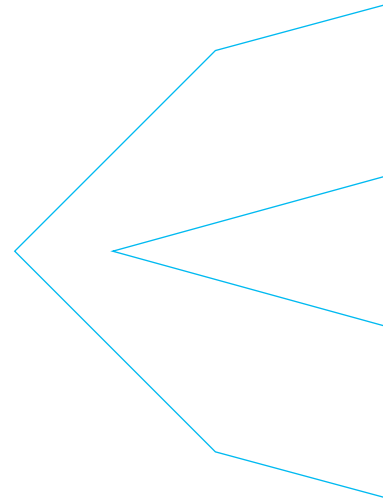


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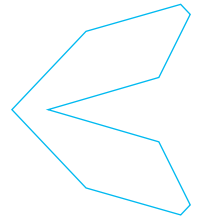
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EDITORIAL

An Introduction and Mission of Building Bridges to Reach the Unknown



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KEYWORDS

Adversarial collaboration, citizen science, cross-disciplinary, participatory team science, public education

The founding of the *Journal of Scientific Exploration* (JSE) in 1987 coincided with my graduation from high school and start of higher education. Even then I was deeply interested in all types of anomalies thanks to my parents' gift about ten years earlier of Jane Werner Watson and Sol Chaneles' (1976) *The Golden Book of the Mysterious* (Golden Press). That book was a childhood obsession that steadily evolved to serious academic curiosity, which then quickly transformed into ardent participation in scholarly research and writing. My curiosity and passion certainly endure, but these have become increasingly balanced with skepticism that erupted from several negative experiences over the years with ideological-motivated academics. Of course, bias cuts both ways (Drinkwater et al., 2019; Irwin et al., 2016, 2017; Kennedy, 2005; Truzzi, 1987), so my own work has disappointed—and sometimes even irked—both debunkers and fervent believers in otherworldly phenomena. My appointment as the new Editor-in-Chief (EIC) might thus surprise individuals who do not view me as a sympathetic champion for the advancement of 'edge science,' or what amounts to empirical observations that challenge scientific principles or concepts as presently understood.

This Editorial avoids reciting my professional background and interests, which anyone can easily read at the Parapsychological Association website (<https://parapsych.org/users/jhouran/profile.aspx>) or via my ORCID record. Rather, the goal here is to introduce readers to the underlying philosophy that will be the backbone of my JSE tenure. Indeed, readers deserve to know what the EIC stands for. I have also not been immersed in the Society for Scientific Exploration's (SSE) activities and culture in recent years, so some members might understandably deem me an outsider. However, my academic career has consistently centered on edge science and advancing its cause. The diligent efforts of past Editors, Associate Editors, Editorial Board, and the unsung hero known as Kathleen Erickson (Managing Editor) have achieved notable strides in the JSE's quality and impact over the years (including becoming 100% platinum open access in 2018). But my primary aim is now to take the journal to the next level by bolstering its familiarity, reach, and influence within academia and the mainstream consciousness alike. This pursuit involves diversifying the provocative research in its pages and making that content more accessible and useful to non-specialists in other fields, as well as to journalistic outlets and the mass media. The latter forums can and should play a valuable role in public science education (Höttecke & Allchin, 2020; Huber et al., 2019; Olson & Kutner, 2008), although they can easily miss the mark as illustrated by my own frustrating experiences with misrepresented research. To these ends, my commitment as EIC will be to promote the publication of articles with the features discussed below.

Collaborative Approaches

In a time of growing cynicism about scientific organizations and academic institutions (more on this below), it is imperative that we reach out to new researchers to broaden the interest and participation in edge science. This is also an opportunity to serve as an



example of how science ought to be more fairly conducted, interpreted, and shared. Thus, studies leveraging different fields or methodologies can facilitate this goal and help to ensure that our work properly ‘connects’ to the concepts and empirical findings of other disciplines.

In this spirit, we strongly encourage submissions that build bridges by being collaborative in nature (Aboelala et al., 2007). This can happen in different ways. “Multidisciplinarity draws on knowledge from different disciplines but stays within their boundaries. Interdisciplinarity analyzes, synthesizes, and harmonizes links between disciplines into a coordinated and coherent whole. Transdisciplinarity integrates the natural, social, and health sciences in a humanities context, and transcends their traditional boundaries” (Choi & Pak, 2006, p. 351). Transdisciplinary approaches also include non-academic stakeholders in the process of knowledge production (Rigolot, 2020). It has been argued that research is increasingly being conducted in teams like these and that transdisciplinary teams are best able to address *complex* challenges (Tebes et al., 2014). Of course, edge science is inherently defined by dilemmas of ambiguity, nuance, and complexity.

In terms of corresponding changes to the *JSE*, we will actively solicit and support research that involves public engagement in science via approaches such as ‘citizen science’ (Bonney et al., 2014) and “participatory team science” (Tebes & Tai, 2018). For instance, some authors contend that hundreds of thousands of enthusiastic laypeople around the world can conceivably be trained to act as citizen scientists in certain field studies in parapsychology (Hill et al., 2019; Laythe et al., 2021, 2022). This could eventually lead to well-coordinated citizen science projects that parallel those routinely embraced across different disciplines including ornithology (see: <https://www.birds.cornell.edu/citizenscience>) and astronomy (see: <https://science.nasa.gov/citizenscience>). The same vision easily applies to other areas of edge science, such as ufology (e.g., certified MUFON field investigators) and cryptozoology (e.g., The Bigfoot Field Researchers Organization). But these niche topics are a minority among the vast array of controversies, paradoxes, and anomalies that remain elusive within mainstream biology, cosmology, geology, history, meteorology, physics, medicine, and the social sciences. More participatory team science is clearly needed everywhere (Hall et al., 2018). Plus, we envision mandatory data sharing obligations to avoid thorny issues related to the validation or further analysis of published outcomes (see, e.g., Nelson, 2016). All this aims to increase cooperation, balance, transparency, and validity concerning the research published in the *JSE* (for a discussion, see Ioannidis, 2005).

Cumulative Model-Building and Theory-Formation

Dare it be said that, over time, we ‘anomalists’ might have bought into our ‘fringe’ positions more than has been helpful or needed. Of course, a consequence of continual social, cultural, and scientific isolation is that we start to see the boundaries of our science as purely residing within journals that specifically cater to our interests or approaches. And all of us become citation heavy with respect to these journals, including perhaps the *JSE*. The edge science community has isolated itself, in part, due to insufficiently tapping into broader areas of mainstream science which very importantly informs and contextualizes our empirical work. Some scientific models have supremely powerful predictive capabilities and so salient deviations from such frameworks should be done with extreme care and caution. Relatedly, and certainly within premier journals, a failure to conduct a thorough, accurate, and up-to-date literature review identifying an important problem and placing the study in suitable context is consistently identified as one of the top reasons for article rejection in some journals (Maggio et al., 2016).

Thus, one of my goals is to encourage and facilitate comprehensive and inclusive empirical discourse on topics versus publishing merely standalone or ‘silo’ papers that lack a broader and relevant context or framework. Shon (2014) described the issue as academics always trying to reinvent the wheel, instead of understanding that scientific model-building and theory-formation is more like ‘wheel modification.’ Vipond (1996) more candidly cautioned researchers not to “expect to develop your own knowledge claim without first examining and understanding those of other scholars. Claims are seldom completely original; instead, they are connected to, and grow out of, the claims of others” (p. 39). Accordingly, articles in the *JSE* will be pushed to more explicitly build on or extend current research and theory (e.g., Lange, 2017) or to show how specific anomalies refine or refute existing assumptions in academia (e.g., Walach & Schmidt, 2005). This campaign will also include a series of peer-reviewed invited papers and commentaries to stoke constructive debate, inspire innovative thinking, and drive new investigations.

Readability and Utility of Conceptual Arguments and Empirical Findings

Not only do we hope to further connect the *JSE* with other fields of science but also we openly welcome the wealth of ‘citizen scientists’ and lay readers who are interested in our various pursuits. To the former, we are instituting for research papers a closing subsection called

'Implications and Applications' that will succinctly summarize or explain how the study's methods or findings potentially inform other fields of study. To the latter, however, a campaign of readability and utility also involves articulating and communicating concepts to non-technical audiences. This includes the mass media and general public, whose constant interest and support certainly helps to sustain edge science (McClenon, 1984/2016). Part of the first steps in this endeavor is to address both the accessibility of research findings and their implications that can translate to the general public and mass media. On this point, there is a push in certain academic circles for the use of 'lay summaries (or abstracts)' to complement or replace technical summaries (Kuehne & Olden, 2015). Recognizing that it can sometimes be difficult for scientists to communicate effectively with generalist audiences and the press, it remains a necessary step of *JSE's* outreach. The literature already contains cogent guidance on this issue (Salita, 2015), and our editorial team will certainly be available for resources and assistance as we transition.

