

## ESSAY REVIEW

### **Mysterious Minds, Irreducible to Brains?**

**Mysterious Minds: The Neurobiology of Psychics, Mediums, and Other Extraordinary People** edited by Stanley Krippner and Harris L. Friedman. Santa Barbara, CA: Praeger, 2009. 219 pp. \$44.95 (hardcover). ISBN 9780313358661.

This book presents a wide range of anomalous experiences and events and their possible neural correlates within a framework that is not necessarily materialist-reductionist based. Here psi-related *experiences* refer to the subjective; whereas psi-related *events* occur in a scientific setting with objective measures. These anomalies are presented using a broad spectrum of viewpoints. One end of the continuum is expressed in Allan Combs' Foreword, stating that the standards that psi research is expected to meet are far stricter than most mainstream science could meet, possibly due to a mindset similar to scientism. The other extreme is expressed in James Alcock's chapter (Chapter 2) titled "The Parapsychologist's Lament" which portrays in detail the body of difficulties in the field, but ends with conclusions—e.g., failure to replicate, and that neural correlates of psi cannot be possible because these things have not been proven to exist.

Chapter 1 by William Roll and Bryan J. Williams addresses the intersection of quantum theory, neurobiology, and parapsychology. This commences with a review of the electrophysiology of psi, including psi-related contingent negative variation and slow cortical potentials, EEG/fMRI correlation studies of remote stimulation, neural correlates of overt psi performance, fMRI/EEG of presentiment, and temporal lobe sensitivity in ESP experiencers. Quantum entanglement is used to explain how non-locality may be involved in psi. From this, theories of mechanism are suggested. Retrocognitive and precognitive information cross into conscious awareness and psychokinesis is suggested to involve entropy and negentropy. Next, poltergeists are described as a form of macro PK (recurrent spontaneous psychokinesis) which takes place when a witness is not directly observing the object moving. This is justified by the quantum Zeno effect. Micro PK, or changes in RNG to a non-random output, is presented here as being correlated with alpha brain activity. Quantum physics may very well be the key to explaining how psi occurs, but, at this point,

mapping psi onto quantum entanglement and other quantum effects is merely an analogy and not a direct mechanism of action of psi.

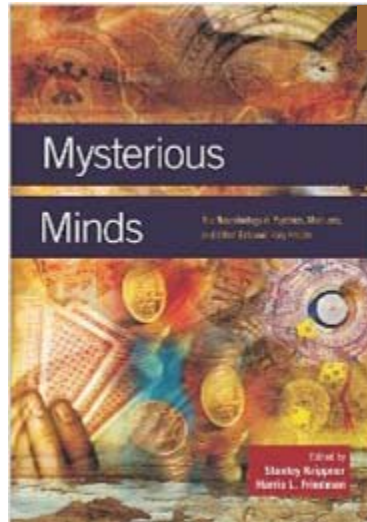
Chapter 2 contains Alcock's negative appraisal of the field, as previously mentioned. He claims that there is a lack of replicability in psi studies. Ironically, the very next chapter by Caroline Watt and Harvey Irwin provides ample evidence that this is not the case, with an emphasis on "independent replications" in their review. Next, Alcock claims that "ad hoc constructs" like an experimenter effect are unfalsifiable. To me, this claim is reminiscent of Freudian ego-defense mechanisms. It may be that Alcock's own bias against evidence of psi is unfalsifiable to himself. Following this, Alcock makes the bold claim that without a theory of the mechanism of action involved in psi and robust evidence that psi exists, we cannot link deviations in objective measures to specific hypotheses. It is not clear that this is the case. Objective observations and correlations, even without a specific mechanism of action, are valid. Hypothesis building may indeed lead to further research which may elucidate the mechanisms of action involved in psi. Alcock ends his chapter with, "there can be no 'neurobiology of ESP and PK' until first one can be sure that there is ESP and PK" (p. 42). This appears to be in contradiction with even the most extreme of viewpoints against psi, that psi is merely an internally generated hallucination of the brain. Even in that case, there should be neural correlates of such human experience worthy of study. The chapter ends with ". . . what it would take for parapsychologists, if there is no psi, to accept that conclusion" (p. 41). This assumes that all parapsychologists are biased in the opposite direction of diehard skeptics. It is unclear that any body of evidence for psi would ever meet Alcock's criteria for existence. He is clearly indoctrinated in scientism. As my friend Julia Mossbridge once said to a skeptical colleague, "I'm sorry; I did not realize you were religious about science. I thought you were an empiricist and valued evidence."

