

*Part 6: Presidential Address**

Heretical Psychology: On the Scope and Substance of Psychical Research

*K. Ramakrishna Rao (Institute for Parapsychology, Box 6847 College Station, Durham, NC 27708)***

In my first presidential address to the Parapsychological Association in 1965, I referred to my 5-year-old daughter, Vani, who seemed consistently to confuse her right shoe with her left, which I thought was a perceptual analog of psi-missing (Rao, 1965). Vani has now grown up to be a physician and has grown out of her seeming perceptual confusion without leaving any trace behind. But my interest in psi-missing has not diminished as I have continued to encounter it, failed to understand it, and, if anything, am more bothered by it now than in 1965. Between now and 1965 a great deal has happened to us, the world we live in, and the organization we belong to.

At a global level, the changes and, indeed, our achievements during the past quarter of a century are truly remarkable. We saw man walk on the moon and experience close encounters with Mars and Venus. The Berlin Wall came tumbling down. Communist states are beginning to embrace market economy and other capitalist practices. Microprocessors and computer technology have brought about a communication revolution. Cognitive psychology has displaced behaviorism in most of

*Chaired by Stephen E. Braude

**Presented on August 18, 1990.

academic psychology. Consciousness is no longer a taboo word, an untouchable forbidden from the temple of science as it was during the heyday of behaviorism. Hundreds of thousands of people have paid millions of dollars to be initiated into meditation. In short, there has been a "consciousness" revolution!

If I were naïve and unfamiliar with the goings-on in our own area of endeavor, I would have thought that the present is the most propitious time for new initiatives to explore those regions of our being that have eluded scientific understanding for centuries. The unquestionable success of science in unravelling many a mystery, the exuberance and the euphoria that underline current scientific enterprise as the royal route to all the unsolved mysteries and hidden wonders should lead us, I would have expected, to forecast a climate that is extraordinarily hospitable for growing new ideas and harvesting new facts on the soil of science. Need I remind you, however, that at least as far as our field is concerned, this has not happened? There is little money to support psychical research, several outstanding parapsychologists find themselves unemployed, and the field itself is suspect in the eyes of many who control and guide the inputs necessary for developments in science.

I have often wondered why. Why on earth are we perpetually on the defensive? What has happened to the enthusiasm to seek the impossible that is believed to nurture many a significant advance in science? Where is the appetite for the anomalies that is supposed to stir up the striving for scientific inquiry? What has gone wrong? How can it be remedied?

In 1965 I honestly felt that we were on the threshold of gaining scientific acceptance and academic legitimacy for psi research in the Western world. I was confident that we had methods and means to investigate the areas that were well mapped by our pioneers, that our results were falling in place to enable us to make reasonable generalizations, and that it was just a matter of time before our work would become integrated with other sciences.

Even 12 years ago when I had the privilege of being your president again, I sensed little that deflated my earlier enthusiasm and optimism. We were then meeting at Washington University in St. Louis. James McDonnell was very much with us, giving us the renewed confidence that men and women of

wealth and vision were ready to back us up. The parapsychology program at Utrecht seemed to thrive. So did the initiative at John F. Kennedy University. Robert Jahn was launching his successful engineering anomalies research at Princeton University. The impressive advances in micro-PK research and the promising results relating ESP performance to internal attention states, as Honorton called them, had given added impetus to our endeavor and legitimate confidence in the viability and progressive character of our research programs. The weakness in the arguments of our critics, such as Persi Diaconis (1978), at that time appeared so transparent that few would fail to see them. We were ready to take off, I thought. Of course, I did not expect a parapsychologist to win a Nobel prize. Nor did I imagine that a scientist aspiring to be a Nobel laureate would go out of the way to invent and concoct false scenarios about dishonesty and incompetence, and appeal that we should be driven out of the workshop of science!

In a sense, the turn of events is somewhat paradoxical. It was not that the research lagged behind; nor was there any erosion in the expanding interest in the paranormal. Recent meta-analyses of parapsychological results have confirmed our subjective impressions of consistency in the results over time and across studies (Honorton & Ferrari, 1989; Radin & Nelson, 1989). Surveys continue to reveal pervasive interest in the paranormal, and the interest is no less among those who have had college education (Wagner & Monnet, 1979). Today we have a solid database, sophisticated and sensitive methods for data collection and analysis, and areas of research that enjoy enormous popular and media interest. Yet sources of support have shrunk significantly. Academic repression is as high as it has ever been. People of science such as John A. Wheeler and writers such as Martin Gardner join magicians such as the Amazing Randi with a missionary zeal to make us see the Lord's way.

The Committee for the Scientific Investigation of Claims of the Paranormal has spread its proselytizing efforts across the globe. Prometheus Books has printed or reprinted over a dozen volumes of critical material in the last few years. Even the National Research Council (Druckman & Swets, 1988) found it expedient to deny that there is anything significant going on in parapsychology. It did not matter that much of the critical

material is as old and dated as G. R. Price (1955) and C. E. M. Hansel (1961). It did not matter that the authority for the NRC was the judgment of those already known to have prejudged the case against psi.

And it did not matter even that the main skeptical arguments had been repeatedly rebutted in the past. What matters apparently is that we be driven out of the workshop of science. What amazes me is the amount of hostility psychological research seems to provoke in this part of the world among some otherwise normal and well-meaning human beings, a reaction not unlike the one we sometimes note among the provoked religious fundamentalists, whom we consider to be living in a less civilized world.

I have called your attention to this somewhat bleak picture of our present state, not merely to share my changed perspective from an earlier exuberant and unbounded optimism with which my involvement in parapsychological research began 40 years ago to my current cautious and possibly more realistic and hopefully mature appreciation of the potential and the pitfalls in treading new paths in science. Rather, I intend to argue that the subject matter we deal with in parapsychology is by its very nature heretical; and, therefore, the hostility, ridicule, and even downright condemnation that we encounter in our pursuits are what we must expect. The current interest in consciousness among scientists is insufficient in and of itself to promote an unbiased study of the phenomena that appear to defy physical explanation. True study of consciousness calls for a conceptual revolution, a revolution that must be led by unorthodox and heretical disciplines like parapsychology. Parapsychology is heretical psychology in that its subject matter is the anomalies that psychology, as it is conceived today, abhors. If we begin from the side of "normal" psychology, we are inevitably led to the rejection of psi anomalies. If, however, we begin with the anomalies themselves we have a chance to transform psychology itself. Therefore, it is better, I think, to be heretical and become the victims of intellectual hostility than to claim normality for the phenomena and respectability for ourselves. To succeed we must recognize that we are in a revolutionary struggle and be prepared to confront all adversities and adversaries with tact

and circumspection, when possible, and with courage and confrontation, if necessary.

PARAPSYCHOLOGY AS HERETICAL PSYCHOLOGY

The problems of parapsychology are twofold. First, with its expressed interest in naturalizing the supernatural, parapsychology is opposed to a belief in the occult and the miraculous. This stance has two consequences. The believers in the occult and the "other world"—and there are many of these as you know—either denounce parapsychology as a devil's workshop or go about claiming falsely that psychical research has provided proof for their beliefs and practices. Second, all our well-meaning attempts to relate psi to natural phenomena notwithstanding, we cannot ignore the fact that we are left with a subject matter that at once arouses intellectual hostility.

