesis that prompted the use of the ganzfeld procedure.

Like the procedure used in the dream studies, the ganzfeld procedure has most often been used to test for telepathic communication between a sender and a receiver. The receiver rests in a reclining chair in a soundproof chamber. Translucent ping pong ball halves are taped over the eyes and headphones are placed over the ears. A red floodlight is directed toward the receiver's eyes and white noise is played through the headphones. (White noise is a random mixture of sound frequencies similar to the hiss made by a radio tuned between stations.) This homogeneous visual and auditory environment is called the *Ganzfeld*, a German word meaning "total field." To quiet "noise" produced by internal bodily tension, the receiver is also led through a set of relaxation exercises at the beginning of the ganzfeld period.

While the receiver is in the ganzfeld, a sender sits in a separate soundproof room and concentrates on the "target," a randomly selected picture or videotaped sequence. For about 30 minutes, the receiver thinks aloud, providing a continuous report of all the thoughts, feelings, and images that pass through his or her mind. At the end of the ganzfeld period, the receiver is presented with several stimuli (usually four) and, without knowing which one was the target, is asked to rate the degree to which each matches the thoughts and images experienced during the ganzfeld period. If the receiver assigns the highest rating to the target, it is scored as a "hit." Thus, if the experiment uses judging sets containing four stimuli (the target and three control stimuli), the hit rate expected by chance is one out of four, or 25 percent. Alternatively, the similarity ratings can be made by outside raters using transcripts of the receiver's imagery, as was done in the Maimonides dream studies.

In 1985 and 1986, the *Journal of Parapsychology* devoted two entire issues to a critical examination of the ganzfeld studies, featuring a debate between Ray Hyman, a cognitive psychologist and a knowledgeable, skeptical critic of parapsychological research, and the late Charles Honorton, a prominent parapsychologist and major ganzfeld researcher. At that time, there had been 42 reported ganzfeld studies conducted by investigators in 10 laboratories.

Across these studies, receivers achieved an average hit rate of about 35 percent. This might seem like a small margin of success over the 25 percent hit rate expected by chance, but a person with this margin of advantage in a gambling casino would get rich very quickly. Statistically this

result is highly significant: The odds against getting a 35 percent hit rate across that many studies by chance are greater than a billion to one. Additional analyses demonstrated that this overall result could not have resulted simply from the selective reporting of positive results and nonreporting of negative results.

The Autoganzfeld Studies

If the most frequent criticism of parapsychology is that it has not produced a repeatable psi effect, the second most frequent criticism is that many, if not most, psi experiments have inadequate controls and safeguards. A frequent charge is that positive results emerge primarily from initial, poorly controlled studies and then vanish as better controls and safeguards are introduced.

The most potentially fatal flaws in a psi study are those that would allow a receiver to obtain the target information in normal sensory fashion, either inadvertently or through deliberate cheating. This is called the problem of sensory leakage. In their debate, critic Hyman and parapsychologist Honorton agreed that the studies that had good safeguards against sensory leakage obtained results that were just as strong as studies that had less good safeguards.

But because Hyman and Honorton disagreed on other aspects of the studies, they issued a joint communiqué in 1986, in which they agreed that the final verdict awaited the outcome of future experiments conducted by a broader range of investigators and according to more stringent standards. They then spelled out in detail the more stringent methodological and statistical standards they believed should govern all future ganzfeld experiments.

Between 1983 and 1989, Honorton and his colleagues conducted a new series of more rigorous ganzfeld experiments, experiments that complied with the Hyman-Honorton guidelines. These are called autoganzfeld studies because a computer controls the experimental procedures, including the random selection and presentation of the targets and the recording of the receiver's ratings. The targets consisted of 80 still pictures (static targets) and 80 short video segments complete with soundtracks (dynamic targets), all recorded on videocassette. The static targets included art prints, photographs, and magazine advertisements; the dynamic targets included excerpts of approximately one minute duration from motion pictures, TV shows, and cartoons.