These focus areas are incorporated in our updated *JSE* Author Guidelines <https://journalofscientificexploration.org/index.php/jse/about/submissions>, which are complemented by other important changes. Readers will hopefully appreciate the *JSE's* new and larger format. Reflecting on it now, *The Golden Book of the Mysterious* engaged me so effectively, in part, because it brought information to life via highly readable content that was reinforced by memorable illustrations. This is unsurprising given that research suggests 'high-strangeness' (e.g., ghosts) has a particularly strong and enduring 'brand personality' precisely because diverse audiences can interact or participate in these topics as narrative constructions (Hill et al., 2018, 2019; Houran et al., 2020). But I digress. Tremendous appreciation goes to the team of Kathleen Erickson, Garret Moddel, Mark Urban-Lurain, and Annalisa Ventola for spearheading this redesign. Also note that three of my Ph.D. colleagues have agreed to join our mission and complement the excellent assembly of current Associate Editors: Rense Lange (the most brilliant statistician and predictive analytics professional known to me), Brian Laythe (an experienced field researcher with a passion for innovative methodologies, public education, and citizen science), and Álex Escolà-Gascón (applied mathematician and strong generalist in the social sciences). No doubt we will continue to extend and round-out the Editorial Team in due course.

As part of my introduction as EIC, this issue includes an essay that Laythe and I originally submitted to the Biegelow Institute for Consciousness Studies (BICS) contest on the best evidence for postmortem survival (see, e.g., Blumenthal, 2021). Our thesis did not place in the competition, but we heartily congratulate those colleagues whose

arguments did. Still, the main value of that exercise for me was the opportunity to think and argue counterpoint to my normally skeptical leanings.¹ Maybe it was recreational to *play chess against oneself* (e.g., Shand, 2014) or perhaps therapeutic to engage in a type of *self-talk*, i.e., our inner voice that combines conscious thoughts and unconscious beliefs and biases to help interpret and process questions, ideas, or experiences (e.g., Fernyhough, 2016). Ultimately, though, it was educational being a '*devil's advocate*' to my own ideas and assumptions (e.g., Charlan, Brown, & Rogers, 2001). Regardless, we purposely designed our essay as an adversarial collaboration that empirically weighed the purported empirical evidence *for* and *against* the survival hypothesis to arrive at a net probability. It thus illustrates and reinforces several of the approaches sought for new *JSE* submissions as outlined earlier. Hopefully, this essay also tangibly demonstrates to the readership that their new EIC is suitably open-minded, curious, and data-driven.

There have been several journals devoted to topics in edge science, albeit some sadly are now defunct. Occasionally, more mainstream periodicals also solicit conceptual and empirical articles that 'foster the diversity and debate upon which the scientific process thrives; ideas with a great deal of observational support and hypotheses where experimental support is yet fragmentary'—a sentiment lucidly explored in David Horrobin's (1975) rousing editorial that introduced the broad-minded journal *Medical Hypotheses*. His position statement is as relevant today as when it was first published, maybe even more so. Yes, it is an admirable that some journals deliberately seek to disseminate and debate controversial ideas, but it is also disheartening that this stance should itself be controversial, as research should serve solely to push the boundaries of knowledge. The problem is not just that the general public perceives ideological bias in research and reporting (MacCoun & Paletz, 2009) but that implicit agendas, in fact, do exist (e.g., Eitana et al., 2018; Honeycutt & Jussim, 2020; Silander et al., 2020).

To me, this situation is greatly worsened by two forces tainting mainstream consciousness and conversation: (a) the failure of many scientific authorities in political positions, academic institutions, or the public spotlight to rigorously defend academic freedom and necessary open debate on empirical matters (e.g., climate change science or pandemic issues), and (b) the rise and normalization of big tech's frequently dubious 'fact checking' and censorship that sabotages data-driven dissent on certain issues with ease and impunity but lacking academic or moral authority. The public is therefore justified to view the 'scientific community' and 'news media' with incredulity and downright scorn. The sociopolitical mantra of 'follow the science' simply rings hollow. Indeed, many commentators on current

events and academic authorities who thoughtfully question popular narratives have been ridiculed by the press as ‘conspiracy theorists’—a loaded and misguided term (Wood, 2016). But such maverick voices have arguably been more correct about pertinent issues in recent years than many journalists, politicians, and even some high-profile academics who are empowered to shape public policy and educational norms. Therefore, I relish the thought of our journal playing devil’s advocate to many biased or unproven assumptions that proliferate in mainstream academia and public discourse; that is, for this forum to serve as a dependable, accessible, and best-in-class outlet of grounded insights and observations that challenge *what* we think we know . . . and *how* and *why* we think we know it.

Accordingly, the *JSE* is uniquely positioned among various journals to present a wide swath of studies that can inform and integrate normally disparate disciplines, constructively confront current scientific thought, and help to shape and sharpen future research across all areas of science. It is humbling and daunting to follow in the footsteps of distinguished thinkers and writers who previously served as EIC, but my firm conviction is that the editorial team will realize many more important advancements with the dedicated support and active participation of our readership. Hopefully this encompassing philosophy and mission resonate with formal SSE members, as well as with those informal but interested students and scholars who collectively share our passion for discovery. However, ‘interest’ alone is not enough; progress and impact will come only from ‘energy and momentum.’ Mission statements are nice but most useful, in my opinion, when they are a clear call to action. And with that, let me close. Now is the time for us to purposefully work together to build the necessary bridges that lead to unknown territories, untapped knowledge, and a deeper understanding of reality—whatever that turns out to be.

NOTE

¹ Maybe we will also prepare a rebuttal to our proffered arguments at some point, akin to the next move in the chess match against myself (see e.g., Colombo & Sprenger, 2014).

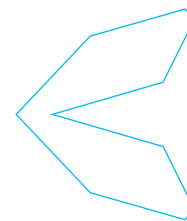
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RESEARCH
ARTICLE

Toward a New Theory of Earth Crustal Displacement

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HIGHLIGHTS

Short-term reversals of the Earth's geomagnetic field may 'unlock' the crust to allow tidal forces to move it in the same way they do the oceans. Sea-level changes might thus result from the buildup and melting of polar ice over Ice Ages by the Earth's cyclical orbital movements combined with pole shifts.

ABSTRACT

In previous studies of more than two hundred archaeological sites, it was discovered that the alignments of almost half of the sites could not be explained, and about 80% of the unexplained sites appear to reference four locations within 30° of the North Pole. Based on their correlation with Hapgood's estimated positions of the North Pole over the past 100,000 years, we proposed that, by association, sites aligned to these locations could be tens to hundreds of thousands of years old. That such an extraordinary claim rests on Hapgood's unproven theory of earth crustal displacement/pole shifts is problematic, even given the extraordinary number of aligned sites (more than several hundred) that have been discovered thus far. Using a numerical model we test his hypothesis that mass imbalances in the crust due to a buildup of polar ice are sufficient to displace the crust to the extent required in his theory. We discover in the process that the crust is not currently in equilibrium with the whole earth in terms of its moments of inertia. Based on a review of the literature that reveals a possible connection between the timing of short-term reversals of the geomagnetic field (geomagnetic excursions), super-volcanic eruptions, and glacial events, we hypothesize that crustal displacements might be triggered by geomagnetic excursions that "unlock" the crust from the mantle to the extent that available forces, specifically earth-moon-sun tidal forces, the same forces that move earth's oceans, can displace the crust over the mantle. It is demonstrated how such a model, when combined with existing climate change theory, may be able to explain periodic changes in sea level associated with the buildup and melting of polar ice over past glacial cycles by a combination of Milanković cycles and Hapgood pole shifts.

KEYWORDS

Earth crust displacement, cataclysmic pole shift hypothesis, true polar wander, Milanković cycles, climate change, insolation, geomagnetic excursions, super-volcanic eruptions, moments of inertia, theoretical rotational axis, tidal forces.

