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Toward a postmaterialist psychology: Theory, research, and applications

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ABSTRACT

The majority of mainstream psychologists still adopt a materialist stance toward nature. They believe that science is synonymous with materialism; further, they are convinced that the view that mind and consciousness are simply by-products of brain activity is an incontrovertible fact that has been demonstrated beyond reasonable doubt. This is an incomplete view of what humans are. In this article, we review two categories of empirical evidence that support a shift toward a postmaterialist psychology. The first category of evidence includes mental events that seem to occur outside the spatial confines of the brain, whereas the second category includes mental events that seem to occur when the brain has ceased to function. Taken together, the two bodies of empirical evidence examined here indicate that the idea that the brain creates mind and consciousness is both incomplete and flawed. In the Discussion section, we argue that the transmission hypothesis of the mind-brain relationship can account for all the evidence presented in this article. We also discuss the emerging postmaterialist paradigm and its potential implications for the evolution of psychology.

Accordingly the cases in which inductions from classes of facts altogether different have thus jumped together belong only to the best established theories which the history of science contains.
William Whewell, *The Philosophy of Inductive Sciences*, 1840

1. Introduction

Most scientists ignore that their worldview is based on metaphysical assumptions that were first proposed by Ancient Greek philosophers (Spencer, 2012). These assumptions which, several centuries later, became associated with classical physics, include materialism — the notion that matter is the only reality, i.e. everything in the universe is made up of aggregates of material/physical particles and fields (*the terms 'materialism' and 'physicalism' are used interchangeably in this article; physicalism is the thesis that everything is physical, https://plato.stanford.edu/entries/physicalism/) — and reductionism, the idea that complex things can be understood by reducing them to the interactions of their parts, or to simpler or more fundamental things such as tiny material particles. Other assumptions include, for instance, determinism, the notion that future states of physical or biological systems can be predicted from current states, and mechanism, the idea that the world works like a machine and can therefore be explained mechanically.

During the 19th century, these assumptions hardened, turned into dogmas, and coalesced into a belief system that came to be known as "scientific materialism" (Burtt, 1949; Sheldrake, 2012). This belief system implies that *mind* — the set of mental faculties (e.g. consciousness, perception, thinking, memory, emotions, volition), processes and events, — *consciousness*, the state of being aware of an external object or something within oneself, and all that we subjectively experience (e.g. memories, emotions, intentions, altered states of consciousness, spiritual epiphanies) are identical with or can be reduced to electrical and chemical processes in the brain; mental processes and events are ultimately reducible to the interaction between basic physical elements. In other words, we human beings are nothing but complex biophysical machines and, as a result, our consciousness and personality automatically vanish when we die.

As we will demonstrate here, the scientific materialist framework is completely at loss to explain a wide array of empirical phenomena that are thoroughly examined in this article. For example, if the mind is what the brain does, then how is it possible for people to be fully conscious while they are in a state of clinical death?

Because physics was considered to be the foundation for all natural sciences, a number of early psychologists adopted the worldview of classical physics (i.e. the metaphysical assumptions of scientific materialism) to establish psychology as a legitimate scientific discipline (Walsh, Teo, & Baydala, 2014). However, over a century ago, physicists discovered phenomena, at the atomic level, that could not be explained

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by classical physics. These phenomena led to the development of a new branch of physics called quantum mechanics (QM). QM has invalidated the metaphysical assumptions of scientific materialism. For example, QM has questioned the material foundations of the world by showing that atoms and subatomic particles are not solid objects that categorically exist at definite spatial locations and times. Actually, they show "tendencies to exist," i.e. atoms and subatomic particles form a world of potentialities within the quantum realm (Heisenberg, 1976).

QM also demonstrated that the particles being observed and the observer — the physicist and the method used for observation — are in some way related. Moreover, the observer's conscious intent appears to influence the results of the observation. Given this phenomenon, some theoretical physicists proposed that the consciousness of the observer is vital to the existence of the physical events being observed, and that mental events, such as intention, can affect the physical world (Stapp, 2011; Wigner, 1967). The results of recent experiments (Radin et al., 2012, 2016) provide support for this interpretation of QM.

Despite the fact that QM invalidated the metaphysical assumptions associated with scientific materialism, mainstream psychologists still adopt a reductive materialist stance of nature and the universe. They firmly believe that science is synonymous with methodological and philosophical materialism; further, they are convinced that the view that mind and consciousness are simply by-products of brain activity is an incontrovertible fact that has been demonstrated beyond reasonable doubt (Dossey, 2015).

We contend that science is, first and foremost, a non-dogmatic, open-minded method of acquiring knowledge about nature through the observation, experimental investigation, and theoretical explanation of phenomena. Its methodology is not synonymous with materialism and should not be committed to any particular beliefs, dogmas, or ideologies (Beauregard et al., 2014; Schwartz, 2012; 2016).

In the present article, we examine various lines of evidence that support an emerging shift toward a postmaterialist psychology (Beauregard et al., 2014; Schwartz, 2012; 2016). As the postmaterialist paradigm is inclusive of matter, which is seen as a core constituent of the universe, postmaterialist psychology does not reject the empirical observations and great value of psychology's achievements realized up until now within a materialist framework.

The first section of this article provides a brief historical context for the scientific study of the empirical evidence we will be discussing. The second section examines the various lines of evidence that support a shift toward a postmaterialist psychology. Generally speaking, we have identified two categories in which to group these lines of evidence:

Category I contains evidence for which a materialist explanation, though commonly presented, is less parsimonious than a postmaterialist explanation. This category includes phenomena suggesting that mind is not limited to space or time.

Category II contains evidence that is outrightly rejected by materialist theories of the mind, but is supportive of a postmaterialist perspective. This evidence is related to mental events occurring when the brain is not functioning in a way that is thought by contemporary neuroscientific models to support consciousness. In line with QM, the substantial body of evidence examined here indicates that scientific materialism is incomplete and, therefore, obsolete.

In the third section of this article, we examine the implications of the evidence presented as well as hypotheses for the mind-brain relationship and basic types of postmaterialist theories. Lastly, in the fourth section, we present the emerging postmaterialist paradigm and discuss its potential impact for psychology.

The reader not familiar with emerging postmaterialist science may find this evidence challenging and controversial. This is unavoidable. In the spirit of open, evidence-based science, we review this extensive evidence with the hope that it will raise questions, stimulate debate, and advance the science of psychology accordingly.

2. Precursors of postmaterialism in psychology

While the term postmaterialism is new, taking what we are referring to as a postmaterialist perspective in psychological science is as old as the field itself. Indeed, there have been, and continue to be, certain subfields of psychology (e.g. psychology of religion and spirituality, transpersonal psychology) that could potentially be classified as postmaterialist in that they investigate or describe phenomena that cannot be accommodated within the materialist paradigm. These phenomena generally involve psychological processes that transcend the assumed boundaries of time and/or space, or point to consciousness existing independent of a functioning brain: for instance, spiritual experiences can occur while experiencers are in a state of clinical death. While the history of these subfields is both long and complex, and sprinkled with controversy, we will briefly describe how they have contributed to the emergence of postmaterialist science.

2.1. Parapsychology

Some of the most respected and influential psychologists held a non-materialist view. For instance, the "Father of American Psychology," Harvard psychologist and philosopher William James, was one of the founders of parapsychology ("para" is an ancient Greek word meaning beyond, or beside; this field of study is also called psychical research or psi research). James and other psychologists, such as James H. Hyslop and William McDougall, attempted to connect psychology with psychic phenomena. Psychical research officially began in the 1880s with the formation of the Society for Psychical Research in London England and, in 1885, the American Society for Psychical Research began in Boston with the assistance of James. The term parapsychology was not adopted until the 1930s.

William James and the founders of parapsychology were pioneers of mediumship research (see Gauld, 1983). They thought that investigating the information reported by mediums — individuals who report experiencing communication with deceased persons — could test the survival of consciousness hypothesis (the continued existence, separate from the physical body, of an individual's consciousness or personality after physical death).

In the 1930s, Joseph Banks Rhine — a botanist who had studied psychology —, along with his associate Karl Zener, — professor of psychology and chairman of the department of psychology at Duke University —, developed a statistical system of testing for extrasensory perception (ESP) that involved subjects guessing what symbol, out of five possible symbols, would appear when going through a special deck of cards designed for this purpose. A percentage of correct guesses (or hits) significantly above 20% was judged as higher than chance and indicative of psychic ability. Rhine stated in his first book, *Extra Sensory Perception* (1934), that after 90,000 trials, he felt ESP is "an actual and demonstrable occurrence" (Rhine, 1934).

Since the Rhine experiments, numerous researchers have successfully replicated psi experiments and generated convincing meta-analyses, including those of presentiment (Mossbridge, Tressoldi, & Utts, 2012) and mental interactions with random number generators (RNGs) (Radin & Nelson, 1989). The results of these experiments will be discussed in the second section of this article.

The uncovering of cases of fraudulent mediums, at the beginning of the 20th century, may have inhibited the progression of parapsychology as a field. Fraud is a problem within all fields of science, however, and when it is present within a research area that has enormous implications, it can rapidly contaminate the entire field. It is also noteworthy that today's mediumship research is rigorous and stands up to such scrutiny, with researchers conducting triple blind protocols, thereby greatly strengthening their results compared to past mediumship experiments (e.g. Beischel & Schwartz, 2007; Beischel, Boccuzzi, Biuso, & Rock, 2015).

2.2. Transpersonal psychology

Like William James, Carl Jung, the father of analytical psychology, was oriented toward a non-materialist perspective, stating: “For lack of empirical data I have neither knowledge nor understanding of such forms of being, which are commonly called spiritual. Nevertheless, we have good reason to suppose that behind this veil there exists the uncomprehended absolute object which affects and influences us — and to suppose it even, or particularly, in the case of psychic phenomena about which no verifiable statements can be made.” (Jung, 2011, p. 351). His work was profoundly influential in describing the subconscious mind, symbolism, and he coined the term synchronicity, referring to meaningful coincidences that seem to have no causal link (Jung, 1955).

Jung played a key role in pioneering transpersonal psychology. This “school” of psychology began in the late 1960s and concerns itself with experiences and needs beyond one's sense of self (or ego self), holistic psychology, and transformation (Hartelius, Caplan, & Rardin, 2007). More specifically, transpersonal psychology encompasses the scientific study of “meta-needs, ultimate values, unitive consciousness, peak experiences, ecstasy, mystical experiences, awe, being, self-actualization, essence, bliss, wonder, ultimate meaning, transcendence of the self, spirit, oneness, cosmic awareness, individual and species wide synergy, maximal interpersonal encounter, sacralization of everyday life, transcendental phenomena, cosmic self-humor and playfulness, maximal sensory awareness, responsiveness and expression; and related concepts, experiences and activities” (Lajoie & Shapiro, 1992). Given this definition, a wide range of universal human experiences fall under the umbrella of transpersonal psychology. Despite this, transpersonal psychology has been met with resistance from mainstream psychology, based on a supposed issue of definition (Hartelius et al., 2007; Lajoie & Shapiro, 1992). However, rejection of this subfield is likely in part due to the dominance of the materialist framework in psychology, which, in turn, often leads to pathologizing spiritual experiences (Lukoff, Turner, & Lu, 1992).