Brian and Lynne MacKenzie (1980) have appropriately called our attention to the twin facets of parapsychology's interface with science: acceptance of and commitment to publicly observable evidence and the historical nonnaturalistic orientation. We share with natural science its method of collecting data that, when found, would at once demolish the assumptive base of all natural science. Therefore, the MacKenzies (1980) assert:

To the extent that an undeniable demonstration or successful theoretical interpretation of the paranormal would have revolutionary implications, to that same extent will parapsychology remain scientifically unacceptable and its findings be scientifically repudiated. Until (or unless) this nexus can be broken by an achievement in the field considerably more compelling than any made up until now, parapsychologists should not expect any more lasting acceptance from their critics than they have received so far [p. 163].

"Undeniable demonstration" of psi, I am persuaded, is unlikely to be achieved in the near future for at least two reasons. First of all, phenomena, such as psi, which are perceived to be "impossible" on a priori grounds may be hardly expected to admit conclusive proof in the sense of a crucial experiment.

Ableson's Law, if I may use such an expression, states "extraordinary claims require extraordinary evidence." In other words, "impossible" phenomena require evidence impossible to obtain. Second, it may be in the very nature of psi that it is capricious and uncontrollable in the ordinary sense, which rules out as a viable option its public demonstration, meaning production on demand.

"Successful theoretical interpretation" of psi would mean either that psi be incorporated into the existing scheme of things and explained within the overall ambit of natural science or, alternatively, that the very constructs of natural science be revised and reformulated to accommodate the anomalous psi phenomena. In other words, we would either find a conventional explanation of psi (in which case it would cease to be anomalous or paranormal) or natural science itself would undergo revolutionary changes in its conceptual and assumptive base. In either case, the thrust would be to diffuse and eliminate if possible the conflict and confrontation, and bring about congruity between natural science and the putative paranormal phenomena by integrating their basic assumptions.

We see that most experimental parapsychologists have shown their inclination to make necessary conceptual adjustments in order to lessen psi's transparent confrontation with natural science. So far, we all know, it has not worked for the simple reason that these adjustments cover up at best and render the conflict less transparent, rather than dissolve the inherent incompatibility between the implications of psi and the assumptive base of natural science.

Two considerations, which are by no means obvious and self-evident, seem to underscore the attitude that calls for an integration of psi and natural science as a prerequisite for accepting psi as a valid phenomenon worthy of inquiry. First is the belief in what may be called the integrity of the universe by which we understand that there is implicit order and uniformity in the universe and that it is governed by laws that have universal validity. This in a sense is scientific monism, which assumes that in the final analysis what is true of matter is also true of mental phenomena and that the laws that explain one set of phenomena may not conflict with those that account for another set. Second, physical laws, that is, laws that explain physical phenom-

ena, have greater intrinsic validity, and therefore any explanations of mind/consciousness or behavior must be consistent with those laws that provide the reference points for cross-checking their validity. In other words, explanations of mental phenomena must be consistent with physical laws.

The above assumptions are mostly justified on pragmatic grounds rather than by any logical necessity. Natural science has recorded extraordinary success warranting the belief that its assumptions must be true, whereas progress in understanding human nature is halting and unimpressive. It does not follow, however, that physical laws have greater intrinsic validity than psychological laws for this reason alone, because it might be the case that the lack of progress in psychological science is a consequence of adopting the physical model rather than its own. The assumption of primacy of physical laws essentially preempts the development of psychological science independently of natural science.

There is no logically compelling reason why we may not accord primacy to consciousness and the principles that govern it, as the idealistic philosophers have tried to do, and demand that the physical theory be consistent with these principles. That the past progress in physical theory is not due to an extension of the "mental" theory but due to the development on its own is not reason enough to dispute that a "better" theory of mental phenomena might not be more successful in explaining the physical phenomena or that genuine progress in understanding mental phenomena will be made only when these phenomena generate their own model instead of borrowing one from the physical domain.

What I am saying, then, is that a variety of logical possibilities exist and that it is premature to foreclose by favoring one and rejecting the rest. It is possible that there is essential integrity in the universe and that the same set of laws apply to both physical and mental phenomena. It is also possible there is no such integrity, that each of these realms has its own set of laws, and that it is therefore futile to attempt to integrate them. Even if the postulated integrity exists, it is logically inappropriate to accord primacy to one over the other without convincing ourselves that our present knowledge of the universe, whether physical or mental, is essentially valid. If, however, we accept

the fallibility of our understanding of the universe and ourselves in it, we become aware of the arrogance implied in the demands for mutual congruence between our understanding of the physical and mental aspects of the universe. Therefore, a reasonable approach, it seems to me, is the one that allows the inquiries in the physical and mental domains to go their own way expecting that if there exists intrinsic integrity in the universe, then the congruence between the understandings of the physical and the mental becomes increasingly apparent as the investigations progress. In other words, the congruence and compatibility between our understanding of the physical and mental phenomena must be the end point of inquiry and not its beginning. At the present time, any demand for congruence and compatibility between physical and psychological theory is highly inappropriate, especially when we note the enormity of the difference in the state of their development, the physical theory being admittedly much farther advanced than the psychological theory.

While questioning the logical validity of the congruence model, I am not at the same time rejecting its pragmatic value. In fact, it is its pragmatic utility that makes up for its logical weakness and makes it a favorite among scientists. Science functions in two modes, creative and communicative. In the creative mode, science is concerned with discovery and invention. In the communicative mode, it is involved in consolidation and systematization of knowledge, without which it is hardly feasible to communicate the fruits of past efforts that often form the starting points of further inquiry. The congruence model is thus more appropriate for science in its communication mode than in its creative function. We must become wary when the concern for communication clouds the creative enterprise of science.

Let me also hasten to add that by freely using the concepts *physical* and *mental* I am not espousing a dualistic view. I take them as experientially givens that call for explanation and understanding. In advocating that each set of phenomena be investigated within their own framework without subjecting them to a test of congruence and compatibility derived from another set of phenomena that seem *prima facie* different, I am rejecting *scientific* monism in favor of *scientific* pluralism. Please note that I am referring to *scientific* and not *metaphysical* mo-

nism and pluralism. I imply here no ontological commitment. Scientific pluralism may eventually support metaphysical monism, if science is ever to provide decisive evidence bearing on metaphysical issues.

If my reading of the history of science is correct, both physics and psychology originally commanded exclusive domains. Natural scientists did not hesitate to relegate everything and anything that they could not deal with to the realm of the mind. Psychology itself began as a distinct scientific discipline with an explicit concern for studying mind/consciousness. For structuralists W. Wundt and E. G. Titchener and functionalists William James and J. R. Angell, the subject matter of psychology is consciousness by which is meant the characteristics that are excluded in principle from the physical world. In a sense, it is unfortunate that neither the structuralists nor the functionalists pursued the implications of their definitions far enough to arrive at a true science of consciousness. It is their respective philosophical positions that constrained them. For example, James was not merely a functionalist but a pragmatic functionalist. His radical empiricism essentially limited his options. So we find him caught on the horns of a dilemma, tossing between the concern for the vital phenomena encountered in his studies of religious experience and psychical research and the commitment to see the world as a radical empiricist. Similarly, structural atomists Wundt and Titchener paid their price for their metaphysical assumptions.