The automated ganzfeld procedure was critically examined by several dozen parapsychologists and behavioral researchers from other fields, including well-known critics of parapsychology. In addition, two "mentalists," magicians who specialize in the simulation of psi, examined the experiment to ensure that it was not vulnerable to inadvertent sensory leakage or to deliberate cheating on the part of the participants.

Altogether, 100 men and 140 women participated as receivers in 354 sessions across 11 separate experiments during Honorton's autoganzfeld research program. The experiments confirmed the results of the earlier studies, obtaining virtually the same hit rate: about 35 percent. It was also found that hits were significantly more likely to occur on dynamic targets than on static targets. These studies were published by Honorton and his colleagues in the *Journal of Parapsychology* in 1990, and the complete history of ganzfeld research was summarized by Bem and Honorton in

the January 1994 issue of the *Psychological Bulletin* of the American Psychological Association (Bem & Honorton, 1994; Honorton et al., 1990).

Why Does the Ganzfeld Procedure Work?

In attempting to understand psi, parapsychologists have typically begun with the working assumption that, whatever its underlying mechanisms, it should behave like other, more familiar psychological phenomena. In particular, they typically assume that target information behaves like an external sensory stimulus that is received, processed, and experienced in familiar information-processing ways. Similarly, individual psi performances should vary with other variables in psychologically sensible ways. These assumptions are embodied in the theory of psi that motivated the ganzfeld studies in the first place.

As noted earlier, the ganzfeld procedure was designed to test the hypothesis that psi-mediated information acts like a weak signal that is normally masked by external sensory and internal bodily "noise." Accordingly, any technique that raises the signal-to-noise ratio should enhance a person's ability to detect psi-mediated information. This noise-reduction model of psi organizes a large and diverse body of experimental results, particularly those demonstrating the psi-conductive properties of altered states of consciousness such as meditation, hypnosis, dreaming, and, of course, the ganzfeld itself (Rao & Palmer, 1987).

Alternative theories propose that the ganzfeld and other altered states may be psi-conductive because they lower the receiver's resistance to detecting alien imagery--imagery that does not seem to originate within his or her own mind--or because they diminish rational censoring and editing of such imagery or stimulate more divergent thinking. At this point, there are no data that would permit one to choose among these alternatives, and the noise-reduction model remains the most widely accepted.

The Target. There are several hypotheses that attempt to account for the superiority of dynamic targets over static targets: Dynamic targets contain more information, involve both the visual and auditory senses, evoke richer internal imagery, are more lifelike, have a narrative structure, and are more emotionally evocative. Several psi researchers have attempted to go beyond the simple dynamic-static dichotomy to more refined definitions of a good target. Although these efforts have involved examining both psychological and physical properties of targets, no definitive conclusions have been reached yet.

The Receiver . Some receivers are more successful than others in psi experiments, including ganzfeld experiments. For example, those who have reported previous psi experiences in real life and meditators and practitioners of other mental disciplines do better than others in ganzfeld experiments. It has also often been reported that creative or artistically gifted persons show high psi ability. Honorton tested this in the autoganzfeld experiments by recruiting twenty music, drama, and dance students from the Juilliard School in New York City to serve as receivers. Overall, these students achieved a hit rate of 50 percent, one of the highest hit rates ever reported for a single sample in a ganzfeld study. The musicians were particularly successful: 75 percent of them successfully identified their targets. (Further details about the Juilliard students and their ganzfeld performance were reported in Schlitz & Honorton, 1992.)

The superior psi performance of meditators and creative or artistically gifted individuals may reflect personal differences that parallel some of the possible effects of the ganzfeld mentioned above: Such individuals may be more receptive to alien imagery, be better able to transcend rational constraints on the reception or reporting of information, or be more divergent in their thinking. It has also been suggested that both artistic and psi abilities might be rooted in superior right-brain functioning.