Transpersonal psychology has shown tremendous benefits within psychotherapy because it concerns itself with aspects of human flourishing and spiritual growth (Lukoff et al., 1992). While Jung was the first psychologist to pay attention to the importance of religion and spirituality for psychological health, his ideas were not necessarily accepted in mainstream psychology either (Lukoff et al., 1992). However, perhaps due to the popularity of meditation research, new journals, including the APA's journal *Spirituality in Clinical Practice*, have finally recognized the importance of the spiritual dimension of humans, and are shedding new light on the psychological healing potential of spirituality and transcendence.

3. Lines of evidence: categories I & II

Here we present evidence for a collection of phenomena that are very difficult, and in some cases impossible, to account for in materialist terms. In our view, the scientific investigation of these phenomena is essential to gain a better understanding of human potential and reality. In that sense, we agree with William James, who called for radical empiricism, whereby we should study any human experience, no matter how unusual it may seem at first glance (James, 1904).

We have grouped the various lines of evidence examined in this section into two general categories, based on how inescapably they violate materialist assumptions about the relationship between mind and brain.

3.1. Category I: Mind beyond space and time

This category describes phenomena that challenge the materialist view that mind is constrained by space and time, and the boundaries of the body. Such evidence includes near-death experiences (NDEs) and out-of-body experiences (OBEs) that occur when the experiencer's brain is still functioning (NDEs that occur when the individual is still alive can be more easily explained within the materialist framework because the brain may be 'creating the experience,' but it still calls into question the time and space constraints of the mind, as in the case of veridical OBEs), and various psi phenomena, including telepathy, presentiment (sensing something before it occurs), remote viewing, and the effects of intention on biological and non-biological systems.

3.2. Out-of-body and near-death experiences

Near-death experiences (NDEs) are dramatic and frequently transformative experiences occurring to people who have been physiologically or psychologically close to death (Greyson, 2011). A clear memory of the experience, enhanced mental activity, and the certitude that the experience is more real than normal waking consciousness are core components of NDEs (Greyson, 2011). Other typical features include an out-of-body experience (OBE) (i.e. a sense of having left one's body), feelings of joy and peace, passage through a dark tunnel, seeing an extraordinarily bright Light (or “Being of Light”) that radiates unconditional love and total acceptance, encountering deceased relatives and friends, seeing an unearthly realm of great beauty, reliving events of one's life, and returning to the physical body (Greyson, 2011).

Some researchers have speculated that NDEs are hallucinations produced by diminished levels of oxygen, i.e. hypoxia or anoxia (Blackmore, 1993). Nonetheless, the subjective effects of hypoxia do not bear resemblance with NDEs, and these experiences can occur in the absence of hypoxia or anoxia (Holden, 2009). Additionally, when oxygen levels diminish markedly, individuals whose hearts or lungs do not function properly experience an “acute confusional state,” during which they are highly agitated and confused, and have little or no memory recall.

In stark contrast, people experience lucid consciousness, well-structured thought processes, and clear reasoning during NDEs (Parnia, Waller, Yeates, & Fenwick, 2001). Furthermore, if anoxia would play an important role in the production of NDEs, most cardiac arrest patients would report an NDE. Studies indicate that this is clearly not the case (Van Lommel, Van Wees, Meyers, & Elfferich, 2001; Parnia et al., 2001) (*NDEs that occur during cardiac arrest will be further discussed under Category II).

Other researchers have speculated that increased levels of carbon dioxide — hypercarbia — may be involved in NDEs (Morse, Venecia, & Milstein, 1989). However, arterial blood gases in near-death experiencers (NDErs) do not always reflect enhanced carbon dioxide levels, and NDE-like features are rarely reported in hypercarbia (Parnia et al., 2001). As notes Parnia et al. (2001), this hypothesis remains untested and not supported by scientific studies to date.

It has also been claimed that temporal lobe epilepsy (TLE) can generate all the classic features of NDEs (Saavedra-Aguilar & Gómez-Jeria, 1989). In our view, this claim is unsubstantiated since experiential symptoms of temporal lobe seizures include hallucinations, illusions, mental confusion, and negative emotional states (Rodin, 1989; Parnia et al., 2001; Greyson, Fountain, Derr, & Broshek, 2014, 2015).

Nearly half of the NDErs report an OBE. NDErs commonly report that in an OBE state, they became aware of events happening at a distance. Importantly, even if the experiencers had been fully and normally conscious, these events would have been beyond the reach of their ordinary senses (Greyson, 2010a).

Reports of OBE perception of events are crucial because they can be independently corroborated, that is, proven to coincide with reality. In that regard, quite a few reports of veridical OBE perception have been authenticated by independent witnesses (Clark, 1984; Cook, Greyson, & Stevenson, 1998; Holden, 2009; Kelly, Greyson, & Stevenson, 2000; Owens, 1995). For example, Cook et al. (1998, pp. 399–400) reported the case of a patient who was immediately rushed into the operation room for emergency coronary bypass surgery. During the surgical intervention, the patient felt himself leaving his body and moving

upward. He looked down and saw himself lying on table, with his chest cut open. He also saw his cardiothoracic surgeon "flapping his arms as if trying to fly." The surgeon later verified this detail by explaining that it was indeed his regular habit to instruct medical personnel by pointing with his elbows so as not to touch anything in the operating room until the actual surgery.

3.3. NDEs in people born blind

Strong support for NDEs also comes from studies of individuals that are blind from birth, and report visual veridical OBEs and NDEs that are indistinguishable from sighted peoples' experiences (Ring & Cooper, 1997; Ring & Lawrence, 1993). It is certainly plausible that the dying brain produces the perception of light from within, and this has been given as a materialist explanation for the "tunnel of light" so often mentioned as characteristic of a NDE (Blackmore & Troscianko, 1989). However, here we are considering cases of a veridical nature, whereby those individuals that have been blind since birth, or blind since a young age, accurately report visual information that they could have only known had they actually seen the object or event.

Ring and Cooper (1997) investigated NDEs and OBEs in 31 blind individuals, nearly half of whom were blind since birth. They found that blind individuals, including those blind from birth, report NDEs that are similar to sighted persons, some of which involved veridical visual information, meaning that they could not have been obtained by normal means and were independently corroborated. Eighty percent of their entire sample had some kind of visual experience during their OBE or NDE and 64% of those blind from birth reported sight.

3.4. Psi phenomena

Psi research is the scientific study of putatively paranormal phenomena (also called psi phenomena), in particular extrasensory perception (ESP) and psychokinesis (PK). ESP denotes the acquisition of information about external events or objects (past, present, or future) by means other than the mediation of any known channel of sensory communication. It includes telepathy — the access to another person's thoughts without the use any of our known sensory channels, clairvoyance — the apparent perception of events or objects that cannot be perceived by the known senses, and precognition — the knowledge of some future event that cannot be deduced from normally known data in the present. PK refers to the influence of mind on a physical system that cannot be totally explained by the mediation of any known physical means (Kugel, 2011). Tart (2009) refers to the primary experimental evidence for psi occurring in five broad areas: precognition, telepathy, clairvoyance, PK, and healing.

Given that space precludes reviewing the substantial body of replicated evidence in all areas of psi research, only a few psi phenomena are examined in this article.

3.5. Telepathy

In the 1970s, some researchers hypothesized that a decrease of sensory stimulation could promote the manifestation of psi because it operates as a faint signal that is normally buried in stronger signals related to internal somatic and external sensory "noise" (Braud, Wood, & Braud, 1975; Honorton & Harper, 1974; Parker, 1975). To test this hypothesis, these researchers devised a telepathy experiment based on the ganzfeld, a sensory deprivation technique. The ganzfeld condition is produced by exposing an individual to a uniform and static sensory field. This is accomplished by covering the individual's eyes with translucent eye shields and filling the individual's ears with a constant stream of white noise. Rapidly, the individual may experience hallucinatory-like images comparable to those experienced during the hypnagogic state.

In the typical experimental test session for telepathy conducted using the ganzfeld procedure, one participant acts as the "sender" and the other participant acts as the "receiver". The two participants are isolated in separate, soundproofed rooms. In one of the rooms, the receiver — who is in a ganzfeld state — is instructed to describe any images or impressions that come to mind. During that time, in the other room, the sender is shown a randomly selected visual target (e.g. a photograph or a video clip), and requested to concentrate on its details.

The receiver is taken out of the ganzfeld state, after about 30 minutes, and shown a collection of four photos or video clips: one of these photos/videos is the target that the sender was concentrating on, the other three being decoys. The receiver is then asked to rank the four photos/videos according to their degree of correspondence with the images and impressions received while in the ganzfeld state. The test session is considered a success, or a "hit", if the photo/video that the sender was concentrating on is ranked as having the highest degree of correspondence; otherwise, the test session is considered a "miss." Since the probability of a hit is 1 in 4, the hit rate expected by chance is 25%.

The advent of the "autoganzfeld", at the beginning of the 1980s, considerably improved the methodological quality of ganzfeld experiments. The target pool, in prototypical autoganzfeld experiments, consists of short audio-video clips, and the interactions between the experimenter, receiver, and sender are totally automated. A computer randomly selects the video-based target pack and the video-clip target, and the target is presented to the sender through a closed-circuit video system. Furthermore, during the judging phase, a computer presents the four targets in random order to a video monitor in the receiver's room.

Parapsychologist Charles Honorton and his co-workers conducted a six-year research program using this experimental protocol. In total, 240 people participated as receivers in 354 autoganzfeld sessions, and the hit rate was 37 percent (Honorton & Schecter, 1987).

Several meta-analyses of ganzfeld telepathy studies have reported overall hit rates significantly above the 25% expected by chance (for a review of these meta-analyses, see Williams, 2011). For instance, Utts, Norris, Suess, and Johnson (2010) found that a database comprising 29 "standard" ganzfeld studies and 11 autoganzfeld studies had a hit rate of 33.4% (709 hits in 2124 sessions, $z = 8.92$, $p = 2.26 \times 10^{-18}$). In another recent meta-analysis (Storm, Tressoldi, & Di Risio, 2010) comprising 30 studies conducted from 1997 to 2008, a hit rate of 32.2% was found (483 hits in 1498 sessions, $z = 6.44$, $p < .001$).

3.6. Remote viewing

Remote viewing (RV) is defined as the ability to perceive aspects of an environment or a target that is at a distance. The scientific study of RV began in the 1970s, when it caught the interest of the Central Intelligence Agency (CIA), which funded RV viewing experiments together with the Stanford Research Institute (SRI). Project Stargate was a Defense Intelligence Agency (DIA) program that explored the possibility of using psi phenomena for intelligence purposes in the 1980s and 90s (Mumford, Rose, & Goshin, 1995). The SRI have generated hundreds of research studies on RV, many of which remain classified. The American Institutes for Research (AIR) was asked by the CIA to produce a report regarding the RV experiments done by the SRI, which they unclassified, to determine whether RV experiments had produced scientifically compelling evidence, detected causal mechanisms, and whether RV had any practical use for intelligence gathering (Mumford et al., 1995). Professor Jessica Utts (a statistics professor at the University of California, Irvine) and Professor Ray Hyman (a Professor Emeritus of Psychology at the University of Oregon and a noted critic of parapsychology) were given the task of evaluating the program.