INTRODUCTION

In 1958, Charles Hapgood proposed that ice ages are caused by climate changes resulting from displacements of the earth's crust over the mantle that shift the location of the geographic poles (Hapgood, 1958). In previous studies of more than two hundred archaeological sites, it was discovered that the alignments of almost half of the sites could not be explained (Carlotto, 2020a) and that about 80% of the unexplained sites appear to reference four locations within 30° of the North Pole. Based on their correlation with Hapgood's estimated positions of the North Pole over the past 100,000 years, we proposed that, by association, sites aligned to these locations could be tens to hundreds of thousands of years old (Carlotto, 2020b).

That such an extraordinary claim rests on Hapgood's unproven theory of earth crustal displacement is problematic, even given the extraordinary number of aligned sites (more than several hundred) that have been discovered thus far. In this paper, we revisit Hapgood's theory in the context of recent developments in climate science and show that his theory may be the missing link in understanding not only the rise and fall of past civilizations, as we first set out to do, but long-term (ice age) climate changes as well. For discussion, we divide Hapgood's theory into two parts: physical mechanism(s) that could cause crustal displacements, and effects of pole shifts on climate.

The organization of this paper is as follows: In the first section, TRUE POLAR WANDER, we begin by reviewing the theory of plate tectonics and its relation to true polar wander (TPW) to understand how it differs from the first part of Hapgood's theory. The section MILANKOVIĆ CYCLES describes the extent to which known climate cycles can predict changes in sea level, which is inversely related to the amount of ice at the poles. In POLE SHIFTS AND SEA LEVEL CHANGES it is argued that by combining Hapgood pole shifts with Milanković cycles over the past 100,000 years, we can better account for periodic sea-level changes and the associated buildup and melting of polar ice over the previous glacial cycle. The next section, GEOMAGNETIC CHANGES, reviews evidence suggesting a connection between changes in the earth's magnetic field, climate, and TPW events. In CORRELATED EVENTS, dates of geomagnetic excursions (short-term reversals of the geomagnetic field), super-volcanic (TEI 7–8) eruptions, and sea-level changes over the past 100 Ky are compared with the timing of hypothesized pole shifts. A POSSIBLE MECHANISM FOR CRUSTAL DISPLACEMENTS, which addresses the first part of Hapgood's theory, postulates a physical model of how geomagnetic excursions might trigger crustal displacement events and how earth–moon–sun tidal forces could provide the energy needed to displace

the crust significant distances over the mantle in a relatively short period of time. New climate data related to the second part of Hapgood's theory is reviewed in CLIMATE EVIDENCE and supports our proposed past pole locations (Carlotto, 2020b) and revised chronology (Gaffney, 2020). The last section discusses reasons why Hapgood's theory has been dismissed by the mainstream scientific community and summarizes how our revised theory, by addressing these concerns, may extend current thinking in climate and geosciences.

TRUE POLAR WANDER

Early in the 20th century, Alfred Wegener and others theorized the continents were once a single large landmass that broke up and slowly drifted apart. Wegener's theory of continental drift explained the complementary shape of coastlines and the similarity in rock formations and fossils along matching coastlines. His theory, now known as plate tectonics, divides the crust into plates that move independently of one another over the mantle. True polar wander (TPW) is the net movement of the crust as a whole relative to the spin axis. The idea that TPW occurs as a result of plate motion was motivated by the early work of Milutin Milanković (1932) who concluded in his analysis of Wegener's theory that "the displacement of the pole takes place in such a way that . . . Earth's axis maintains its orientation in space, but the Earth's crust is displaced on its substratum."

Thus, TPW, like plate tectonics, thought to be driven by convection cells in the mantle (Holmes, 1944), is a slow geological process that occurs over time scales of millions to tens of millions of years (Evans, 2003). Inferring from the estimated movement of earth's magnetic poles (known as apparent polar wander), Kirschvink et al. (1997) hypothesized that a TPW event occurred between 534 million and 505 million years ago that rotated Australia a quarter of the way around the globe. The event occurred around the time of the Cambrian Explosion when most groups of animals first appear in the fossil record and is thought to have been a factor in evolutionary changes that later took place. More recently, Daradich et al. (2017) estimate a steady shift of earth's poles by ~8° over the last 40 million years toward Greenland, which has brought North America to increasingly higher latitudes and caused the climate to gradually cool over this period.

This idea that changing the latitude of a geographic region changes its climate was the motivation behind Hapgood's theory. Where TPW may explain climate changes over long periods, Hapgood attempted to solve the problem of the ice ages, which he did not believe were caused by global temperature fluctuations. Similar to the way TPW

is thought to have shifted North America toward Greenland, Hapgood proposed that glacial cycles and ice ages were the results of a much more recent series of crustal displacements driven by physical processes operating over timescales of tens of thousands of years that shifted different geographic regions toward and away from the North Pole.

MILANKOVIĆ CYCLES

In the 1920s, Milutin Milanković proposed that changes in earth’s eccentricity, axial tilt (obliquity), and precession result in cyclical variations in the amount of incident solar radiation (insolation) reaching the earth. Insolation is generally assumed to be a major driver of climate change over long periods. From 1–3 million years ago, climate patterns were correlated with the earth’s 41 Ky-long obliquity cycle. Then, about a million years ago, patterns began to follow a 100 Ky cycle that is between the 95 Ky and 125 Ky cycles in earth’s orbital eccentricity. Why the period of climate patterns changed, the origin of the 100 Ky cycle, and why insolation lags rather than leads climate changes are among some of the problems that cannot be explained by Milanković cycles (https://en.wikipedia.org/wiki/Milankovitch_cycles).

Perhaps the greatest shortfall of Milanković’s theory is the inability of insolation in itself to accurately account for the periodic buildup and melting of polar ice over glacial cycles. Figure 1 plots the average daily mean top of the atmosphere (TOA) insolation at 65°N over the past 250 Ky. Using sea level as a climate proxy, which is inversely related to the amount of polar ice, Figure 2 plots global sea level over the same period. The two time series are weakly correlated ($R = 0.14$). There is a somewhat higher ($R = 0.33$) correlation between insolation and temperature, and an even greater correlation ($R = 0.63$) between insolation and changes in sea level as a function of time. The reason for the increased correlation is that as insolation increases, temperatures increase, polar ice melts, and sea levels rise. Conversely, as insolation decreases, temperatures decrease, precipitation freezes and accumulates at the poles, and sea levels fall. Exploiting this correlation, we can estimate mean sea level change $\Delta s(t)$ as a linear function of insolation $Q(t)$ from the time-series data

$$\Delta s(t) = Q(t) \times 0.12 - 58.85$$

that when summed provide an estimate of sea level as a function of insolation over time

$$s(t) = s(0) + \sum_{t'=0}^t \Delta s(t')$$

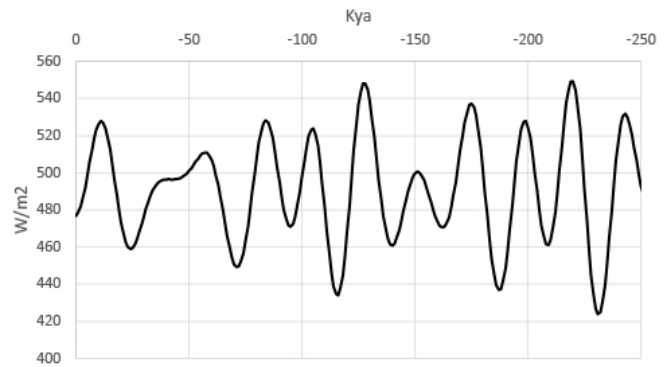


Figure 1. Average daily mean TOA insolation at 65°N over the past 250,000 years. <http://vo.imcce.fr/insola/earth/online/earth/earth.html>



Figure 2. Global sea level obtained by averaging first principal components from short and long records over the past 250,000 years. https://www1.ncdc.noaa.gov/pub/data/paleo/contributions_by_author/spratt2016/spratt2016.txt

The result plotted in Figure 3 shows that over the last two glacial cycles, insolation tends to underpredict sea level (overpredict polar ice) at the beginning of a cycle and overpredict sea level (underpredict polar ice) at the end. In other words, a greater amount of ice melts at the beginning and accumulates at the end of a glacial cycle than what is predicted by insolation.

