

PHOTONIC MEASUREMENT OF APPARENT PRESENCE OF SPIRIT USING A COMPUTER AUTOMATED SYSTEM

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Background: Research investigating the potential of detecting the purported presence of spirit (POS) has been hampered by the necessity of employing a human being to collect the data. To infer the presence of alleged spirit, it is essential to remove the simultaneous presence of an experimenter (POE), thereby eliminating his or her physical energy as well as accompanying conscious intentions and expectations.

Objective: The purpose of these two proof of concept experiments was to explore the feasibility of completely automating data collection in the absence of an experimenter to determine if evidence consistent with POS was still obtained.

Design: A computer automated system was developed making it possible to collect all data in the absence of an experimenter (thereby achieving complete experimenter blinding). In the evenings, the computer would perform as follows: (1) start the experimental run at random times, (2) conduct 30-minute baseline as well as POS trials involving two different alleged spirits, and (3) record background light in a completely dark chamber with a highly sensitive low-light Princeton Instruments charge-coupled device (CCD) camera system.

Setting: The CCD camera and light-tight recording chamber were housed in a light-tight room; the computer, large screen monitor, and speakers were housed in a separate control room.

Participants: The participants were two purported spirits involved in previous research published in this journal, in which a silicon photomultiplier system was used.

Intervention: The primary intervention was the computer selecting and presenting visual and auditory information inviting Spirit 1 or Spirit 2 to enter the chamber in the absence of experimenter presence and awareness.

Main Outcome Measurements: The CCD camera provided 512×512 pixel images of 30-minute exposures (reflecting a combination of possible background light plus instrument dark noise). The images were imported into image processing software, and two-dimensional fast fourier transform (FFT) analyses were performed. Visual examinations of the FFT images were performed; average brightness levels of the FFTs were calculated and subjected to repeated measures analyses of variance.

Results: Compared with prebaseline and postbaseline images, the POS trials were associated with reliable increases in the average brightness of the FFT images, suggesting increased structure of the background light as revealed in the FFTs.

Conclusion: These findings indicate that POE per se is not sufficient to explain the observed POS effects. Future experiments can address the remaining potential psi interpretations (decision augmentation theory [DAT] and retro psychokinesis [PK]) as well as the source of the observed information (ie, the chamber, cosmic rays, and/or the CCD chip itself).

Key words: Survival of consciousness, detection of spirit, low-light CCD detector, photomultiplier sensors, photons, experimenter intention, spirit intention, DAT, psychokinesis, computer automation

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INTRODUCTION

The thesis that (1) mind is in at least some respects separate from brain, and that (2) consciousness survives physical death, is receiving increased attention by science, the public, and the media. Various observations point to the possibility of "life after death"; the research includes blinded laboratory experiments with mediums,^{1,2} accounts of near death experi-

ences,³ and cases of possible reincarnation.^{4,5} A common assumption made by investigators in this area is that the organized energy and information that presumably comprises the history and essence of a person continues in some form in the "vacuum" or "zero-point field" of space after physical death (reviewed in *The Sacred Promise*² and by Laszlo in *Explore*⁶). In this paper, the term *spirit* is used to refer to the hypothesized existence of organized energy and information.

Although there are various speculations about the possible nature of this inferred organized energy and information, including photonic, electromagnetic, and/or quantum fields, it can be hypothesized that the purported presence of spirit (POS) could in principle be detected with suitably sensitive and reliable sensors and appropriate analytic techniques.^{2,6} Laszlo, in this journal (and others cited in his paper), refers to this possibility as "instrumental transcommunication."⁶

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The quest to detect POS has been hampered by three primary categories of factors: (1) conceptual, (2) technological, and (3) experimental.

Concerning *conceptual* factors, it is necessary not only to posit the existence of alleged spirits, but it is essential to entertain the possibility that under certain conditions spirits can (and will) reliably collaborate with the experimenters just as human participants are required to do in conventional research.

Technologically, it is necessary to have sufficiently sensitive and reliable sensors, amplifiers, and signal processing systems that can record and display the types and frequencies of energies and information that presumably comprise (and/or can be influenced by) alleged spirits.

However, the most challenging factors may be *experimental*. Historically, virtually all anecdotal observations (eg, ghost hunting), as well as exploratory experimental effects (from purported electronic voice phenomena to the measurement of low-light photons by using a silicon photomultiplier system), have involved one or more observers or experimenters being present at the time the recordings were made.⁷ It is conceivable that some, if not all, of the observations made could be explained in terms of possible presence of experimenter (POE) effects, including the following: (1) awareness of the occurrence of the conditions, and (2) hypotheses and associated intentions and expectations. Until possible POE effects are eliminated experimentally, potential POS interpretations can be questioned.

