

# Informational Psi

## Collapsing the Problem Space of Psi Phenomena

SONALI BHATT MARWAHA, EDWIN C. MAY<sup>1</sup>

**Abstract** – The data from precognition and real-time psi laboratory experiments and applications establish the validity of this phenomenon. Based on the theoretical foundations of decision augmentation theory and the multiphasic model of precognition (informational psi), we support an informational process for psi, and consider *informational psi* ( $I\Psi$ ) as the only form of psi.  $I\Psi$  is defined as *the transfer of information, which is based on entropic considerations, arising from a distant point in spacetime leading to the local acquisition of non-inferential information by an atypical perceptual ability*. Scientific understanding always evolves towards simplicity.  $I\Psi$  remains a viable alternative to the standard interpretations of many different varieties of psi: telepathy (for e.g., the Ganzfeld), presentiment/pre-stimulus response, statistically-based PK (RNG, DMILS, GCP), post-mortem survival (mediumship, reincarnation). In this paper we expand our arguments for the view that apparently different psi phenomena which generally require different theoretical approaches, collapse into one phenomenon—informational psi. Future directions for research on  $I\Psi$  are discussed.

**Keywords:** psi research – theories of psi – entropy – parapsychology – informational psi – causal psi

### Informationsgestütztes Psi Kollabierender Problemraum von Psi-Phänomenen

**Zusammenfassung**<sup>2</sup> – Die Befunde aus Präkognitions- und Echtzeit-Psi-Laborversuchen und -Anwendungen belegen die Echtheit von Psi-Phänomenen. Basierend auf den theoretischen Grundlagen

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1 Sonali Bhatt Marwaha, M. Phil., Ph. D. (Psychology) is a research associate with the Laboratories for Fundamental Research. Her interests include a synthesis of the cognitive sciences and psi research which can lead to theoretical developments in the field. She lives in India (email: sonalibm@gmail.com).

Edwin C. May, Ph. D. (Nuclear Physics) is a leading figure in psi research, and has authored more than 500 research and technical papers in this area. He was with the U.S. government's psi research program, *Star Gate*, from late 1975 to 1995, and was the research director from 1985 to 1995, at SRI International and SAIC. He is the president of the Laboratories for Fundamental Research in Palo Alto, California (email: may@LFR.ORG).

2 Eine erweiterte deutsche Zusammenfassung findet sich am Ende des Artikels.

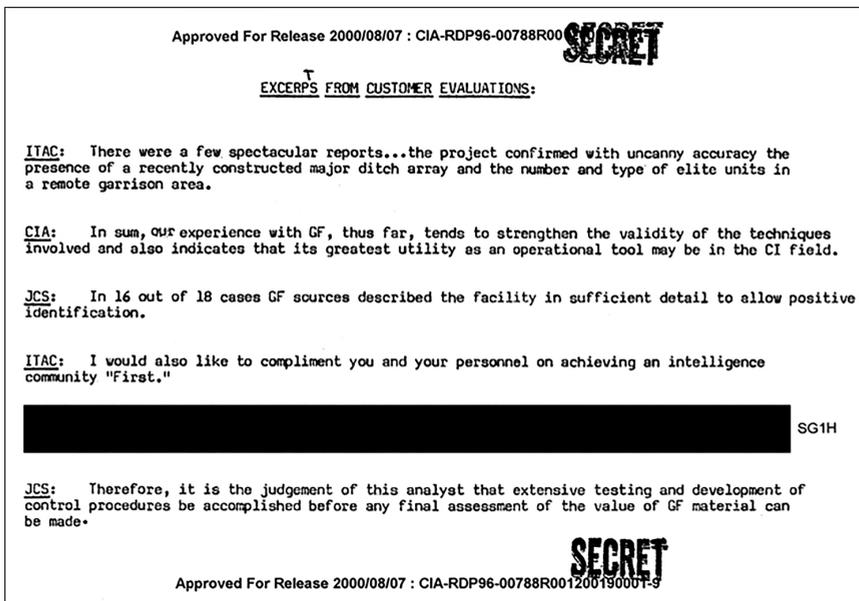
der Decision Augmentation Theory (DAT) und dem mehrphasigen Modell der Präkognition (Informationsgestütztes Psi) vertreten wir das Konzept eines Informationsprozesses für Psi und betrachten Informationsgestütztes Psi (I $\Psi$ ) als die einzige Form von Psi. I $\Psi$  ist definiert — eine Definition, die auf entropischen Überlegungen basiert — als die Übertragung von Information, die aus einem entfernten Punkt in der Raumzeit entsteht und zur lokalen Erfassung nicht-inferenzieller Informationen durch eine atypische Wahrnehmungsfähigkeit führt. Das wissenschaftliche Verständnis entwickelt sich immer in Richtung Einfachheit. I $\Psi$  bleibt eine praktikable Alternative zu den Standardinterpretationen vieler verschiedener Varianten von psi: Telepathie (Ganzfeld), Presentiment/Pre-Stimulus-Reaktion, statistisch basierte PK (RNG, DMILS, GCP), Überleben nach dem Tode (Mediumismus, Reinkarnation). In diesem Beitrag erweitern wir unsere Argumentation dafür, dass vermeintlich unterschiedliche Psi-Phänomene, die üblicherweise unterschiedliche theoretische Ansätze erfordern, zu einem Psi-Phänomen kollabieren. Zukünftige Forschungsausrichtungen bezüglich I $\Psi$  werden diskutiert.

*Schlüsselbegriffe:* Psiforschung – Entropie – Parapsychologie – informationsgestütztes Psi – kausales Psi

### ***Brief Background***

Psi phenomena have been observed and theorized cross-culturally throughout our historical past. Empirical investigations that have been added to this vast body of literature has led contemporary researchers to make substantial advances in establishing the validity of the phenomena and in theory development. An extensive review of the US Government sponsored psi research program, *Star Gate*, has led to the conclusion that informational psi (precognition, real-time psi) is a scientifically valid phenomenon that has been applied successfully to problems of US national security. There is only weak statistical evidence for the existence of psychokinesis, which has subsequently been considered to be a part of informational psi (May & Marwaha, 2018a: 22). All areas of research—field studies, laboratory-based studies and applications—from laboratories across the world, have served as building blocks towards the advancement of this evolving field, to the state-of-the-science as it stands now.

The *Star Gate* applied informational psi program, using the remote viewing method, was tasked on a total of 504 separate military and intelligence missions by a variety of agencies that required 2865 individual remote viewings to accomplish those stated missions. The data from these sessions produced actionable intelligence such that, of the 19 client agencies from 1973–1995, 17 were returning customers for the RV-HUMINT (remote viewing human intelligence) collection product—an 89% customer return rate. It seems highly unlikely that there would be such a high customer return rate if the RV-HUMINT derived information were not worthy of such attention. Figure 1 illustrates excerpts from end-user evaluations of the informational psi product (May & Marwaha, 2019b).



**Fig. 1:** Excerpts from customer evaluations (1981).  
(ITAC – Intelligence Threat Assessment Center; CIA – Central Intelligence Agency; GF – Grill Flame, one of the code names for Star Gate; JCS – Joint Chiefs of Staff).

A universal phenomenon such as psi has culture specific terminology that is intrinsically linked to religious and metaphysical belief systems. The nomenclature of the field and phenomena have evolved over the years ranging from psychological experiences, to extrasensory perception and psychokinesis to anomalous mental phenomena (anomalous cognition and anomalous perturbation), to *psi* (Zingrone & Alvarado, 1987, 2015). With further advances in this field, this term too will evolve, reflecting a greater understanding of the phenomenon.

Contrary to popular perception, psi theorizing has been part of psi research from its early years. Scientists from various disciplines have focused on determining the mechanism of psi, developing theories and models based on philosophical perspectives and the science of the day (Beichler, 1998; Rao, 1977, 1978, 2011; Stokes, 1987). A greater understanding of the empirical data and the phenomena have led to advances in theoretical understanding and theory development, leading to several testable and speculative hypotheses as proposed by the theorists. As psi experience involves all aspects of the explanatory domains—physics, neuroscience, psychological—theories have focused on various elements of the entire process. (See May & Marwaha, 2015 for some representative theories). Since psi is intrinsically linked to the external and internal worlds, advances made in other relevant disciplines such as physics, psychology,

and the neurosciences have and will continue to influence psi theorizing. Science is, after all, a symbiotic process with every discipline contributing to the work-in-progress in all spheres of inquiry.

Although dualist and panpsychist approaches to understanding psi have their proponents (e. g., Dossey, 2014; Hardy, 2017; Kelly, Crabtree, & Marshall, 2015; Neppe & Close, 2012; Rao, 2011, 2013), in our view, psi is best understood as other sensory systems are; that is, psi is the perception and cognition of informational signals from the external world.

In 1945 J. B. Rhine stated: “[...] the occurrence of telepathy [was] of very great importance to the investigation of the spirit hypothesis” (p. 191). In 1974 he stated that even after a century of effort, evidence for the telepathy hypothesis has not been found to be verifiable (p. 137), as “precognition offered a new counterhypothesis to telepathy” (p. 143)—post-mortem survival, out-of-body experience, psychokinesis, retro-PK can be accounted for by precognition. Based on the analysis of contemporary psi research, we reassert Rhine’s observations on “the concept of the unity of psi” (1974: 146), and collapse the problem space of psi phenomena into a single phenomenon. The term “informational psi” ( $I\Psi$ ) is an apt terminology that best represents the psi data.

Scientific understanding invariably evolves towards simplicity; the more we understand something, the simpler it appears, although, the underlying processes may be complex. Based on an analysis of the different classes of psi phenomena—precognition, clairvoyance, telepathy, psychokinesis, and the survival hypothesis, in Marwaha & May (2016) we stated that precognition is the only form of psi. In this paper we expand on our arguments and assert that the evidence and theories of psi have reached a state where we can collapse psi into a single phenomenon—informational psi ( $I\Psi$ ). Understanding the underlying processes of  $I\Psi$  is the next step forward for psi research.

### ***Defining Informational Psi ( $I\Psi$ )***

In the effort to understand the process of psi, we parsed the problem into the physics domain (information-centric perspective) and the neuroscience domain (person-centric perspective) (Marwaha & May, 2015a). Examining psi from these two domains enables us to explore the phenomenon from the perspective of its intrinsic nature, and from the processing of the acquired information.

In Marwaha & May (2016) we defined precognition as an *atypical perceptual ability that allows the acquisition of non-inferential information arising from a distant point in spacetime*. This definition primarily addresses the person-centric perspective of the problem. In this paper, we expand on this definition to incorporate the information-centric perspective (i. e., the physics domain) to

provide a definition for  $I\Psi$ . Since, in our view, changes of entropy of the target system play a vital role in  $I\Psi$ , we have incorporated it into the definition as:

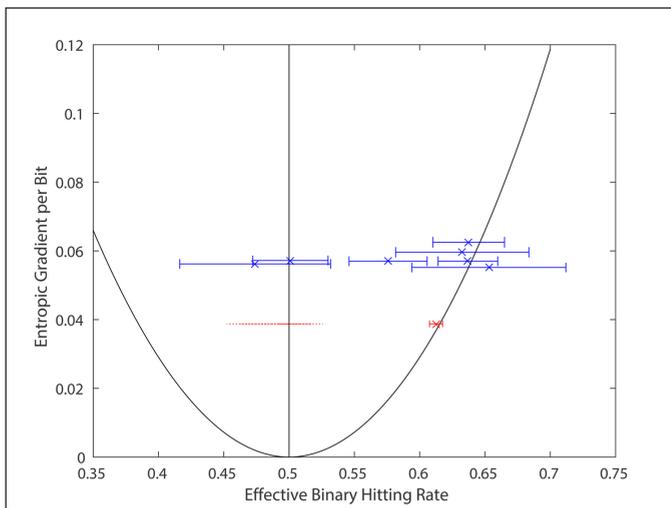
*Informational psi ( $I\Psi$ ) is defined as the transfer of information, which is based on entropic considerations, arising from a distant point in spacetime leading to the local acquisition of non-inferential information by an atypical perceptual ability.*

### Explanation of Definitional Terms

#### Entropy

It is well known that physics at the micro level is bi-directional in time (e.g., molecules colliding in liquid). That is, the equations governing their motion are all quadratic in time, so if one replaces time with minus time we get the same answer. Yet we know that at the macro level (e.g., humans) time marches on in one direction only. How this can happen involves a concept called entropy—a measure of disorder. Specifically, the second law of thermodynamics states that the entropy of a closed system can never decrease.

As  $I\Psi$  data show, the quality of  $I\Psi$  is statistically proportional to the change of entropy of the target system. Moreover, an analysis of the forced choice and free-response (remote viewing) data indicates that there may be a statistical limit based on entropic limits for the upper limit of  $I\Psi$ . Figure 2 illustrates this data against an information theoretic curve. The standard errors (error bars in Figure 2) for the best studies, statistically speaking, do not exceed the theoretical curve for effective binary hitting rate.



**Fig. 2:** Entropic limits of informational psi data. The blue lines represent all the free-response (remote viewing) data in which entropic gradients were available. While the database for forced-choice (card guessing) data is huge, points in red represent a sample of near chance results and the very best result we could find in the literature.

Entropy thus becomes an integral part of the  $I\Psi$  definition as the relationship of micro- to macro- time is understood with the second law, and now we find that the  $I\Psi$  quality is related to changes in entropy. (Details can be found in May, 2011, 2014; May & Depp, 2015; May, Hawley, & Marwaha, 2017; May & Lantz, 2010; May & Spottiswoode, 1994).

## Spacetime

In classical physics, space and time are considered separate things. Space is three-dimensional (height, breadth, and depth), and can be divided into a three-dimensional grid of cubes that describes the Euclidean geometry familiar from high-school math class. Time is one-dimensional in classical physics. Einstein's theory of special relativity combines the three dimensions of space and one dimension of time into a four-dimensional grid called "spacetime." Spacetime may be flat, in which case Euclidean geometry describes the three-space dimensions, or it could be curved. In Einstein's general theory of relativity, the distribution of matter and energy in the universe determines the curvature of spacetime.

