Editor's Afterword

In preparing each issue of this *Journal,* I engage in a process with authors in which we go back and forth with my suggested edits of their original submission; their acceptance, modification, or rejection of those suggestions; and their further edits—until we settle on a final version. While editing Alexis P. Malozemoff and Jack A. Mroczkowski's (2019) rejoinder, I suggested some material that the authors declined to include in their article but encouraged me to include in my Foreword. However, for people relatively less knowledgeable about quantum physics, understanding that material depended on having read this issue of the *Journal.* For that reason, I decided to write this brief Afterword. I want to thank Malozemoff and Mroczkowski for their extensive input on this article to ensure that my references in it to quantum physics are accurate to their knowledge.

Before I get to that material, another follow-up point. In the process of doing background research related to this *Journal* issue, I came across what I considered a relevant online essay. In it, quantum physicist Ruth Kastner (2015) presented an argument that is echoed in the article and rejoinder by our lead authors in this issue. Kastner (2015) explained that some early quantum physicists expressed the idea that quantum measurement requires consciousness. Because of subsequent research, most quantum physicists no longer believe this idea. However, knowing that authors who continue to express this discredited idea "came by it honestly"—from early quantum physicists themselves—makes these authors' error more understandable—if not entirely forgivable in light of the overwhelming subsequent evidence that contradicts the idea. The online essay is a rather quick read—and mostly comprehensible to a lay person like me and most *Journal* readers. It's followed by additional comments and responses, and it's linked to Kastner's recent interview by Jeffrey Mishlove (2019) in the New Thinking Allowed series.

Now back to the original inspiration for this Afterword. It seemed to me that the psi phenomenon most similar to quantum entanglement, and therefore the one for which authors might most readily invoke quantum physics to try to explain, is telepathy. In telepathy, a person (or animal) who is out of physical communication with or knowledge of

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another person nevertheless knows what the other is experiencing; in other words, "mental intentions and information [from one entity appear to] travel across space to other living human minds" (Tart, 2009, p. 99). Sheldrake (2011) demonstrated this phenomenon in his book *Dogs That Know When Their Owners Are Coming Home*—but most of the research he and others have conducted has involved human-to-human experiences. In a hypothetical example, a man in the US is driving home from work one day and suddenly is overcome with excruciating chest pain, along with a sense that this pain is somehow associated with his son who is a soldier deployed in combat in the Middle East. The father goes to the nearest emergency room, but they find nothing wrong with him and send him home. A couple of days later, representatives from the military come to the parents' home to notify them that their son died two days previous in the Middle East—from a massive chest wound that took his life in a matter of minutes. When the parents compare the time of the son's death to the time of the father's experience, it turns out to be exactly the same time.

It can be tempting to think of this situation as "consciousness entanglement" between father and son—whereby their consciousnesses were entangled while they were together and continued to be entangled despite their distant physical separation—and to compare it to quantum entanglement in which, in experiments such as those of Aspect, Grangier, and Roger (1982), particles remained correlated after an interaction, even when they were later separated in space. But in two important ways, this telepathic situation differs from quantum entanglement.

First are the matters of isolation and duration. In entanglement experiments, correlated behavior of, say, two electrons lasted only until the particles interacted with other particles or with the measurement apparatus—which also consists of particles—thus ending coherence and resulting in the particles proceeding to act independently. In the real world, interaction with other particles is ubiquitous. Thus, unless the two entities—father and son—are isolated from interaction with other entities, for instance in deep outer space, their supposed entanglement will last only a very short time following physical separation; as soon as they interact with other entities, decoherence occurs and the correlation is broken, so to speak. Thus, an experience of telepathy in the macrocosm following a lengthy separation cannot easily be attributed to quantum entanglement.