When J. B. Watson arrived on the scene with his behavioristic manifesto, psychology, caught as it were in the feverish enthusiasm to become a "respectable" science, chose to do so by adopting the role model of classical physics. For the next one-half of a century the dominant trend in psychology was to seek mathematico-physical explanations for the phenomena of its study. Concepts such as *consciousness*, *experience*, and *imagery* that did not admit mechanical analyses into physical operations were thrown out of court, and many areas of psychological concern were thus vengefully discarded or blissfully ignored.

It has become increasingly apparent that we have not succeeded in assimilating all mental functions to physically verifiable processes and that some of the higher order mental functions seem to be essentially irreducible to deterministic

equations. This awareness has made psychologists generally uneasy to uphold a rigid behaviorist stance and has prompted them to pay more attention to mental phenomena, which behaviorism banished earlier from psychologists' universe of discourse. So we find cognitive psychologists such as Neisser (1967) asserting that "the world of experience is produced by the man who experiences it" (p. 3).

These are indeed welcome developments. But it would be a mistake, I think, to interpret the current dominant trend as one that will lead us to a true science of consciousness. The fear of the "ghost" still haunts much of psychology. Although few such as B. F. Skinner (1975) today admonish psychology for its "diverting preoccupation with a supposed or real inner life" (p. 46), many psychologists attempt to understand consciousness in terms of processes derived from existing theoretical structures external to psychology, such as information theory. Even those psychologists who are not inclined to believe that consciousness can be localized in certain brain tissues do not seem to consider consciousness as something that can be studied on its own. The trend is to displace consciousness with concepts such as information. "Cognitive psychology took an enormous step forward," wrote J. P. Guilford (1982), "when it substituted the concept of information for that of 'consciousness.' Information is much more manageable than consciousness in many ways" (p. 49). Mind, for many cognitive psychologists, does not seem to be any more than an information-processing machine.

Therefore, I am not persuaded that mainstream psychology will in the foreseeable future venture into a study of consciousness as such. The congruence model to which most psychologists subscribe overwhelmingly favors the identity hypothesis, that consciousness is in the final analysis identical to certain physical events taking place in the brain. Orthodox science takes few high-stake risks. For one working in traditional areas, the identity hypothesis works rather well. In their own work, many scientists do not encounter any compelling data that present insurmountable theoretical difficulties leading them to question the identity hypothesis. Even when they find some gaps between the physical properties of the brain and certain mental phenomena, it is far more comfortable to continue in the hope of filling

the gaps as our knowledge of the cerebral processes increases than to conjure up bold new paradigmatic theories.

Therefore, it is unlikely that a study of consciousness qua consciousness will come about from the physical end or from psychologists who have historically followed the lead of natural science. It must, then, begin at the other end, where phenomena have conceivably no physical explanation. Suppose it is possible, as several of us here believe, to become aware of events that do not exist now but will come into being in the future in the absence of any discernible causal or inferential links that connect us with the event, that human intentions correlate significantly with external events without any conceivable mediating physical energy source, and that one may experience memories of a person who is already deceased. These are some of the phenomena that call for a radically different postulation, because they are surely anomalous phenomena for which there are no conventional explanations. It is here, I believe, the study of consciousness qua consciousness must begin. Consequently, I am inclined to think that it is for parapsychology to herald the science of consciousness, a prospect psychology has given up since its inception as a distinct science, separate from philosophy.

I agree with Stephen Braude (1986) that there is no logical necessity to postulate any conflict between physical laws and psi and other phenomena of consciousness. Any perception of a conflict, as I have tried to show, is due to the commitment to the coherence model and the needless assumption that all phenomena must obey the laws of physics. As Braude writes, "If there are vital or intentional processes in nature not analyzable into or describable in terms of impersonal or mechanistic forces, those processes would not *violate* the laws of physics. . . . Those vital processes would simply be *outside* the domain of physics" (pp. 17-18).

In breaking with the historical tradition of psychology to regard behavioral/mental phenomena as essentially explainable in terms of physical processes, parapsychology becomes heretical. In its heretical role, one would hope that it would herald the true science of consciousness, that is, the study of consciousness qua consciousness. We assume that consciousness is a fact of nature and that it can be studied empirically by investigating it

in its pure form or as it manifests in, or causes to manifest, certain phenomena.

At this point of our ignorance of its nature from a strictly scientific point of view, we may at best conceptualize consciousness broadly on the basis of some analogies. As I said earlier, the world out there and my awareness of it are two experientially given sets of phenomena, and the understanding of each is best done by considering each set independently of the other. We postulate that there is matter that is basic to all the objects, the furniture of the universe. Similarly basic to all our awareness, there may be underlying consciousness. Consciousness is to mental phenomena what matter is for all physical phenomena. The concept of pure consciousness may be an abstraction in the sense that matter is an abstraction because in experience it manifests in various grades and shades. I believe Frederic Myers and Henri Bergson have in the past indicated some of the directions the study of consciousness qua consciousness may take. Myers' (1903) monumental work *Human Personality and Its Survival of Bodily Death* is a pioneer attempt to lay the foundation for a true science of consciousness. Myers believed that consciousness is more than that which we are ordinarily aware of. Our ordinary consciousness, which Myers calls supra-liminal consciousness, "does not comprise the whole of the consciousness or of the faculty within us. There exists a more comprehensive consciousness, a profounder faculty" (p. 12), which he refers to as subliminal or ultra-marginal consciousness. Consciousness is like radiation beyond the visible spectrum. Its various states of which we are ordinarily aware are like those that fall within the light spectrum, that is, between violet and red. But there are others beyond the red and the violet. Myers points out that "representing conscious human faculty as a linear spectrum whose red rays begin where voluntary muscular control and organic sensation begin, and whose violet rays fade away at the point at which man's highest strain of thought or imagination merges into reverie and ecstasy" (p. 18). Thus at either end of the psychological spectrum, Myers sensed a wide variety of conscious states that go beyond sensation and intellect. And his book *Human Personality* was an attempt to study them.

Similarly we find in the writings of Henri Bergson (1911, 1912, 1913) many heuristic ideas for developing the science of consciousness. In fact, there is today a greater appreciation of Bergson's philosophy, not as "a romantic revival of anti-scientific vitalism," but as something that is "strikingly akin to developments in modern physics" (see Papanicolaou & Gunter, 1987). Surprisingly, however, Bergson has had little influence on contemporary theorizing in parapsychology, even though Bergson himself was a president of the Society for Psychical Research and made several important suggestions for understanding and explaining psi phenomena. His view of time as qualitative, heterogeneous, and nondiscrete, and his distinction between the processes of pure memory, memory-image, and perception are pregnant with possibilities for a new science of consciousness.