Multiplying a time interval by the constant speed of light (designated by  $c$ ) then a time duration becomes equivalent to a distance. In simple algebra and from elementary physics:

$$\Delta x = c \times \Delta t.$$

This equation is a way of converting a velocity (i. e., the speed of light) into an effective spatial coordinate. The familiar term light-year—the *distance* light travels in one year  $\approx 9.46 \times 10^{13} = 9,460,730,472,580.8$  kilometers—illustrates the point. Adding this "spatial" dimension to the familiar three, we end up with a 4-dimensional space, albeit difficult to comprehend, which is called Minkowski space.

Obviously, it is impossible to draw a 4-dimensional picture, so what is done instead is to draw a 3-dimensional equivalent. The vertical axis usually represents the time axis (actually  $c \times t$ ) and the x-y axes represent space. The present is represented by a single point (the vertex) of a cone that extends upward from each moment of the present toward the future. The past is another cone with its vertex in the present but opening downward to the past.

This concept is best illustrated by the light cone (Figure 3). The points located inside the cones are called time-like separated from the present. That means information has time to reach the present at speeds less than that of light. All points outside the light cones are called space-like separated; that is, no causal connection can exist between them and the present. Finally, light-like points lie along the edge of the cones.

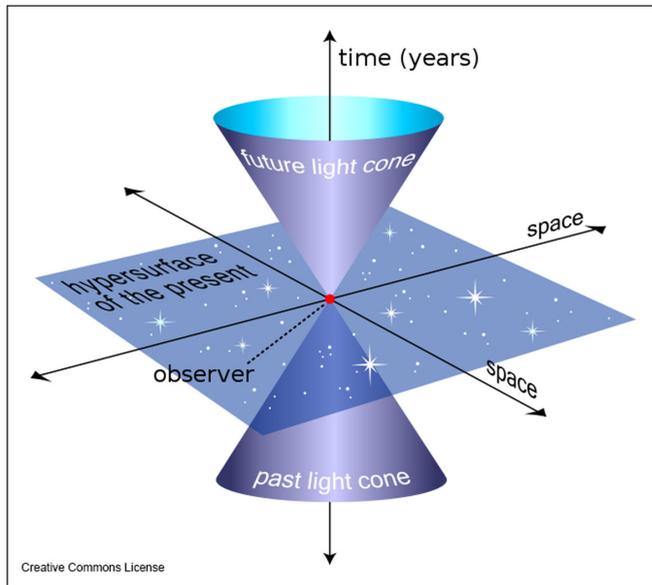


Fig. 3: The light cone. The edges of the cones represent the equation  $\Delta x = c \times \Delta t$ .

### Local Acquisition

Once information from a future point propagates to the vicinity of the percipient, the perception of  $I\Psi$  signals is occurring in close to real time. The likelihood of cortical mechanisms being able to differentiate between the temporal origins of the signal are quite unlikely, unless we are willing to posit at this stage of the evidence that the nature/properties of signals vary depending on their temporal origins. This implies that, *from the person-centric perspective, all perception, regardless of its temporal origin, is local in both time and space* (i. e., here and now).

### Non-inferential Information

This implies that the perceived information cannot be inferred by ordinary means.

### Atypical Perceptual Ability

Due to the hypothesized requirement of a specific  $I\Psi$  signal transducer and cortical hyper-associative mechanisms to process this signal, we propose that  $I\Psi$  is a normal, albeit atypical perceptual ability that is present in about 1% of selected populations (Marwaha & May, 2015a, 2015b, 2015c; May, Utts, Trask, et al., 1989/2018).

### ***Overview of Informational Psi (I $\Psi$ ) Theories***

Since the late 1970s, the *Star Gate* program at SRI International was tasked with examining the micro-PK hypothesis, under contract from the Defense Intelligence Agency, US Army Medical Research and Development Command, and the Missile Intelligence Agency. High precision engineering equipment were used to examine this hypothesis (May & Marwaha, 2019a). Based on the data, in 1986 the SRI team first proposed the intuitive data sorting informational model for micro-PK, which took its final shape as the decision augmentation theory (DAT). Following a review of the entire *Star Gate* database, Marwaha and May (2015a) developed the multiphasic model of precognition (MMPC) that has since served as a basis for the several theoretical advances as presented in this paper. As we have refined the core concept based on an increasing understanding of the nature of the phenomenon and its experience, *we rename the multiphasic model of precognition to the multiphasic model of informational psi* (MMI $\Psi$ ), without any alterations to the structure and content of the model. While there are several other theorists who have addressed various aspects of the problem (see May & Marwaha, 2015), in this paper we present briefly DAT and MMI $\Psi$ , as they form the theoretical basis for collapsing the problem space of psi phenomena.

#### *The Decision Augmentation Theory (DAT)*

The problem as to whose psi is at work in an experiment has been plaguing psi research since the 1970s. Is the participant performing as expected or has the experimenter made seemingly objective decisions so that the performance only mimics the participant-centered hypothesis? This issue was similarly proposed by Rosenthal (1966) as experimenter effects, Schmidt (1970) in his initial studies, and later adopted by Stanford and Thompson (1973) as psi mediated informational response (PMIR), and subsequently addressed by the formulations of DAT (May, 2015; May, Utts, & Spottiswoode, 1995). Experimenter psi refers to psi mediated experimenter expectancy effects.

The PMIR model (Stanford, 1974a, 1974b, 1976) proposes that an organism unintentionally uses psi to scan its environment for need-relevant objects or events or for information crucially related to such events and that when such information is obtained, the organism tends to act in ways that are instrumental in satisfying its needs in relation to the particular object/event in question. The intuitive data sorting model, now known as DAT, arose out of the analysis of the data on micro-PK with random number generators (RNG) carried out in 1979–1980 at SRI International. It was noticed that the data were inconsistent with the strongly held notion that PK agents were affecting the physical devices on a binary bit-by-bit basis.

As part of the *Star Gate* program, May, Humphrey, and Hubbard (1980) conducted a replication of an RNG experiment with substantial protocol improvements to try to understand

the mechanism behind the statistically robust phenomenon. In that experiment, a continuous stream of binary bits at a rate of one per millisecond were collected and sent to a computer in byte form. Bit number three in the 8-bit byte was designated, in advance, as the target bit. Thus, each byte contained three bits of future and four bits of past relative to the target bit. Using a statistic called sequential sampling (Wald, 1973) they were able to identify single runs that were individually statistically significant. Seventeen runs out of 87 produced individually significant evidence for a deviation from mean chance expectation of bit number 3 (exact binomial for 17 hits in 87 trials with an event probability of 0.05 yields  $z = 4.75$ ,  $p = 1 \times 10^{-6}$ , run effect size = 0.509).

For these data to be the result of causal psi (psychokinesis, mind-over-matter) implies that causal psi ( $C\Psi$ ) must be volitionally turned on and off within a single millisecond—faster than any known volitional control of biological phenomena. Therefore, one might expect under a  $C\Psi$  assumption that the neighboring bits to the target bit should be nearly 100% correlated. It would not be an exaggeration to expect that all bits in the byte to be correlated since eight milliseconds is also short for many biological processes. May et al. (1980) computed three separate correlations—the immediate neighboring bits to the target bit: bit three with bit four; bit three with bit two; and bits two and four. Figure 4 shows a non-parametric fit to the observed correlations indicating no correlation between any of the three bits in the study. This led to the hypothesis that what appeared to be  $C\Psi$  was an  $I\Psi$  process.

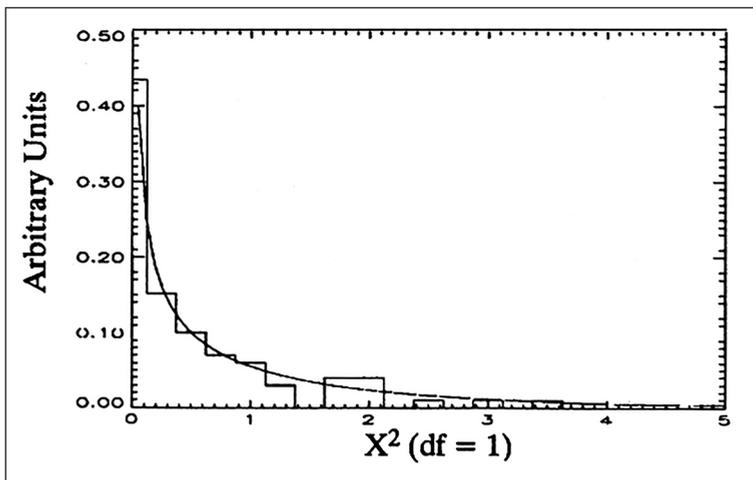
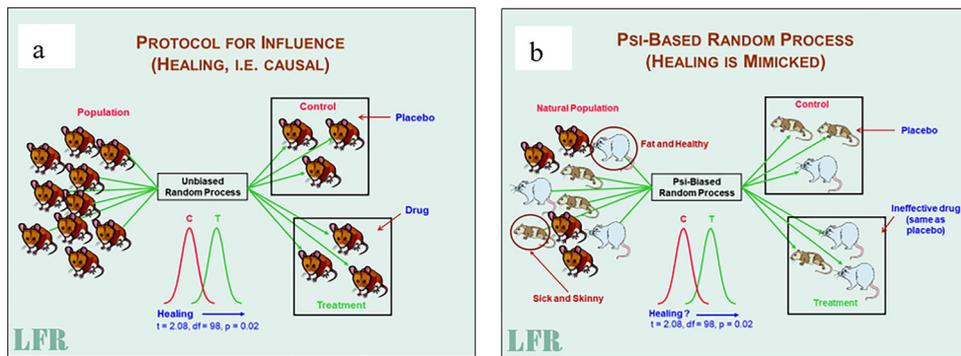


Fig. 4: Non-parametric fit to the correlations of bits related to the target bit.

The mathematical formulation of DAT quantifies statistical tests and shows beyond any doubt that the reported significant statistics in many of these studies arise not because of some putative PK force, but rather the experimenter uses his/her unconscious  $\Psi$  ability to extract information from a non-perturbed random sequence subset that mimic forces on the bit level. The mimic effects are not very robust, nevertheless, they might contribute to the direction of the data and the interpretation of the results. DAT is data-driven and helps to make sense of a very large amount of robust psi data.

The DAT protocol can be incorporated into any research protocols that use randomization and inferential statistics in data analysis such as in drug trials and placebo studies. Figure 5a-b illustrate this effect in a hypothetical drug trial.



**Fig. 5:** (a) Represents the causal effect; that is, the drug is efficacious; (b) Demonstrates how the efficacy is mimicked by  $\Psi$ .

In a typical drug trial, an unbiased random process sorts patients into two groups—a drug and placebo group. Under double-blind conditions, the drug/placebo is administered; the statistics shown in Figure 5(a) above, are typical and indicate the efficacy of the drug. However, the same statistic in Figure 5(b) above has a different interpretation. In any real population, there is a diverse set of circumstances such as age, ethnicity, and health conditions as indicated by the fat and skinny mice. In general, medical researchers are aware of such diversities and attempt to account for them. However unlikely, it is possible, that the individual responsible for the random assignment of patients, uses her/his unconscious  $\Psi$  to bias the sorting process to mimic the efficacy of the drug.

As Jessica Utts (2016: 163), former President of the American Statistical Association, states:

[...] “decision augmentation” may be used routinely to help people make better decisions in the present about what actions to take, based on information about the consequences of

those decisions in the future. If true, this kind of anomalous information about the future could include knowing when a favorable sequence is about to be generated by a random number generator, and that information could be used (unconsciously) in the randomization phase of clinical trials.

Utts concludes, “[...] the assumptions upon which most medical (and other) research is based may not be accurate” (p. 164).

Decision augmentation theory may well be one of the most significant takeaways from the past 30 years of psi research.

### *The Multiphasic Model of Informational Psi (MMI $\Psi$ )*

The MMI $\Psi$  (a.k.a. multiphasic model of precognition) is a signal-based process-oriented model. One of the key features of this model is that it divides the problem space into the physics and neuroscience domains for understanding the I $\Psi$  process. Psi information arises from the external world (i.e., the physics domain), and is perceived and processed in the internal world (i.e., the neuroscience domain).

- *The physics domain (PD)*: The PD falls exclusively within the purview of physics. It addresses the question, how is it possible that information can go between two space-time points and can be used, especially if the two points of the events cannot be causally connected? For example, in all precognition studies in which the target stimuli are generated *after* a response has been recorded. It is related to how information is carried from an external source, which is distant in time and space, to the percipient. This is the information-centric perspective of the process. Although there are several conundrums relating to this domain, entropy has been identified as a key feature. (See May, 2011, 2014; May & Depp, 2015; May, Hawley, & Marwaha, 2016; May & Lantz, 2010; May & Spottiswoode, 1994).
- *The neuroscience domain (ND)*: The ND is the person-centric perspective of I $\Psi$  that includes the psychological domain and resides internal to the human percipient. It addresses the neurological and experiential part of the problem, that is, how is the information acquired, how is this information processed in the brain, and how is it expressed.

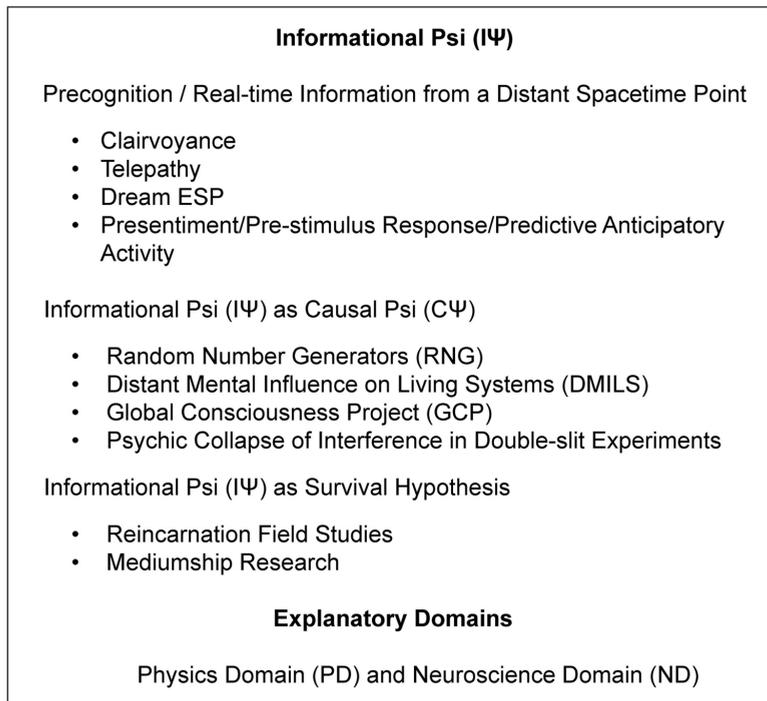
This formal bifurcation clearly lays out the domain of activity for researchers from various disciplines, by considering the well-established laws of the physical world and what we currently know—and will know—about brain-behavior relationships. The model presents several testable hypotheses and stages within the ND; a detailed discussion of these can be found in Marwaha & May (2015a, 2015b, 2015c). Based on our ongoing analysis, the multiphasic model of precognition may be better referred to as the *multiphasic model of informational psi* (MMI $\Psi$ ).