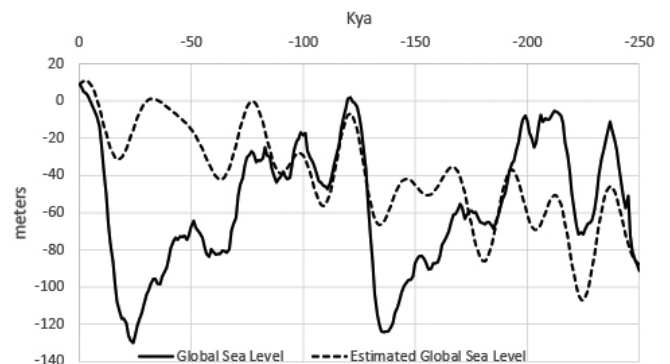


Figure 3. Global sea level estimated from insolation over the past 250,000 years.

POLE SHIFTS AND SEA-LEVEL CHANGES

Insolation varies with the cosine of the solar zenith angle and so increases as we move toward the equator. Allowing the geographic location of the earth’s poles to shift relative to the rotational axis as Hapgood proposed provides an additional degree of freedom that can potentially account for the difference between the two sea-level curves in Figure 3. Before the start of a glacial cycle, a large

amount of water is stored in an ice sheet around the pole. If the crust displaces enough to move the ice sheet out of the polar zone, the increased amount of solar radiation at lower latitudes will cause the ice to melt, raising sea levels. After a period, an ice sheet begins to form at the new pole, causing sea levels once again to fall.

Figure 4 shows the displacement of the crust south for five hypothesized pole shifts (Carlotto, 2020b). Sea levels decrease in stages during a glacial cycle suggesting

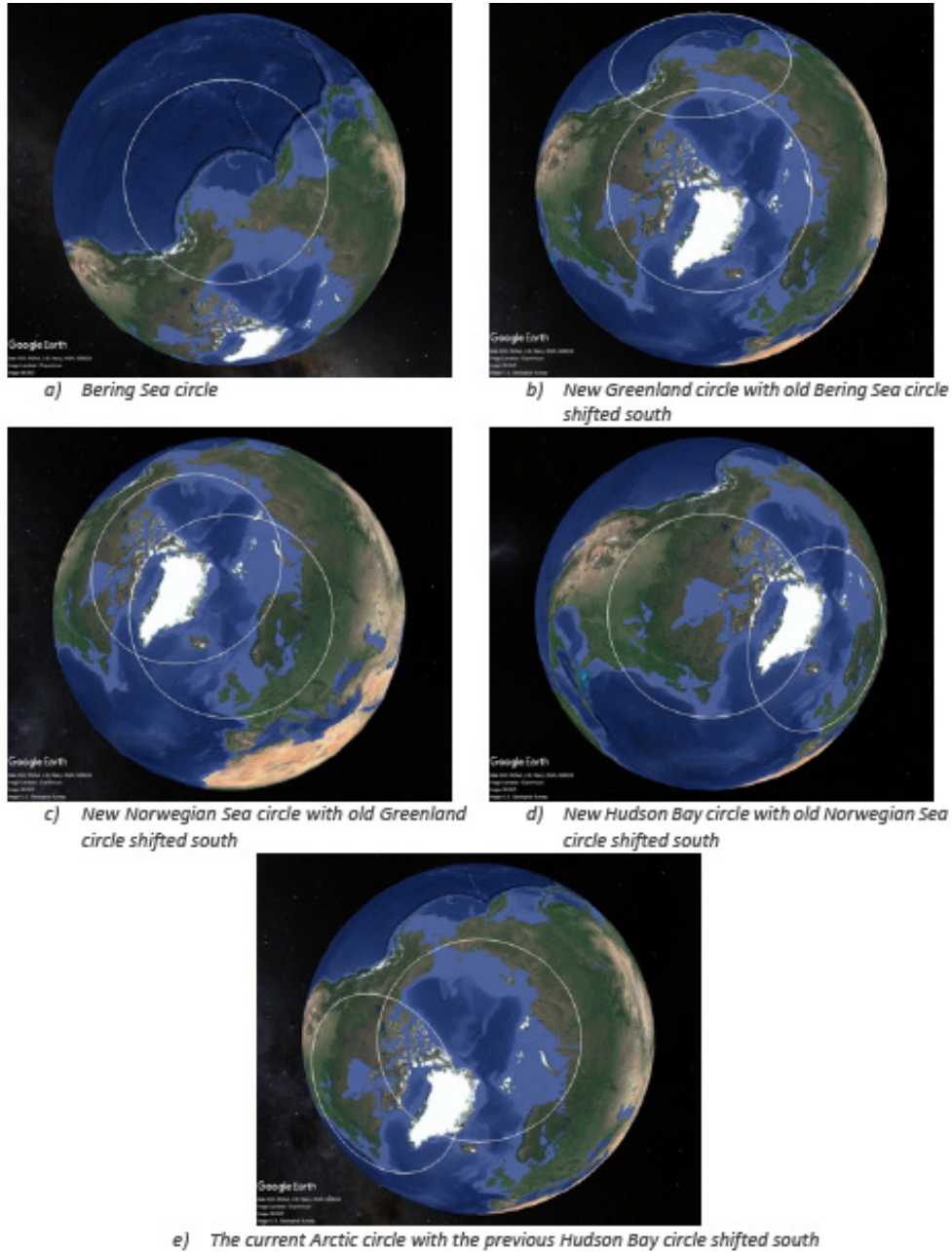


Figure 4. Crustal displacements cause former polar regions to shift south toward the equator. (Google Earth)

a continued buildup of ice near the poles. Notice the land area around the pole is different at different pole locations. Since ice forms and accumulates more readily on land than over the ocean, if the land area at the new pole is greater than the land area at the old pole, sea levels after a pole shift should eventually fall to a lower level as there is a greater land area for ice to accumulate. Based on measurements of land area in the Arctic circle and former polar regions, there is a strong correlation between the size of the ice sheet (assumed to be determined by land area) and sea level for the current and four prior pole locations (Figure 5). Successive increases in available land area following the Bering Sea to Greenland pole shift have led to successive decreases in sea level. This suggests that the magnitude of crustal displacements during a glacial cycle, i.e., before the last glacial maximum (LGM) and penultimate glacial maximum (PGM) were small enough to keep the accumulating mass of ice in the polar zone. The precipitous rise in sea level after the LGM and PGM suggests that larger magnitude crustal displacements shifted the ice sheet farther south to melt a significant fraction of the accumulated ice.

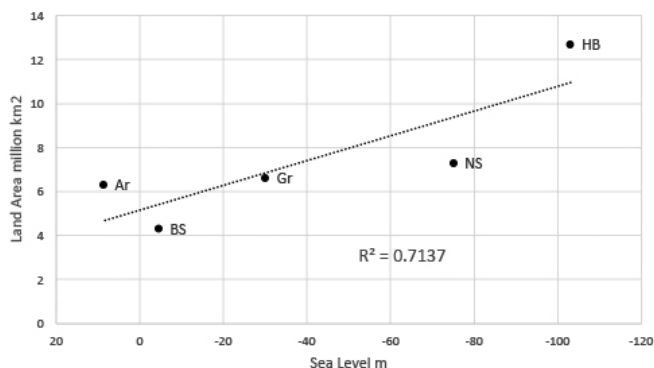


Figure 5. Relation between sea levels and land areas at former poles.

It is interesting to note that the current distribution of ice in the Arctic is not centered on the pole but tends to be shifted toward Greenland, the largest landmass in the region. This asymmetry existed even at the time of the LGM relative to the current Arctic Sea pole (Figure 6a,b). If ice buildup continued during the Greenland, Norwegian Sea, and Hudson Bay poles, the spatial distribution of net ice can be approximated by the union of three circles—areas like today's Arctic Circle that were within approximately 23.5° of the poles at the time (Figure 6c). Notice the union of the three former northern polar climate zones (areas above 50°N relative to the former poles) contains all of the ice in the northern hemisphere during the LGM (Figure 6d).

GEOMAGNETIC CHANGES

A growing body of evidence suggests changes in the earth's magnetic field may influence climate. Over the last 83 million years, 183 geomagnetic reversals have taken place in which the poles changed polarity. Geomagnetic reversals occur, on average, 450 Ky years apart. Courtillot and Olson (2007) show that long periods (millions of years) in which the magnetic poles do not flip preceded the four largest extinctions on earth: the Cretaceous-Tertiary (KT), Triassic-Jurassic (TJ), and the Permo-Triassic (PT) and Guadalupian-Tatarian (GT) doublet. Mitchell et al. (2021) report a late Cretaceous true polar wander oscillation around 84 Mya (million years ago) where the earth's geographic poles shifted about 12° and returned to their original position over about 6 million years. Muttoni and Kent (2019) report an even greater shift during the Jurassic period.