Chapter 3 is a review by Watt and Irwin of the laboratory evidence for psi. This is broken down into two types of research, proof-oriented and process-oriented studies of ESP. Next, definitions based on Rhine (1934) are given for precognition, telepathy, and clairvoyance. Meta-analysis of a pool of studies is presented as a useful tool to show how many null studies would be needed to counteract studies with positive results and thus support the null hypothesis of no psi. This is helpful to demonstrate that anomalous results significantly different from chance are indeed consistent across studies. Of course, considering the conflicting results between various meta-analysis publications, this is making the assumption that all meta-analyses show a significant deviation from chance or significantly large effect sizes. Such discrepancies suggest that the biases of the people conducting a meta-analysis can affect the outcome and results. Interestingly, despite the tendency of the use of meta-analysis to shoot down the

file drawer effect, Watt and Irwin state that “. . . proof-oriented ESP experiments have not succeeded in establishing the reality of ESP” (p. 48). As in the Alcock chapter, the reason given for this statement is lack of a specific mechanism of psi action. Surely in the early days of scientific discovery, correlations and subsequent theory building were essential to unraveling the mysteries of mechanisms of action. Particularly relevant to this topic is the fact that most modern-day neuroimaging is merely correlational by design, which does not necessarily reveal causation. Without true causation, where is the mechanism of action? Next, there is an overview of independently replicable patterns seen in

psi performance such as the sheep–goat effect (psi-missing correlating with negative attitudes toward psi, psi-hitting correlated with positive attitudes toward psi), position effects (clustering of hits at the beginnings or ends of runs and displacement forward or backward by trials, both of which are associated with negative attitudes), and decline effects. This is followed by a review of electrophysiological and neuroimaging studies, some with selected and some with unselected subjects, suggesting that reduced physiological arousal is psi-conducive.

Chapter 4 by Adrian Parker considers psychokinesis (PK) within a dualist and other perspectives. One other perspective is panpsychism. This is defined here as “. . . the unique property of neural matter to provide the means for producing consciousness. . .” (p. 67). Next, evidence of PK is presented. Much of this is from subjective experiences of objects moving on their own, or macro-PK. Some has come from laboratories such as PEAR (Princeton Engineering Anomalies Research Laboratory) using random number generators (RNG) to study “micro-PK.” The positive results seen at PEAR have not been replicated with significant results or similar effect size according to Parker. Additionally, other studies have shown psi-missing attributed to micro-PK within micro-PK protocols. Such varying results might be caused by mixing gifted PK subjects with the average person who does not have such ability. That would explain why such a small effect is seen. Interestingly, based on a meta-analysis by Radin and Ferrari (1991) of dice-throwing studies, there is a very small but significant and consistent effect of PK with intention. This appears to be universal and is not present in control studies. This suggests that this small but



universal effect is not due to an error. Subsequently, Parker describes a PK-conductive psychological state involving “. . . suspension of one’s critical ability and dissociation from one’s ordinary sense of identity” (p. 75). This is followed by cases of poltergeists involving disturbed adolescents with apparent temporal lobe abnormalities. The conclusion of the chapter includes an introduction of the filter theory, attributed to F. W. H. Myers, about how much information processing takes place outside of conscious awareness.

Chapter 5, by Joan Hageman and colleagues, is titled “The Neurobiology of Trance and Mediumship in Brazil.” The chapter commences with a detailed list of “methodological pitfalls” in such studies. These include materialist interpretations (assuming region-specific brain activity as the origin and cause of such experiences), secondhand hearsay, causality/directionality within a proposed mind–brain interaction, superficially clustering subjects by their subjective experience, ignoring the holistic viewpoint, theories that do not include a mechanism of action or are not all-encompassing of phenomena, and finally using novices instead of expert subjects. This is followed by an overview of electrophysiology/neuroimaging studies of various trance and religious experiences including a table for comparison. Common findings include an increase in brain activity in the frontal lobes during trance. Next, they present two original studies conducted in Brazil with mediums. In the first study, two mediums and a control were used. To avoid motion-induced artifacts in the autonomic (hand temperature, EMG, heart rate, and skin conductance level) and central (EEG) measures, “. . . mediums were instructed to imagine incorporating a spirit (rather than to engage in direct incorporation)” (p. 97). This fact alone means that the results obtained do not necessarily reflect what occurs in the physiology of a medium when he/she actually does the regular process. Results from the two mediums were paradoxical, combining sympathetic activation in the ANS with relaxation in the CNS. Study two employed EEG (with no mention of montage or number of channels) with nine mediums, all free of known mental illness and use of indigenous ritualistic substances, doing their usual practices of mediumship.