### ***Collapsing the Problem Space of Psi Phenomena***

Informational psi ( $I\Psi$ ) is a process rather than a singular event, involving the information-centric and person-centric processes.

Despite two differing conditions (i. e., real-time or precognition), we still *cannot* control *when* the percipient obtains the information. In all real-time cases we know of there are always at least two possible open channels through which the psi-information may be obtained—the present and the future. In spontaneous or operational/applied situations, the temporal location of the event determines whether it is a precognition or real-time task.

Following a review of the entire Star Gate remote viewing and psychokinesis database, including the complete declassified operational remote viewing data, and data from other laboratories in the peer reviewed literature, we conclude that informational psi is a scientifically valid phenomenon, and that  $I\Psi$  is a normal, albeit atypical, phenomenon. There is insufficient evidence to support the causal psi ( $C\Psi$ ) hypothesis.



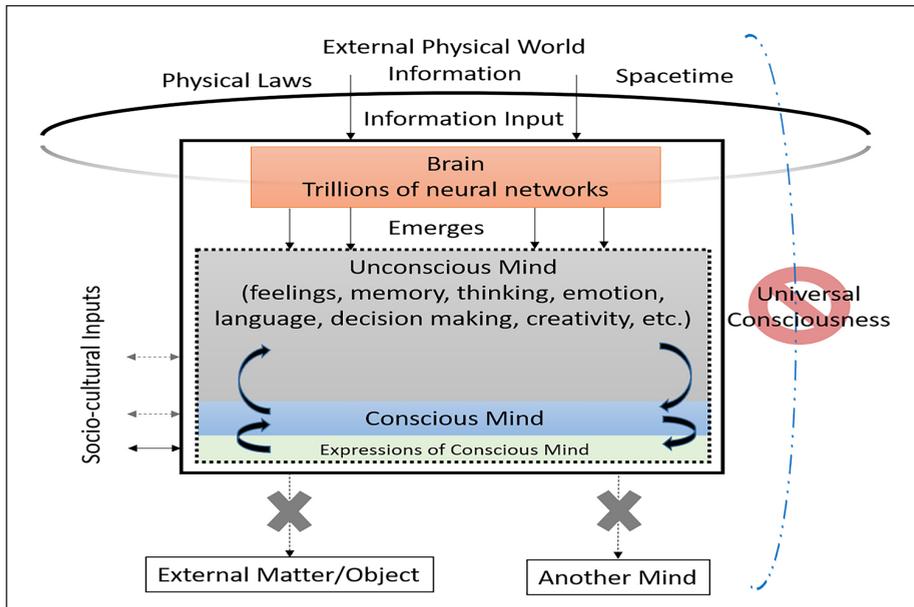
**Fig. 6:** Collapsing the problem space of psi phenomena.

As summarized in Figure 6, in this section we discuss the various psi phenomena and their associated investigation methods leading to the view that the problem space of psi phenomena can be collapsed into a single phenomenon—informational psi—that can be explored from the PD or ND with domain specific questions. This, in our view, is a step forward in psi research. Addressing the several questions related to  $I\Psi$  listed in the discussion section of this paper will shed light on  $C\Psi$  phenomena also, if indeed they are a distinct class of phenomena.

### *Basic Premise*

At the outset it is important to specify the basic premise on which the arguments presented in this paper rest. As illustrated in Figure 7:

- The universe is governed by physical laws.
- Information is the ground field of the perennial external world.
- Mind/consciousness is an emergent property of the impermanent brain.
- Mind/consciousness cannot exert a direct force on the external world, except by means of the motor system.



**Fig. 7:** Basic premise of informational psi ( $I\Psi$ ). While universal consciousness may be considered as an abstract metaphorical construct, the large X indicates a forbidden connection or at least an unlikely one.

## *The Telepathy Hypothesis*

Telepathy generally refers to the acquisition of information concerning the thoughts and feelings of another conscious being without the use of normal means of communication—both verbal and non-verbal. Procedurally, it is difficult to determine exactly what the target is, as one must either rely on a prerecorded note of the target stimulus (a real-time condition) or rely on a post-session narration of the target stimulus (a precognition condition) to determine whether the “telepathically” transmitted information was accurate or not. The methods used to examine telepathy include the Ganzfeld and dream telepathy experiments.

### **The Ganzfeld Procedure**

In the Ganzfeld, a participant is comfortably seated in an acoustically shielded room, eyes covered with half ping-pong balls, and wearing a headset with “white noise” streaming through it. Additionally, the participant is presented with a soothing but constant visual experience of a red glow. The rationale for this is to reduce somatosensory noise. In a distant room, a partner, either a sibling/family, friend, or stranger, is seated, and at the appointed time is asked to “telepathically transmit” the designated target randomly selected from a target pool. In a free-response format, the participant is then asked to narrate the content of the telepathically acquired message. This procedure is similar to that used in the dream telepathy studies, and was, in fact, developed to simulate a dream situation by Charles Honorton in the early 1970s.

Meta-analyses of the Ganzfeld and dream telepathy studies show a robust  $I\psi$  effect. (See Bem, Palmer, & Broughton, 2001; Honorton, 1985; Hyman & Honorton, 1986; Storm, Sherwood, Roe, Tressoldi, Rock, & Di Risio, 2017; Storm, Tressoldi, & Di Risio, 2010). Storm et al. (2017: 123) state: “Perhaps telepathy, or at least a pure form of it, may even be an abstraction that is not only impossible to prove, but is parsimoniously redundant.”

### **Rejecting the Telepathy Hypothesis**

In examining the telepathy hypothesis we address two major points: (1) mind/consciousness is an emergent property of the brain, and (2) the nature of psi. Analyzing these will enable us to determine whether telepathy can be considered a distinct phenomenon, or subsumed within  $I\psi$  for both empirical and theoretical considerations, or rejected.

#### *1. Mind/Consciousness as an Emergent Property of the Brain*

A human brain contains about 86 billion nerve cells (neurons) and billions of nerve fibers (axons and dendrites), which are connected by trillions of connections or synapses. Consciousness, in our view, is a broad term that incorporates all aspects of feeling, awareness, knowing, doing;

consciousness is not a monolithic “thing” that gives rise to all these other aspects. The self, feelings, thoughts, and all else that makes us human—the feeling of being conscious—are emergent properties of the cellular activity. The vast varieties of cognitive deficits or impairments associated with genetic disorders and brain injuries are evidence of the emergent mind/consciousness from brain architecture and neural activity. The present-day view of most mainstream-oriented scientists is that “consciousness” is an emergent property of the underlying activity in the brain (e.g., Churchland, 1995; Crick, 1994; Damasio, 1994; Kim, 1999; Silberstein, 2001; Sperry, 1969, 1991; Stephan, 2004; Tegmark, 2015; Tononi, 2008; Tononi & Koch, 2008).

A “thought”—non-verbal, expressed, conscious/aware or unconscious/unaware—is an activity pattern among the billions of brain cells as they interact with each other (e.g., Paulesu, Frith, & Frackowiak, 1993; Perogamvros, Baird, Seibold, Riedner, et al., 2017; Sumner, Bell, & Rossell, 2017). While it is possible to locate regions in the cerebral topography for various types of cognitive activity, it may not be possible to pin down a single thought or a single concept, or a string of words. In other words, there is no neural correlate for the word “apple” that is distinct from that for the word “orange” such that activity in the region can be identified as indicating one or the other. Thus, by definition, a “thought” is an emergent property of the underlying neuronal activity. This raises five major points in the context of putative “telepathic” communication:

- i. The distance between the brain and skull varies between 0.4 and 7 mm depending on where you measure it; the thickness of skull bones varies from 3 mm to 14 mm, with an average of 8 mm. That said, can an emergent consciousness—however one chooses to define consciousness—extend past the layers of the brain and the cranial bones? Thus far, there is no independent evidence that points in this direction.
- ii. There is no evidence for informational signals emanating from the brain that can propagate across distant spacetime.
- iii. Let us assume that an individual’s consciousness can extend out of his skull, and reach another person. Then: (i) what is the nature of mind/consciousness such that it can extend out from the brain over thousands of kilometers? What is “it” that extends out, (ii) what is its carrier, (iii) what is the transducer for the perception of consciousness emerging from another brain, (iv) what is “it” that the percipient is “reading” in another person’s mind? The same set of questions arise whether the person is sending or receiving information from the thoughts of another person.
- iv. As far as current neuroscience is concerned, there are no unique central nervous system (CNS) signatures of a “thought” that can serve as a telepathic target. A thought is significantly different than even an encrypted image contained in the inner workings of a computer hard drive that could serve as a target stimulus.

- v. Since there is a stream of conscious and unconscious thoughts in the human mind, how is the “incoming” consciousness/mind able to distinguish between the target thought and the rest of the stream? There is simply too much noise in the human mind!

## 2. *The Nature of Psi*

There are three major points about the nature of psi that we must consider:

- i. **The When and Where of Psi:** One of the biggest challenges of psi research is when and where does psi happen. Experiment participants inform us that they do not have control over *when* they are “psychic.” For instance, the psi information can be acquired when the session is scheduled, on the way to the laboratory, or even days earlier—that is, a precognitive condition. (This makes it difficult to analyze a proof-of-principle or process-oriented CNS study of psi).
- ii. **Future Answer Book:** As evidence from precognition studies indicate, there is an “answer book” in a future point in spacetime, which is the source of the percipients psi information. Whether or not it is written down on paper or shown to a person, the answer exists; it is impossible to close this future door, both in experimental and spontaneous cases. Thus, even in any telepathy experiment, a future “answer book” is always available to the percipient.
- iii. **Shielding of  $I\Psi$  Signal:** Examining the telepathy hypothesis, I.M. Kogan (1966, 1967, 1968, 1969) had proposed that information transfer under conditions of sensory shielding is mediated by ELF waves with wavelengths in the 300-to-1000-km region. As Targ and Puthoff (1974) experimentally determined, placing the percipient in a faraday cage does not block any putative psi signal. In a classified study funded by the United States Airforce Foreign Technology Division, Wright-Patterson Air Force Base, the SRI team (Puthoff & Targ, 1975: 129–130; Puthoff, Targ, & May, 1977: 179; Puthoff, Targ, May, & Swann, 1978/2018: 202–204) tested this hypothesis by conducting a remote viewing session with a psi-adept remote viewer and monitor seated in a submersible at the depth of 78 meters in sea water, with the target about 800 km away. This shielding did not affect the accuracy of the remote viewing. Thus, even in a telepathy experiment one cannot shield the percipient from future informational psi signals, making it impossible to develop a “pure” telepathy protocol.

Based on these principal arguments—no informational signals emanating from the brain, no target, door to information from future cannot be closed—the telepathy hypothesis can be rejected.

### *The Prestimulus/Presentiment Psi Hypothesis*

It is well known that the reporting of first-person experience is fraught with difficulty (Burton, 2008; Chabris & Simons, 2010; Eagleman, 2011). For example, expectational and change blindness, reporting a personal experience that was actually another's experience reported in the first place, or adjusting the reporting as confirmation bias are just three from a long list of normal perceptual and cognitive phenomenon. Magicians and psychotherapists base their professions on the fact that we humans are unreliable in interpreting and reporting our observations and experiences.  $\Psi$  experiences are not immune to these problems. Seeking a way out of this dilemma, experimenters examined physiological signatures of  $\Psi$  such as in the autonomic nervous system (ANS). Two methods are popular differing only in two respects: who initiates each trail and what are the stimuli.

The pre-stimulus psi hypothesis (now a.k.a. predictive anticipatory activity) is based on the premise that the measurement of physiological responses (e.g., an acoustic startle response, skin-conductance, and heart rate, prior to the onset of a stimulus) will provide a measure of psi without the reliability problems associated with first-person reporting. This methodological approach allows the research participant's body to "speak" for them by avoiding the problems associated with first-person reporting. The idea is that a randomly selected stimulus (e.g., emotional photograph in presentiment experiments, or startle noise in pre-stimulus response experiments) is presented to a participant. In these studies, aspects of the ANS are measured by skin conductance, heart rate; some experiments monitor the central nervous system itself. The dependent variable is the behavior of the physiology *before* the future stimulus has been determined—stimulus versus control.

Research across several laboratories observed significant ANS responses in advance of randomly chosen stimuli (Duggan & Tressoldi, 2018; Mossbridge, Tressoldi, & Utts, 2012; Mossbridge, Tressoldi, Utts, Ives et al., 2014). After conducting several studies in presentiment/prestimulus response, May and colleagues (May & Spottiswoode, 2003, 2010, 2014; Spottiswoode & May, 2003; May, Paulyini, & Vassy, 2005) abandoned this area of research, as a second interpretation of these findings is that they were due to the experimenters' or participants' unconscious  $\Psi$ . The analysis of pre-stimulus response data is based on inferential statistics and can be adequately addressed by the decision augmentation theory.

### *The Causal Psi (C $\Psi$ ) Hypothesis: Micro-Psychokinesis*

The concept of C $\Psi$  (psychokinesis) is based on the premise that mind/consciousness can directly interact with objects in the external world and can exert a force on matter such that

the object is moved or perturbed. This is much like the Newtonian/classical mechanics which is concerned with the set of physical laws describing the motion of bodies under the influence of a system of forces.