One type of RV experiments involves a "sender" or "beacon" travelling to a location occluded from the "remote viewer", who is then asked to describe the location of the sender. The description can include verbal descriptions or drawings. Then, a judge or group of judges rates and ranks the descriptions that match the location. A hit occurs when the viewer's description matches the location of the sender. If the hits

occur more often than chance, RV has occurred. There are many variations of the basic protocol, and more recent experiments have controlled for weaknesses of past designs, such as a lack of blinding. Other protocols do not involve the sender going to an actual location, but instead, the sender draws from a pool of National Geographic photographs (Mumford et al., 1995).

The conclusion of the AIR report was mixed. Utts explicitly stated that no more proof-oriented RV studies were necessary, but Hyman stated that a conclusion could not be drawn (Mumford et al., 1995). Utts and Hyman did agree, however, that the results were consistent and well beyond chance, that they were not due to publication bias, statistical flukes or flaws, and that there were no identifiable methodological errors (Mumford et al., 1995).

Other researchers have replicated RV under strictly controlled conditions. For instance, Jahn, Dunne and their colleagues (from Princeton University's PEAR Lab; Jahn et al., 2000) conducted 653 trials from 1976 to 1999, involving 72 participants. The overall assessment of the matches in the 653 trials provided robust evidence that the results were not due to chance (z score = 5.42, $p = 3 \times 10^{-8}$).

3.7. Presentiment experiments

Presentiment experiments often involve protocols where a series of emotionally laden stimuli are presented while participants have continuous physiological recordings, such as skin conductance, heart rate, pupil dilation, electroencephalography (EEG) and blood-oxygen-level dependent (BOLD) responses. In these experiments, post-stimulus activity is predictive of pre-stimulus activity. That is, various aspects of human physiology respond to the stimulus before it is presented or known by the participants.

A recent meta-analysis of 26 presentiment experiments between 1978 and 2010 was performed by Mossbridge et al. (2012) and published in *Frontiers in Psychology*. The authors included studies that used one of two protocols: (1) randomly ordered presentations of arousing vs. neutral stimuli, or (2) guessing tasks with feedback (correct vs. incorrect). The dependent variables included: electrodermal activity, heart rate, blood volume, pupil dilation, EEG activity, and BOLD activity. The results of this meta-analysis indicate a significant overall effect (fixed effect: overall effect size (ES) = 0.21, $z = 6.9$, $p < 2.7 \times 10^{-12}$; random effects: overall (weighted) ES = 0.21, $z = 5.3$, $p < 5.7 \times 10^{-8}$). Interestingly, experiments with higher quality methodology produced larger effect sizes and were more significant than lower quality experiments. The authors also determined that there would need to be 87 experiments with results that would have to average an overall null effect to reduce the level of significance of these 26 studies to chance ($p > 0.05$).

3.8. Effects of intention on non-biological systems

For over a century, researchers around the world have conducted laboratory experiments to investigate the effects of mental intention on inanimate objects and physical systems (e.g. morphological changes in thin strips of metal, distribution of metallic and plastic balls, temperature changes in well-shielded environments, latencies in radioactive decay, perturbations in sensitive magnetometers and interferometers). Several of these experiments have produced statistically significant results (see Radin & Nelson, 2003).

Dice and electronic random number generators (RNGs) have frequently been used as physical targets in mind-matter interaction (MMI) experiments. In dice experiments, participants typically tossed one or more dice while wishing for pre-specified faces to appear. In the majority of published studies, the dice were either tossed by a machine or held in cups to prevent manual manipulation. Results were calculated by comparing the number of matches to the target face to the number of dice tossed. Radin and Ferrari (1991) carried out a meta-analysis of 73 PK-dice studies published from 1935 to 1987, and conducted by 52 different principal investigators (most of these studies were performed in the 1940s and 1950s). A total of 2.6 million dice-throws in 148 experiments were described in the published reports of these studies. This set of experiments produced a small but significant overall effect (an average of 1.2% over chance expectation). Of note, this effect was more than 18 standard errors from chance, and the control results (when no mental intention was applied to the dice) were well within chance expectation. Interestingly, it was determined that variations in reported study designs were not correlated with the outcomes, and that selective reporting problem could not plausibly explain the results of this meta-analysis (Radin & Ferrari, 1991).

MMI experiments with RNGs began in the late 1950s. Modern RNGs are circuits designed to produce electronic noise that is converted in random sequences of 0 and 1 bits. During a fixed group of successive trials, called a run, participants in these experiments are asked to mentally affect the outcome of an RNG so that it may generate, for example, a high number of 0s (i.e. greater than chance expectation), and then a low number of 0s (i.e. lower than chance expectation). In the control condition, the participants do not exert any intentional influence on the outcome. Typically participants in RNG experiments contribute several hundred runs, and the outcomes are often expressed in terms of z scores.

In 1989, Radin & Nelson published a meta-analysis including 597 experiments and 235 control studies published from 1959 to 1987 by 68 different principal investigators (258 of these experiments and 127 of the control studies were reported in a long-term RNG study from the Princeton University PEAR laboratory). The magnitude of the overall statistical outcome was small (a 0.9% shift of the 50% chance expected ratio). However, this shift of the mean was more than 12 standard errors from chance (Radin & Nelson, 1989).

To determine whether the evidence persisted, Radin & Nelson conducted another meta-analysis which included 515 RNG experiments published in 216 articles by 91 different first authors (423 were published through 1987, and 92 published after 1987) (Radin & Nelson, 2003). Again, the magnitude of the overall effect size per experiment was small (on average less than the equivalent of 1%) but statistically the overall effect was more than 16 standard errors from chance. The difference in average z scores for studies published up to 1987 ($z = .73$) and after 1987 ($z = .61$) was not significant. This indicates that the RNG experiments carried out after 1987 continued to provide statistical evidence for independently repeatable MMI effects observed under controlled conditions. Furthermore, as in the dice studies, chance, variations in experimental quality, and selective reporting problems could not explain the results of these meta-analyses (Radin & Nelson, 2003).

In 2006, Bösch et al. published a meta-analysis that combined 380 RNG studies. This meta-analysis revealed a considerable effect size heterogeneity. Bösch and colleagues speculated that this heterogeneity is ascribable to selective reporting and, therefore, that MMI is “not proven”. However, it was later demonstrated that the Bösch et al. meta-analysis contains several significant errors, such as data selection bias, flawed data coding, a lack of correspondence between experimental and control datasets, incorrect statistical analyses, and mistaken interpretation of results (Kugel, 2011; Radin, Nelson, Dobyns, & Houtkooper, 2006).

In other respects, the effect of intention on water has been demonstrated with regard to plant growth (Grad, 1963; Lenington, 1979; Munson, 1979; Roney-Dougal & Solfvin, 2004; Scofield & Hodges, 1991) and, more recently, the aesthetics of water crystallization (Radin et al., 2006; Radin, Lund, Emoto, & Kizu, 2008). Concerning the latter phenomenon, 2000 people in Tokyo focused positive intention on a bottle of water located in an electromagnetically shielded room in California. A control bottle of water was not known to the participants and known to only half of the researchers. The water was then crystallized and 100 independent blind judges rated the beauty of the experimental and control water crystals in a random order. The treated water was

found to be significantly more beautiful than the control water. An additional group of 100 independent judges also reported the same finding (Radin et al., 2006a,b). In a subsequent study, 1900 people in Austria and Germany sent intention to two water bottles in California, with two control bottles in the shielded room, and two control bottles outside of the shielded room. After the water was frozen, crystallized, and photos were taken, 2500 independent blind judges rated the beauty of the crystals. A similar result was found, i.e. the treated water crystals were judged to be more beautiful than the control crystals overall (Radin et al., 2008). While many more studies are needed to refute or support these findings, they are intriguing and contain enormous implications for health, given that our bodies are made of mostly water.

3.9. Effects of intention on biological systems

Researchers have explored whether people can mentally influence biological systems situated at a distance when shielded from all possible conventional influences. For instance, Braud and Schlitz (1991) conducted a series of experiments in which one person (the influencer) attempted to mentally influence the ongoing electrodermal activity (an index of emotional responses) of a distant target person (the influencee) using intentionality, focused attention, and imagery of desired outcomes. During these experiments, the influencee and the influencer were placed in separate, non-adjacent rooms. Moreover, the influencee remained unaware of the way in which the various epochs were scheduled to avoid the possibility of placebo effects. In these experiments, the influencee's spontaneously fluctuating electrodermal activity was monitored while he/she made no deliberate attempts to relax or become more active. During series of 30-s electrodermal activity recording epochs, the influencer received instructions about what to do during each epoch. Epochs were signalled to the influencer (through headphones) by special tones not audible to the influencee. During experimental epochs, the influencer created and maintained a strong intention for the influencee to be calm and relaxed and to display little electrodermal activity; during non-influence (control) epochs, the influencer attempted not to think about the influencee or the experiment. In some experiments, the influencers were also instructed to activate the influencees' electrodermal activity.

Using this experimental protocol, Braud and Schlitz (1991) conducted 15 electrodermal influence experiments: in these experiments, a 40 percent success rate was found, which was associated with an overall z-score of 4.08 and a p value of .000023. In addition, the mean effect size (r) was .25, which compares favorably with effect sizes commonly reported in behavioral and biomedical studies.

Other distantly influenced systems investigated by these researchers included another person's blood pressure and muscular activity, the rate of hemolysis of human red blood cells, the spatial orientation of fish, and the locomotor activity of small mammals. Globally, their research program encompassed 37 experiments, 655 sessions, 449 different influencees, and 153 different influencers. A meta-analysis of these 37 experiments indicated that the overall results from this work were highly significant ($z = 7.72$, $p = 2.58 \times 10^{-14}$).

Schlitz and Braud (1997) reviewed 19 studies of distant mental influences on human physiology that involved a total of 417 sessions. There was a mean effect size of $r = 0.25$ and $p = .00000007$. A more recent meta-analysis of 36 experiments that investigated the effect of distant mental influence on human physiology revealed a small but significant effect of intention on the electrodermal activity of participants ($d = .11$, $p = .001$; Schmidt, Schneider, Utts, & Walach, 2004).