Between geomagnetic reversals, events known as geomagnetic excursions take place where the field temporarily reverses for a shorter period (thousands of years or less). Channell and Vigliotti (2019) argue changes in magnetic field strength during geomagnetic excursions lead to variations in ultraviolet radiation, which have influenced mammalian evolution. Rampino (1979) proposes that there is a connection between geomagnetic excursions and Milanković cycles, showing that four recent geomagnetic excursions closely follow times of maximum eccentricity of earth's orbit and precede periods of sudden cooling and glacial advance.

If long-duration TPW events follow geomagnetic reversals, could short duration Hapgood pole shifts follow geomagnetic excursions?

CORRELATED EVENTS

Table 1 gives an approximate chronology of recent geomagnetic excursions, super-volcanic eruptions, and glacial events. The Blake geomagnetic excursion occurred 15–20 Ky after the PGM. The Volcanic Explosivity Index (VEI) is a relative measure of the explosiveness of volcanic eruptions (https://en.wikipedia.org/wiki/Volcanic_Explosivity_Index). The next two geomagnetic excursions were each followed by massive VEI 8 magnitude volcanic eruptions. The most recent Toba eruption 73–75 Kya followed the Norwegian-Greenland Sea excursion. The Oruanui eruption of New Zealand's Taupo volcano followed the Lake Mungo excursion 28–30 Kya. The somewhat smaller VEI 7 Phlegraean Fields eruption followed the Laschamp event 40–42 Kya.

Although the trigger mechanism for geomagnetic reversals is not clear, crustal shifts could provide an explanation for earthquake activity, volcanic eruptions, and other

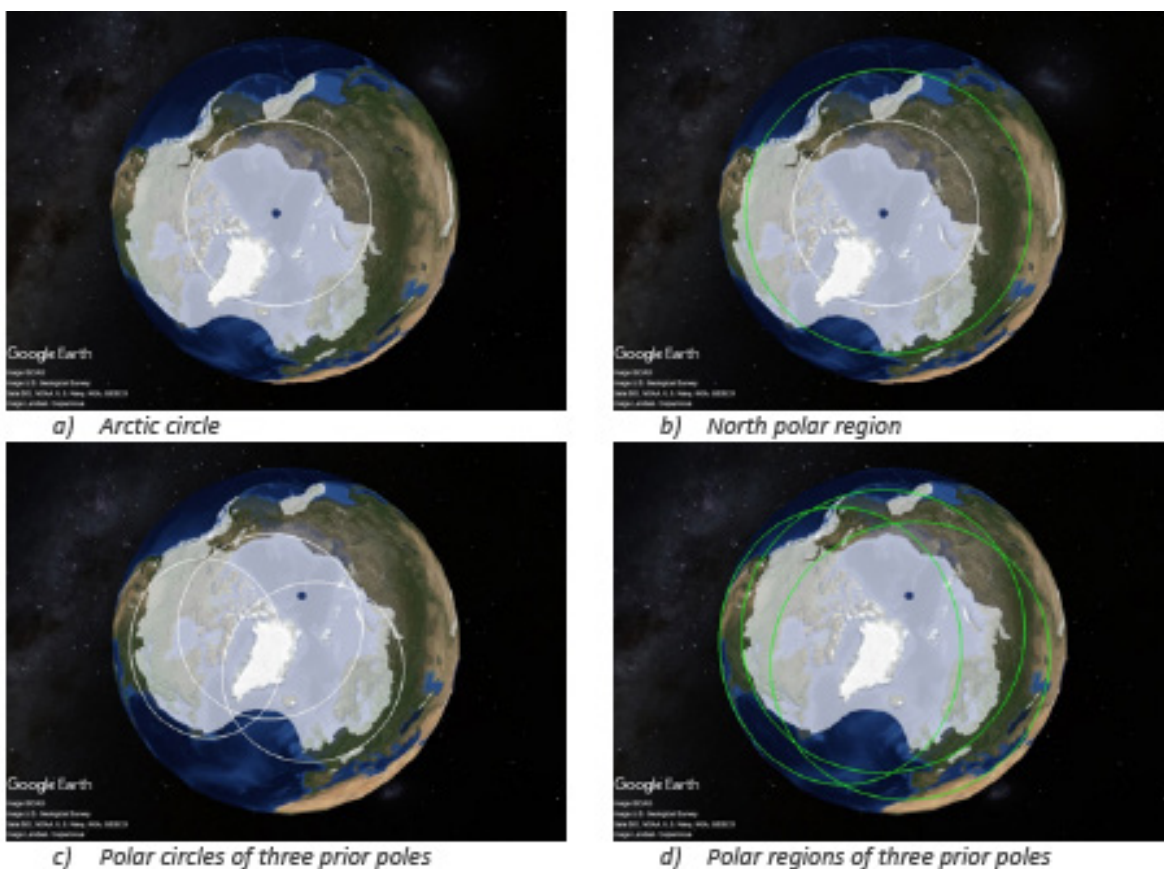


Figure 6. North polar circles and regions superimposed on estimated ice sheet circle 18 Kya. (Ice sheet visualization, Zurich University of Applied Sciences. http://waikiki.zhaw.ch/radar.zhaw.ch/bluemarble3000_en.html)

TABLE 1. Correlation of Geomagnetic, Super-Volcanic, and Glacial Events with Proposed Pole Shifts

Kya	Geomagnetic Excursion	Super-Volcanic Event	Glacial Event	Pole Shift
12.3	Gothenburg (Rampino, 1979)			
22			LGM	Hudson Bay to Arctic?
26.5		Taupo (VEI 8)		
28–30	Lake Mungo (Barbetti & McElhinny, 1976)			Hudson Bay to Arctic?
32–34	Mono Lake (Hambach et al., 2008)			
40		Phlegraean Fields (VEI 7)		
40–42	Laschamp (Hambach et al., 2008)			Norwegian Sea to Hudson Bay
73–75		Toba (VEI 8)		
70–80	Norwegian-Greenland Sea (Langereis et al., 1997)			Greenland to Norwegian Sea
115–120	Blake (Hambach et al., 2008)			Bering Sea to Greenland
135			PGM	? To Bering Sea

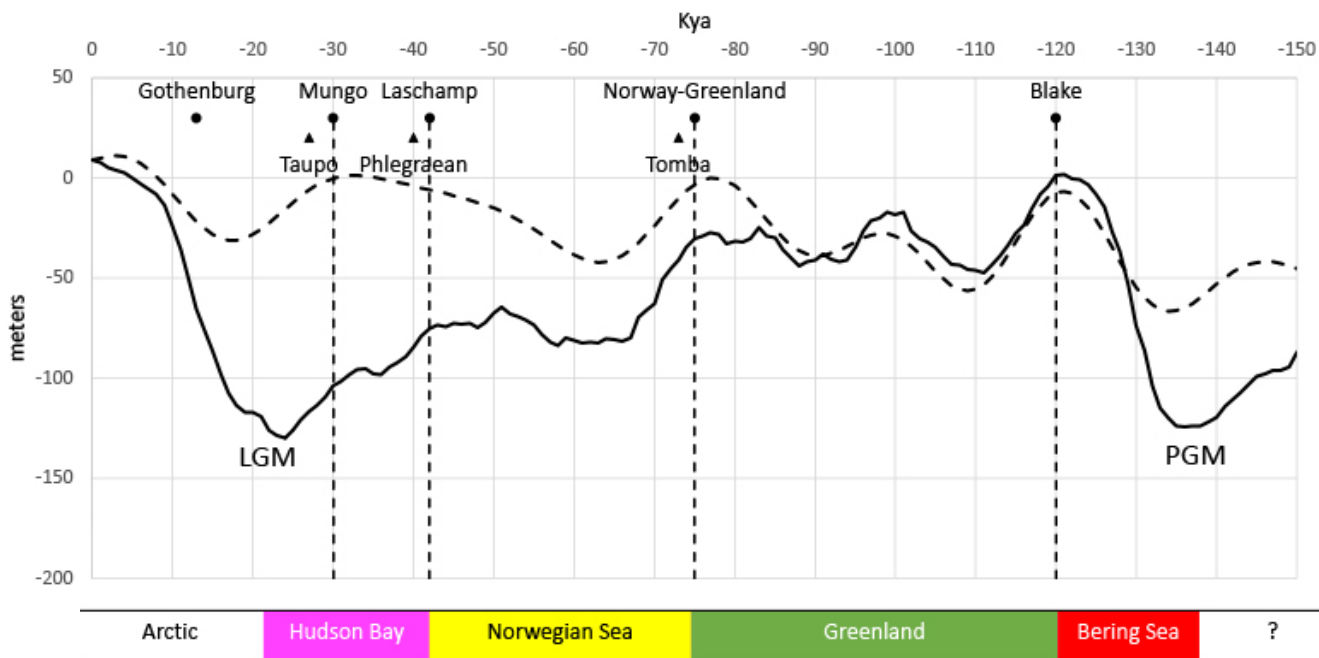


Figure 7. Hypothesized pole shift sequence based on times of geomagnetic excursions, super-volcanic eruptions, and glacial events. The top curve (dotted line) is the prediction from Figure 3. The bottom curve (solid line) is the difference between global sea levels (Figure 2) and their predicted value from insolation (Figure 1).