In recent years one impetus to study consciousness qua consciousness came from the impact on prominent scientists of Maharishi Mahesh Yogi's Transcendental Meditation. For example, Nobel laureate Brian Josephson (1984) has come out strongly in favor of studying consciousness, which he believes may provide better explanations of certain classes of phenomena and may even enable us to discover new phenomena. Following the Maharishi, Josephson postulates the existence of pure consciousness, "that limiting state of consciousness which is completely undisturbed by other entities; in other words it consists only of the phenomena of consciousness interacting with itself" (p. 12). Josephson goes on to suggest that behavior is regulated by concepts present in consciousness and that the evolution of a nervous system is a response to generate the required states of consciousness. Also the nervous system has the potential capacity to interact with pure consciousness so that new ideas in mathematics and other creative arts can be generated by "perturbing pure consciousness in particular ways." Josephson believes that conscious experience is quantifiable and therefore is amenable to scientific inquiry and that controlled experiments to study pure consciousness are possible, as in the case of TM-Siddhi techniques.

In a sense, the science of consciousness is broader than parapsychology, which is limited to the investigation of psychic abilities, PK and ESP, and the implications of their existence.

In another sense, parapsychology is central to consciousness studies because, with the possible exception of religious phenomena, there do not seem to be any others whose explanations more strongly require consciousness than psi. Even the quantum physical theories of psi (Walker, 1970) require an observer and, by implication, consciousness. There are obviously other areas such as transpersonal psychology and meditation research that have dealt extensively with consciousness in recent years. Unfortunately, the progress in these areas has been vitiated by a number of factors, not the least of which is the failure of their proponents to stick to the rules of scientific discourse, with only a few exceptions.

Much of the discussion of consciousness in psychological discourse is vitiated by a lack of conceptual clarity resulting in serious problems of communication. Even the contemporary theorists, including those who insist on objectivity, have not succeeded in arriving at an agreed-on connotation, which is possibly the reason why widespread scientific discussion is lacking. Some have seen consciousness as an ability, to some it is a state, and yet for others it is reflected in the content. Consequently, the concerns of researchers have also varied. Some looked at the functions of consciousness (e.g., Luria, 1978), whereas structure was the main concern for a few (e.g., Pribram, 1976a, 1976b, 1984). Some postulated varied modes of consciousness (e.g., Deikman, 1973; Ornstein, 1977), yet others speculated about levels of consciousness. Sometimes the answers are sought in physiology. Metaphors and models are also used. In a few cases, neural organizations or special entities (Popper & Eccles, 1977; Sperry, 1976) are proposed to account for conscious experience. All this is interesting, but we are left with a confusing picture as to what precisely it is that is being explained.

I believe even the mighty William James himself might have felt a similar dissonance when dealing with consciousness. How else can we account for his fascination as well as his despair? For example, he wrote: "The first and foremost concrete fact which everyone will affirm to belong to his inner experience is the fact that consciousness of some sort exists" (1893, p. 152). Again, "Our normal waking consciousness, rational consciousness, as we call it, is but one special type of conscious-

ness . . . there lie potential forms of consciousness entirely different" (1890/1973, p. xxx). But in later years, for example in his essay "Does 'Consciousness' Exist?," James (1912/1938) conceded that it does not exist.

Awareness is often considered to be synonymous with consciousness. This is certainly the case in common sense usage and is consistent with dictionary meaning. But there is meaningful mentation below the threshold of awareness. Exclusion of that leaves out a great deal of mental phenomena that we need to explain. Also, consciousness as awareness becomes a mere quality imposed on certain contents of experience. That quality may indeed be no more than the result of certain cortical processes, because their destruction leads to loss of awareness. It may be the reason why Charles Tart finds it necessary to include attention along with awareness in describing consciousness. Again, several philosophers have regarded intentionality as the essence of consciousness. For example, Brentano pointed out that "intentional inexistence is excessively peculiar to psychical phenomena" by which he meant phenomena that "intentionally contain an object within themselves" (quoted from Klein, 1984, p. 25). Pribram (1984) also lays special emphasis on attention. "Consciousness," writes Pribram, "refers to states which have contents; 'attention' refers to processes which organize these contents into one or another conscious state" (p. 329). In Eccles' theory, the main function of the conscious self is seen in volitional acts. Volition necessarily involves attention. Even in the information-processing models, attention has an important place. Note also in Harris Walker's (1970) quantum mechanical theory, the will channel is postulated as necessary for the collapse of the state vector. Therefore, it seems to me that attention is the crucial concept in understanding consciousness, which manifests in various forms of mentation and could take place below or above the threshold of awareness. Mental activity, it would seem, is brought about by attention channeling consciousness in various ways.

There is another, perhaps more important, reason why I consider "attention" as crucial for understanding consciousness. Several of the psychic development techniques that are believed to produce higher order psychical phenomena, such as those we deal with in our research, seem essentially to involve manipula-

tion of attention in a variety of ways. Therefore, we may benefit from the study of the traditional psychic development strategies such as Chinese Qigong, Indian Yoga, and Japanese Zen. There is already an impressive scientific literature on meditation, even though much of it has suffered from conceptual confusion, methodological weaknesses, and some overgeneralizations (Rao, 1989).

OF MEDITATION AND ATTENTION

During the past 20 years, there has been a considerable amount of popular and scientific interest in Western countries in the study and practice of meditation. A recent review of meditation research by Murphy and Donovan (1988) contains a bibliography of over 100 pages. It appears that meditation was a response to the psychedelic "challenge" of the 1960s (Carrington, 1977). Experience with mind-altering drugs led to a heightened interest in altered states of consciousness. Meditation seemed to produce an agreeable state without involving any chemical stimulation. Those age-old claims of yogins and others proficient in meditative practice that they could produce extraordinary phenomena became more credible as laboratory evidence indicated that autonomic functions may be controlled by means of suitable feedback and reward systems (Barber, DiCara, & Kamiya, 1972). Also, the successful promotion of Transcendental Meditation as a simple and easy-to-practice technique for stress reduction has greatly contributed to both the popularity of meditation as a technique and the widespread interest in studying it scientifically.

This rather abrupt eruption of interest in meditation was not without its share of problems. The concept itself became somewhat nebulous, resulting in a variety of ambiguities in its usage. Research on meditation suffered much on this account, which led one researcher, who himself wrote extensively on meditation, to complain that "ninety-seven percent of meditation research is not worth the paper it is printed on" (J. C. Smith, personal communication).

For one thing, there is the confusion as to whether meditation is a state or technique. Meditation as popularized is a practicing

technique, but as a subject of research it is equated with a state. The necessity to distinguish between the state and the technique led some writers to coin such phrases as "meditative experience" (Goleman, 1977), "meditative mood" (Carrington, 1977), or "relaxation response" (Benson, 1975). To compound this confusion, meditation technique is not clearly limited to one practice or to one set of practices. Sometimes any practice that is believed to produce a particular state is regarded as meditation (Smith, 1986). At other times, engaging in a certain practice is automatically equated with being in a meditative state (Wallace, 1970). Thus there is a general failure to clearly define meditation either as a technique or a state; if it is a state, we need precise criteria for identifying it; if it is a technique, it should be clearly described.