One weakness of research on the effect of distant mental influence on 'whole' human participants is that the target individuals might benefit either from the healing intentions of family and friends who were not part of the experimental protocol, or they might be susceptible to expectancy effects. To address this issue, Roe, Sonnex, and Roxburgh (2015) carried out a meta-analysis of 49 healing studies that implicated biological systems other than 'whole' humans (e.g., studies of cell cultures or plants) which are less susceptible to placebo-like effects. They also conducted a meta-analysis of 57 whole human studies. Non-whole human studies yielded a highly significant effect size, whereas whole human studies yielded a small but significant effect size. Results indicate that subjects in the active condition show a significant improvement in wellbeing compared to control subjects under circumstances that do not appear to be susceptible to placebo and expectancy effects. Furthermore, findings with the whole human database indicate that the effect does not depend upon the previous inclusion of methodologically suspect studies (Roe et al., 2015).

3.10. Remote staring

Remote staring, also known as the sense of being stared at, is the feeling people get when someone that they cannot see is looking at them. This phenomena has been researched for nearly 20 years (Colwell Schröder, & Sladen, 2000; Sheldrake, 1998, 1999, 2000, 2001; Radin & Schlitz, 2005), but more studies are needed. The basic protocol for a remote staring experiment involves one participant observing (or not observing; the "starer") the other participant (the "staree") via a closed-circuit television system while the electrodermal activity of the person being stared at is measured. Studies have also included the starees reporting when they felt that they were being watched, if at all.

Schlitz and Braud (1997) reviewed 11 remote staring studies (241 sessions) with the same mean effect size ($r = 0.25$, $p = 0.000054$). More recently, Schmidt et al. (2004) conducted a meta-analysis of 15 remote staring experiments, which revealed a very small but significant effect ($d = .013$, $p = .01$) of remote staring on electrodermal activity of the target (Schmidt et al., 2004).

Using a novel protocol, Radin and Schlitz (2005) measured electrogastrogram (EGG) activity in a remote staring experiment to test whether a person's myoelectric behavior (stomach contractile activity) would react to the emotions of someone who is looking at him/her via a monitor. EGG is noninvasive and monitors the gut's myoelectrical behavior with skin electrodes (Stern, Ray, & Quigley, 2001). EGG activity was recorded in an individual relaxing in an acoustically and electromagnetically shielded chamber while, at a distance, a second person periodically viewed a live video image of the first person along with stimuli designed to evoke positive, negative, calming, or neutral emotional states. EGG maximums were significantly larger on average when the distant person was experiencing positive ($z = 2.54$, $p = 0.006$) and negative ($z = 3.13$, $p = 0.0009$) emotions, as compared to neutral emotional states. Therefore, the stomach of the person being measured responded to the emotions of the starers even though they did not see them and were shielded from any possible communication through recognized means.

3.11. Category II: Mind beyond brain

The lines of evidence discussed in Category II are those in which the materialist views about the relationship between mind and brain are most strongly challenged. Indeed, the data presented in this section are incongruent with the materialist perspective that mind is produced solely by the brain. This includes NDEs that occur while one's brain is no longer functioning, as in the case with clinical death/cardiac arrest patients.

3.12. NDEs during cardiac arrest and clinical death

NDEs are frequently evoked by cardiac arrest. When the heart stops, breathing stops as well, and blood flow and oxygen uptake in the brain are rapidly interrupted; the EEG becomes isoelectric (i.e. flat-lined) within 10–20 seconds, and brainstem reflexes vanish (Clute & Levy, 1990). The person having the cardiac arrest is then considered to be clinically dead. Because the brain regions mediating consciousness and mental functions are markedly impaired, cardiac arrest survivors are

not expected to have clear mental experiences that will be remembered. Nevertheless, studies conducted in the Netherlands (Van Lommel et al., 2001), United States (Greyson, 2003; Schwaninger, Eisenberg, Schechtman, & Weiss, 2002), United Kingdom (Parnia et al., 2001) and Belgium (Lallier, Velly, & Leon, 2015, p. P421) indicate that approximately 15 percent of cardiac arrest survivors have some recollection from the time when they were clinically dead.

Proponents of materialist theories of the mind argue that during cardiac arrest, even if the EEG is isoelectric, there may be some residual brain activity that is not detected because of the limitations of scalp-EEG technology. This is conceivable because scalp-EEG technology records mostly the activity of large populations of cortical neurons. However, as notes Greyson, the crucial "issue is not whether there is brain activity of any kind whatsoever, but whether there is brain activity of the specific form agreed upon by contemporary neuroscientists as the necessary condition of conscious experience" (Greyson, 2011, p. 4688). This form of neuroelectrical activity, which is well detected via current EEG technology, is clearly abolished by cardiac arrest.

Advocates of materialist theories of the mind also object that NDEs do not occur during the actual episodes of brain insult, but just before or just after the insult, when the brain is more or less functional (Saavedra-Aguilar & Gómez-Jeria, 1989; Blackmore, 1993; Woerlee, 2004). The problem with this interpretation is that unconsciousness generated by cardiac arrest leaves patients amnesic and confused for events occurring immediately before and after such episodes (Aminoff, Scheinman, Griffin, & Herre, 1988; Parnia & Fenwick, 2002; Van Lommel et al., 2001). Furthermore, the confusional experiences happening, when an individual is losing or regaining consciousness, are not transformative like NDEs. Additionally, in some cases, NDEs contain time "anchors" that take the form of verifiable reports of events occurring during the brain insult itself (Greyson, 2010a).

For instance, Van Lommel et al. (2001) reported the case of a cardiac arrest victim who was comatose and cyanotic when he was brought into the hospital. Resuscitation procedures succeeded but the man remained in a coma and on artificial respiration in the intensive care unit for more than a week. When he regained consciousness, days later, he recognized one of the nurses as the person who had removed his dentures during the procedures. That nurse had put his dentures in a cart. The man was also able to provide accurate information concerning the emergency room and the resuscitation procedures.

3.13. Reincarnation research

During the last 50 years, over 2500 cases of young children who reported memories from ostensible previous lives have been studied (Haraldsson, 2012). The pioneer of this type of research was Dr. Ian Stevenson, a psychiatrist who held an endowed chair at the University of Virginia School of Medicine. Today, other researchers, such as Erlendur Haraldsson, Professor Emeritus of Psychology at the University of Iceland, and Jim Tucker, Professor of Psychiatry at the University of Virginia, continue the research pioneered by Stevenson. Many cases have been verified, and some have not. If the verified cases are indeed indicative of accurate memories from another life, these data challenge the materialist view that mind is what the brain does. Clearly, the fact that the brain of the deceased is no longer functional, and that the memories of the individual may still be accessible, seriously question what we know about memory and its dependence on cerebral activity (Haraldsson, 2012).

Most children who experience ostensible past-life memories do so between the ages of 2 and 5, and usually stop talking about these memories between 5 and 7 years of age (Mills & Lynn, 2000). While most incidences occur in Eastern countries, where reincarnation is accepted, some cases also occur in Western countries (Stevenson, 2001). Approximately 80% of children's ostensible past-life memories are of violent deaths (Haraldsson, 2003). Common themes include claiming that their current parents are not their real parents, and that their homes are somewhere else. Many children have birthmarks that coincide with wounds reportedly associated with the previous life. Though not as common, there are multiple cases of children who present with xenoglossy, meaning they are able to communicate in a language, with various degrees of fluency, which they did not learn through any known means (Stevenson, 1976; Stevenson & Pasricha, 1979; 1980).

The investigations usually involve child and parent interviews, and any other person who has witnessed the child speaking of the memories. Then, it is important to rule out whether the child is speaking of events or experiences that he/she learned about from something or someone in his/her environment. After those steps, it is determined whether the case is worth investigating further. Often the witnesses are interviewed again for reliability. The next step, which is very important, is to determine if a deceased person can be traced whose life events correspond to the statements made by the child. Frequently, a person is found whom the child is believed to be referring to. The family of that person will then be interviewed, if possible, and all relevant documents obtained, such as birth and death certificates, postmortem reports, and any other materials (Haraldsson, 2012).

One recent case that has received a lot of media attention is that of James Leininger, an American child who at age 2 began having intense nightmares of a plane crash where he would yell in the night "airplane on fire, little man can't get out!" He described being an American pilot who was killed when his plane was shot down by the Japanese. Moreover, he gave details that included the name of an American aircraft carrier (the Natoma), the first and last name of a friend who was on the plane with him (Jim Larsen), and the location and other specifics about the fatal crash. His parents eventually discovered a close correspondence between James's statements and the death of a World War II pilot named James Huston (Tucker, 2016).

Some common materialist explanations for ostensible past-life memories include mere coincidence, child or parental fabrication, fantasies, false memories or paramnesia (Haraldsson, 2003). Some have suggested that past-life memories may be a result of trauma in the current life, such as child abuse, but no evidence for this has been found (Haraldsson, 2003). However, children do display post-traumatic stress disorder (PTSD) symptoms, such as fear, phobias, anxiety, and aggressiveness, though these behaviors may be related to the past life trauma rather than trauma from the current life (Haraldsson, 2003). Nevertheless, these children could be actually remembering previous lives that they lived as they suggest, or they could be accessing information of a deceased individual through some unknown means (i.e. super-psi theory: the idea that people are capable of super-ESP abilities). Regardless of their cause, these intriguing cases warrant further investigation, particularly by multiple independent investigators. In the words of the often skeptical Carl Sagan, "At the time of writing there are three claims in the (paranormal) field, which in my opinion, deserve serious study" the third being "that young children sometimes report details of a previous life, which upon checking turn out to be accurate and which they could not have known about in any other way than reincarnation" (Sagan, 1996, p. 302).

3.14. Mediumship research

Contemporary research has been carried out mainly by one of us (G.S.) in the Laboratory for Advances in Consciousness and Health (formally the Human Energy Systems Laboratory) at the University of Arizona. The early experimental designs were mostly single blinded, i.e. the medium was blind to the identity of the sitters (e.g. Schwartz & Russek, 2001; Schwartz, Russek, & Barentsen, 2002; Schwartz, Russek, Nelson, & Barentsen, 2001). Other exploratory experimental designs were double blinded in that the medium was blind to the identity of the sitters, and the sitters were blind to the identity of their personal readings. In other experiments, the medium was blind to the identity of the sitters, and the experimenter was blind to information regarding the sitter's deceased loved ones.

To determine whether accurate information about a sitter's deceased loved ones can be reliably obtained from research mediums under highly controlled experimental conditions that effectively rule out conventional explanations, the most recent experimental designs were triple blinded (Beischel & Schwartz, 2007). Blinding was produced at three levels: (a) the mediums were blind to the identities of the sitters and their deceased, (b) the experimenter/proxy sitter interacting with the mediums was blind to the identities of the sitters and their deceased, and (c) the sitters rating the transcripts were blind to the origin of the readings (intended for the sitter vs. a matched control) during scoring.

Eight research mediums that had previously shown an ability to report accurate information in a laboratory setting performed the readings. Eight University of Arizona students served as sitters: four had experienced the death of a parent; the four others had experienced the death of a peer. Each deceased parent was paired with a same gender deceased peer to optimize potential identifiable differences between readings. Both the deceased parents and the deceased peers were associated with their respective University of Arizona students. The deceased peers served as "controls" for the deceased parents (i.e. for the four students who had a deceased parent), and the deceased parents served as "controls" for the deceased peers (i.e. for the four students who had a deceased peer). The parents and peers were known to their respective student "sitters."