events that follow geomagnetic excursions. Figure 7 proposes a sequence of six pole shifts based on these events. Four previous pole locations estimated from archaeological site alignments (Carlotto, 2019) are listed in Table 2 along with estimated dates. The Blake, Norwegian-Greenland Sea, and Lachamps geomagnetic excursions precede three episodes of sea level decline/increase of polar ice. The Lake Mungo geomagnetic excursion occurs just before the LGM after which global sea levels began to rise to current levels. According to the model, crustal displacement(s) triggered by the Mungo Lake and possibly the Gothenburg geomagnetic excursions shifted most of the ice sheet that had formed up to the LGM almost 2,000 miles south well into the temperate zone leading to rapid melting and sea-level rise. The Younger Dryas event (Firestone et al., 2006) was

also likely a significant contributor to glacial melt. All four events appear to be somewhat correlated with Milanković cycles evident in the insolation curve. Three precede major volcanic eruptions.

A POSSIBLE MECHANISM FOR CRUSTAL DISPLACEMENTS

In his original theory, Hapgood proposed that polar ice creates mass imbalances that can cause the crust to slip over the mantle shifting the geographic location of the North Pole. Einstein later argued that the force of the ice was not sufficient to cause a crustal displacement (Martínez-Frías et al., 2005). It is now possible using models of the crust and ice sheets at the LGM to estimate the degree

TABLE 2. Estimated Locations and Dating of Previous Poles

Name	Latitude	Longitude	Dating (Kya)
Hudson Bay	59.75°	-78°	25-42
Norwegian Sea	70°	0°	42-75
Greenland	79.5°	-63.75°	75-120
Bering Sea	56.25°	-176.75°	120-135

to which the ice could have affected the earth's moments of inertia. As shown in the Appendix, if the crust were free to move, the ice would have shifted the pole by less than 0.25° relative to its present position. If the first part of Hapgood's theory is wrong, that ice cannot move the pole, and TPW is too slow a process to affect glacial cycles, are there any other ways to save the rest of his theory?

As discussed in the Appendix, an analysis of alternative mass distribution models (Caputo & Caputo, 2012) reveals the crust's theoretical axis of rotation (TRA), which is based on its moments of inertia, deviates significantly from the whole earth's rotational axis and so may not be in equilibrium with the earth. Using a numerical model described in the Appendix, we have determined the crust's TRA is at 1.21°N, 18.52°W. This location lies in the zone of the tropics almost on the equator. At the equinox, the equator is parallel with the ecliptic plane. At other times of the year, the ecliptic passes through the earth's equatorial region between the tropics of Cancer and Capricorn. The path of the sun, moon, and most other bodies in the solar system lies along the ecliptic. That the crust's TRA points in this direction suggests the possibility the crustal disequilibrium may have an external (i.e., extraterrestrial) cause.

The influence of the moon, and to a lesser extent, the sun, are responsible for the earth's tides (Figure 8). The balance between gravitational and centrifugal forces causes the earth (primarily its oceans) to elongate in the direction of the moon by 1.34 meters and the direction of the sun by 0.61 meters (<https://farside.ph.utexas.edu/teaching/celestial/Celestial/node53.html>). As the earth rotates, tidal forces cause the oceans to rise and fall twice a day. These forces also pull on the crust. It has been proposed that tid-

al forces acting on the crust could be a possible trigger for certain kinds of earthquakes (Ide et al., 2016).

Tidal torques τ acting on the earth and moon dissipate energy at a rate

$$\dot{E} = \tau(\omega - \Omega) < 0$$

since $\Omega > \omega$, where Ω and ω are the angular velocities of the earth and moon, respectively (<https://farside.ph.utexas.edu/teaching/celestial/Celestial/node54.html>). With the crust "locked" to the mantle, the energy loss manifests as the frictional heating of the crust and oceans. If, however, the crust became "unlocked," the effective work could result in a displacement of the crust over the mantle.

The key to crustal displacement thus becomes the question of whether there is a way for the crust to become unlocked from the mantle. One possibility is that changes in the magnetic field during a geomagnetic reversal/excursion may affect the ease with which the crust can move over the mantle. Magnetic dipoles of ferromagnetic minerals in the crust normally line up in the same direction as those in the core resulting in continental ferromagnetic fields (Lorenzen, 2019). It is conjectured that when the core magnetic field flips during a geomagnetic excursion, the dipoles in the crust temporarily point in the opposite direction to produce a repulsive force between the crust and core fields (Figure 9). If this force, perpendicular to the crust, is sufficient to reduce the frictional force between the crust and mantle, it may be possible for forces acting on the crust parallel to the surface to move the crust over the mantle while the geomagnetic field is reversed. When

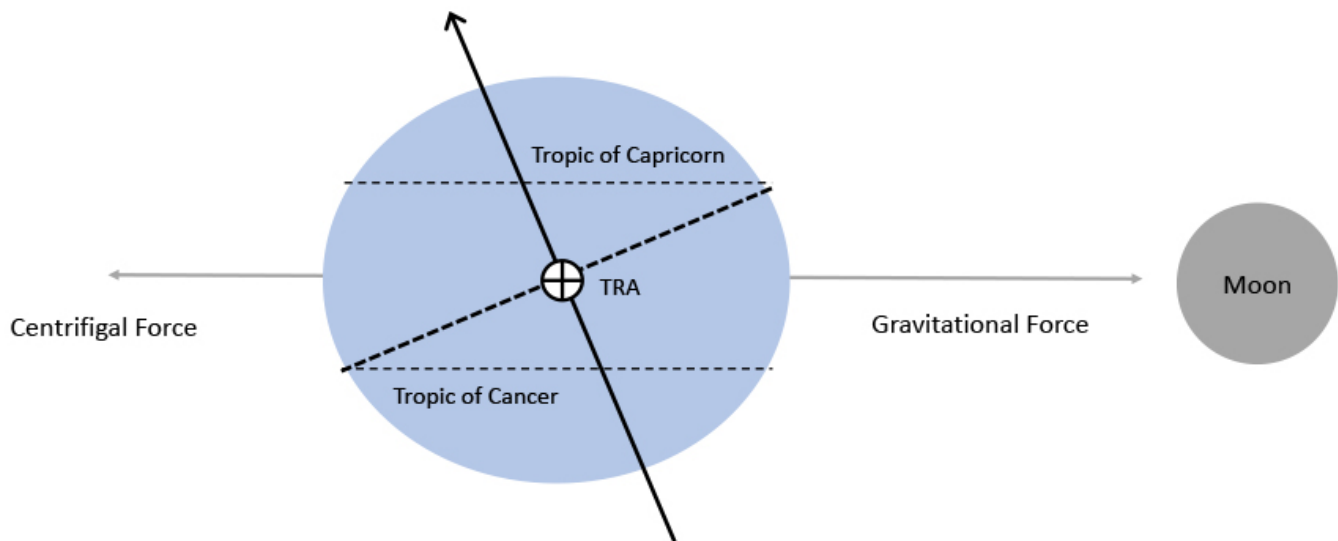


Figure 8. Possible role of tidal forces in changing the position of the crust's TRA.