The Parapsychological Association defines PK as “the *direct influence of mind* [emphasis added] on a physical system that cannot be entirely accounted for by the mediation of any known physical energy.” Palmer (1985: 2) has defined psychokinesis as “[...] the influence of [on] physical objects or events by an organism in ways that cannot be attributed exclusively to known physical forces.” Currently, there are only four known fundamental forces, in order of strength: gravity, weak nuclear, electromagnetic, and strong nuclear. Considering there is no definition of “mind”, leads to a major definitional problem for C $\Psi$  studies. The definition is negative—PK is what happens when observations indicate that nothing else could or did affect the physical target system. Palmer’s definition leaves the door open for many normal causal factors that may have *not* been accounted for in the protocol or adjusted for in the measuring devices, thus, extending the definition to classical causal effects that are not understood or considered by the experimenter.

As mentioned in the previous section, there is no evidence for signals propagating out from the brain, hence, equating consciousness/mind with a fundamental force may be an error. These fundamental factors compel us to reject the possibility of consciousness/mind serving as a physical force.

May, Radin, Hubbard et al. (1985/2018) state:

For a causal force to be the fundamental mechanism, it must be endowed with particularly interesting properties. Namely, it must interact with processes governed by the weak nuclear force in  $\beta$ -decay (radioactive RNG sources); interact with processes governed by the electromagnetic force (noise diode RNG sources); and interact with biological systems (plant, animal, and genetic); and, it must interact with the RNG devices regardless of the internal complexity of the generator (Schmidt, 1974). Until we have exhaustively studied the “known” forces in nature with regard to psi, it is premature to posit an unknown *fifth* force to account for the data.

The supporting evidence against the C $\Psi$  hypothesis is seen in the analysis of results across the various experimental methodologies adopted to examine the mind-perturbing-matter hypothesis: random number generator (RNG) studies, direct mental influence on living systems (DMILS), the Global Consciousness Project (GCP), and the recent hypothesized psychic collapse of interference in double-slit experiments. As in the telepathy hypothesis, the experimental results may be valid, albeit, the interpretation of the results point to I $\Psi$ .

### The Random Number Generator (RNG)/Random Event Generator (REG) Experiments

The first experiments using electronic devices based on a simple quantum process were conducted by Schmidt (1969a, b) wherein he was able to observe significant evidence of precognition. Based on this, Schmidt (1970) attempted to see significant evidence of psychokinesis using a similar apparatus. Schmidt states, “The basic part of the apparatus was a binary random number generator which produced the numbers “+1” and “-1” in random sequence, and the general objective was to have the subjects try to mentally influence the generator to produce one of the two numbers more frequently than the other” (p. 175). Schmidt (p. 181) concludes:

The experiment has been discussed in terms of PK, but in principle the result could certainly also be ascribed to precognition on the part of the experimenter or the subject. Since the sequence of generated numbers depended critically on the time when the test run began, and since the experimenter, in consensus with the subject, decided when to flip the start switch, precognition might have prompted experimenter and subject to start the run at a time which favored scoring in a certain direction.

Since the 1960s, reports emanating from the former Soviet Union pointed to the possibility that the Russians may have “harnessed” “psychoenergetic” energy into “psychotronic weapons” that could apparently store and later direct the psychic energy for whatever purpose, including as offensive weapons during the Cold War (Maire & LaMothe, 1975). Psychotronic weapons were to affect, influence or control the minds of their targets, potentially affect a target’s health (for example, to give the target a headache or stomach ache to distract him or her from some task), or perhaps even drive them to suicide or accidental death. The latter notwithstanding, had they actually worked as designed, most psychotronic devices were considered as non-lethal weaponry (May, Rubel, McMoneagle, & Auerbach, 2015: 202). Based on recent meetings with Major General Nikolai Sham, Deputy Director of KGB, Retd., May reports, “General Sham told me in person that he funded 40 different institutes specifically for the purpose of building non-lethal psychotronic weaponry. They could not make it work” (p. 356). Thus, even strong motivational bias in favor of the PK hypothesis was insufficient to make them work.

Schmidt’s early results and the Russian reports prompted psi researchers across the world and the US intelligence services to investigate psi. Thus, aside from the IΨ/remote viewing program, the Star Gate team undertook extensive work examining the CΨ hypothesis (May & Marwaha, 2019a). Based on studies using RNG hardware and software systems, with random outputs from a beta-decay source, single alpha-particle, piezoelectric strain gauges and transducers, the Star Gate meta-analysis concluded that “There is no evidence to support that a psychoenergetic interaction with the physical world exists” (May, Utts, Trask, et al., 1989/2018). Meta-analyses of RNG studies from other laboratories indicate a weak but statistically robust effect (Bösch, Steinkamp, & Boller, 2006; Parker & Brusewitz, 2003; Radin & Nelson, 2003). The

$\Psi$  hypothesis, as initially suggested by Schmidt (1970), was carried forward by the SRI team since the early 1980s and formulated into what is now known as the decision augmentation theory (May, Spottiswoode, & Utts, 1995/2014; May, Utts, & Spottiswoode, 1995/2014).

### Direct Mental Interactions with Living Systems (DMILS)

In some experiments research participants were asked to influence, mentally and at a distance, the physiological or behavioral activities of other persons, animals, or cells; meta-analyses have revealed significant evidence for psi in the form of psychokinetic influences on animate target systems (Braud, 2003; Schmidt, Schneider, Utts, & Walach, 2004). These are described as distant mental influence (DMI) or direct mental interactions with living systems (DMILS) experiments (Braud, 2008), also known as distant healing intention—DHI—(Schlitz, Radin, Malle et al., 2003).

Radin, Schlitz, Baur (2015: 67) stated that DHI is defined “as a compassionate mental act directed toward the health and wellbeing of a distant person.” Schlitz et al. (2003: A31) state: “[...] DHI postulates that the intentions of one or more persons can interact with the physiological, psychological and/or behavioral status of one or more distant living systems.” In defining the terms they state: “The word *distant* in DHI specifically means shielded from ordinary physical and psychological influences by means of spatial, temporal, and/or sensory shielding, i.e. exclusion of all known causal pathways of human interaction.” Further, they define intention as “a mental state directed toward achieving a goal.” Schlitz et al. (p. A32) clarify the distinction between intentionality and mind:

To be clear, intentionality is not the same as *mind* because intentionality is a property of objective actions, whereas mind is essentially the “apparatus” that harbors and produces subjective mental states. Intentionality is also not the same as consciousness, which may be defined as the capacity to be conscious, or the state of conscious awareness. Intention is also distinct from attention. Intentions are mental states representing future actions, whereas attention is a mode of focusing or selecting objects of perception, thinking, and awareness.

As intention is defined as a mental state, researchers *need* to address the question how a mental state can, from a distance—across spacetime—affect the physiology, psychology, and/or behavioral status of an individual/group. This question *must* be addressed before proposing DHI as a possible hypothesis for the observed data. That said, Schlitz et al. (2003) acknowledge the role of DAT (experimenter psi) as a possible source of the observed effect. However, according to Schmidt (2012) and Roe, Sonnex, and Roxburgh (2015) data supporting the DHI hypothesis may be a reflection of protocol problems, which are also replicated.

## The Global Consciousness Project (GCP)

Started in 1998, the Global Consciousness Project (GCP) is a collaboration of researchers studying effects of mass consciousness on random number generators (RNG). The GCP network consists of approximately 60 hardware RNGs installed on computers at localities throughout the world. It investigates the possibility of a subtle connection between the collective mental activity of humans and the physical behavior of systems in the surrounding environment. The project formulates this proposition as a broad hypothesis that relates the output of true random number generators (RNGs) to times of intense, collective mental attention in the world: *Periods of collective attention or emotion in widely distributed populations will correlate with deviations from expectation in a global network of physical RNGs* (Bancel, 2014: 255; Bancel & Nelson, 2008; Nelson, 2014: 237).

May and Spottiswoode (2011/2014: 276) reported, that the DAT analysis of the formal GCP events ( $n = 300$ ), shows no evidence of any asymmetric interaction with the physical devices. They conclude that the experimenter's DAT-like decision capacity drives the GCP result, and it is unlikely that their statistically robust result is due to a variation of their primary hypothesis of some global consciousness connections to the RNG devices.

In a reanalysis of the GCP data Bancel (2017: 94) reports that:

Over 17 years, the [GCP] hypothesis has been tested on nearly 500 events, yielding a cumulative result that rejects the null hypothesis by seven standard deviations, apparently lending strong support to the proposal of global consciousness. However, an alternate interpretation is that the result is due to an anomalous effect associated with persons directly engaged with the experiment. [...] and *finds that the data do not support the global consciousness proposal* [emphasis added]. Rather, analyses indicate that the GCP result is due to a goal-oriented effect associated with individuals, similar to effects reported in prior research that studies subject engagement with RNG outputs.

## Rejecting the Causal Psi Hypothesis

In another class of micro-PK experiments, Radin, Michel, and Delorme (2016), in their series of double-slit experiments, examined the speculation that an extra-physical factor, i. e., mind/consciousness, plays a role in the quantum measurement problem. They state:

[...] these results do not support a strong role for the mind, as in consciousness literally causing a collapse of the quantum wave function. Rather, a more modest function is suggested whereby the mind has the capacity to modulate probabilities associated with the transition from quantum to classical behavior. In terms of absolute magnitude, these modulations are subtle (p. 21).

The validity and applicability of  $I\Psi$ , the effectiveness of the DAT formulations in distinguishing between informational and causal processes in data using inferential statistics, the several questions regarding the definition and attributes of mind/consciousness, the issue of environmental decoherence in quantum mechanics, raise several critical questions on the validity of the  $C\Psi$  hypothesis. In viewing psi as information, the DAT based data from micro-PK (RNG, DMILS, GCP, psi mediated double-slit experiments) studies lend support to  $I\Psi$ . Based on these factors, the  $C\Psi$  hypothesis needs to be rejected. However, if mind/consciousness is hypothesized to have the attributes to perturb external matter, proponents *must* take the next step by first defining what mind/consciousness is such that it can have the effects hypothesized for these experiments.

### *The Causal Psi Hypothesis: Macro-Psychokinesis*

Macro-PK poses several theoretical challenges. Macro-PK is the influence of mind/consciousness on large scale matter in the classical external world, and, therefore, do not require inferential statistics to validate the effect. Although field research has led to observations of macro-PK events that do not have easy or conventional explanations, they are difficult to tease into the laboratory and must be examined on a case-by-case basis. The macro-PK feats of Ted Owens, e.g., changing weather patterns, causing volcanic eruptions (Mishlove, 2000), can be adequately explained by  $I\Psi$ .

Considering the discussion so far, the plausibility of macro-PK may be vanishingly small; i.e., the arguments against mind on micro-matter, are equally valid for macro-PK. Given the varieties of observed putative macro-PK events, investigators need to first eliminate all physical influences from the physical world, internal biological effects, and instrumentation errors before proposing a  $C\Psi$  effect. Further, they need to address if and how there are violations of the known physical forces by normal means before attributing the observed effect to the influence of mind/consciousness on external matter separated in time and space.

Lloyd Auerbach (personal communication) suggests, in many of the observed macro-PK events eliminating conventional explanations is relatively easy. In several macro-PK events there are physical influences that are likely *not* violations of known physical forces; however, the application of these are influenced/directed via conscious/unconscious intention, by a redirection of what may already be in the environment or produced by the human body to create external effects in the real world. As stated, the question of what constitutes intention such that it can influence the external world without the use of direct force, and at a distance from the mind/consciousness of the causative agent, is a theoretical and empirical question that needs to be examined, before accepting or rejecting case-specific putative macro-PK events. A critical aspect of this investigation would be determining the nature of mind/consciousness and its potentiality to influence external matter from a distant spacetime point.

### *The Post-Mortem Survival Hypothesis*

It is a matter of immutable faith in several cultures and belief systems across the world, and embedded in their language, that the soul/consciousness survives bodily death. While in the Abrahamic religions rebirth is not considered, a belief in reincarnation/rebirth is a central tenet of the Hindu, Buddhist, Jaina, and Sikh religions, although there are differences in their conception of rebirth. This belief is deeply rooted in these cultures, along with the view that all fortunes/misfortunes are associated with the individual's deeds in a past life. However, philosophers have scrutinized these issues across and within the various schools of thought. For instance, Gokhale (2016) states:

Whether one accepts a soul-substance or not, schools of Indian philosophy while explaining bondage and liberation had to accept an entity or entities such as a subtle body and/or soul and/or mind which can exist outside the gross body and had to attribute bondage or liberation ultimately to that entity. The existence of such an entity is more a matter of faith and wishful thinking rather than a doctrine based on experience and reason.

The Lokāyatā/Cārvāka schools (beginning about 600 BCE) of Indian thought have rejected the survival hypothesis (Bhattacharya, 2016; Chattopadhyaya, 1959/1973; Chattopadhyaya & Gangopadhyaya, 1990; Gokhale, 2015; Sinha, 1994), as have Chinese philosophers Wang Ch'ung (202 BCE–220 CE) in *Discourses Weighed in the Balance*, and Fan Zhen (450 CE–510 CE) in *Spirit Does Disintegrate*. Fan Zhen sets out to disprove the possibility that man can survive death in any form, or that the spirits of the dead possess the power to communicate with man or injure him during his life time. As the existence of the soul is questioned, the immortality of the soul becomes an absurdity (Chin, 2006; Twitchett & Loewe, 1986).

As Rousseau (2012: 47) explains, the survival hypothesis commits the survival theorist to the following: (1) living persons are composed of a physical part ("body") and a supra-physical part (a "soul"); (2) the soul survives the death of the body; (3) the soul is the essential bearer of the person's mental and psychic properties; (4) discarnate souls ("spirits") can, via their psychic abilities, interact with living people and the ordinary physical world. In our view, this immediately raises the question of what the soul is. Assuming the reality of an immaterial soul, how or where are the mental and psychic properties stored?

We examine briefly the two methods adopted to determine the validity of the survival hypothesis: mediumship research and investigations into cases of the reincarnation type.

#### *1. Mediumship Research*

Mediums may be defined as "individuals who report experiencing regular communication with the deceased" (Beischel, 2007: 37). Laboratory based investigation of mediums incorporates

both qualitative and quantitative phenomenological research methods, using double- and triple-blind protocols to provide unique and valuable insights into mediumship (Beischel (2007, 2013; Beischel & Schwartz, 2007). Beischel, Mosher and Boccuzzi (2017) report that some mediums are able to differentiate between experiences of discarnate communication and psychic readings for living targets.