Presence of an experimenter contains the simplest (and most obvious) set of potential alternative parapsychological explanations that must be addressed—and successfully ruled out—before POS can be considered seriously.

In the discussion following this writer's three exploratory proof-of-concept experiments reported in this journal, investigating the possible application of silicon photomultiplier systems for detecting POS as well as POE, it was proposed that future research could eliminate POE effects—at least in terms of *conscious awareness and intentions*—by having the experiments run entirely by computer in the absence of any experimenters.⁷

This writer proposed that a completely computer-automated system could be constructed that could determine whether purported POS effects could occur in the absence of hypothesized POE effects. Presence of spirit theory (here termed POST) would predict that positive results should be obtained with complete computer automation, and therefore with *complete experimenter blinding*.

However, removing POE per se does not eliminate all possible nonspiritual paranormal interpretations. Two remaining potential explanations include decision augmentation theory (DAT)⁸ and retro PK. Decision augmentation theory predicts the possibility that in the process of designing research protocols or in conducting experiments, investigators may unconsciously make decisions that favor the likelihood of obtaining effects in alignment with the hypothesis under test. Retro PK predicts the possibility that the expectations of the experimenters when they analyze the data in the future will retroactively influence random events in the past that were used to make decisions. These psi possibilities notwithstanding, the process of experimentally removing POE effectively addresses the most plausible (and obvious) alternative hypotheses to POST (other than DAT and retro PK).

The present research is unavoidably controversial and seemingly inconsistent with mainstream materialistic philosophy. Both of the anonymous reviewers of the original submission of this manuscript verbalized the challenging nature of inferring the possible existence of spirit in their opening remarks. Their statements are inserted verbatim (ie, unedited for grammar); the italics were added by this writer. Reviewer one wrote “I applaud the courage and chutzpah of the experimenters in taking up this challenge to a basic paradigm of modern science: *the presumed spirits simply do not exist*.” Reviewer two wrote, “I must introduce this review by acknowledgement that I am *suspicious of extrapolations like those made in this paper*” Appreciating these challenges and concerns, the reader is encouraged to insert the terms *alleged*, *supposed*, or *apparent* whenever the word *spirit* happens to be mentioned in the text in the absence of such qualifiers.

Keeping these questions in mind, the present paper nonetheless provides what may be the first experimental evidence indicating that *alleged* POS effects can be reliably observed in the absence of possible POE factors (ie, conscious, real-time human presence effects).

METHODS

CCD Camera and Operating System

Patterns of low-level light were recorded in a light-tight metal imaging chamber housed in a light-tight imaging room. A Princeton Instruments VersArray XP NTE3 CCD-77-B air cooled detector (camera) with a Princeton Instruments ST133A controller was used to obtain 30-minute exposures (Princeton Instruments, Trenton, NJ). The camera is cooled to -77°C . Figure 1 provides a diagram of the components of the camera and operating system.

Previous research using this camera and controller has documented the exquisite sensitivity and reliability of this technology for imaging low-level “biophoton” light emitted by biological systems (eg, plants and humans) as well as photons emitted by nonliving substances such as certain minerals (including diamonds).⁹ The technology is sensitive enough to detect patterns of light surrounding and interconnecting biological systems (sometimes termed *auras*). The lens of the camera is focused a few millimeters above a stage consisting of nonfluorescing white graph paper with light blue lines. The purpose of the white background is to reflect either photons, biophotons, or associated auric/field light back to the lens, depending upon the conditions of a given experiment.

In the present research, no biological samples were placed on the stage (ie, the camera was peering into a pitch-black environment). Hence, the camera was not registering biophoton activity here; it was detecting whatever photons were either spontaneously present in the chamber or entered the chamber, including occasional cosmic rays (and possibly, hypothesized photons associated with purported POS). The purpose of the white background paper was to reflect any potential photons back to the lens; otherwise the photons would be absorbed by the black walls of the chamber.

The camera control room was adjacent to the imaging room. As depicted in Figure 1, the PC that runs the system used two displays: the smaller 19-inch monitor displayed the camera imaging software (WinView32, version 2.5.21.0, Princeton Instruments), the larger 32-inch monitor displayed the PowerPoint (Microsoft Corporation, Redmond, WA) presentation that provided visual instructions

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