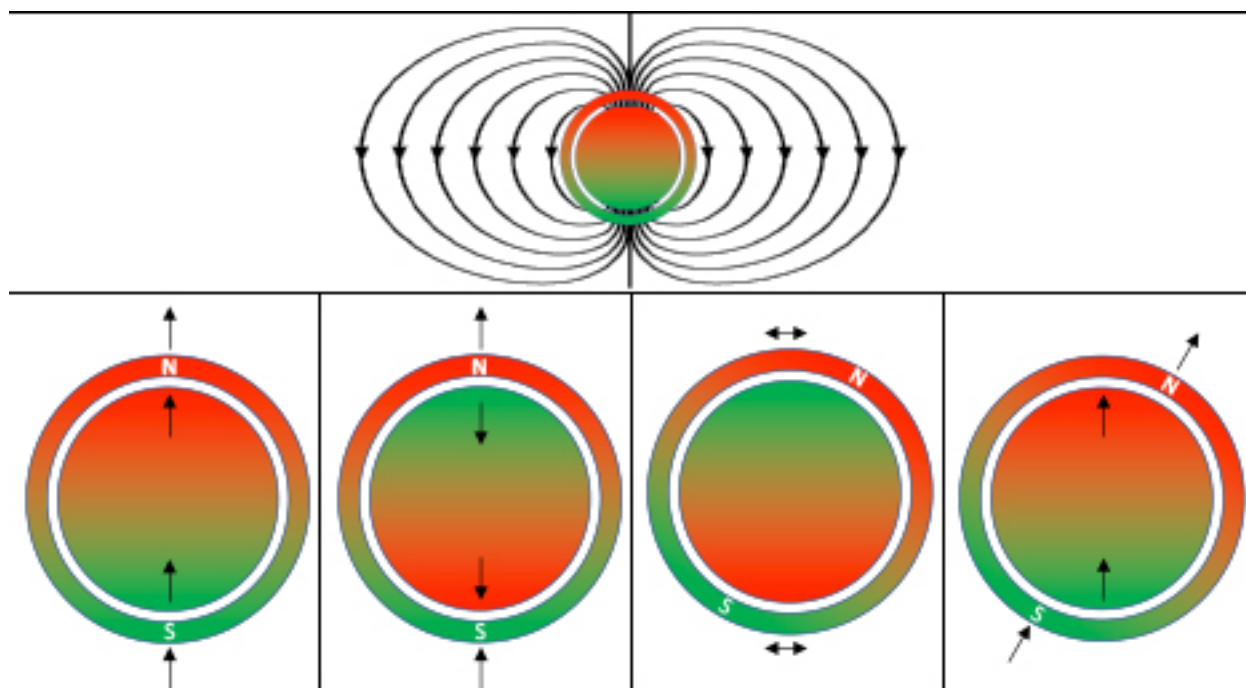


Figure 9. Earth's magnetic field (top). Bottom left to right shows the normal polarity of core and crust, polarity during a geomagnetic excursion, rotation of crust, and return to original field polarity.

the geomagnetic field flips back the crust is once again locked to the mantle maintaining disequilibrium.

If the crust were to displace over the mantle, its TRA would shift as well. As shown in Figure 10, the crust's TRA is roughly within the zone of tropics for all four prior estimated locations of the North Pole. Considering the last pole shift from Hudson Bay to the Arctic, Figure 11 plots different hypothetical pole shift paths along with the corresponding paths of the crust's TRA. Notice the most gradual pole shift path is associated with the movement of the TRA along the ecliptic. This suggests the possibility that if the crust did become unlocked during a geomagnetic excursion, tidal torques could have shifted it along with the geographic pole such that the crust's TRA would have remained in the equatorial zone under the influence of the moon and sun.

CLIMATE EVIDENCE

If the second part of Hapgood's crustal displacement theory is correct, pole shifts should cause climate zones¹ and habitats to change relative to the new poles. Gaffney (2020) tested this hypothesis using mammal assemblage zone (MAZ) biostratigraphy in Britain over the late Pleistocene (Currant & Jacobi, 2001, Gilmour et al., 2007). Figure 12 plots the approximate dates of five assemblages. The oldest in the Joint Mitnor Cave, dated to the early marine

isotope stage (MIS) 5, which began about 130 Kya, contains bones of the hippopotamus and spotted hyena, animals who live in sub-tropical climates. According to our model, this period corresponds to the time when the North Pole was in the Bering Sea. With a pole at this location, Britain's latitude would be approximately 20°N at the northern edge of the tropical zone.

The next assemblage, Bacon Hole, contains bones of animals that live in temperate climates such as the vole and woolly mammoth. Its estimated age, 80–110 Kya, is during the time the North Pole is estimated to have been in northern Greenland. With the pole at this location, Britain's latitude would be approximately 57°N at the northern edge of the temperate zone. Based on our estimated chronology, a pole shift from the Bering Sea to northern Greenland 110–130 Kya that shifted Britain's geographic location 37° north from the sub-tropical to temperature zone would explain this change in climate.

Fossils in the Banwell MAZ include animals that live in cold climates such as Arctic fox and reindeer. Its estimated age, 50–79 Kya, corresponds to the time when the North Pole was in the Norwegian Sea. With the pole at this location, Britain's latitude would be shifted north to 75°N, well inside the polar region. The last two assemblages at Pin Hole and Gough's Cave contain fossils of animals such as horses and woolly mammoths who live in temperate climates. The dating of these assemblages is consistent

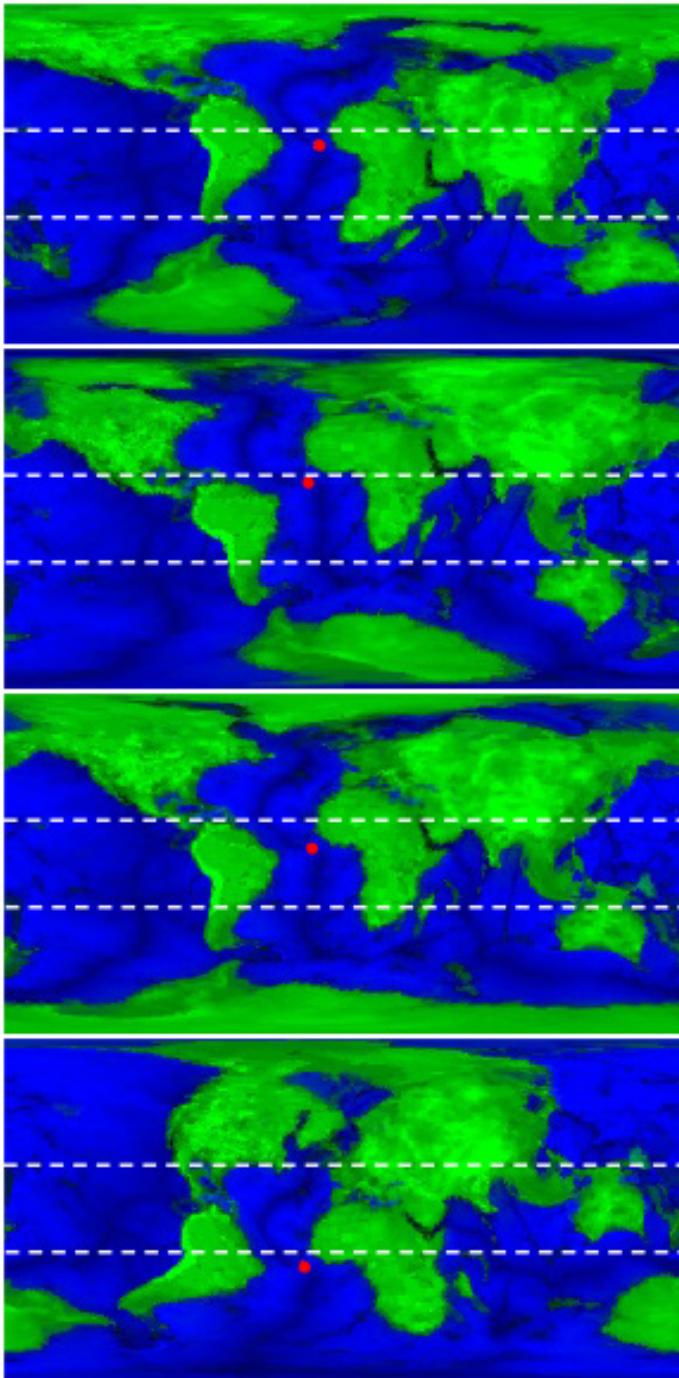


Figure 10. Location of crust TRA (red dot) for poles (from top to bottom) in Hudson Bay, the Norwegian Sea, Greenland, and the Bering Sea. Dotted lines delimit the tropical zone (23.4°N to 23.4° S).

with subsequent crustal displacements that shifted Britain south, back into the temperate zone.