Sitters were not present at the readings. The mediums each read two absent sitters and their paired deceased; each pair of sitters was read by two mediums. Each blinded sitter then scored a pair of itemized transcripts (one was the reading intended for him/her; the other, the paired control reading) and chose the reading more applicable to him/her. The mediums performed the study readings over the phone at scheduled times in their homes to improve testing conditions. The audio-recorded phone readings took place long-distance; the medium was in a different city (if not state) than both the blinded absent sitter and the experimenter acting as the proxy sitter.

The results included significantly higher ratings for intended versus control readings ($p = 0.007$, effect size = 0.5) and significant reading-choice results ($p = 0.01$). Otherwise stated, the sitters were able to correctly identify above chance which of two readings belonged to their paired discarnates.

These findings provide evidence that under stringent triple-blind conditions, certain mediums can receive accurate information about deceased individuals. The findings cannot discriminate between alternative hypotheses, such as the survival of consciousness or super-psi. However, the use of a blind proxy sitter under triple blind conditions reduces the plausibility of telepathy (i.e. mind reading of the unknown and absent sitter) as being a likely explanation for the results.

It is noteworthy that the use of this triple-blind design reflects significant methodological and conceptual innovations beyond previous mediumship experiments because it successfully eliminated all known potential sources of conventional sensory cues and conventional rater bias: (a) the mediums were not provided with any sensory cues from the absent sitters and were blind to information about the sitters or the discarnates (beyond the discarnate's first name), (b) the experimenter could not provide cueing as she was blind to the identity of the sitters and the discarnates, and (c) the sitters were blind to which reading of the pair was intended for them during scoring insuring that their biases would equally influence the ratings of both readings.

Moreover, the experimental design used also eliminated the possibility of fraud or "cold reading" (a set of techniques used by psychic entertainers in which visual and auditory cues from the sitter are used to fabricate "accurate" readings): (a) the mediums and sitters never interacted in any way, (b) the mediums were never in the laboratory, (c) the sitters were in the laboratory under supervision and only during scoring, (d) the experimenter who trained the sitters just prior to scoring was blind to the origin of the readings.

Importantly, findings from multi-blinded mediumship experiments have been independently replicated in the US and the UK (e.g. Beischel et al., 2015; Kelly & Arcangel, 2011; Roy & Robertson, 2004).

3.15. Deathbed communications

Deathbed communications (DBCs) constitute another source of evidence suggesting that consciousness and personality may not cease after bodily death. DBCs are any communication between the patient and deceased friends or relatives within 30 days of the patient's death (Lawrence & Repede, 2012). These experiences have been reported across different cultures and throughout history (Fenwick, Lovelace, & Brayne, 2010). DBCs may encompass auditory, visual, and kinesthetic elements, and are often indicated by nonverbal processes (e.g. reaching out of the hands toward an invisible person or object) (Lawrence & Repede, 2012). One frequent type of DBC involves apparent encounters with deceased spirits who seem to welcome the dying person to the afterlife and converse responsively with him/her (Greyson, 2010b). DBCs have a deep impact on the alleviation of physical, emotional, and existential distress at the end of life, and most of the people who have these experiences derive great meaning and comfort from them (Lawrence & Repede, 2012).

Research conducted with end-of-life nurses and physicians (Fenwick et al., 2010) suggests that these experiences are not uncommon. The prevailing view among physicians is that DBCs are confusional-hallucinatory, drug induced (Fenwick et al., 2010), or due to expectation and wishful thinking (Greyson, 2010b). While this may sometimes be true, there are cases of DBCs which cannot be simply explained as hallucinations based on expectation: in these cases, the dying person apparently sees, and expresses surprise at seeing, a person whom he/she thought was living, but who had in fact recently died (Greyson, 2010b).

4. Discussion of evidence

4.1. Implications of the empirical evidence presented

As we have shown in section 2, there is mounting evidence that mind can act outside of space and time, and that the brain may not be required for the existence of mind and consciousness. The Category I evidence presented, including studies of psi phenomena, suggests that the impact of the mind is not confined to space and time, nor closely restricted to the brain and body since mental intentions can influence at a distance the activity of physical and biological systems screened from all conventional physical influences. Furthermore, meta-analyses of other psi studies indicate that it is possible to mentally acquire information about objects or external events without the use of the known senses. It is important to note here that materialist theories of mind do not account for psi phenomena.

With respect to Category II evidence, the fact that enhanced mental experiences and accurate OBE perception can occur at a time when brain activity is greatly impaired or seemingly absent (during clinical death) strongly challenges the reductive materialist stance that mind results solely from brain activity (Trent von Haesler & Beauregard, 2013). Importantly, from an ontological perspective, NDEs occurring in cardiac arrest are suggestive of post-mortem survival and the existence of other levels of reality that are non-physical. Regarding this question, further evidence is provided by studies on DBCs, mediumship, and past life memories.

4.2. Hypotheses about mind-brain relationship – understanding the methodologies

Materialists often argue that the experimental evidence obtained, using neuroscience techniques, proves that the brain produces mind and consciousness. As a matter of fact, neuroscience studies only suggest that mental activity is usually correlated with brain activity.

Recording, stimulation, and lesion represent three of the main

techniques allowing neuroscientists to gather experimental evidence. Contrary to what is frequently assumed, the three kinds of evidence obtained via these techniques do not necessarily validate the hypothesis that mind is what the brain does. To understand why, let's consider for a moment an example from electronics and electrical engineering (Schwartz, 2012).

It is now well accepted that televisions work as receivers for processing information carried by external electromagnetic fields oscillating in specific frequency bands. Television (TV) receivers are not the source of the visual information presented — they detect the information, amplify it, process it, and display it. Interestingly, a strong parallel can be drawn between the brain and the TV, and the experiments conducted by neuroscientists and electrical engineers with respect to the techniques they use.

a. *Evidence from recordings*—Neuroscientists record brain activity using electronic equipment. For instance, they can use EEG to demonstrate that occipital alpha waves decrease when people see visual objects. Electrical engineers can monitor signals inside the TV set using electronic devices. For example, electrodes can be placed on specific components in circuits that correlate with the visual images observed on the screen.

b. *Evidence from stimulation*—Neuroscientists can stimulate various areas of the brain using electrodes placed inside the head or magnetic coils placed outside the head. For instance, they can stimulate the occipital cortex: such stimulation is typically associated with people experiencing visual sensations and images. Electrical engineers can stimulate selective components of the TV using electrodes placed inside the TV set or magnetic coils placed outside the set. For example, specific circuits can be stimulated with particular patterns of information, and replicable patterns can be seen on the TV screen.

c. *Evidence from ablation*—Neuroscientists (and neurosurgeons) can surgically remove various regions of the brain. For instance, when selective areas of the occipital cortex are removed, people and animals lose aspects of vision. Electrical engineers can remove various components from the TV (or components can be damaged or wear out). For example, key components can be removed and the visual images on the screen will drop out of sight.

Do these three kinds of evidence imply that the source or origin of the TV signals is inside the TV set — i.e., that the TV creates the signals? The answer is, of course, no.

If we apply this basic logic to the brain with reference to vision, the three kinds of evidence only allow us to conclude that brains play some sort of role in visual experience; by themselves, the three kinds of evidence do not tell us whether brains "self-create" the visual information internally (this is the production hypothesis: brain creates mind) or function as complex receivers of external information (which allows for both survival of consciousness after death and a greater reality) (Schwartz, 2012).

More than a century ago, William James proposed that the brain may play a permissive and transmissive role regarding consciousness and other mental functions (James, 1898). James further hypothesized that the brain may be a filter that usually limits/constrains/restricts the experience of expanded forms of consciousness and a larger mental reality. This hypothesis was also defended by philosophers Ferdinand Schiller and Henri Bergson, and more recently by Kelly et al. (2007). It entails that during transcendent experiences, the filter function of the brain is deactivated (Beauregard, 2012; Kelly et al., 2007). Such a deactivation may play a role in ESP.

It is paramount to realize that while the production hypothesis is unable to explain most of the empirical phenomena presented in this paper, the transmission hypothesis provides a useful theoretical framework for understanding this evidence which appear anomalous only when seen through the lens of materialism.

Reductive materialist theories of the mind do not explain these phenomena, and have failed to elucidate how brain could generate mind. This is also true of lesser reductive materialist theories, such as non-reductive physicalism. In the version of this thesis proposed by philosopher and theologian Nancey Murphy, mental events are seen as emerging from physical processes in the brain (Murphy, 2002). As it is the case of reductive materialist theories, such a view cannot account at all for the fact that conscious mental activity is still possible during clinical death. Given this, we posit that it is now time to free ourselves from the shackles and blinders of reductive and lesser reductive materialist/physicalist theories of the mind, and enlarge our concept of the natural world.

4.3. Three types of postmaterialist theories

One of us (G.S.) has recently proposed that there are three basic types of theories which may be required for explaining the various categories of empirical evidence examined in the present article (Schwartz, 2016):

Type I postmaterialist theories: Neo-physical theories which are derived from materialist theories, where the materialist theories are still seen as primary and are viewed as being fundamentally necessary to create "non-material" (yet "physical") phenomena such as consciousness.

Type II postmaterialist theories: Postmaterialist theories of mind and consciousness existing alongside materialist theories, where both classes of theories are seen as primary and are viewed as not being derivable from (i.e. are not reducible to) the other, and.

Type III postmaterialist theories: Where materialist theories are derived from, and are a subset of, more inclusive postmaterialist theories of consciousness; here postmaterialist theories are seen as primary and are viewed as the ultimate origin of material systems.

An anonymous reviewer of the present manuscript commented: I find this distinction between Types I, II, and III unnecessarily cryptic. Is not Type I Physicalist Theories, Type II Dualist Theories, and Type III Idealist Theories? If so, then why not use the terms that have been familiar for centuries?

The simple answer is yes: the three types of postmaterialist theories generally parallel physical, dualist, and idealist theories. If the reader prefers, s/he can substitute these terms and appreciate the distinctions in light of current theories and research.

Type I postmaterialist theories assume that phenomena such as consciousness, including non-local consciousness, although they may be "non-material" (e.g. do not meet the classical criteria of having mass and being localized as such), are nonetheless still "physical" and obey physical laws. An example of "non-material, yet physical" is the concept of a field. In physics electromagnetic and quantum fields do not have mass or weight; they are mathematical abstractions which are theorized to produce lawful effects on material objects.

This can be thought of as "neo-physicalism" in the sense that Type I theorists posit that energy and information are in essence "physical" even though they are not "material" (i.e. their form and properties are not of classical matter with properties of mass and momentum).

Neo-physical theories allow for "info-energy" and "fields" (including "quantum" fields) to exist "independently of matter" and therefore operate in "non-material" yet physical ways. Proponents of neo-physical theories posit that this class of theories can potentially be used to explain phenomena including NDEs, OBEs, and evidence of life after death.