Is the aim of mediumship research to examine (i) the validity of the survival hypothesis or (ii) is it to examine whether the medium is communicating with the deceased or using psi as an informational source? If the former, then the current mediumship protocols employed are inadequate to examine the survival hypothesis; if the later, then the protocols and analysis of results are based on an a priori assumption that post-mortem survival is a valid phenomenon, and the mediums are indeed communicating with the discarnate.

There are two competing hypotheses for the mediumship data: the term survival psi is used to describe the assumption that mediums communicate directly with the deceased, and the term somatic psi, (a.k.a. the living agent psi hypothesis), is used for the competing theory that mediums use I $\Psi$  with the living, clairvoyance (including of a psychic reservoir), and/or precognition but not communication with the deceased to acquire information (Beischel & Rock, 2009; Beischel, Mosher and Boccuzzi, 2017, Sudduth, 2009). The case of the chess game between medium Rolans and grandmaster Viktor Korchnoi can be addressed by I $\Psi$  (May & Marwaha, 2016).

According to Beischel et al. (2017: 85), survival psi and somatic psi (a.k.a. living agent psi—LAP) may be terms referring, in actuality, to the same phenomenon. Braude (2013: 26–27) states, “[...] if information provided by the medium can subsequently be verified [...] then all along it was available to the medium’s ESP.” As Braude further states, the argument put forth against this by survivalists is that “LAP presupposes an implausible degree or refinement of psychic functioning, and (in particular) *more than would be required by the survivalist* [emphasis original]” (p. 28). However, as we have seen in the remote viewing literature, review of operational RV, reports by remote viewers, and theoretical analysis of RV, the RVer may begin accessing the psi information well before the start of the session, obtain it across several sessions, and consolidate all of it with non-psi information, to present a coherent picture.

The survival hypothesis is premised on the assumption that there are discarnate entities with whom one can communicate. This raises several questions: (i) what are they made of, i.e., what is “it”? (ii) does “it” have the property such that it can store information (memory), and serve as a target for the medium? Although the LAP hypothesis includes telepathy with the living, the arguments presented in this paper raise the question of the validity of telepathy. Thus, I $\Psi$  remains the only source of psi mediated information. That is, the medium could obtain the data, not telepathically—or telepathically from the deceased which is all the more a dif-

ficult condition—but rather from the IΨ process, such as future feedback of information to the medium from any other future source, which is a precognitive condition.

However, as Loyd Auerbach (personal communication) questions, what about those situations in which the medium gets no feedback about their statements? In a series of experiments on feedback and precognition dependent remote viewing, May and Lantz (1987) address the question of the future “answer book”—the feedback.

What constitutes an “answer book?” The most direct “answer book” might be the reporting of the target material to the viewer after the session (feedback). Unfortunately, the situation is more complex. There are no examples in nature that are fundamentally anthropomorphic. If information from a future time is available, then most certainly it is available to anyone.

Based on a series of remote viewing experiments, Lantz, May, and Piantanida (1990) report, “[...] viewers could obtain information regardless of the feedback parameters—including no feedback at all.” Thus, the role of precognition (IΨ) cannot be ruled out for data acquired by mediums. This problem of the source of information—whether acquired by IΨ processes or from the discarnate—is well-recognized amongst researchers. Krippner, Rock, Beischel, Friedman, and Fracasso (2013; cited by Rock, 2013: 11) state:

[...] we (the editors) are not aware of the results of a single study in the field of *survival of consciousness* research that allows one to distinguish between two information sources: *survival psi* (i. e., knowledge acquired by the medium via communication with a *discarnate* or deceased individual and *living agent psi* (i. e., knowledge acquired by the medium telepathically by scanning the mind of the *sitter* or loved one of the discarnate of other living people; clairvoyantly by acquiring information from documents, photos, or other objects or places; and/or precognitively from future feedback (pp. 2–3).

Our long-standing experience (40+ years) with remote viewers indicates that they have idiosyncratic areas or tasks in which they are proficient. For instance, while one viewer may be proficient with finding missing people, another may have strengths in describing remote locations. The medium can be considered as one who has psi ability just like a remote viewer, the only difference being the circumstances and manner in which the psi information is expressed—which also may be a function of culture.

According to Roe and Roxburgh (2013: 75) there are several “[...] mainstream explanations for mediumship in terms of cold reading as an account of mental phenomena, misperception and selective recall as an account of physical phenomena, and dissociation as the primary cause of the mediumistic experience itself.” These explanations of mediumship have received little empirical attention, despite being more parsimonious and more easily tested than the survival hypothesis (Rock, 2013: 15).

Based on this discussion we assert that the mediumship data is insufficient to support the survival hypothesis. The psi-based data from mediumship research adds to the IΨ database.

## 2. *Reincarnation Investigations*

Based on field research, Ian Stevenson and others (1974/1966, 1983; Pasricha, 1990) have recorded substantial numbers of accounts from across the world on cases suggestive of reincarnation. Stevenson and Keil (2000: 365) state that by “paranormal connection” with a deceased person they mean “[...] the communication of information without the recognized sensory channels.” Stevenson reported on birthmarks and birth defects, which appear to be the death wounds of a previous body, that occur frequently in children who remember past lives, including on twins (one or both of whom claim to remember a past life) (Stevenson, 1987, 1993, 1997). Stevenson (2006: 20) states: “Let no one think that I know the answer. I am still seeking”

Proponents of this view need to address questions such as what is non-material soul/mind/consciousness, how does it carry impressions of a previous experience, what are the genetic factors involved in such impressions. Can a non-material “something” affect the genetic structure such that it influences the gross physical body causing birthmarks? If it is indeed possible, then why is it that only a birth mark is displayed and not the form of the entire physical structure of the deceased now-reborn person? These and several such questions need to be addressed before post-mortem survival can be considered as a valid hypothesis.

### *Rejecting the Survival Hypothesis*

In examining the issue of consciousness Bernat (2016) has provided a definition of death. He states,

The *irreversible* [emphasis added] cessation of brain functions serves as a criterion of death because it is a necessary and sufficient condition for the cessation of the organism as a whole. [...] The irreversible loss of the functions of the brain that are responsible for the emergent functions of the organism as a whole indicates that the brain-dead patient is a mechanically supported, living component part of a human organism who has already died (p. 45).

Irwin (2002: 20) reviewed séance phenomena, NDEs, OBEs, poltergeist and apparitional experiences, and reincarnation experiences and concluded that “the operation of such processes” as LAP are “impossible to exclude” and, thus, the aforementioned phenomena “cannot be conclusive for the survival hypothesis.” Following an extensive analysis, Sudduth (2016) states “[...] the classical empirical arguments for survival do not succeed in showing that there is good evidence for survival, however provocative the arguments may be otherwise.”

Based on the arguments presented in this paper we reject the post-mortem survival hypothesis on the following grounds:

1. The cessation of neuronal activity in the brain leads to the cessation of its emergent properties including mind/consciousness.
2. In most cases ostensibly suggesting post-mortem survival, I $\Psi$  is a sufficient alternative explanation to account for the data.
3. Near-death- and out-of-body experiences are profound experiences emerging from the brain often under distress (Lake, 2017).
4. These arguments also render invalid Lund's (2009; Sudduth, 2013) argument that so-called apparitions of the dead are another source of evidence for survival. Broughton (2006: 150) states: "[...] from the earliest days of psychical research there was an awareness, if not a consensus, that classic ghost experiences were essentially a product of the mind of the percipient—an hallucination composed of images taken or constructed from the experiencer's memory."

### *Discussion*

The varieties of psi phenomena discussed so far can be collapsed into and be considered as expressions of informational psi (I $\Psi$ ), as illustrated in Figure 6. In summary we state:

1. Information is classically defined as reduction of uncertainty: the more numerous the alternatives that are ruled out, the greater the reduction of uncertainty, and thus the greater the information. It is usually measured using an entropy function, which is the logarithm of the number of alternatives (assuming they are equally likely) (Tononi, 2008: 217).
  - We often think of information as being equivalent to meaning. After all, that is the fundamental basis of language—to provide “information as meaning.” However, information theorists such as Shannon and Weaver (1949) add “pure” information that may not contain meaning; meaning is ascribed to the pure information based on individual learning and sociocultural influences.
  - Our interaction with the environment is based on information acquired through our sensory systems.
2. Consciousness is an emergent property of information processing throughout the brain.
  - The cessation of neuronal activity in the brain leads to the cessation of its emergent properties including mind/consciousness.

3. Informational psi ( $I\Psi$ ) is defined as the transfer of information, based on entropic considerations, arising from a distant point in spacetime leading to the local acquisition of non-inferential information by an atypical perceptual ability.
4. There is insufficient evidence to support the view that there are signals emanating from the brain or propagating over long distances; additionally, a single thought has no specific signatures that can be “read” by another mind.
5. Mind/consciousness cannot exert an effect, except by means of the motor system, such that it can perturb matter in the external world.
  - The decision augmentation theory (DAT) adequately interprets the inferential statistics based  $C\Psi$  data as  $I\Psi$ .
6.  $I\Psi$  is a signal-based, cortically processed, local phenomenon, just as for all the other sensory systems.
7. Although information arises from a distant spacetime point, from the person-centric perspective, all perceptions, regardless of their temporal origin, is local to the percipient.
8.  $I\Psi$  incorporates data from: remote viewing (clairvoyance, precognition), dreams studies (precognition, telepathy), ganzfeld (telepathy), survival research, micro-PK studies (RNG, REG, GCP, and other methods and protocols based on inferential statistics for data analysis).
9.  $I\Psi$  has the potential to address questions on the nature of time, information, and causality.

Collapsing the problem space of psi phenomena to a single phenomenon— $I\Psi$ —provides a parsimonious approach for theoretical advancements in psi research.  $I\Psi$  can be explored in the physics and neuroscience domains, based on domain specific questions.

Some of the key questions in the physics domain include:

- Does special or general relativity play a role in  $I\Psi$ ?
- Is a quantum description required for understanding  $I\Psi$ ?
- What is the information signal carrier that can propagate backward in time, and can be processed by the brain?
  - Does the signal have energy/mass?
  - How are time paradoxes avoided?
  - A starting point for addressing this question is to determine how psi information is transferred in real-time psi situations, i. e., when information is emerging from a distant point in space (there to here). This may lead to clues for the emergence of psi information separated in time and space (precognition condition).

- What is the transmission rate (bits/symbol) of the  $I\Psi$  signals and what are its limits?
- From where does the information arise—from an event or from later feedback, from actual or possible futures?
- The statistical properties/bit-rate of  $I\Psi$  vary with regard to when they are measured. Where does this apparent nonstationary nature of  $I\Psi$  arise? Under a signal model, there are only three possibilities—at the source, in the transmission channel, or in the detection mechanism.

Some of the key questions in the neuroscience domain include:

- What and where is the possible signal transducer for the processing of  $I\Psi$  signals?
- What are the signal transduction processes (any process by which a biological cell converts one kind of signal or stimulus into another) involved?
- Which are the CNS regions involved in  $I\Psi$  perception?
  - What makes this an atypical ability?
  - What are the underlying genetic factors?
  - What are the associated cognitive abilities and its atypical properties?
  - Can the answers to these questions enable us to identify other species with similar abilities?
- In temporal terms, when and where does psi happen; i. e., before or during the session?
- For how long does a psi experience last?
- What allows the participant to focus upon the relevant  $I\Psi$  signal?

While the answers to some of these questions are known or hypothesized, several are unknown, and several more need to be raised; it is a science-in-progress. Exploration of these questions will surely give rise to more questions before we gain a full understanding of this fascinating atypical human perceptual ability. To reiterate, informational psi has the potential to address questions on the nature of time, causality, and information. This may be one of the biggest contributions of the psi database.

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### Erweiterte Zusammenfassung

Während unserer historischen Vergangenheit und über alle Kulturen hinweg wurden Psi-Phänomene beobachtet und theoretisch zu fassen versucht. Diese umfangreichen Literatur wurde ergänzt durch empirische Untersuchungen, die zeitgenössischen Forschern wesentliche Fortschritte bei der Validierung der Phänomene und der Theorieentwicklung ermöglicht haben. Eine umfassende Prüfung des von der US-Regierung geförderten Psi-Forschungsprogramms *Star Gate* hat zu dem Schluss geführt, dass *Informationsgestütztes Psi* (Präkognition, Echtzeit-Psi) ein wissenschaftlich valides Phänomen ist, das erfolgreich auf Probleme der US-Nationalsicherheit angewendet wurde. Es gibt nur schwache statistische Beweise für die Existenz der Psychokinese, die in der Folge als Teil des Informationsgestützten Psi ( $I\Psi$ ) betrachtet wird.

Aus der *Star Gate*-Forschung entstanden verschiedene theoretische Modelle: (1) ein heuristisches Modell namens Decision Augmentation Theory (DAT), das zu bestimmen hilft, ob inferentielle statistische Ergebnisse auf Kausal- oder Informationsfaktoren zurückzuführen sind; (2) die Entropiehypothese, die zu der Beobachtung geführt hat, dass es eine statistische Grenze geben könnte, basierend auf entropischen Grenzen für  $I\Psi$ , die der für andere sensorische Systeme ähnelt; und (3) das Mehrphasige Modell des Informationsgestützten Psi (MMI $\Psi$ ), das die *Star Gate*-Daten und alle Psi-Forschungen in einem signalbasierten prozessorientierten Modell zusammengeführt hat. Das MMI $\Psi$  verortet das Problem in die physikalische Domäne (informationszentrierte Perspektive) und schließt die Entropiehypothese und die neurowissenschaftliche Domäne (personenzentrierte Perspektive) mit ein. Indem wir Psi von diesen beiden Bereichen aus untersuchen, sind wir in der Lage, das Phänomen aus der Perspektive seiner intrinsischen Natur und der Verarbeitung der gewonnenen Informationen zu erforschen.

In diesem Beitrag werden verschiedene Psi-Phänomene und die damit verbundenen Untersuchungsmethoden diskutiert, was uns zu der Ansicht führt, dass der ganze Bereich (problem space) der Psi-Phänomene auf ein einziges Phänomen reduziert werden kann – Informationsgestütztes Psi – für dessen Untersuchung die Domänen der Physik und der Neurowissenschaften mit ihren domänenspezifischen Fragenstellungen zuständig sind.  $I\Psi$  ist, basierend auf entropischen Überlegungen, definiert als die Übertragung von Informationen, die sich aus einem entfernten Punkt in der Raumzeit ergeben und zur lokalen Erfassung nicht-inferenzeller Informationen durch eine atypische Wahrnehmungsfähigkeit führen. Dies ist aus unserer Sicht ein Fortschritt in der PSI-Forschung.