Second is the matter of the nature of the correlation. In entanglement experiments, the correlation consisted of either identical or op-

posite up- or down-spin of the electrons which occurs instantaneously but without transfer of useful information, as predicted by the No Communication Theorem. The father's experience of some aspects of his son's death is not, however, a simple correlation such as up- or down-spin; rather, it seems to require transfer of meaningful information from the son who is dying to the father who experiences some aspects of the son's dying. To summarize, combining both the first and second problems, the fragile correlative entanglement that occurs between two or more subatomic particles under very restricted conditions is quite different from the robust apparent transfer of information between two or more entities at the macroscopic level who have been separated physically for a relatively long time.

The problem of applying the concept of quantum entanglement to other seemingly transpersonal—transcending the usually personal limits of space and/or time—experiences becomes even greater in the case of transcendence of time. Like telepathy, these phenomena reportedly occur in a variety of circumstances such as during wakefulness, sleep, and near-death experiences. They include precognition—knowing in advance that something physically unpredictable is going to happen, past-life memories, and the panoramic memories of every detail of one's entire earthly life. The problem is that so far, there has been no proof of temporal quantum nonlocality; entanglement has never been shown to occur between particles' current behavior and past or future behavior. Thus, quantum nonlocality pertains only to space and, therefore, cannot apply to phenomena that appear to involve seemingly non-physical knowledge of the future or the past.

None of this reasoning is to argue against the existence of transpersonal phenomena. In recent years a variety of authors have published excellent treatises compiling the empirical evidence for such phenomena (e.g., Cardeña, Lynn, & Krippner, 2014; Kelly, Kelly, Crabtree, Gauld, Grosso, & Greyson, 2007). In one of them, Charles Tart (2009) expressed ideas about quantum physics explanations of psi phenomena that seem to be echoed in the lead co-author's original article and rejoinder in this *Journal* issue (Malozemoff & Mroczkowski, 2019; Mroczkowski & Malozemoff, 2019). Tart (2009) said,

> The quantum picture of the universe is indeed very interesting, and some contemporary writers have cited aspects of it as science's somehow justifying psychic and spiritual phenomena. Well maybe, and maybe not.
>
> I'm skeptical of how well most of these writers actually understand quantum physics. I know enough about physics to know that I don't

> really understand quantum physics, so I won't use my poor and possibly distorted understanding to argue for the existence of psi . . . and spiritual phenomena [which are] more than adequately demonstrated by the empirical results of so many experiments already. I understand that this isn't enough for some people. They want to have a good reason, a good theory, to accept something, but as I've said in outlining essential science in earlier chapters, empirical evidence, data, *always* has priority. It's nice to have a theory to make you mentally comfortable with the data, but you can't ignore or reject data simply because you're intellectually uncomfortable. (p. 112)

Tart (2009) also endorsed Dean Radin's work:

> The best treatment of possible relationships between quantum physics and parapsychology that I know of is Dean Radin's (2006) *Entangled Minds: Extrasensory Experience in a Quantum Reality*. The treatment is thoughtful and creative, and comprehensible by nonphysicists. At the very least, Radin makes a convincing case that the Newtonian, classical-physics universe that seems to rule out psi phenomena in principle is really only a special case of a larger physical reality, where psi phenomena might have a place. But a lot of details need to be filled in on that "might." (p. 297)

Tart's (2009) point may serve as a final guide to authors addressing psi/paranormal/transpersonal experiences. Quantum physics concepts are challenging even for accomplished scholars such as Tart who have advanced knowledge of physics, and the prevailing views on quantum physics yield quantum processes that do not readily compare with transpersonal experiences. For these reasons, and with due respect to Radin and others, authors might do well to avoid terms that conflate quantum physics with consciousness phenomena. Rather than use terms such as "entangled minds" and "quantum consciousness," they might do well to use a term such as TKI—transpersonal knowledge and influence—that is, knowledge and/or influence that transcends the usual, Newtonian, materialist—and even quantum physics—limits of space and/or time. The empirical evidence for transpersonal phenomena indicates that, to loosely quote William Shakespeare (*Hamlet,* Act I, Scene V, lines 166–167), there are more things in heaven and earth than are dreamt of in Newton's—and even quantum physicists'—philosophies.

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