For example, Stuart Hameroff & Roger Penrose have proposed the Orchestrated objective reduction (Orch-OR) theory. According to Orch-OR, consciousness in the brain is produced by objective reduction, a quantum physics process that is orchestrated by molecular structures called microtubules. Once created, consciousness can exist and operate as organized quantum fields in the vacuum of space (Hameroff & Penrose, 2014). Hameroff & Penrose are clearly "materialists" in the sense that they view matter (e.g. neurons as material systems) as being essential to the creation of consciousness, but they are also "postmaterialists" in the sense that their hypothesized quantum field

physical nature of consciousness model (a “neo-physical” theory) allows it to function above and beyond its original material form.

Type II postmaterialist theories assume that certain phenomena in nature and the cosmos cannot be explained by materialist explanations and therefore require innovative non-material theories to understand them. Moreover, they view the phenomena as being separate from matter and, in their essence, on a conceptually equal footing with matter and what we experience as material reality.

Type II theories are not meant to expand or replace physical theories of the material world. The new theories are meant to compliment them, adding to a more complete description of nature and the cosmos without requiring a re-envisioning of physical theories of the material world.

Not long ago, one of us (M.B.) advanced a novel theory called the “Theory of Psychelementarity” (or TOP - Beauregard, 2014). The TOP proposes that the psyche is a force that plays a role as primordial as that of matter, energy, space-time, and the fundamental forces of physics. Another central premise of this theory is that the psyche cannot be reduced to physical processes. The TOP is an exemplar of a Type II postmaterialist theory.

Type III postmaterialist theories are by far the most controversial and challenging to the mainstream materialist paradigm. These theories expressly predict that phenomena such as mind and consciousness are not only (1) separate conceptually from material systems (Type II theories) and, (2) not created by material systems (Type I theories), but they are also (3) precursors to the creation of matter itself. In other words, they are “primordial to matter itself.”

At present time Type III theories tend to be offered by big picture visionary theorists who have an eastern background, such as physicist Amit Goswami (Goswami, 1995), or theorists who have an affinity for both western and eastern spiritual perspectives, such as physicist Bernard Haisch (Haisch, 2012), physician Larry Dossey (Dossey, 2013), and computer engineer and AI pioneer Bernardo Kastrup (Kastrup, 2014). Type III theories are also seriously entertained by scientists who have strong mathematical and statistical perspectives. An example is Schwartz's analysis of order, randomness and the essential logic of positing the existence of some sort of guiding-organizing-designing process in nature and the cosmos (see Schwartz, 2006).

It should be recognized that what we are calling “postmaterialist theorizing” is not new. For instance, Max Planck, one of the founders of quantum mechanics, said:

> *"I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness. Everything that we talk about, everything that we regard as existing, postulates consciousness."* (The Observer, 25 January 1931)

Regardless of whether Planck was right or wrong about this crucial issue, it is conceivable that a radical new idea about the nature of mind will need to be formulated to fully account for the evidence discussed in this paper. In the process, our very concepts of matter and material may need to be reformulated accordingly. Be that as it may, postmaterialist science needs to be open-minded and visionary enough to allow for the creation of Type I, Type II and/or Type III theories. Indeed, pursuing all testable postmaterialist theories of mind, notwithstanding of type, is both prudent and exciting, and holds great promise for science and humanity.

5. Toward a postmaterialist psychology

5.1. The emerging postmaterialist paradigm

If psychologists truly seek to make great strides concerning the scientific study of mind and consciousness, they need to consider all types of human experiences, not only a narrow range of phenomena; they also need to embrace a postmaterialist perspective that is compatible both with QM and the evidence examined in this paper.

The term postmaterialist was selected intentionally as it leaves the future completely open, and inspires the vigorous pursuit of new ideas and observations (e.g. Beauregard et al., 2014). We believe that in a near future, postmaterialist theories will seek to resolve crucial theoretical issues such as qualia emergence, the mind-brain relationship, and the nonlocal characteristics of mind.

The emerging postmaterialist paradigm, based on the various lines of empirical evidence examined in this article, stimulates the following hypotheses that deserve empirical testing:

1. Mind (including consciousness) represents an aspect of reality as primordial as the physical world. Mind is fundamental in the universe, i.e. it cannot be derived from matter and reduced to anything more basic.

2. Mind and the physical world appear to be separated but they are in fact deeply interconnected. The interconnectedness between mind and the physical world does not seem to rest on quantum entanglement. Indeed, non-local connections between entangled particles do not involve the transfer of information (Kafatos & Nadeau, 1999), whereas interaction at a distance between humans and physical/biological systems seemingly implicates a mental information transfer. Furthermore, this type of interaction implicates various forms of mental processes that QM does not take into account.

3. Mind (will/intention) acts as a force and field, i.e. it can influence the state of the physical world, and operate in a nonlocal (or extended) fashion. This implies that mind is not confined to specific points in space, such as brains and bodies, nor to specific points in time, such as the present.

4. The brain acts as a transceiver of mental activity, i.e. the mind works through the brain, but is not produced by it.

5. There are other levels of reality that are non-physical.

This paradigm, which in our view represents the next phase toward an even greater understanding of ourselves and reality, has far-reaching implications. It fundamentally alters the vision we have of ourselves. The postmaterialist paradigm fosters positive values such as compassion, respect, and peace because it promotes an awareness of our interconnection. Additionally, it acknowledges spiritual experiences, which relate to a fundamental dimension of human existence and are frequently reported across all cultures (Hardy, 1975). These experiences offer an enlarged perspective on the nature of the self and reality that cannot be accommodated within a materialist framework (Cardeña, Lynn, & Krippner, 2017). Moreover, within the postmaterialist paradigm, spiritual experiences are not seen *a priori* as fantasies or the symptoms of pathological processes, such as brain or mental disorders. Regarding this issue, there is mounting evidence that spiritual experiences are often associated with better mental health (Moreira-Almeida & Cardena, 2011). Lastly, by emphasizing a deep connection between ourselves and nature at large, the postmaterialist paradigm also promotes environmental awareness and the preservation of our biosphere.

What could be the impact of the postmaterialist paradigm on psychology?

Allowing for research from a postmaterialist perspective would impact many subfields within psychology. Not only would a postmaterialist paradigm allow for research to extend further into the potential of the mind, it would do so with an understanding of our interconnection, thereby moving forward in an ethical, holistic way. Even more so, it would decrease the reliance on a materialistic, reductionist perspective, which justifies unethical research on animals and vulnerable populations.

With respect to abnormal psychology, the belief in psi phenomena is currently classified as a symptom of a mental disorder, such as schizotypal personality disorder. A postmaterialist paradigm would recognize that many people do experience psi phenomena, and that these phenomena are not necessarily the products of delusions or pathological belief systems. Furthermore, a postmaterialist paradigm would take into account the enormous power of spirituality and mystical

experiences to fundamentally transform one's life in a positive way (Van Lommel et al., 2001).

As regards social psychology, adopting a postmaterialist paradigm would allow for deeper research into our interconnection and social bonds that may transcend the physical boundaries assumed by scientific materialism. For example, there may be a component of empathy that requires more direct connection between individuals than the physical cues of the face, voice, and body language. We can explore the extent of our ability to communicate with each other nonverbally, across distances. More rigorous and sophisticated studies of telepathy, clairsentience ('clear-feeling'), and empathy would greatly contribute to our understanding of our social bonds, and ultimately, how to improve them.

The implications of postmaterialist paradigm also extend to cross-cultural psychology, whereby other cultural belief systems often correspond to a non-materialist perspective. Considering that the vast majority of psychological studies are conducted by, and with, Western psychology students and faculty, who tend to be of a particular way of thinking about and understanding the world, this is particularly important. Adopting a postmaterialist paradigm would allow for the investigation into higher or altered states of consciousness without the assumption that they are dysfunctional or a problem with the brain's ability to properly communicate with itself and the environment. Instead, from a postmaterialist paradigm, these states can be recognized as a change in characteristics of the brain's transmission process, which can provide us with much insight into our consciousness, its potential expression, and other aspects of information we do not normally perceive.

A postmaterialist paradigm can also create a bridge between modern medicine and traditional forms of medicine. Some cultures have been practicing medicine for thousands of years, and these other medical traditions may enhance our understanding of health and disease. Indeed, the integration of many aspects of Traditional Chinese Medicine into Western medicine is on the rise (Chan, Tan, Xin, Sudarsanam, & Johnson, 2010). The cause of disease in traditional Tibetan Medicine, which has roots in a form of shamanism known as Bon, and other forms of indigenous medicine, are often attributed to spiritual causes, including hauntings by deceased loved ones, the influence of negative spiritual beings, and a loss or fragmentation of part of the essence or soul of the individual, particularly after trauma (Glazer, Baer, Weller, de Alba, & Liebowitz, 2004; Greenway, 1998; Samuel, 2007; Waldau & Patton, 2009, pp. 224–229). A postmaterialist paradigm allows for an open investigation into these more traditional approaches to healing without presuming they are inaccurate.

6. Conclusions

In the December 2015 issue of *Scientific American,* the skeptic Michael Shermer published an article about the importance of the consilience of inductions and the convergence of evidence in advancing science. He wrote:

An answer may be found in what 19th-century philosopher of science William Whewell called a "consilience of inductions." For a theory to be accepted, Whewell argued, it must be based on more than one induction—or a single generalization drawn from specific facts. It must have multiple inductions that converge on one another, independently but in conjunction. "Accordingly the cases in which inductions from classes of facts altogether different have thus jumped together," he wrote in his 1840, p. 230 book The Philosophy of the Inductive Sciences, "belong only to the best established theories which the history of science contains." Call it a "convergence of evidence."

The controversial area addressed by Shermer was the importance of the convergence of evidence in the development of theories of apparent climate change. The same logic can be applied to the development of postmaterialism. It is the *"consilience of inductions"* and the *"convergence of evidence"* which justifies our taking the postmaterialist paradigm seriously.

Scientific materialism still continues to exert substantial influence in the academic world. QM and the numerous lines of converging empirical evidence discussed here, however, strongly suggest that this ideology is incomplete, erroneous and obsolete: the time is indeed ripe to embrace a broader and more inclusive postmaterialist conception of the world.

The history of science has been marked by a few special moments that were characterized by major conceptual breakthroughs that have been called paradigm shifts or changes (Kuhn, 1970). Pivotal paradigm changes include the shift in thinking that (a) the Earth was flat, to the Earth being spherical, that (b) the Sun revolved around the Earth, to the Earth revolving around the Sun, that (c) matter was solid and fixed (how we conventionally experience it), to matter being mostly "empty space" and dynamically probabilistic (QM) (Schwartz, 2012).

It appears that we are now approaching another crucial paradigm shift, namely the transition from materialist science to postmaterialist science. We may be witnessing the end of materialism (Tart, 2009), at least as originally conceived. Holding great promise for science, this transition may be of vital importance to the evolution of the human civilization. Toward this end, a group of postmaterialist scientists (Schwartz et al., 2018) have founded a global Academy for the Advancement of Postmaterialist Sciences to foster theory, research, and applications in all branches of science.