EEG findings did not show a consistent pattern among the mediums, but ranged from absolutely normal electrical activity to some degree of EEG slowing. (p. 104)

This was determined by comparing the baseline with the trance states. Most noteworthy, none of these mediums showed any evidence of epilepsy. This chapter mainly shows that more and better research is needed in this area to elucidate neural correlates of trance and mediumistic experiences.

Chapter 6 by Norman Don is a presentation of his group’s research which includes unconscious physiological measures associated with psi. In a number

of the studies presented, behavioral performance on psi tasks was at chance level, but physiological responses to targets were different than responses to non-targets, providing evidence of unconscious physiological differences associated with precognition and clairvoyance, depending on the design. Following this, Don presents his EEG research with a professed psychic, Olof Jonsson. Jonsson claimed that he experienced three unique states (CD 1–3) which he associated with psi, CD 2 and CD 3 being the prime states for this. In the analysis, CD 3 was contrasted with CD 1. CD 3 with psi-hitting was associated with right hemispheric dominance shown by EEG power and 40 Hz occipital activity. Using Stepwise discriminant analysis, a model was developed that allowed for correct classification of CD 1 and CD 3 and classification of correct versus incorrect behavioral psi responses with the incredible claim of  $\geq 90\%$  accuracy. Based on this 40 Hz gamma activity, Don and colleagues decided to go back to reexamine the data in their ERP studies of unconscious psi. As expected, they found that there was “. . . significantly more 40 Hz EEG activity for target card imagery than for non-target imagery” (p. 118). This was demonstrated in the right frontal and posterior regions. Don and colleagues have also seen similar gamma activity in ayahuasca users during Brazilian rituals, trance surgeons during a “possession trance,” and even those claiming to have been abducted by extraterrestrials during self-initiated altered states of consciousness involving hyper-vigilance. This was often with simultaneous random event generators giving non-random output. Additionally, Don was inspired to examine the hits and misses in behavioral data. He created a table of this which resulted in what appeared to be a wave-like oscillating pattern. This was visible even though the behavioral results were at chance, suggesting the answers were random. However, despite there being no periodicity in the data, spectral analysis revealed peaks that were significant. Don termed these anomalies “correlation waves.” In further research, the peaks in these wave patterns tended to correspond to hits. Don interpreted this to represent a leak from the unconscious mind to consciousness based on placement of the trial within the run. Furthermore, Don claimed this was found in both precognition and clairvoyance experiments. Based on this, Don made a statement that this “. . . suggests that psi is woven into the very fabric of nature” (p. 125). On further speculation, Don ties this together with the gamma waves and correlation waves. While the information provided in this chapter is intriguing, there are many questions which remain unanswered to this reader. For instance, it is not clear from this chapter if the differences seen between target and non-target averages are statistically significant. Furthermore, the explanation of “correlation waves” is unclear. Finally, connecting gamma brain waves and correlation waves with psi and the fabric of the universe seems a bit premature. Presumably, many of

these issues would become clearer upon reading the original papers. However, a chapter such as this should be complete within itself.