The confusion probably has roots in the classical writings associated with different systems of meditation in which there was no particular need for making the distinction, probably because of the presumed identity of ends and means. In the Buddhistic practices as described by Buddhaghosha in *Visuddhimagga*, *jhana* (Sanskrit *dhyana*) it is a state. In fact, eight *jhana* states are distinguished. By the time one reaches the fourth state of *jhana*, there is the cessation of all those limiting conditions that bind the mind and limit mental functions. The last four stages are efforts to seek out or realize answers to ultimate philosophical questions and experience reality the way it is. In the raja yoga as described in Patanjali's *Yoga Sutras*, meditation (*dhyana*) is a technique that in combination with *dharana* (concentration) and *samadhi*, produces a state called *samyama* that is comparable to Buddhistic *jhana*. The counterparts to *dharana* and *dhyana* of yoga are *upacara* and *appana* in Buddhistic psychology. *Upacara* is concentration that is unsteady, whereas *appana* is steady concentration leading to a state of absorption.

Meditation as Deployment of Attention

Meditation in classical terms is a pursuit toward transcendence from the constraints of the human condition. It is a quest for perfection, a quest to experience consciousness in and of itself, unblemished by the sensory modalities. This can be achieved, we are told, through effort and the practice of certain mental

disciplines. As we travel on this path to perfection, it is believed, we find ourselves on the new frontiers of unfolding human potentials that hitherto have lain dormant and hidden from us. It is hardly a concern of the traditional meditator to lower anxiety or control blood pressure. In fact, such concerns are attended to as preparations for meditation. It would appear, therefore, that the concerns of the contemporary meditative systems to help achieve psychosomatic well-being seem to be somewhat misplaced.

In the yoga system, for example, cultivation of certain attitudes and habits and the practice of bodily and breathing exercises precede meditation proper. It makes good sense to consider them as preliminary steps that would enable one to practice meditation more efficiently. If the purpose of yoga is to gain control over one's mind through concentration and meditation, all distractions that hinder such concentration and attentional focus must be overcome before one can meditate well. Therefore, to regard meditation as a practice that will overcome these distractions may be somewhat like placing the cart before the horse.

There are many important differences between classical and contemporary approaches to meditation: (a) In the classical traditions, meditation is a rigorous discipline practiced for many years before one considers oneself to be proficient; (b) teaching of meditation in traditional systems requires close supervision and personalized attention by the teacher, who provides constant guidance; (c) meditation proper precedes several preparatory steps that are considered necessary in most cases for its proper practice; and (d) good health and well-being are not the effects of, but necessary conditions for, practicing meditation.

The core commonality among all systems of meditation, past and present, undoubtedly has to do with *attention*. Most reviewers of the varieties of religious practices seem to agree on that (Goleman, 1977; Naranjo & Ornstein, 1971). Attention seems to be the essence of yoga, if by the latter we mean the control of normal mental functions (*Chitta Vrittis*). In the commentary on *Yoga Sutras*, Vacaspati Misra defines attention as one-pointedness. It is the focusing of the mind on one object to the exclusion of others. According to Buddhaghosha, attention narrows the focus of consciousness and makes the object of

attention distinct. Inasmuch as attention involves the absence of distraction, it leads to peace and equanimity, to growth, fulfillment, and perfection. Bhatta Akalanka mentions the following conditions as necessary for focusing attention:

(1) a congenial environment, which is neither too hot nor too cold, which is free from the scorching sun and rain, which is not infested by wild beasts, birds and reptiles,—that divert the internal organ and the external sense-organs to improper objects; (2) a favourable posture of the body; (3) inhaling and exhaling slowly and steadily; (4) inhibition of distracting bodily actions; (5) suppression of attachment, aversion and delusion; (6) fixation of the mind without wavering on a desirable object; and (7) suppression of lethargy, sleep, attachment, sex-love, grief, mirth, fear, doubt, desire and aversion [Cited in Sinha, 1961].

Vyasa, commenting on the *Yoga Sutras* of Patanjali, explains how distractions that inhibit attention may be overcome. Detachment, compassion and love for all, regulation of breathing, good company, concentration on agreeable and pleasing objects, and covert or overt repetition of the mystic sound OM or any name of God are among those recommended for overcoming distraction. Different meditative practices seem to involve essentially similar approaches. As Davidson and Goleman (1977) suggest, meditation appears to be one of the oldest techniques for self-regulation of attention. The two apparently distinct forms of meditation—concentrative meditation and passive meditation—both involve manipulation of attention. The object of attentional focus may be different, but attentional deployment seems to be at the core of all meditational practices.

Meditation is not a psychic development technique as such. Rather, it is a process initiated by focusing attention on an object or a mental or body state for a prolonged period. Sustained one-pointed attention would lead to a state of absorption in which one experiences expanded awareness that transcends the limitations imposed by the normal psychobiological processes—an awareness that gives unbiased knowledge. In order to attain such an attentional focus and sustain it, it is necessary to avoid distractions, both psychological and biological. As a conse-

quence, other benefits such as psychological and biological well-being may accrue. They are, however, not a direct result of meditation. Inasmuch as meditation enables selective deployment of attention, it may be possible to gain control over certain psychobiological processes over which we normally lack volitional control. Thus, it would seem that if meditative practices help gain volitional control of autonomic processes or achieve psychic abilities, they may not be regarded as the essence of meditation. Classical systems warn us against pursuing those ends, because they become hurdles on the path to perfection.

Attention, then, is undoubtedly central to meditation. Unfortunately, however, in spite of a great deal of interest in studying attention since the mid-1950s, we still do not know much about its physiological basis, even though the discovery of the "expectancy wave" or CNV and the work on the P-300 component of the brain-evoked potential are important advances in the physiological research underlying attention. Part of the problem may be found in the fact that attention may be a very complex process involving many skills.

Like consciousness, attention has enjoyed a variety of connotations, and again like consciousness, its understanding was considered to be extremely important for psychology when psychology began as an independent discipline and was later eclipsed by the rise of behaviorism to emerge again with the advent of cognitive psychology. James (1890/1973), in his *Principles*, described several characteristics of attention. Titchener (1908) believed that "attention" is the "nerve of the whole psychological system." Pillsbury (1908) wrote a whole book on it. The French experimental psychologist Ribot, who published a smaller book (1898), distinguished between spontaneous or natural attention and voluntary or artificial attention, the latter being a product of learning. Thorndike (1907) referred to five different senses in which attention is understood. More recently, Moray (1969) mentioned six kinds of attention—concentration, selective attention, vigilance, search, activation, and set, and Posner (1975) pointed out three dominant usages: alertness, selection, and effort.

Broadbent's (1958) filter theory continues to be the most influential in the research on attention. According to his theory, there is a single channel in the brain, with a limited capacity to

process the inputs received simultaneously from different sense organs. In order to cope with the sensory load, the organism selects only one sensory input channel, while the others are held in short-term memory. Broadbent labeled the selection mechanism "the filter." What is important here is that we have the capacity to block the incoming signal, even though it still remains far from being well understood how this is done. But such an understanding seems essential, and meditation research may have something to offer.