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References

Aminoff, M. J., Scheinman, M. M., Griffin, J. C., & Herre, J. M. (1988). Electrocerebral accompaniments of syncope associated with malignant ventricular arrhythmias. *Annals of Internal Medicine, 108*, 791–796.

Beauregard, M. (2012). *Brain wars.* New York: Harper Collins.

Beauregard, M. (2014). The primordial psyche. *Journal of Consciousness Studies, 21*, 132–157.

Beauregard, M., Schwartz, G. E., Miller, L., Dossey, L., Moreira-Almeida, A., Schlitz, M., et al. (2014). Manifesto for a postmaterialist science. *Explore: The Journal of Science and Healing, 10*, 272–274.

Beischel, J., Boccuzzi, M., Biuso, M., & Rock, A. J. (2015). Anomalous information reception by research mediums blinded conditions II: Replication and extension. *Explore: The Journal of Science and Healing, 11*, 136–142.

Beischel, J., & Schwartz, G. E. (2007). Anomalous information reception by research mediums demonstrated using a novel triple-blind protocol. *Explore: The Journal of Science and Healing, 3*, 23–27.

Blackmore, S. J. (1993). *Dying to Live: Science and the near- death experience.* London: Grafton.

Blackmore, S. J., & Troscianko, T. S. (1989). The physiology of the tunnel. *Journal of Near-death Studies, 8*, 15–28.

Bösch, H., Steinkamp, F., & Boller, E. (2006). Examining psychokinesis: The inter action of human intention with random number generators—a meta-analysis. *Psychological Bulletin, 132*, 497–523.

Braud, W. G., & Schlitz, M. J. (1991). Consciousness interactions with remote biological systems: Anomalous intentionality effects. *Subtle Energies, 2*, 1–46.

Braud, W. G., Wood, R., & Braud, L. W. (1975). Free-response GESP performance during an experimental hypnagogic state induced by visual and acoustic ganzfeld techniques: A replication and extension. *Journal of the American Society for Psychical Research, 69*, 105–113.

Burtt, E. A. (1949). *The metaphysical foundations of modern science.* London: Routledge.

Cardeña, E., Lynn, S. J., & Krippner, S. (2017). The psychology of anomalous experiences: A rediscovery. *Psychology of Consciousness: Theory, Research, and Practice, 4*, 4.

Chan, E., Tan, M., Xin, J., Sudarsanam, S., & Johnson, D. E. (2010). Interactions between traditional Chinese medicines and Western. *Current Opinion in Drug Discovery & Development, 13*, 50–65.
Clark, K. (1984). Clinical interventions with near-death experiencers. In B. Greyson, & C. P. Flynn (Eds.). *The near-death experience (pp. 242–255)*. Springfield, IL: Charles C. Thomas.
Clute, H. L., & Levy, W. J. (1990). Electroencephalographic changes during brief cardiac arrest in humans. *Anesthesiology, 73*, 821–825.
Colwell, J., Schröder, S., & Sladen, D. (2000). The ability to detect unseen staring: A literature review and empirical tests. *British Journal of Psychology, 91*, 71–85.
Cook, E. W., Greyson, B., & Stevenson, I. (1998). Do any near-death experiences provide evidence for the survival of human personality after death? *Journal of Scientific Exploration, 12*, 377–406.
Dossey, L. (2013). *One mind.* New York: Hay House.
Dossey, L.. (2015). http://opensciences.org/blogs/open-sciences-blog/232-consciousness-why-materialism-fails.
Fenwick, P., Lovelace, H., & Brayne, S. (2010). Comfort for the dying: Five year retrospective and one year prospective studies of end of life experiences. *Archives of Gerontology and Geriatry, 51*, 173–179.
Gauld, A. (1983). *Mediumship and survival: A century of investigations.* Chicago: Academy Chicago Publishers.
Glazer, M., Baer, R. D., Weller, S. C., de Alba, J. E. G., & Liebowitz, S. W. (2004). Susto and soul loss in Mexicans and Mexican Americans. *Cross-Cultural Research, 38*, 270–288.
Goswami, A. (1995). *The self-aware universe.* Los Angeles, CA: Tarcher/Putnam.
Grad, B. (1963). A telekinetic effect on plant growth. *International Journal of Parapsychology, 5*, 117–133.
Greenway, C. (1998). Hungry earth and vengeful stars: Soul loss and identity in the Peruvian Andes. *Social Science & Medicine, 47*, 993–1004.
Greyson, B. (2003). Incidence and correlates of near-death experiences in a cardiac care unit. *General Hospital Psychiatry, 25*, 269–276.
Greyson, B. (2010a). Implications of near-death experiences for a postmaterialist psychology. *Psychology of Religion and Spirituality, 2*, 37–45.
Greyson, B. (2010b). Seeing dead people not known to have died: "Peak in Darien" experiences. *Anthropology and Humanism, 35*, 159–171.
Greyson, B. (2011). Cosmological implications of near-death experiences. *Journal of Cosmology, 14*, 4684–4696.
Greyson, B., Fountain, N. B., Derr, L. L., & Broshek, D. K. (2014). Out-of-body experiences associated with seizures. *Frontiers in Human Neuroscience, 8*(65), 1–11. http://dx.doi.org/10.3389/fnhum.2014.00065.
Greyson, B., Fountain, N. B., Derr, L. L., & Broshek, D. K. (2015). Mystical experiences associated with seizures. *Religion, Brain & Behavior, 5*, 182–196. http://dx.doi.org/10.1080/2153599X.2014.895775.
Haisch, B. (2012). *The purpose-guided universe.* New York: New Page Books.
Hameroff, S., & Penrose, R. (2014). Consciousness in the universe: A review of the 'Orch OR' theory. *Physics of Life Reviews, 11*, 39–78.
Haraldsson, E. (2003). Children who speak of past-life experiences: Is there a psychological explanation? *Psychology and Psychotherapy: Theory, Research and Practice, 76*, 55–67.
Haraldsson, E. (2012). Cases of the reincarnation type and the mind–brain relationship. In A. Moreira- Almeida, & F. Santana Santos (Eds.). *Exploring Frontiers of the Mind-Brain Relationship (pp. 215–231)*. New York: Springer.
Hardy, A. (1975). *The biology of god.* New York: Taplinger.
Hartelius, G., Caplan, M., & Rardin, M. A. (2007). Transpersonal psychology: Defining the past, divining the future. *The Humanistic Psychologist, 35*, 135–160.
Heisenberg, W. (1976). *Physics and Philosophy: The revolution in modern science.* New York: Harper and Row.
Holden, J. M. (2009). Veridical perception in near-death experiences. In J. M. Holden, B. Greyson, & D. James (Eds.). *The Handbook of Near-Death Experiences: Thirty Years of Investigation, (pp. 185–211)*. Santa Barbara, CA: Praeger/ABC-CLIO.
Honorton, C., & Harper, S. (1974). Psi-mediated imagery and ideation in an experimental procedure for regulating perceptual input. *Journal of the American Society for Psychical Research, 68*, 156–168.
Honorton, C., & Schecter, E. I. (1987). Ganzfeld target retrieval with an automated system: A model for initial ganzfeld success. In D. B. Weiner, & R. D. Nelson (Eds.). *RIP 1986, (pp. 36–39)*. Metuchen, NJ: Scarecrow Press.
Jahn, R., Dunne, G., Bradisj, Y., Dobyns, A., Lettieri, A., Nelson, R., et al. (2000). Mind/machine interaction consortium: PortREG replication experiments. *Journal of Scientific Exploration, 14*, 499–555.
James, W. (1898). Human immortality: Two supposed objections to the doctrine. In G. Murphy, & R. O. Ballou (Eds.). *William James on psychical research (pp. 279–308)*. New York: Viking.
James, W. (1904). A world of pure experience. *The Journal of Philosophy, Psychology, and Scientific Methods, 1*, 533–543.
Jung, C. G. (1955). *Synchronicity an acausal connecting principle.* Ark/Routledge.
Jung, C. G. (2011). *Memories, dreams, reflections.* Vintage.
Kafatos, M., & Nadeau, R. (1999). *The conscious Universe: Parts and wholes in physical reality*. New York: Springer.
Kastrup, B. (2014). *Why materialism is Baloney: How true skeptics know there is No death and fathom answers to life, the universe, and everything.* Iff Books.
Kelly, E. W., & Arcangel, D. (2011). An investigation of mediums who claim to give information about deceased persons. *The Journal of Nervous and Mental Disease, 199*, 11–17.
Kelly, E. W., Greyson, B., & Stevenson, I. (2000). Can experiences near death furnish evidence of life after death? *Omega, 40*, 513–519.
Kelly, E. F., Kelly, E. W., Crabtree, A., Gauld, A., Grosso, M., & Greyson, B. (2007). *Irreducible Mind: Toward a psychology for the 21st century.* Lanham, MD: Rowman & Littlefield.
Kugel, W. (2011). A faulty PK meta-analysis. *Journal of Scientific Exploration, 25*, 47–62.
Kuhn, T. S. (1970). *The structure of scientific revolutions.* Chicago: University of Chicago Press.
Lajoie, D. H., & Shapiro, S. I. (1992). Definitions of transpersonal psychology: The first twenty-three years. *Journal of Transpersonal Psychology, 24*, 79.
Lallier, F., Velly, G., & Leon, A. (2015). Near-death experiences in survivors of cardiac arrest: A study about demographic, medical, pharmacological and psychological context. *Critical Care, 19*(Suppl 1), P421.
Lawrence, M., & Repede, E. (2012). The incidence of deathbed communications and their impact on the dying process. *American Journal of Hospice & Palliative Care, 30*, 632–639.
Lenington, S. (1979). Effect of holy water on the growth of radish plants. *Psychological Reports, 45*, 381–382.
Lukoff, D., Turner, R., & Lu, F. (1992). Transpersonal psychology research review: Psychoreligious dimensions of healing. *Journal of Transpersonal Psychology, 25*, 11–28.
Mills, A., & Lynn, S. J. (2000). Past-life experiences. In E. Cardeña, S. J. Lynn, & S. Krippner (Eds.). *Varieties of anomalous experience: Examining the scientific evidence (pp. 283–313)*. Washington, DC, US: American Psychological Association.
Moreira-Almeida, A., & Cardena, E. (2011). Differential diagnosis between non-pathological psychotic and spiritual experiences and mental disorders: A contribution from Latin American studies to the ICD-11. *Revista Brasileira de Psiquiatria, 33*(suppl.1), S21–S36.
Morse, M. L., Venecia, D., & Milstein, J. (1989). Near-death experiences: A neurophysiological explanatory model. *Journal of Near-death Studies, 8*, 45–53.
Mossbridge, J., Tressoldi, P. E., & Utts, J. (2012). Predictive physiological anticipation preceding seemingly unpredictable stimuli: A meta-analysis. *Frontiers in Psychology, 3*, 390.
Mumford, M. D., Rose, A. H., & Goshin, D. A. (1995). *An evaluation of remote viewing: Research and applications.* American Institutes for Research.
Munson, R. J. (1979). The effects of PK on rye seeds. *Journal of Parapsychology, 43*, 43.
Murphy, N. (2002). How physicalists can avoid being reductionists. In H. D. Regan, & W. M. Mark (Eds.). *Interdisciplinary Perspectives on Cosmology and Biological Evolution. ATF Science and Theology Series 2*. Worthing, Australia: Australian Theological Forum.
Owens, J. E. (1995). Paranormal reports from a study of near-death experience and a case of an unusual near-death vision. In L. Coly, & J. D. S. McMahon (Eds.). *Parapsychology and thanatology (pp. 149–167)*. New York: Parapsychology Foundation.
Parker, A. (1975). Some findings relevant to the change in state hypothesis. In J. D. Morris, W. G. Roll, & R. L. Morris (Eds.). *Research in Parapsychology 1974 (pp. 40–42)*. Metuchen, NJ: Scarecrow Press.
Parnia, S., & Fenwick, P. (2002). Near death experiences in cardiac arrest. *Resuscitation, 52*, 5–11.
Parnia, S., Waller, D. G., Yeates, R., & Fenwick, P. (2001). A qualitative and quantitative study of the incidence, features, and aetiology of near death experiences in cardiac arrest survivors. *Resuscitation, 48*, 149–156.
Radin, D. I., & Ferrari, D. C. (1991). Effects of consciousness on the fall of dice: A meta-analysis. *Journal of Scientific Exploration, 5*, 61–84.
Radin, D., Hayssen, G., Emoto, M., & Kizu, T. (2006b). Double-blind test of the effects of distant intention on water crystal formation. *Explore: The Journal of Science and Healing, 2*, 408–411.
Radin, D., Lund, N., Emoto, M., & Kizu, T. (2008). Effects of distant intention on water crystal formation: A triple-blind replication. *Journal of Scientific Exploration, 22*, 481–493.
Radin, D., Michel, L., & Delorme, A. (2016). Psychophysical modulation of fringe visibility in a distant double-slit optical system. *Physics Essays, 29*(1), 14–22.
Radin, D., Michel, L., Galdamez, K., Wendland, P., Rickenbach, R., & Delorme, A. (2012). Consciousness and the double-slit interference pattern: Six experiments. *Physics Essays, 25*, 157–171.
Radin, D. I., & Nelson, R. D. (1989). Evidence for consciousness-related anomalies in random physical systems. *Foundations of Physics, 19*, 1499–1514.
Radin, D., & Nelson, R. (2003). Research on mind–matter interactions (MMI): Individual intention. In W. B. Jonas, & C. C. Crawford (Eds.). *Healing, Intention and Energy Medicine: Research and Clinical Implications (pp. 39–48)*. Edinburgh: Churchill Livingstone.
Radin, D., Nelson, R., Dobyns, Y., & Houtkooper, J. (2006a). Reexamining psychokinesis: Comment on Bösch, steinkamp, and boller. *Psychological Bulletin, 132*, 529–532.
Radin, D. I., & Schlitz, M. J. (2005). Gut feelings, intuition, and emotions: An exploratory study. *Journal of Alternative & Complementary Medicine, 11*, 85–91.
Rhine, J. B. (1934). *Extra-sensory perception* (4th ed.). New York: Branden Publishing Company (1997).
Ring, K., & Cooper, S. (1997). Near-death and out-of-body experiences in the blind: A study of apparent eyeless vision. *Journal of Near-death Studies, 16*, 101–147.
Ring, K., & Lawrence, M. (1993). Further evidence for veridical perception during near-death experiences. *Journal of Near-death Studies, 11*, 223–229.
Rodin, E. (1989). Comments on "a neurobiological model for near-death experiences. *Journal of Near-death Studies, 7*, 255–259.
Roe, C. A., Sonnex, C., & Roxburgh, E. C. (2015). Two meta-analyses of noncontact healing studies. *Explore: The Journal of Science and Healing, 11*, 11–23.
Roney-Dougal, S. M., & Solfvin, J. (2004). Field study of enhancement effect on lettuce seeds: Their germination rate, growth and health. *Journal of the Society for Psychical Research, 66*, 129–142.
Roy, A. E., & Robertson, T. J. (2004). Results of the application of the Robertson- Roy protocol to a series of experiments with mediums and participants. *Journal of the Society for Psychical Research, 68*, 18–34.