Chapter 7 by Vernon Neppe is an attempt to present the neurobiology of “subjective paranormal experiences” (SPEs). Oddly enough, none of the published research by Varela and colleagues about neurophenomenology is included in the chapter. Out of body experiences (OBEs) and near-death experiences (NDEs) are discussed in relation to the supposed induction of similar experiences via brain stimulation, and in relation to traumatic insults and pathologies such as narcolepsy and temporal lobe sensitivities. Some of this appears to suggest that “REM intrusion” into normal consciousness may be associated with SPEs. Next, Neppe transitions awkwardly into a review of fMRI studies of ESP, commencing with an appropriately scathing review of Moulton and Kosslyn (2008) and their Harvard press release. Ironically, as Neppe reports, one pair of the subjects in this study appeared to show above chance on ESP scores, and trials of correct ESP responses were associated with unique brain activity changes (reductions in brain activity in temporal lobes and other areas). Moulton and Kosslyn dismissed this as artifact. In contrast to his previous assertions, Neppe proceeds to say that subtle differences associated with psi may not be easily seen in fMRI due to the low signal-to-noise ratio. There is substantial evidence against Neppe’s claim that subtle differences may not be seen in fMRI. Many event-related fMRI experiments have discerned parametric subtleties in responses and successfully deconvolved overlapping hemodynamic response curves even to very brief stimuli (for instance, refer to Dale and Buckner 1997). Next, Neppe proceeds with a brief survey of previous and generally more successful fMRI studies of ESP-related anomalies. Then there is a review of the temporal lobe’s potential involvement in SPEs via the use of the “Neppe Temporal Lobe Questionnaire” (NTLQ) and the “Inventory of Neppe of Symptoms of Epilepsy and the Temporal Lobe” (INSET) for possible temporal lobe symptoms (PTLS). Following this, Neppe provides a possible neuropsychological basis for SPEs involving frontal lobe inhibition or inhibition of the “cortical filters.” Obviously, research needs to be conducted to validate this theory. The chapter ends with Neppe’s own phenomenological classification of SPEs. Throughout this chapter, Neppe references his own prior work without clear explanations of meaning and definitions, using his own often idiosyncratic language. Such a chapter should be complete within itself and not require one to read all of Neppe’s work to make sense of it. Terms of this ilk include “dimensional biophysicist” (apparently replacing parapsychologist), parafamiliar, metafamiliar, queryfamiliar, and Neppe’s Anomalous Multiaxial Event System (NAMES).

Chapter 8 by Morris Freedman is simply titled “Psi and the Brain.” Freedman points out that despite the large body of literature on psi, there has



been a lack of focus on the potential neural correlates or specific brain loci correlated with authentic psi. Here authentic psi is differentiated from Neppe's SPEs and limited to lab experiments with objective measures including REG and neuroimaging. Freedman elaborates that there are many brain regions that have been theorized to be involved with objective psi, e.g., reticular formation of the brain stem and right hemispheric occipito-parietal regions, in contrast with SPEs which appear to involve the temporal lobes. One theory given about the reason for the elusiveness of psi is that we have developed, evolutionarily, a filter to inhibit the overwhelming surge of psi-related input we receive at every moment. Without such a filter, we would be overwhelmed and unable to focus on information vital for our survival. If we could discover the nature of such a filter, and find a way to inhibit it, this might uncover the neural correlates that mediate authentic psi and improve access to strong psi phenomena. As in the previous chapter, there is mention of reducing self-awareness and frontal lobe activity, perhaps via altered states of consciousness that may be intertwined with this filter. Freedman further explains that neuropsychological patients with frontal lobe lesions or disorders with known deficits in frontal lobe functioning could be key to examining this theory. He then presents a pilot study using patients with pre-existing frontal lesions. A random event generator (REG) was used with a visual stimuli representing the outputs. Only one patient, one with a left frontal lesion, was able to significantly alter the REG output, and thus the visual display, toward the right hemifield with directed intention. One possible explanation given is that an intact right frontal lobe is required to sustain attention to complete the task at hand. Thus, right frontal lesion and bilateral lesion patients were unable to accomplish this. Freedman rightfully suggests that further research is needed to verify the importance of left frontal lobe inhibition in psi tasks. Note that transcranial magnetic stimulation (TMS) might be used to create reversible functional lesions in human subjects, e.g., to test this theory.