If attention is the process of regulating inputs into our awareness, intentionality signifies voluntary attention. Intentional deployment of attention, such as narrow and intense attentional focusing on an object so as to be absorbed in it, may bring about radical alterations of consciousness. Arthur Deikman called it "deautomatization." Deautomatization, according to Deikman (1966), is an essential aspect of meditation. In an interesting study, Deikman instructed his subjects to focus their attention on a blue vase to the exclusion of all other thoughts. After a series of such intense concentration sessions, his subjects reported perceiving aspects of the vase that they never did before. One subject felt that she had "merged" with the vase. Deikman felt that deautomatization achieved through selective deployment of attention "may permit a new and perhaps more advanced experience."

Mihaly Csikszentmihalyi (1978) argued: "Optimal experiences occur when a person *voluntarily* focuses his attention on a limited stimulus field, while aversive experiences involve *involuntary* focusing of attention" (p. 343). According to Csikszentmihalyi, voluntary focusing of attention is intrinsically pleasurable because (a) it is a state of "optimal interaction" and (b) its exercise has a positive survival value, like eating and sex. We may note in this connection that all systems of meditation repeatedly mention that meditation leads to a state of pleasure, happiness, and, ultimately, to the experience of bliss.

Further, attention, however manipulated, is not the end point. Attention should lead to absorption. In yoga, we may recall, *dhyana* is a practice beyond *dharana* (concentration). The distinction between *dharana* and *dhyana* and, in Buddhistic terms, between *appana* and *upacara* should not be overlooked. The need for developing appropriate criteria for identifying and

measuring the meditation "depth" cannot be overemphasized either.

Meditation, it seems to me, is neither a technique nor a state. It is a process, a process that involves manipulation of attention. A variety of techniques may be used and diverse state effects or even trait effects may be obtained. It may therefore be a futile attempt to look for a unique psychophysiological characterization of meditation. Instead we should be looking at attentional phenomena. It is likely that meditative practice enables selective deployment of attention to arouse or depress specific cortical areas. I tend to agree with Schuman (1980) that cognitive variables may be more important than physiological correlates in determining the meditative experiences. As Schuman points out, "The available evidence supports the notion of *specificity* in cortical activation and suggests that EEG correlates in meditation may, in fact, be explicable in terms of specific cognitive behaviors, that is, in terms of the *content* rather than the *context* of meditation" (p. 361). Discovering physiological correlates of meditation, if they exist, is not sufficient to understand the meditation process. The urgent need now is to define adequately the phenomenology of meditation, rather than attempt to discover its neurophysiological roots. This can be done only by carefully studying the subjective experiences of highly proficient meditators and not by questioning the "instant" meditators or recording their physiological measures.

I believe also that attention is a key factor in understanding how consciousness manifests in our experience and the forms it takes. Ordinarily attention either fluctuates randomly or is determined by environmental conditions and subject dispositions. The subject conditions, including motivation, that influence attention could themselves be products of environmental or genetic determinants. For this reason, much of cognitive behavior can be understood and explained by deterministic models. If, however, we accord primacy to consciousness, there should be nondeterministic aspects to human volition and intentionality. Meditation, it would seem, is a process of promoting such voluntary attention.

Attention, whether in perception or action, is not always under deliberate conscious control; it may be automatic. Consider, for example, the distinction between what William James

called *ideo-motor* and *willed* actions. The latter, in contrast to the former, require will. The will may exercise control by activation or inhibition of available signals/impulses so that they receive attention.

Although the will often succeeds in its modulating role of activating some and inhibiting other signals when they are competing for attention, the stimulus characteristics of signals themselves are quite powerful in triggering their own activation. Again the will itself may be influenced by subjective conditions, interests, attitudes, dispositions, etc., of the individual person. Thus, in principle, given the subjective characteristics of the individual and the stimulus properties at a precise point in time, it should be possible to predict the focus of one's attention—what one would perceive, do, or think at a given moment. For this reason, much of our cognitive behavior can be understood and explained by deterministic models. Where we are unable to find a reasonable explanation we assume that our present knowledge and instrumentation are insufficient at the moment to record and monitor the minute and complex brain processes. Alternatively, it may be argued that some of the brain processes are random, and because of that some aspects of human behavior remain unpredictable. It would appear, then, that if attentional fluctuations are either determined or random, there is hardly any room for free will.

Meditation research seems to suggest something different. If meditation is a process of promoting voluntary attention, meditators may reveal nondeterministic aspects of human volition and intentionality that have discernible effects distinct from others modulated by subjective bias and external pressures. If such is the case, there would be reason to believe in pure volition and consciousness as primary phenomena that have a causative role in our experience.

One-pointed attentional focus in concentrative forms of meditation controls the random fluctuations of attention, on the one hand, and renders attention impervious to environmental pressures and subjective bias, on the other. Even in the so-called passive meditation, the meditator learns to nonreactively attend to incoming signals for prolonged periods of time, which serves the same purpose of promoting voluntary attention or pure volition. In other words, meditation brings about cessation of

thought-evoking habitual brain activity, which normally has the effect of masking pure volition.

Psychophysical Links

It is possible that consciousness, as it manifests in our experience through the instrumentality of attention, may utilize some of the physical energies available in the body. Alternatively, there may be hidden energies that become accessible through pure volitional activity. In any case, there may exist physiological indices that point to the psychophysical activity resulting from the volitional influence of consciousness on the body. There is reason to believe that the so-called subtle energies implied, for example, in the Chinese meridian system, as well as the Indian concepts of chakra and Kundalini, may point to hypothetical psychophysical links involved in the interface between consciousness and environment.

In the Hindu tradition, chakras are regarded as centers of consciousness. They are believed to be subtle and invisible vital forces. Though connected with neural networks, they are not identical with them; neither can they be observed by dissection. They are more like functional points than structural entities. In line with the *Hamsa Upanishad*, chakras are considered to be seven in number, even though the later Upanishads mention only six. In Tantric texts, however, we find references to 10 different chakras.

According to the Tantras, chakras are centers of meditation. They are located in the *susumna* in the spinal column. The *muladhara* chakra is at the base of the spinal cord and is considered the seat of Kundalini, where cosmic energy lies dormant. This energy may be aroused through meditative practice and channeled through the *susumna* to various chakras, resulting in a variety of states of consciousness. Meditation on the *muladhara* chakra is said to result in four types of blissful experience. The *svadhithana* chakra is the seat of sexual feelings, suspicion, aggression, etc. Meditation on this chakra leads, we are told, to the acquisition of knowledge and the destruction of lust, anger, and delusion. Meditation on the *manipura* chakra bestows one with the ability to create and destroy. The *anahata* chakra is the seat of the egotistic impulses, and meditation on it

gives one the sense of self-control, nobility, and wisdom. Meditation on the *visuddha* chakra frees one from malice, pride, and greed and makes one courageous, kind, gentle, and forgiving. The *ajna* chakra is believed to be centered between the eyebrows. Meditation on it is said to endow one with the ability to have access to everything—past, present, and future. Topping all the chakras is the *sahasrara* chakra, the chakra with a thousand petals. Meditation on this chakra makes one experience his or her unity with the absolute self. The distinctions of subject and object become obliterated and the meditator acquires power so that events happen entirely according to his will.