Die Grundannahmen sind: (i) das Universum unterliegt physikalischen Gesetzen; (ii) Informationen bilden die Basis (ground field) der beständigen Außenwelt; (iii) Geist/Bewusstsein ist eine emergente Eigenschaft des unbeständigen Gehirns; und (iv) Geist/Bewusstsein kann keine direkte Kraft auf die Außenwelt ausüben, außer mittels des Bewegungsapparates. Die theoretischen Grundlagen der Telepathie (Ganzfeld), der Presentiment/Pre-Stimulus-Response, der statistisch basierte Psychokinese (RNG, DMILS, GCP), des Post-Mortem-Überlebens (Mediumismus, Reinkarnation) werden diskutiert; basierend auf einer Analyse der Natur von Psi, einem auf Daten und Modellen gegründeten theoretischen Verständnis, und einem Verständnis der theoretischen Fragen, die den verschiedenen experimentellen Methoden zur Erforschung von Psi-Phänomenen zugrunde liegen, kommen wir zu dem Schluss, dass die bisher diskutierten Phänomene in  $I\Psi$  zusammengeführt und als Ausdruck von  $I\Psi$  betrachtet werden können. Zusammenfassend lässt sich sagen:

- Es gibt keine ausreichenden Beweise zur Untermauerung der Ansicht, dass es Signale gibt, die vom Gehirn ausgehen oder sich über weite Strecken ausbreiten; außerdem hat ein einzelner Gedanke keine spezifischen Signaturen, die von einem anderen Geist „gelesen“ werden können.
- Geist/Bewusstsein kann keine Wirkung entfalten, außer mit Hilfe des Bewegungsapparates, so dass es die Materie in der Außenwelt beeinflussen kann; die Decision Augmentation Theory (DAT) interpretiert die auf inferentiellen Statistiken basierenden kausalen Psi-Daten adäquat als I $\Psi$ .
- I $\Psi$  ist ein signalbasiertes, kortikal verarbeitetes, lokales Phänomen – vergleichbar den anderen sensorischen Systemen.
- Obwohl Informationen von einem entfernten Raumzeitpunkt herrühren, sind aus der personenzentrierten Perspektive alle Wahrnehmungen lokal für den Wahrnehmenden, unabhängig von ihrem zeitlichen Ursprung.
- I $\Psi$  umfasst Daten aus remote viewing (Hellsehen, Präkognition), Traumforschung (Präkognition, Telepathie), Ganzfeld-Studien (Telepathie), Survival-Forschung und Mikro-PK-Studien (RNG, REG, GCP und anderen Methoden und Forschungsansätzen, die auf Inferenzstatistiken zur Datenanalyse basieren).
- I $\Psi$  hat das Potenzial, Fragen nach der Natur von Zeit, Information und Kausalität zu behandeln.
- Das Zusammenführen des Bereichs von PSI-Phänomenen zu einem einzigen Phänomen – I $\Psi$  – bietet einen ökonomischen Ansatz für theoretische Fortschritte in der PSI-Forschung. I $\Psi$  kann, basierend auf domänenspezifischen Fragen, in den Bereichen Physik und Neurowissenschaften erforscht werden.

Es werden mehrere theoretische Fragen zum Verständnis von I $\Psi$  gestellt, die in den Bereichen Physik und Neurowissenschaften behandelt werden müssen. Während die Antworten auf einige dieser Fragen bekannt sind oder gemutmaßt werden, sind etliche unbekannt, und einige weitere müssen aufgeworfen werden – dies ist der Gang der Wissenschaft. Die Erforschung dieser Fragen wird sicherlich weitere Fragen aufwerfen, bevor wir ein vollständiges Verständnis dieser faszinierenden atypischen menschlichen Wahrnehmungsfähigkeit erlangen. Informationsgestütztes Psi hat das Potenzial, Fragen nach der Art von Zeit, Kausalität und Information zu beantworten. Dies könnte einer der größten Beiträge der Daten aus der Psi-Forschung werden.

***Comments on Sonali Bhatt Marwaha & Edwin C. May:  
Informational Psi: Collapsing the Problem Space of Psi Phenomena***

HARTMUT GROTE<sup>1</sup>

**A Brief Commentary on  $\Psi$**

The article from May and Marwaha presents ideas and hypotheses aimed at reducing the multitude of psi phenomena in order to make them potentially explicable under the paradigm of information flow from “distant points in space-time” to an observer.

While simplification seems welcome under the idea of underlying unifying concepts, I am not too sure of the hypothesis that science always evolves towards simplicity in general. Particle physics with its zoo of fundamental particles may be an example to the contrary. Of course a search for a simpler underlying model is going on in particle physics as well, but it seems fair to say the outcome of that is unknown.

The term of “ $\Psi$ ” is proposed for the underlying unifying process, and while a new name can be helpful for a new concept, I wonder if this name does not also evoke the contrary notion, namely that there then also have to be other forms of psi different from  $\Psi$ .

Leaving the name question aside I would agree with the authors that an “influence” of observers or agents onto physical systems (other than by the motor-system of the body) seems unlikely given the history and findings of the field. The example of the experiment the authors cite in this context is convincing. I find less convincing though how DAT can operate in making an agent make fine-tuned decisions in choosing, for example, the right time when to press a button to start a random sequence of events, while this type of fine tuning was excluded by arguments about neurology in the former cited experiment.

I also do not follow the logic about how the DAT protocol can be incorporated into any research protocols that use randomization and inferential statistics. The point is correct, but it is not a point to support DAT in particular. The same would also be true for a causal-psi model, where an agent may actively “influence” the randomization process. This process is not specific to DAT.

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1 Hartmut Grote is a physicist and worked at the Max-Planck-Institute for Gravitational Physics in Germany. He is now a faculty member in the school of physics and astronomy, Cardiff University.

The authors suggest that  $I\Psi$ , as they understand it, may be split into the physics and neurology domains, and that all laws of physics have to be obeyed. Obviously, all physical laws have to be obeyed by a viable explanation of psi, but it may well be that physics needs to be extended to accommodate psi phenomena, if they exist. That current physics models are incomplete is long known and there are several puzzles in particle physics and cosmology that call for new physics beyond the standard model.

After all, I think its fair to say that none of the standard physics forces or fields are viable candidates to transport psi information, and I would assume the authors mostly agree with this.

Also in this context I was a bit surprised by the statement that the brain would not send out  $I\Psi$  signals. If the signaling process is a physics-based one, then why would the brain (a physical system after all) not be able to send out psi information as well? Some remarks about how the “distant events in space-time” are different from processes in the brain may have been helpful here.

What I also miss in the article is a mention of alternatives to signal models, mainly theories that hypothesize entanglement correlations to explain psi phenomena. While perhaps not usable to transmit information, they would at least provide a possibility how to bridge space-like distances which otherwise cannot communicate to each other, being restricted by the finite speed of light.

And as a last remark, I find the term “collaps” for the reduction of the problem space slightly over the top. For my taste this analogy is too close to physics, like a conscious mind is observing the problem, and is has no choice other than to collapse. I would find a simple “reduction” of the problem space more adequate. But surely, a matter of taste.

WALTER VON LUCADOU<sup>2</sup>

## Neither Causal nor Information – Psi Always Slips Away and yet is Powerful

Since Hartmann Römer (see his comment in this issue) has already taken a detailed position from a theoretical point of view of the General Quantum Theory (GQT) and the Model of Pragmatic Information (MPI) in his comment on the article by Sonali Bhatt Marwaha and Edwin C. May: “Informational Psi: Collapsing the Problem Space of Psi Phenomena”, I would like to restrict myself here to some empirical findings that the authors apparently disregarded in their presentation, although they should know them.

In September 1995, I have met Edwin May at the IGPP, at that time located at Eichhalde 12 in Freiburg, and discussed the IDS model—as he called it at the time—with him and explained my theoretical concerns as well as my experimental data to him in detail. Even then, I can’t remember if he could not or did not want to say anything substantial about my arguments.

All psi experiments conducted according to the correlation matrix method (CMM) which started in 1982 until today (Kirmse, 2018; Lucadou, 1983, 2015b; Lucadou & Mischo, 1983) have shown that there are numerous significant correlations between psychological variables (questionnaires or behavioural variables) and the physical variables of the random process that do not appear in the equivalent matrix of the control runs, where the number of significant correlations usually does not differ very much from the expectation value. A recent meta-analysis (Lucadou, in press) of these experiments (10 independent studies with a total of 2,209 subjects) resulted in an alpha error of  $1.0 \times 10^{-8}$ .

Nevertheless, the respective hit rates of all studies show no significant deviation from the expected mean-values. Due to the  $I\Psi$ -model, this would not initially be expected, since a deviation from the expected mean was precisely the instruction for the subjects in these experiments. Of course, one could bring these results into agreement with the  $I\Psi$ -model by certain post-hoc assumptions—but from such a point of view it seems to be rather unfalsifiable. However, it had been additionally shown with identical replications that even the most significant correlations never occur with the same psycho-physical variable pairs of the matrix, but “jump” to another matrix cell in strict replications. This behaviour is a direct consequence of the NT

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2 Walter v. Lucadou, studied physics and psychology in Freiburg i. Br. and Berlin. 1974 research assistant at the Physics Institute of the University of Freiburg and 1977 at the Kiepenheuer Institute for Solar Astronomy in Freiburg. 1979 Scientific assistant at the Department of Psychology and Border Areas of Psychology at the University of Freiburg. 1985 Visiting professor at the Parapsychological Laboratory of the University of Utrecht (Netherlands). Since 1989 head of the „Parapsychological Counselling Office“ in Freiburg i. Br.

axiom (Lucadou, 2015a; Lucadou, Römer, & Walach, 2007) and thus a clear indication that the measured correlations are entanglement correlations and not a result of causal processes. Insofar it would be in agreement with one basic assumption of I $\Psi$  namely that psi effects cannot be explained by causal influences in the sense of a physical *causa efficiens*. On the other hand, in the I $\Psi$  model, one would expect that the underlying neuronal information processes leads to a more or less stable structure in the matrix, otherwise intrinsic information could not be reconstructed.

The clearest indication, however, that the IDS- or I $\Psi$  model cannot be correct is the fact that the comparison of different random generators REGs (Schmidt and Markow) revealed that the generator with the smaller scattering (Markow SD =  $1/\sqrt{(n/12)}$ , n = number of trials) produced clearer and stronger correlations than the Schmidt REG (SD =  $1/\sqrt{(n/4)}$ ). From an information and entropy point of view one would expect the opposite.

I have published these facts over the years in several English-speaking peer-reviewed journals, so that the authors cannot claim to have known nothing about it—otherwise they didn't their homework properly. I wrote (Lucadou, Lay & Kunzmann, 1987): “Moreover, based on our data we can rule out the GESP-assumption of the IDS model. If the subjects could precognitively foresee fluctuations in a “prestabilized” sequence of random events which they then select for their own purpose by pushing the start-button in the right moment, it can be expected that random sequences which show large fluctuations at the display would be a better target than those with small fluctuations. Hence, the subjects should be more successful with the Schmidt runs than with the Markow ones. As pointed out above, we found the opposite.” And further (Lucadou, 1987, 2006): “These findings raise a lot of theoretical problems concerning the so-called “observational theories”. [...] These correlations between psychological and physical variables are regarded as being non-local and they reflect the meaning (pragmatic information) of the display and the instruction given to the subjects. The assumption that the effect is due to precognition or intuitive data selection (IDS) is not supported.”

Finally, it must be mentioned that on the basis of the GQT and the MPI it is not necessary to negate a large part of the spontaneous phenomena such as RSPK just because it does not fit the I $\Psi$  model. This shows that entanglement relationships (embodiment) can be quite powerful (Lucadou & Zahradnik, 2004, 2006).

One should at least expect that the authors of the article should discuss these well-known issues before they claim that “The varieties of psi phenomena discussed so far can be collapsed into and be considered as expressions of informational psi (I $\Psi$ )” and further: “[...] informational psi has the potential to address questions on the nature of time, causality, and information. This may be one of the biggest contribution” (Marwaha & May, 2019: 40, this issue).

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MICHAEL NAHM<sup>3</sup>

## Assessing the Problem Space of Precognition: Can it be the Only Form of Psi? A Commentary on the Multiphasic Model of Informational Psi

Parapsychologists are typically concerned with unusual phenomena that do not easily fit into mainstream theories about the functioning of nature and the world. Hence, they are forced to develop new and often controversial theories to account for the observed phenomena. One of these theories developed by parapsychologists is the *multiphasic model of precognition* (MMPC; Marwaha & May, 2015a, b, c), which has been renamed by the authors to the *multiphasic model of informational psi* in the present publication without changing its basic structure and content (MMI $\Psi$ ; Marwaha & May, 2019). In this model, *informational psi* (I $\Psi$ ) is equated with precognition, and the MMI $\Psi$  rests fundamentally on the assumption that precognition is the only existing form of psi. Obviously, this is an unusual claim that challenges scientific researchers and theorists, especially parapsychologists. In fact, it is prone to running into several conceptual difficulties, especially when it builds on a reductionist physicalist world view like that promoted by Marwaha and May, in which mind/consciousness is regarded as a mere emergent phenomenon of brain chemistry that cannot have any effect on its environment. In the following, I will outline some of the difficulties with the MMI $\Psi$ , drawing from empirical findings of parapsychological research that Marwaha and May also seem to accept.