Saavedra-Aguilar, J. C., & Gómez-Jeria, J. S. (1989). A neurobiological model for near-death experiences. *Journal of Near-death Studies, 7*, 205–222.
Sagan, C. (1996). *The demon-haunted world: Science as a candle in the dark.* New York: Random House.
Samuel, G. (2007, October). Spirit causation and illness in Tibetan medicine. *Proceedings of the Tenth Seminar of the IATS, 2003. Volume 10: Soundings in Tibetan Medicine (pp. 213–224)*. Brill.
Schlitz, M., & Braud, W. (1997). Distant intentionality and healing: Assessing the evidence. *Alternative Therapies in Health & Medicine, 3*, 62–73.
Schmidt, S., Schneider, R., Utts, J., & Walach, H. (2004). Distant intentionality and the feeling of being stared at: Two meta-analyses. *British Journal of Psychology, 95*, 235–247.
Schwaninger, J., Eisenberg, P. R., Schechtman, K. B., & Weiss, A. N. (2002). A prospective analysis of near-death experiences in cardiac arrest patients. *Journal of Near-death Studies, 20*, 215–232.
Schwartz, G. E. (2006). *The G.O.D. Experiments.* New York: Beyond Words (Simon & Schuster).
Schwartz, G. E. (2012). Consciousness, spirituality, and postmaterialist Science: An empirical and experiential approach. In L. J. Miller (Ed.). *The Oxford Handbook of Psychology and Spirituality (pp. 584–597)*. New York: Oxford University Press.
Schwartz, G. E. (2016). What is the nature of a postmaterialist paradigm? Three types of theories. *Explore: The Journal of Science and Healing, 12*, 123–127.
Schwartz, G. E. R., & Russek, L. G. S. (2001). Evidence of anomalous information retrieval between two mediums: Telepathy, network memory resonance, and continuance of consciousness. *Journal of the Society for Psychical Research, 65*, 257–275.
Schwartz, G. E. R., Russek, L. G. S., & Barentsen, C. (2002). Accuracy and replicability of anomalous information retrieval: Replication and extension. *Journal of the Society for Psychical Research, 66*, 144–156.
Schwartz, G. E. R., Russek, L. G. S., Nelson, L. A., & Barentsen, C. (2001). Accuracy and replicability of anomalous after-death communication across highly skilled mediums. *Journal of the Society for Psychical Research, 65*, 1–25.
Schwartz, G. E., Woollacott, M., Schwartz, S., et al. (2018). The Academy for the advancement of postmaterialist Sciences: Integrating consciousness into mainstream science. *Explore: The Journal of Science and Healing* (in press).
Scofield, A. M., & Hodges, R. D. (1991). Demonstration of a healing effect in the laboratory using a simple plant model. *Journal of the Society for Psychical Research, 57*, 321–343.
Sheldrake, R. (1998). The sense of being stared at: Experiments in schools. *Journal of the Society for Psychical Research, 62*, 311–323.
Sheldrake, R. (1999, January). The" sense of being stared at" confirmed by simple experiments. *Rivista Di biologia biology forum: 92*, (pp. 53–76).
Sheldrake, R. (2000). The “sense of being stared at” does not depend on known sensory clues. *Biology forum: 93*, (pp. 209–224).
Sheldrake, R. (2001). Experiments on the sense of being stared at: The elimination of possible artefacts. *Journal of the Society for Psychical Research, 65*, 122–137.
Sheldrake, R. (2012). *Science set free: 10 paths to new discovery.* New York: Random House.
Shermer, M. (2015). Consilience and consensus. *Scientific American, 313*, 81.
Spencer, J. H. (2012). *The eternal Law: Ancient Greek philosophy, modern physics, and ultimate reality*. Vancouver: Param Media.
Stapp, H. P. (2011). *Mindful Universe: Quantum mechanics and the participating observer.* New York: Springer.
Stern, R. M., Ray, W. J., & Quigley, K. S. (2001). *Psychophysiological recording.* USA: Oxford University Press.
Stevenson, I. (1976). A preliminary report of a new case of responsive xenoglossy: The case of gretchen. *Journal of the American Society for Psychical Research, 70*, 65–77.
Stevenson, I. (2001). *Children who remember previous lives.* Jefferson, NC: McFarland & Company.
Stevenson, I., & Pasricha, S. (1979). A case of secondary personality with xenoglossy. *American Journal of Psychiatry, 136*, 1–1592.
Stevenson, I., & Pasricha, S. (1980). A preliminary report on an unusual case of the reincarnation type with xenoglossy. *Journal of the American Society for Psychical Research, 74*, 331–348.
Storm, L., Tressoldi, P. E., & Di Risio, L. (2010). Meta-analysis of free-response studies, 1992–2008: Assessing the noise reduction model in parapsychology. *Psychological Bulletin, 136*, 471–485.
Tart, C. T. (2009). *The end of materialism.* Oakland, CA: New Harbinger.
Trent von Haesler, N., & Beauregard, M. (2013). Near-death experiences in cardiac Arrest: Implications for the concept of non-local mind. *Revista de Psiquiatria Clinica (Journal of Clinical Psychiatry), 40*, 197–202.
Tucker, J. B. (2016). The case of James Leininger: An American case of the reincarnation type. *Explore: The Journal of Science and Healing, 12*, 200–207.
Utts, J., Norris, M., Suess, E., & Johnson, W. (2010). The strength of evidence versus the power of belief: Are we all Bayesians? In C. Reading (Ed.). *Data and Context in Statistics Education: Towards an Evidence-Based Society*. Voorburg, The Netherlands: International Statistical Institute.
Van Lommel, P., Van Wees, R., Meyers, V., & Elfferich, I. (2001). Near-death experience in survivors of cardiac arrest: A prospective study in The Netherlands. *Lancet, 358*, 2039–2045.
Waldau, P., & Patton, K. (Eds.). (2009). *A communion of subjects: animals in religion, science, and ethics*. Columbia University Press.
Walsh, R. T. G., Teo, T., & Baydala, A. (2014). *A critical history and philosophy of psychology*. New York: Cambridge University Press.
Whewell, W. (1840). *The philosophy of inductive sciences, in two volumes.* London: John W. Parker., II230.
Wigner, E. P. (1967). *Symmetries and reflections: Scientific essays of eugene P. Wigner.* Bloomington, IN: Indiana University Press.
Williams, B. J. (2011). Revisiting the Ganzfeld ESP debate: A basic review and assessment. *Journal of Scientific Exploration, 25*, 639–661.
Woerlee, G. M. (2004). Cardiac arrest and near-death experiences. *Journal of Near-death Studies, 22*, 235–249.