The meridians postulated in Chinese medicine similarly appear to be potential links between consciousness and body. It is an ancient Chinese belief that all existence is sustained by two opposite forces, yin and yang, which balance each other, and that the human body, which is a microcosm of the universe, is also governed by positive and negative forces, the imbalance of which is at the root of all disease. The energy underlying these forces is called *Ki*, which flows to various parts of the body along certain paths called meridians. When an organ in the body is impaired or disturbed, specific areas of skin become excessively sensitive. Each organ's dysfunction has its own areas of cutaneous hypersensitivity, so that by tracking the sensitivity zones, one can obtain information about organ functioning. What is even more important is that these areas of sensitivity, the meridian points, seem to be similar in all individuals. The Chinese acupuncture system is based on the belief that it is possible to restore the balance of the negative and positive forces of *Ki* energy, which are upset when there is organic disturbance, by stimulating the specific meridian points related to the affected organ.

Some investigators (Motoyama, 1978) have pointed out the similarity and correspondence between the Chinese meridians and the Indian chakras and the *nadis*. In both systems, it is presumed that subtle energy mediates between mind and body and that identifiable physiological changes may be associated with such a process, thus leaving open the possibility of scientifically investigating how consciousness manifests in our experience.

Meditative Attention and Psi

The widespread belief in the efficacy of nonconventional healing practices and the evidence in support of the reality of such unusual mental phenomena as the anomalous acquisition of information and the direct effect of conscious intentions on physical systems, as we have seen, suggest that consciousness exists and that it has properties and capacities that may not be attributed to the physical and mechanical processes in the brain and nervous system. Past research also suggests that interactions of consciousness with the environment produce tangible psychological and physical effects that can be recorded and measured.

We may assume that consciousness is involved in all our mental activities. Most often it is passive; but it can also be active and able to influence events. This may be happening constantly in one's life, but such influences are seen as unusual, perhaps because mostly they manifest below the threshold of one's awareness and only rarely are they perceived overtly. It would seem that volitional control of "unusual" mental phenomena is impeded by the existential condition wherein the volitional effort, that is, attention, is programmed to deal with routine sensory-motor input. Volition, imprisoned as it were in the cerebral cells and performing the chores of attending to the commands of sensory and proprioceptive inputs (if we can believe in some of the traditional systems), can be freed to escape the existential impasse. When this happens and one gains volitional access to consciousness, the unusual phenomena become ordinary. Attention can be passive or active, reactive, or voluntary. Sensory attention is passive and reactive, whereas pure, or volitionally guided, attention is active. The attention cultivated through meditative practices, as I have tried to show, is the voluntary and active kind. Pure volition obtained as in meditative attention has the ability to channel consciousness in ways that bring about interactions that appear anomalous in comparison with ordinary interactions involving sensory inputs. Channeling pure volition may leave identifiable physiological trails, and the people with greater facility to channel may exhibit consistent patterns in their personality and physiological functioning. An understanding of these may give us

insights into the nature of consciousness and the modalities of consciousness/environment interface. Such an understanding is also essential for developing design criteria for feedback instrumentation for those who want to learn volitional control.

It is in this context that I find the study of meditation and attention quite compelling. Our review (Rao & Palmer, 1987) has shown that a large body of diverse experimental results of psi seems to suggest that psi may be facilitated by procedures that result in the reduction of meaningful sensory and proprioceptive input to the organism and the concomitant redeployment of attention to other processes. In fact, there is substantial evidence to suggest that meditation may enhance one's psychic ability (Braud, 1990; Rao, Dukhan, & Rao, 1978).

I also note several converging lines of research between our work and research in the areas of attention such as vigilance. Vigilance decrement appears to me to be much like declines in psi results. Feedback and knowledge of results are known to reduce vigilance decrement, and they also appear to have a similar effect in ESP research. Expectation in vigilance research, like belief in psi, seems to have a positive effect. Similarly, motivation and novelty have positive effects in both cases. Also, it is likely that attention involved in sensory vigilance may be different in some respects from meditational attention and that attention to sensory inputs may impede pure volitional activity. If such is the case, we could use, in our research, strategies that discourage attention to sensory inputs like habituation, monotony, and sensory deprivation. Possibly something like this may be happening in some of the psychic enhancement techniques like Ganzfeld stimulation and hypnosis. If we can identify the crucial respects in which meditative and volitional or active attention differ from sensory, passive, or reactive attention and the respects in which they resemble each other, we may be in a better position to design effective research strategies.

CONCLUSION

To sum up, then, I have argued for the study of consciousness qua consciousness, and I have pleaded that parapsychology be

in the forefront of this movement. I pointed out that attention seems to be central for understanding consciousness and that meditative attention may hold the key for understanding higher order psychical phenomena such as psi. No doubt, as psychologists we will be perceived as heretical and may be persecuted for sacrilege of the scientific method in pursuit of endeavors that are less than holy; but I believe we have little choice. What we need is the courage to face up to intellectual hostility, repression, and ridicule but not the cleverness to camouflage the basic differences between the dominant assumptions of current science and ours. I am calling upon my fellow parapsychologists to come out of their cloistered isolation and join other "heretical" brain and behavioral scientists interested in those margins of awareness that are yet to be translated into the language of science. With consciousness as our common flag and our main weapon the scientific method, adapted to the peculiar needs of our respective phenomena, let us march together to occupy our rightful place in science.

REFERENCES

- Barber, T. X., DiCara, L. V., & Kamiya, J. (Eds.). (1972). *Biofeedback and Self-Control*. Chicago, IL: Aldine.
- Benson, H. (1975). *The Relaxation Response*. New York: William Morrow.
- Bergson, H. (1911). *Creative Evolution* (A. Mitchell, Trans.). New York: Henry Holt.
- Bergson, H. (1912). *Time and Free Will: An Essay on the Immediate Data of Consciousness* (F. L. Pogson, Trans.). London: George Allen.
- Bergson, H. (1913). *Matter and Memory* (N. M. Paul & W. S. Palmer, Trans.). New York: Macmillan.
- Braud, W. G. (1990). Meditation and psychokinesis. *Parapsychology Review*, 21 (1), 9-11.
- Braude, S. E. (1986). *The Limits of Influence: Psychokinesis and the Philosophy of Science*. New York: Routledge & Kegan Paul.
- Broadbent, D. E. (1958). *Perception and Communication*. London: Pergamon Press.
- Carrington, P. (1977). *Freedom in Meditation*. Garden City, NY: Doubleday.