### *Scrutinizing the Central Axiom of the MMI $\Psi$ : Is Precognition the Only Form of Psi?*

**Fundamental problems of wave-based models of psi.** Wave-base models of psi have a long tradition in parapsychology, but they have usually found only a few supporters. The MMI $\Psi$  belongs to the category of wave-based models because it rests on the postulate that I $\Psi$  must be loaded onto physical energy carriers such as gravity waves to be able to propagate backwards in time. Hence, the traditionally discussed problems for physicalist wave-based models also apply to the MMI $\Psi$ . These concern questions of how the percipients of extrasensory perception (ESP) are successfully selected among the millions of other potential percipients, how the often delicate timing of the ESP reception is accomplished, how mind/consciousness-related information including emotional content is loaded onto physical waves, and how this information is decoded to result in perceptions of events that mimic usual perceptions obtained via the normal

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<sup>3</sup> Dr. Michael Nahm is a Research Associate at the Institute for Frontier Areas of Psychology and Mental Health (IGPP) in Freiburg. His research interests include enigmas of evolution, unusual phenomena in near-death states, physical mediumship, and the history of parapsychology. He has authored or co-authored more than 100 publications in scientific journals and other research outlets, and published two books on psychical matters in German.

sensory channels. None of these fundamental problems for physicalist wave-based models has been solved. As a consequence, wave-based physical models have, as mentioned above, always played a negligible role in parapsychological theorizing. Marwaha and May frankly admit that the postulated information carriers, potential mechanisms for loading information onto such carriers, and possibilities of their perception and the subsequent information decoding inside the brain are indeed not yet known. However, they don't mention the problems of percipient selection and timing, which are of at least similar importance, especially in collective and/or reciprocal ESP experiences. All these fundamental issues of psi theories are very difficult to account for in physicalist wave-based ESP models like the MMIΨ.

**Varieties of extrasensory perception.** Extrasensory perception is usually considered to include telepathy, clairvoyance and precognition. Interestingly, early psychical researchers had already noted that some of the gifted individuals they worked with seemed to be selectively gifted for one mode of ESP but not for another. An early example was provided by Sir William Barrett, who found that a girl he hypnotized was able to identify hidden targets correctly—but only when he knew the targets himself (Barrett, 1882–1883). Thus, telepathy seemed to work well with this girl, but not clairvoyance.<sup>4</sup> There are many more examples of such peculiar idiosyncrasies in the parapsychological literature. One of the best studied cases concerns the mediumship of Leonora Piper. After entering a state of deep trance, she often performed brilliantly with regard to retrieving information that was known to other living people who were present or absent (a telepathy condition), but she usually had great difficulty unearthing information that was not known to anybody alive (a clairvoyance condition. For a discussion of this aspect of Mrs. Piper's mediumship, see Moser, 1974). These idiosyncrasies pose difficulties for the MMIΨ. It should have been irrelevant for the hypnotized girl's and Mrs. Piper's supposed precognitive ability, be it based on direct precognition or on precognition relying on feedback, if other people knew the information to be gained at the time of the experiment, or not.

Moreover, drawing from the enormous amount of material on spontaneous cases but also certain experimental telepathy studies (e.g., Puharich, 1975), the following requirements have been identified as promoters for inducing a successful telepathic experience in which a “message” is conveyed (after Playfair, 2012):

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4 Barrett regarded these phenomena as an example of “rapport”, which, in its highest degree, has been described as the temporary unification of the minds of a mesmerized/hypnotized subject and the mesmerizer/hypnotizer. There are numerous fascinating and seemingly well-documented examples for rapport phenomena in the older literature of the 19th century, and they can be regarded as the highest form of telepathy (Moser, 1974). I believe some of them are difficult to explain with precognition, but space prohibits a more detailed discussion.

1. An emphatic bond between agent (sender) and percipient (receiver) greatly enhances the success of telepathic experiences; and the closer this bond is, the better.
2. The sender should be in an “adrenalized” or even frightened state, the receiver in a calm and relaxed state.
3. The sender must be faced with a fairly powerful emotional stimulus.

These conditions indicate that the mental state of the assumed sender can play a crucial role in successful telepathic events. Yet, the MMI $\Psi$  is exclusively concerned with the perceptions of the receiver, and it attributes them to precognition. As I understand the MMI $\Psi$ , an active sender of  $\Psi$  cannot even exist, and much less can a sender's emotions play a role as they merely belong to the emergent mind/consciousness and possess no objective properties that might affect the environment. The way in which an emotional bond between the two actors and the emotional state of one of these actors can promote the other's perception of  $\Psi$  that is presumed to arise from a future point in spacetime thus remains unexplained in the MMI $\Psi$ .

**Apparitions.** Analyses and discussions of apparitions have a long-standing tradition in the history of psychological research as well. Thus, they also need to be accounted for in the MMI $\Psi$ . In this context, Marwaha and May (2019: 38) cite a statement from a publication by Richard Broughton (2006: 150) stating that “from the earliest days of psychological research there was an awareness, if not a consensus, that classic ghost experiences were essentially a product of the mind of the percipient—an hallucination composed of images taken or constructed from the experiencer's memory.” By citing this sentence, Marwaha and May seem to say that apparitions cannot have intersubjective or even objective attributes, and that their appraisal would be in agreement with that of the authors alluded to, namely Edmund Gurney, Frederic Myers, and Frank Podmore (1886), as well as Henry Sidgwick et al. (1894). This, however, is at best only half of the truth because these authors included telepathy as a crucial and indispensable part of veridical apparitional experiences. For example, in cases of veridical crisis apparitions, the initial impulse was assumed to originate from the person undergoing the crisis (the agent or sender discussed in the previous section). In cases in which apparitions were collectively and congruently perceived, Gurney assumed that the original and telepathically received impulse was transferred further by the primordial percipient to the other percipients by means of telepathy. Myers (1903) even assumed that telepathically transmitted impulses of the deceased might play a part in the formation of apparitions of deceased individuals (for a brief overview of these theories, see Gauld, 1968). Hence, because Marwaha and May deny the existence of telepathy, the MMI $\Psi$  disagrees with the theories of the early psychological researchers in fundamental respects and the latter cannot be used to legitimize the MMI $\Psi$ . Rather, the MMI $\Psi$  must offer alternative hypotheses about how veridical (crisis) apparitions that have been collectively and congruently perceived from different visual angles by different percipients can be explained by

precognition alone. Such collective and veridical apparition sightings can also include animals as co-percipients, even as primordial percipients that perceive the apparition first, as in a noted case described by Sidgwick et al. (1894: 227; see Nahm, 2016, for a discussion). Classical studies of collective cases that should be considered are, for example, represented by Hart et al. (1956), Hart & Hart (1932–1933), and Mattiesen (1936–1939). For reasons of space limitation, I won't expound on theoretical possibilities to explain such collective apparition sightings via precognition, but it is obvious that creating plausible explanatory models is quite challenging for the MMIΨ. The same goes for reciprocal ESP experiences of two or more people.

**Cases of the reincarnation type.** Events that happened before a supposed ESP-percipient was born cannot be perceived or known by direct precognition because such events are already past and cannot enter the mind of the percipient from a future point in spacetime. Thus, in the MMIΨ, if events from a pre-birth past are perceived via ESP, they must be attributed to precognition of *feedback* arising, for example, from discussions about the past events in question. This constellation applies, among others, to typical cases of the reincarnation type (CORT). In rather a superficial attempt to explain CORT, Marwaha and May refer to Michael Sudduth (2016), who argued that all survival-related phenomena can be accounted for at least equally well by living agent psi (Marwaha & May, 2019: 35). Marwaha and May then equate IΨ with living agent psi. Yet, as in their discussion of apparitions, in which they simply skip telepathy, the move to equate IΨ with living agent psi is highly problematic. Living agent psi is often called *superpsi* to highlight the very high quantity and quality of telepathy and clairvoyance required in this model. As a consequence, and because *superpsi* implies rather convoluted streams of reasoning to account for all survival-related phenomena, most parapsychologists who have considered the multifaceted phenomenology of CORT *in detail* still lean towards a survivalist interpretation regarding the best cases. For example, Stephen Braude (2003) argued that the “crippling complexity” of such CORT would ultimately tilt the scales towards survival.

Consequently, the elimination of telepathy and clairvoyance from the *superpsi* approach, as in the MMIΨ, results in a kind of *super-precognition* of received feedback arising from discussions and investigations of the case by the subjects' contemporaries. In addition, the feedback information perceived in this manner from a future point in spacetime would have to be transformed in such a way that it causes the young children to identify themselves with the personality of the supposed previous life. Simultaneously, all traces of the actual feedback situations need to be eliminated, never to enter the consciousness of the affected children. This information transformation would then have to have a rather powerful effect on the affected child, often still a baby, that can lead to such a strong identification with the former personality that it elicits nightmares related to the other life, phobias, peculiar behavioral habits and (language) skills, correct descriptions of earthly events pertaining to the time of the intermission period between the two lives, and even affect non-verbal fetuses and trigger the formation of birthmarks and birth

defects (Stevenson, 1997). Regarding the future families of the subjects or the families of the previous personalities, CORT may also include announcement and departure dreams, as well as other complications (e. g., Nahm & Hassler, 2011). The MMI $\Psi$  must also be able to account for the question of why this assumed *super-precognition* of CORT subjects is exclusively limited to feedback concerning the life of one particular deceased person, and to nothing else. Obviously, trying to explain all these diverse CORT facets with *super-precognition* alone results in a drastic increase in theoretical complications and questionable ad-hoc assumptions—a *super-crippling complexity* that renders the MMI $\Psi$  barely tenable. But the worst for the MMI $\Psi$  is still to come.

**The need to distinguish between unknown information about the past and unknown information from the future.** As mentioned above, young children who claim to remember a previous life in CORT cannot have obtained paranormally gained knowledge about the previous personality's life via direct precognition, but only via precognition of feedback received, for instance, via discussions about this previous personality. But where does the paranormally gained knowledge about the previous person's life come from in the first place? In the case of James Leininger, for example (Leininger & Leininger, 2009; Tucker, 2016; numerous alternative cases could be named), the parents and the other people involved in the unfolding of the CORT also had no knowledge about the previous person's life at first. They only started to collect information about the previous personality's life after the strange behavior and claims of little James motivated them to do so. Yet, in the parlance of the MMI $\Psi$ , one must assume that James first received precognitive information about the previous personality's life via feedback derived from his parents' activities. These activities, however, were in fact triggered by James' behavior, which must have already been influenced by the precognitively perceived information that should have been gained only later through the future activities of his parents.

At this point, the MMI $\Psi$  boils down to mere circular reasoning: A is presupposed to lead to B, but B is presupposed to lead to A. In this way, the true origins of A and B can never be explained. The issue to be explained always needs to be presupposed and is considered explained already. This is similar to the story of the Baron of Münchhausen who claimed to have drawn himself out of a swamp by pulling his own hair. This logical circle and unsolvable paradox is rooted in a grave conceptual problem of the MMI $\Psi$ .

This conceptual problem is that in explanatory models for precognition like the MMI $\Psi$ , which are based on an assumed entropy-driven linear time flow that runs from the past into the future in a physicalist macrocosm, it is of crucial importance to distinguish between unknown information from the past and unknown information from the future. Such a distinction is, however, not contained in the MMI $\Psi$ . Yet, it is important to understand that information gained precognitively from a future point in spacetime *principally cannot contain information from the past that is unknown to all individuals involved in the presently occurring precognitive*

*affair* (such as at the beginning of Leininger’s CORT). The reason is that, from the perspective of the percipient(s) involved, such information is exclusively located in the “past light cone” (see Figure 3 of Marwaha & May, 2019: 18, this issue). And in the MMI $\Psi$ , information about an event that happened in an unknown past cannot transfer itself from the past light cone into the future light cone, and miraculously appear in there. The assumed entropy-driven precognitive information channel of the MMI $\Psi$  does not allow unknown past information to migrate into the future of a physicalist universe. Presently unknown information in the past light cone can thus also not be loaded onto gravity waves originating in the future light cone, and therefore also not travel backwards in time again to result in the assumed precognitive perception of this information in the present.

In other words: In the MMI $\Psi$ , retrocausation cannot be triggered by information from the past that is unknown in the present and at the future point in spacetime that is presumed to trigger the retrocausation that leads to the obtaining of this past information. Consequently, the origin of paranormally gained knowledge about the past in CORT, such as in Leininger’s case, cannot, in principal, be explained by the MMI $\Psi$ , as this necessarily results in the demonstrated loop of circular reasoning.

However, if one still assumes that information from the past that is unknown to everybody involved in the unfolding of a CORT can somehow be perceived precognitively, as the MMI $\Psi$  implies, one cannot avoid introducing at least one more different ESP-like bypass or shortcut channel into the MMI $\Psi$  to render this information from the past light cone accessible in the future light cone. Then, however, the assumption that precognition is the only form of psi cannot be upheld in the MMI $\Psi$ , and it therefore needs to be refuted.<sup>5</sup>

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5 The importance of distinguishing between unknown information about the past and unknown information about the future in precognition models like the MMI $\Psi$  cannot be overestimated. I would, therefore, like to elaborate a little further on this. Typical forms of precognition, such as the anticipation of accidents and precognition studied in laboratory settings or the *Star Gate* program, concern presently unknown information about the future. Thus, they match the conceptualization of the MMI $\Psi$ . ESP regarding unknown information about the past is, by contrast, usually not regarded as precognition, but as a retrocognitive form of clairvoyance. To regard retrocognition as precognition, as in the interpretation of CORT in the MMI $\Psi$ , necessarily results in the described paradox when it concerns information about the past that is unknown to the people involved.

This is also true for numerous other examples of ESP-mediated knowledge, such as all cases in which unknown veridical information from the past is obtained via afterlife communications, and certain data obtained in the context of mediumship research. A noted example is the case of Runki’s leg (Haraldsson & Stevenson, 1975). Also here, the relevant information about Runki’s life was not known to anybody involved in the unfolding of the case, and thus it cannot be accounted for by pure entropy-driven precognition. It can only be explained in the frames of survival or conventional concepts of living agent psi.