Chapter 9, by David Luke and Harris Friedman, focuses on the neurochemistry of psi and SPEs. Psychedelic psychotherapy using LSD has yielded much evidence of psi-related SPEs. Furthermore, self-reports of psychedelic users has also yielded a high percent of such experiences using the Anomalous Experiences Inventory. It is not clear if this is showing a cause and effect relationship between the use of psychedelics and such experiences. It may be that people who choose to use psychedelics do so because they believe in SPEs and are trying to induce them. Therefore, belief and corresponding interpretation of experience may have more to do with SPEs in these people than do the psychedelics themselves. Alternatively, these substances may be inhibiting frontal lobe activity and self-awareness of the body, leading to dissociation and inhibition of a possible psi filter. The authors review seventeen

studies involving the use of psychedelics in the lab with psi tasks using a forced-choice paradigm. The majority of these were exploratory and lacking methodological rigor such as a control condition, etc., and they did not yield significant results. Only one such study (van Asperen de Boer, Barkema, & Kappers 1966) demonstrated that psilocybin produced psi-hitting significantly greater than chance using a Zener-card-like task. Free-response experiments have yielded much better results than forced-choice protocols. As expected, Luke and Friedman report that subjects in these studies were “high” and thus it was difficult to get them to focus on a laboratory experiment. Osis (1961) and Wezelman and Bierman (1997) are examples of studies also showing significant results. Again, as in previous chapters, a model of the brain as a filter to psi is suggested. Psychedelics, as Huxley (1954) put it, may “. . . override the ‘reducing valve’ of the brain” (p. 167) and thus permit psi to emerge into conscious awareness. Subsequently, Luke and Friedman present several neurochemical models of psi and SPEs based on psychedelics and their central mechanisms of action. This includes a disruption (via antagonism of 5-HT<sub>2A</sub> receptors) of the cortico-striato-thalamo-cortical circuit, the  $\beta$ -carboline and tryptamine model via MAO inhibition as via DMT (dimethyltryptamine) and ayahuasca, or endogenously via pineal secretions, the DMT model again with endogenous involvement of the pineal, and a ketamine model of NMDA-receptor binding, blocking glutamate and eliciting dissociative experiences. As the authors readily admit, this chapter is highly speculative. The conclusion of the chapter is that there are four possible models of psi and SPEs: (1) the brain acting as a filter, (2) the  $\beta$ -carboline and tryptamine model, and the (3) DMT and (4) ketamine models. However, one possibility, as mentioned by the authors, is that all of these models interact, intersect, or even overlap. Psychedelics and ketamine may work via different mechanisms to inhibit the frontal lobe function where such a psi-filter may exist.

The book ends with a Postscript by Stanley Krippner and Harris Friedman, emphasizing a “costly signaling theory” (CST). In accordance with CST, such a signal between people (perhaps telepathy) would need to be “. . . reliable, authentic, and fairly impervious to fakery” (p. 191). However, this is not how psi appears to work. Furthermore, the explanation of this theory in the context of psi is not very clear here. Following this is an overview of the book’s various chapters, and excessive references to Gazzaniga. Mirror neurons are presented as binding people. Could this be a neural interface of telepathy via some non-local or quantum entanglement-like mechanism? At this point, that is mere conjecture. The Postscript ends with a non-materialist explanation of consciousness in which a mind may exist outside of the brain.

In sum, this book provides a wealth of information and varying opinions of relevant studies of SPEs and psi; some contesting the existence of psi,



whereas others provide evidence in favor of it. The studies presented are a bit selective and uneven in quality. This is all within the context of possible neural correlates of psi and related SPEs. Suggested neural correlates for psi and related SPEs include slow cortical potentials, gamma waves (40 Hz), and temporal lobe abnormalities as shown in EEG; fMRI correlates; reduced physiological arousal, as measured by psychophysiology and neuroimaging, shown to be conducive to psi; the model of the cortex (possibly the frontal lobes) acting as a filter for unconscious psi; and psychedelic models of psi including serotonergic and glutamatergic systems possibly inhibiting the frontal lobes and thus the filter of psi. Several chapters mention the need for theories of mechanism of action of psi and related experiences while ignoring the evidence for psi. Other chapters supply metaphors of quantum mechanics without a direct mapping onto phenomena. In order to progress in this field, testable hypotheses of mechanisms of action are needed. Some theories may help divulge a mechanism of action of psi, whereas others may not. If theories are not supported by evidence, this does not discount the possibility of psi. However, it remains clear that until a mechanism/or mechanisms of action for psi can be supported by objective evidence, leading to predictions of outcome and replicability, this debate will be ongoing.

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