- Csikszentimihalyi, M. (1978). Attention and holistic approach to behavior. In K. S. Pope & J. L. Singer (Eds.), *The Stream of Consciousness: Scientific Investigations Into the Flow of Human Experience* (pp. 335-358). New York: Plenum Press.
- Davidson, R., & Goleman, D. (1977). The role of attention in meditation and hypnosis: A psychobiological perspective on transformation of consciousness. *International Journal of Clinical and Experimental Hypnosis*, 25, 291-308.
- Deikman, A. J. (1966). Deautomatization and the mystic experience. *Psychiatry*, 29, 324-338.
- Deikman, A. J. (1973). Bimodal consciousness. In R. E. Ornstein (Ed.), *The Nature of Consciousness: A Book of Readings* (pp. 67-86). New York: Viking.
- Diaconis, P. (1978). Statistical problems in ESP research. *Science*, 201, 131-136.
- Druckman, D., & Swets, J. A. (Eds.). (1988). *Enhancing Human Performance: Issues, Theories, and Techniques*. Washington, DC: National Academy Press.
- Goleman, D. (1977). *The Varieties of the Meditative Experience*. New York: Irvington.
- Guilford, J. P. (1982). Cognitive psychology's ambiguities: Some suggested remedies. *Psychological Review*, 89, 48-59.
- Hansel, C. E. M. (1961). A critical analysis of the Pearce-Pratt experiment. *Journal of Parapsychology*, 25, 87-91.
- Honorton, C., & Ferrari, D. C. (1989). "Future telling": A meta-analysis of forced-choice precognition experiments, 1935-1987. *Journal of Parapsychology*, 53, 281-308.
- James, W. (1893). *Psychology: The Briefer Course*. New York: Henry Holt.
- James, W. (1938). Does "consciousness" exist? In *Essays in Radical Empiricism* (pp. 1-38). New York: Longmans, Green. (Original work published 1912)
- James, W. (1973). *Principles of Psychology* (Vol. 1). New York: Henry Holt. (Original work published 1890)
- Josephson, B. D. (1984). Conscious experience and its place in physics. In M. Cazenave (Ed.), *Science and Consciousness: Two Views of the Universe* (pp. 9-19). Elmsford, NY: Pergamon Press.
- Klein, D. B. (1984). *The Concept of Consciousness: A Survey*. Lincoln: University of Nebraska Press.
- Luria, A. R. (1978). The human brain and conscious activity. In G. E. Schwartz & D. Shapiro (Eds.), *Consciousness and Self-Regulation: Advances in Research and Theory* (Vol. 2, pp. 1-35). New York: Plenum Press.

- MacKenzie, B., & MacKenzie, S. L. (1980). Whence the enchanted boundary? Sources and significance of the parapsychological tradition. *Journal of Parapsychology*, 44, 125-166.
- Moray, N. (1969). *Attention: Selective Processes in Vision and Hearing*. London: Hutchinson.
- Motoyama, H. (1978). *Science and the Evolution of Consciousness*. Brookline, MA: Autumn Press.
- Murphy, M., & Donovan, S. (1988). *The Physical and Psychological Effects of Meditation*. San Francisco, CA: Esalen Institute.
- Myers, F. W. H. (1903). *Human Personality and Its Survival of Bodily Death* (Vol. 1). New York: Longmans, Green.
- Naranjo, C., & Ornstein, R. E. (1971). *On the Psychology of Meditation*. New York: Viking Press.
- Neisser, U. (1967). *Cognitive Psychology*. New York: Appleton-Century-Crofts.
- Ornstein, R. E. (1977). *The Psychology of Consciousness* (2nd ed.). New York: Harcourt Brace Jovanovich.
- Papanicolaou, A. C., & Gunter, P. A. G. (Eds.). (1987). *Bergson and Modern Thought: Towards a Unified Science*. New York: Harwood Academic.
- Pillsbury, W. B. (1908). *Attention*. New York: Macmillan.
- Popper, K. R., & Eccles, J. C. (1977). *The Self and Its Brain: An Argument for Interactionism*. Berlin: Springer-Verlag.
- Posner, M. (1975). Psychobiology of attention. In M. Gazzaniga & C. Blakemore (Eds.), *Handbook of Psychobiology*. New York: Academic Press.
- Pribram, K. H. (1976a). Problems concerning the structure of consciousness. In G. G. Globus, G. Maxwell, & I. Savodnik (Eds.), *Consciousness and the Brain* (pp. 297-313). New York: Plenum Press.
- Pribram, K. H. (1976b). Self-consciousness and intentionality: A model based on an experimental analysis of the brain mechanisms involved in the Jamesian theory of motivation and evolution. In G. E. Schwartz & D. Shapiro (Eds.), *Consciousness and Self-Regulation* (Vol. 1, pp. 51-100). New York: Plenum Press.
- Pribram, K. H. (1984). Mind, brain and consciousness, the organization and conduct (A. Hall & E. Callander, Trans.). In M. Cazenave (Ed.), *Science and Consciousness: Two Views of the Universe* (pp. 327-341). Elmsford, NY: Pergamon Press.
- Price, G. R. (1955). Science and the supernatural. *Science*, 122, 359-367.
- Radin, D. I., & Nelson, R. D. (1989). Evidence for consciousness-related anomalies in random physical systems. *Foundations of Physics*, 19, 1499-1514.

- Rao, K. R. (1965). The bidirectionality of psi. *Journal of Parapsychology*, 29, 230-250.
- Rao, K. R. (1989). Meditation: Secular and sacred. Presidential address, Indian Academy of Applied Psychology. Calcutta: University of Calcutta.
- Rao, K. R., Dukhan, H., & Rao, P. V. K. (1978). Yogic meditation and psi scoring in forced-choice and free-response tests. *Journal of Indian Psychology*, 1(2), 160-175.
- Rao, K. R., & Palmer, J. (1987). The anomaly called psi: Recent research and criticism. *Behavioral and Brain Sciences*, 10, 539-551.
- Ribot, T. (1898). *The Psychology of Attention* (4th ed.). Chicago, IL: Open Court Publishers.
- Schuman, M. (1980). The psychophysiological model of meditation and altered states of consciousness: A critical review. In J. M. Davidson & R. J. Davidson (Eds.), *The Psychobiology of Consciousness* (pp. 333-378). New York: Plenum Press.
- Sinha, J. (1961). *Indian Psychology: Emotion and Will* (Vol. 2). Calcutta: Sinha Publishing House.
- Skinner, B. F. (1975). The steep and thorny way to a science of behavior. *American Psychologist*, 30, 42-49.
- Smith, J. C. (1986). *Meditation: A Sensible Guide to a Timeless Discipline*. Champaign, IL: Research Press.
- Sperry, R. W. (1976). Mental phenomena as causal determinants in brain function. In G. G. Globus, G. Maxwell, & I. Savodnik (Eds.), *Consciousness and the Brain* (pp. 163-177). New York: Plenum Press.
- Thorndike, E. L. (1907). *The Elements of Psychology* (2nd ed.). New York: Seiler.
- Titchener, E. B. (1908). *Lectures on the Elementary Psychology of Feeling and Attention*. New York: Macmillan.
- Wagner, M. W., & Monnet, M. (1979). Attitudes of college professors toward extrasensory perception. *Zetetic Scholar*, 5, 7-16.
- Walker, E. H. (1970). The nature of consciousness. *Mathematical Biosciences*, 7, 131-178.
- Wallace, R. K. (1970). *The Physiological Effects of Transcendental Meditation, A Proposed Fourth Major State of Consciousness*. (Doctoral dissertation, University of California, Los Angeles, 1970). Ann Arbor, MI: University Microfilms.