**Wormholes undermining the MMI $\Psi$ .** It is somewhat ironical that Edwin May himself has explicitly added such compromising ESP-channels to the MMI $\Psi$  in collaboration with Joseph Depp (May & Depp, 2015). They suggested that I $\Psi$  might travel through wormholes in a hyperdimensional space. According to May and Depp (2015: 140), time as we know it does not exist in that hyperdimensional space, but “all events that have happened, are happening, or will ever happen in our spacetime exist simultaneously.” In this hyperdimensional space, wormholes are assumed to function as shortcuts that connect “*any* two points in spacetime regardless as to where they are in that four-dimensional space” (May & Depp, 2015: 141; emphasis in the original). This means that these wormholes are thought to be able to mediate the flow of I $\Psi$  between all possible points in the past, present, and future spacetime. Concerning explanatory frames for psi phenomena, I sympathize with hyperdimensional models of the universe as well (Nahm, 2007). However, the above-mentioned properties of the supposed wormholes contradict the very essence of the MMI $\Psi$ : Obviously, real-time clairvoyance, retrocognition, and even telepathy (in case that people’s brains are directly connected in real-time) must also then be allowed to exist in addition to precognition. Therefore, Marwaha and May’s laborious attempts to substantiate that precognition must be regarded as the only form of psi are redundant and dispensable. In a hyperdimensional universe full of potential wormholes that can mediate the flow of information between all points in spacetime, precognition can only be regarded as one type of manifestation of ESP among others, just like in previous and more conventional models of ESP.

### *Concluding Comments*

If one accepts the general veracity of the empirical findings of parapsychology considered in this article, precognition cannot be the only form of psi. Hence, if the conceptual implications of the MMI $\Psi$  for ESP are thought through to the end, the fundamental axiom of the MMI $\Psi$  must be regarded as refuted. Yet, that is not true for every aspect of the MMI $\Psi$ . For example, I am particularly intrigued by the possibility that the amount of entropy generated in a given situation might exert a decisive effect on the success of a precognition experiment. I can well imagine that this might indeed be the case, and would thus encourage further studies on this topic. A potentially related issue that could be addressed in precognition experiments concerns the question of whether occurrences that involve exceptionally intense emotions in large

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The same is true for a theoretical mediumistic case constructed by Marwaha and May (2016: 92). When the experimenter dies and takes the outcome of the experiment (which is known to nobody else) to his grave in this constructed case, this outcome becomes inaccessible information in the past light cones of all surviving individuals. Hence, it cannot be retrieved by these surviving individuals via an entropy-driven backward flow of information from within the future light cone, as assumed by Marwaha and May.

numbers of people would be more successful than trivial occurrences concerning only a few individuals. Such emotionally intense events often accompany increased physical entropy generation as well and it would be an interesting and challenging task to differentiate between the two possible triggers.

Moreover, I perfectly agree with Marwaha and May's notion that psi is a fundamentally unitary phenomenon that transcends the properties of our familiar spacetime. The available mass of parapsychological research results strongly suggests that ESP and also psychokinesis (PK) are best regarded as belonging to a phenomenological continuum of psi that manifests in different facets reflecting different poles or properties of it.<sup>6</sup> It might therefore well be that aspects of the MMI $\Psi$ , but also aspects of other theories and philosophical frameworks outlined, for example, by May & Marwaha (2015) and Kelly, Crabtree, & Marshall (2015) have their place in an encompassing theoretical frame that can account for the similarities and variances of different psi phenomena. However, one should be careful when regarding any of the more specific theories as potentially able to account for *all* reported psi phenomena. Although I regard psi to be a unitary phenomenon, it is also likely to be an utterly complicated affair that is very difficult to penetrate with our familiar logical thinking, which developed over the course of evolution to cope with the more reliably occurring macroscopic events within our small window of conventionally perceived spacetime. In addition, it is my impression that many of the more specific theories, such as the MMI $\Psi$ , stand largely separate and that a real constructive dialogue between the proponents of different psi models in parapsychology has so far not taken place. Marwaha and May have already offered a tentative comparison of other available models elsewhere (e. g., Marwaha, 2018; Marwaha & May, 2015c, d), and I hope that recent developments such as the presentation of some theories and possible relations to other models, as in a recent issue of the *Mindfield Bulletin* of the Parapsychological Association (issue 10/3, 2018), will trigger such a constructive dialogue. Only such dialogue can lead to a "Modern Synthesis" of psi theories, similar to the "Modern Synthesis" developed by 20th century evolutionary biologists in which several seemingly separate and disparate theoretical concepts were successfully united into an encompassing frame subsuming different sub-theories (Mayr & Provine, 1980). Should such a "Modern Synthesis" of psi theories be developed, it would require an active and vivid dialogue between the different protagonists in which seemingly negligible details of hypoth-

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6 I abstained from commenting on PK in this Commentary, but one remark seems apt. One might already regard telepathy as a special form of PK, thus emphasizing the unitary nature of all psi phenomena. At least, if the mental state of one person can affect the mental state of another, this results inevitably in accompanying changes of the correlated neurophysiological processes in the latter's brain. A particularly promising method for investigating these phenomena further consists of applying physiological measurements in experiments with identical twins who share a close empathic bond (Jensen & Parker, 2012; Parker & Jensen, 2013; Playfair, 2012, 2017).

eses and theories would also have to be considered. Moreover, these discussions should be guided and shaped by an objective assessment of available empirical data from parapsychological research and a thorough acquaintance with them, not on preconceived assumptions that determine *a priori* which phenomena are allowed to occur and which are not. This process would be expected to involve controversial discussions, but after all, such discussions in which the strengths and weaknesses of particular theoretical approaches are meticulously carved out are necessary for real progress in theorizing about psi. I hope that my criticism of the MMI $\Psi$  will be received in this constructive spirit.

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DEAN RADIN<sup>7</sup>

### Yes, But What is New?

Marwaha and May's (M&M) physicalist model of "informational psi" aims to unify the various ways that psi experiences manifest, offering the promise that descriptive terms of apparently different experiences, like telepathy, clairvoyance, precognition, psychokinesis and survival phenomena, can ultimately be collapsed into a single phenomenon. The urge to identify commonalities among apparently different phenomena is laudable because when successful, it can lead to a much deeper understanding of the underlying mechanisms.

Readers unfamiliar with M&M's previously published articles may find elements of this single target article insufficiently detailed, but even without the full details the point of their proposal is clear. To paraphrase, psi is conceived as a unitary psychophysical phenomenon involving the transfer of nonlocal information carried via signals, which are perceived by unknown processes in the brain.

This proposal is straightforward enough, but it is not a new idea. That is, as M&M mention in their article, the idea that telepathy and clairvoyance might be a unitary process was discussed by J. B. Rhine in 1945 (Rhine, 1945), and a year later R. H. Thouless and B. P. Wiesner (Thouless & Wiesner, 1946) proposed thinking about different psi phenomena "not as effects of different paranormal capacities (telepathy, clairvoyance, and precognition) but rather as manifestations of one single paranormal capacity [...]" (p. 107), adding that "psychokinesis [...] is probably to be regarded as a phenomenon of the same order and it may be considered

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<sup>7</sup> Dean Radin PhD (psychology) is currently Chief Scientist at the Institute of Noetic Sciences and Associated Distinguished Professor at the California Institute of Integral Studies. He previously worked at AT&T Bell Labs, Princeton University, University of Edinburgh, and SRI International, has given over 500 invited presentations and interviews worldwide, and is the author or coauthor of over 250 technical and popular articles, 50 book chapters, and four best-selling books that have been translated into 15 languages: *The Conscious Universe* (1997), *Entangled Minds* (2006), *Supernormal* (2013), and *Real Magic* (2018).

as the motor aspect of psi” (p. 116). Similarly, the idea of applying informational concepts to understanding psi was proposed over a half-century ago (Cadoret, 1961), and psi as a type of signal was used metaphorically over a century ago by Mark Twain in a series of experiences he described as “mental telegraphy” (Twain, 1891).

This is not to say that the proposal is wrong. But what makes M&M’s article unsatisfying is that it provides no new answers to the key questions that have been discussed without resolution for many decades. The only accepted physical theory that allows for the kinds of nonlocal connections required by M&M’s proposal is quantum mechanics (QM), but in its orthodox form QM disallows any form of signaling. In addition, no clues are provided for what processes in the brain might be able to receive nonlocal signals, nor are there any hints about the source of such signals.

Proposing a physical theory for psi is understandable, and even desirable, because it would provide an explanatory framework for the ample empirical evidence for psi without challenging the prevailing scientific worldview. That in turn might allow psi to become mainstreamed more easily. However, even if the problem of transmission and reception of nonlocal signals were solved, the proposal still fails to solve an important problem raised by J. Beloff (1970):

For all their ingenuity, such [physicalist] theories are really nonstarters. They concentrate on the energetics of the psi process while ignoring its even more intractable informational aspects. For the crux of the problem, as I see it, lies, not so much in specifying what kind of energy might surmount spatial and temporal distances or material barriers, but rather in explaining how it comes about that the subject is able to discriminate the target from the infinite number of other objects in his environment. Perhaps my point can best be illustrated with the help of an analogy: Imagine that sound waves were no longer attenuated with distance. It would follow that every conversation going on for miles around would be equally audible to you. But by this very fact, every conversation would be equally unintelligible. (p. 138)

In the above quote, Beloff’s use of the term “informational aspects” was not meant in the entropic sense, but rather in the sense of meaning. If we reside in a spacetime with a potentially infinite number of nonlocal signals floating about, how can one focus on the one signal of interest? M&M appropriately noted this as an unsolved question, but this problem has been repeatedly asked for a long time with no clear resolution in sight. One conceivable answer is that the brain can only perceive its own future state, perhaps because of the presence of time-symmetry in the elementary particles that compose the brain. If that were the case, one could argue that all forms of psi must involve the brain acting in some sort of temporal resonance with its own future state. An earlier formulation of M&M’s (2015) theory proposed something like this, but perhaps that idea was dropped because precognition experiments indicate that precognition

can operate at many orders of magnitude longer than the sub-nanosecond time frame where time-symmetry exists in the sub-atomic realm.

In sum, despite the shortcomings in M&M's proposal, it is useful to periodically repeat proposed models of psi in the hopes that someone not familiar with the earlier literature will encounter the challenge afresh and offer a novel solution. For those who do know the relevant literature, it is interesting to see how difficult it has been to move beyond established concepts, which in turn suggests that a conventional physicalist model may simply be inadequate. However, there is one interesting clue that is very briefly mentioned in M&M's paper: Evidence that changes in entropy seem to be correlated with psi performance. That provides a constructive clue because a similar relationship is observed in the ordinary senses, thus supporting the idea that psi is processed like an ordinary sensory system. Such similarities are discussed in theories like J. Carpenter's *First Sight*, indicating that maybe some aspects of brain processing are involved in psi perception. This possibility does not solve the signaling problem, but it's a start.

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HARTMANN RÖMER<sup>8</sup>

## Remarks on Informational Psi

The main message I infer from reading the paper of Sonali Bhatt Marwaha and Edwin May published in this issue is twofold:

1. Psi effects cannot be explained by causal influences in the sense of a physical *causa efficiens*.
2. All psi phenomena can be reduced to precognition which, in turn, is due to a physical entropic mechanism of information flow from the future and localisation in a perceptual apparatus.

While I fully agree to the first statement I have strong reservations with respect to the second one.

- There may in principle be a way to insist on reducing all psi phenomena to precognition, but it seems to be very hard to reconcile this view with observed phenomena (see e. g the comment by M. Nahm, 2019, in this issue).
- A decidedly physicalist-reductionist world-view forces the authors to employ Shannon's notion of quantified information, stripping off from information any aspect of meaning. On the other hand, multiple experience with psi phenomena points to a crucial importance of meaning and emotion.
- Physical mechanisms for the transfer of information from the future are not established and have to be very unusual and speculative if not bizarre.
- Even if such a mechanism were identified, it would be very difficult both to reject causal influences and to keep information flow.
- It is not clear how a receiver's mind would tune in to filter and capture very specific signals from the future and to reconstruct their meaning.

Searches for stable and reliably usable signals in psi research were consistently frustrated. Even the big and extensive *Star Gate* project, in which one of the authors played a leading role did not identify a clear, unambiguous and unanimously accepted psi signal. This accumulated

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<sup>8</sup> Hartmann Römer is a retired full professor of Theoretical Physics. He studied physics and philosophy in Bonn. After his postdoctoral research in Bonn, at the Weizmann Institute in Rehovot/Israel, and at CERN in Geneva/Switzerland, he received a full professorship for Theoretical Physics at the University of Freiburg in 1979. He had longer research stays at CERN, Geneva, Helsinki, São Paulo and Mexico City. His research and publications concern particle theory, quantum field theory, in particular geometrical and topological methods: symplectic geometry, quantization theory, classical limit and short wave asymptotics as well as natural philosophy. He wrote several textbooks on theoretical physics.

negative evidence should leave one prepared seriously to consider the notion of *synchronicity* as envisaged by C. G. Jung and W. Pauli, according to which psi phenomena should not be understood as causal influences or informational signals but rather as meaningful coincidences, i. e. as merely constellational holistic features of some systems. Admittedly, a physical reductionist does not tend to be sympathetic with such a view, but countless examples show that such situations undeniably exist. For instance, the correlations between angles or lengths in a triangle are meaningful but certainly not a result of causal influences or transmission of information. Moreover, they are completely unrelated to time.

The models of Pragmatic Information (MPI) (Kornwachs & Lucadou, 1982; Lucadou, 2015a) and Generalised Quantum Theory (GQT) (Atmanspacher, Römer & Walach, 2002; Filk & Römer, 2011) are attempts to cast the idea of synchronicity into a more concrete and workable form. GQT is not a physical theory but rather some kind of a general non-commutative system theory. MPI can be understood as a special case of GQT. Just like synchronistic correlations, the entanglement correlations of GQT are unrelated to time and neither causal nor informational in their nature (Lucadou, Römer & Walach, 2007). The impossibility to transmit controllable causal actions or informations by entanglement correlations is expressed as an “Axiom NT” in GQT. In spite of its negative formulation it has several positive consequences in accordance with many observations:

- What looks like a causal or informational signal at first sight is in danger to be wiped out in the sequel by “decline” or “evasion” (shift and reappearance at unexpected places).
- A reciprocity of effect size and reliability of psi effects is predicted.
- “Matrix” strategies for efficient psi experiments can be developed on the basis of GQT. (Lucadou, Römer & Walach, 2007; Lucadou, 2015b, in press)

In contrast to this, informational psi ( $I\Psi$ ) does not seem to offer a good explanation for the smallness and elusiveness of psi effects. Moreover, the above-mentioned theoretical difficulties of  $I\Psi$  are absent in synchronistic “no signal” theories. In this sense,  $I\Psi$  is not the unchallenged sweeping theoretical breakthrough and one wonders, why apparently viable synchronistic alternatives are not mentioned by the authors.

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