And finally, extraverts also tend to do better in psi experiments than introverts, and this was true in the autoganzfeld experiments as well (Honorton, Ferrari, & Bem, 1992). Eysenck (1966) reasoned that extraverts should perform well in psi tasks because they are easily bored and respond favorably to novel stimuli. In a setting such as the ganzfeld, extraverts may become starved for stimulation and thus may be highly sensitive to any stimulation, including weak incoming psi information. In contrast, introverts may be more inclined to entertain themselves with their own thoughts and thus continue to mask psi information despite the diminished sensory input. Eysenck also speculated that psi might be a primitive form of perception antedating cortical developments in the course of evolution, and, hence, cortical arousal might suppress psi functioning. Because extraverts have a lower level of cortical arousal than introverts, they should perform better in psi tasks.

But there are more mundane possibilities. Extraverts might perform better than introverts simply because they are more relaxed and comfortable in the social setting of the typical psi experiment. Introverts actually outperformed extraverts in a study in which participants had no contact with an experimenter but worked alone at home with materials they received in the mail (Schmidt & Schlitz, 1989). Current research is directed toward examining extraversion as well as other personality traits that appear to enhance psi performance.

The Sender. In contrast to this information about the receiver in psi experiments, virtually nothing is known about the characteristics of a good sender or about the effects of the sender's relationship with the receiver. There is some evidence that sender-receiver pairs who are friends or close relatives do better than unacquainted pairs.

A number of parapsychologists have entertained the more radical hypothesis that the sender may not even be necessary. In the terminology of parapsychology, the sender-receiver procedure tests for the existence of telepathy, anomalous communication between two individuals; however if the receiver is somehow picking up the information from the target itself, it would be termed clairvoyance, and the presence of the sender would be irrelevant (except for possible psychological reasons, such as expecting to do better with a sender).

There are nonganzfeld studies in the literature that do report significant evidence for clairvoyance, including a classic card-guessing experiment conducted by J. B. Rhine and Pratt (1954). At the time of Honorton's death in 1992, there were 12 ganzfeld experiments in which there was no sender. The overall hit rate in these studies was 29 percent, which, with only 12 experiments, is not significantly higher than the 25 percent expected by chance. In an attempt to settle the question, investigators at the University of Edinburgh are currently conducting experiments in which ganzfeld sessions with and without senders will be systematically compared.

The Physics of Psi. The psychological level of theorizing discussed above does not, of course, address the conundrum that makes psi phenomena anomalous in the first place: their presumed incompatibility with our current conceptual model of physical reality. Parapsychologists differ widely from one another in their taste for theorizing at this level, but several whose training lies in physics or engineering have proposed physical (or biophysical) theories of psi phenomena (an extensive review of theoretical parapsychology was provided by Stokes, 1987). Only some of these theories would force a radical revision in our current conception of physical reality.

Those who follow contemporary debates in modern physics, however, will be aware that several phenomena predicted by quantum theory and confirmed by experiment are themselves incompatible with our current conceptual model of physical reality. Of these, it is the 1982 empirical confirmation of Bell's theorem that has created the most excitement and controversy among philosophers and the few physicists who are willing to speculate on such matters (Herbert, 1987). In brief, Bell's theorem states that any model of reality that is compatible with quantum mechanics must be nonlocal: It must allow for the possibility that the results of observations at two arbitrarily distant locations can be correlated in ways that are incompatible with any physically permissible causal mechanism.

Several possible models of reality that incorporate nonlocality have been proposed by both philosophers and physicists. Some of these models clearly rule out psi-like information transfer, others permit it, and some actually require it. Thus, at a grander level of theorizing, some parapsychologists believe that one of the more radical models of reality compatible with both quantum mechanics and psi will eventually come to be accepted. If and when that occurs, psi phenomena would cease to be anomalous.

Continuing Ganzfeld Research

Because of their success, several parapsychology laboratories around the world continue to conduct ganzfeld experiments, including those at the University of Amsterdam, the University of Edinburgh, Gothenburg University in Sweden, and, in the United States, at Cornell University and the Rhine Research Center in Durham, North Carolina. As critic Hyman himself has written, the autoganzfeld "experiments have produced intriguing results. If independent laboratories can produce similar results with the same relationships and with the same attention to rigorous methodology, then parapsychology may indeed have finally captured its elusive quarry" (p. 392).

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