The Arabia Desert, the largest in Asia, and the fifth-largest in the world, occupies most of the Arabian Peninsula. In the south, between Yemen and Oman, lies the Rub'al Khali (The Empty Quarter), one of the most extreme

environments on earth. Yet, it is clear from satellite imagery (Figure 13) that this part of the world has not always been arid. Extensive and well-developed drainage patterns seen in satellite imagery prove rivers once flowed throughout a much different landscape. Crassard et al. (2013) present geochronological data supporting the existence of a paleolake in the Mundafan region at the western edge of the Rub'al Khali. Lacustrine samples dated using carbon-14 and optically stimulated luminescence suggest the paleolake first formed during MIS 5 (80–130 Kya). The presence of freshwater mollusks indicates the lake existed over an extended period. Significant changes in climate resulting from pole shifts would likely have affected human populations as well at the time. Groucutt et al. (2015) discovered signs of prolonged human occupation in this area during MIS 5 (80–130 Kya) that they believe constitute evidence of early human dispersals out of Africa and across the Arabia peninsula. According to Hapgood's theory, Arabia would have had a wet tropical climate 75–135 Kya during the times of the Bering Sea and Greenland poles.

DISCUSSION

Figure 14 summarizes the key elements of our revised version of Hapgood's theory of crustal displacement. As stated at the outset, there are two parts to his theory. In the first part, which concerns possible mechanisms, we replace Hapgood's polar ice/mass imbalance hypothesis with a new model that postulates crustal displacements are triggered by geomagnetic excursions and driven by tidal forces. We refine the second part of his theory based on a linear model, which predicts the extent to which Milanković cycles can account for sea-level changes over the previous glacial cycle and hypothesize that the difference between what is observed and what is predicted is due to the effect of crustal displacements that modulate incident solar radiation during Milanković cycles.

It has been suggested that increased amounts of cosmic radiation during periods of geomagnetic collapse could lead to increased ionization in the atmosphere and cloud formation, which would reduce the amount of solar radiation reaching the surface. Although this explains why the climate grows colder and sea levels fall during a glacial cycle, it cannot explain how ice can later melt and sea levels rise in a cold world (Berger, 2012). Crustal shifts provide the missing piece (nonlinear factor) sought in many climate theories needed to melt ice in a cold world by simply moving the ice to a lower latitude so that it can melt.

Historically, Hapgood's theory has been dismissed by the mainstream science community for several reasons. Foremost is the lack of a physical process capable of shifting the crust thousands of miles over timescales of tens of

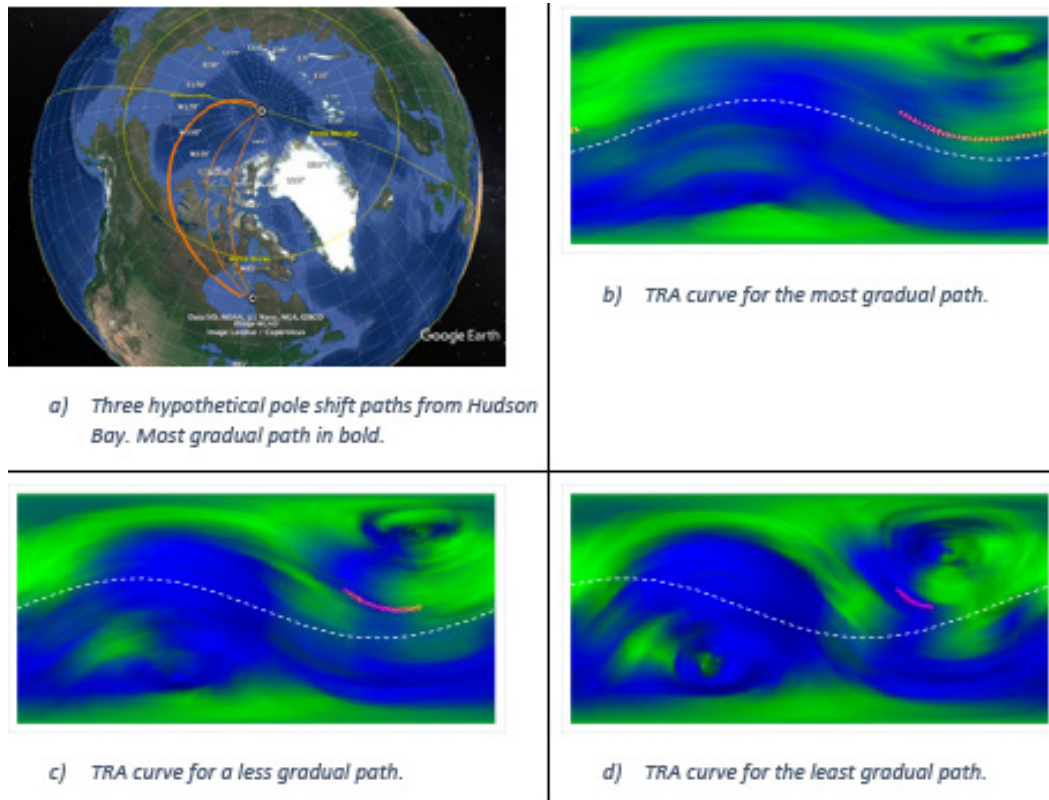


Figure 11. Different hypothetical paths of geographical pole shifts (top left) and corresponding crust TRA displacement curves (top right, bottom left, and bottom right). TRA curves (red lines) that follow ecliptic paths (dotted white line) are consistent with the tidal hypothesis.

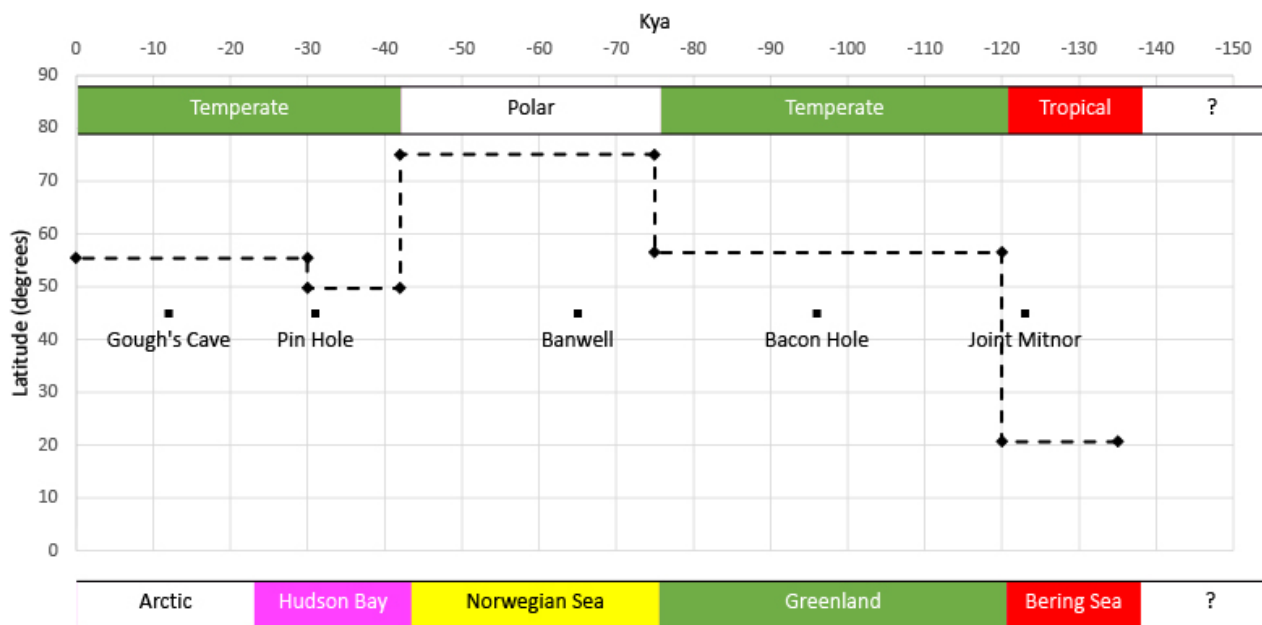


Figure 12. Correlation of mammal assemblage zones and climate zones in Britain associated with prior poles. Dates for Pin Hole, Banwell, and Bacon Hole are average values of ranges compiled by Gaffney (2020).

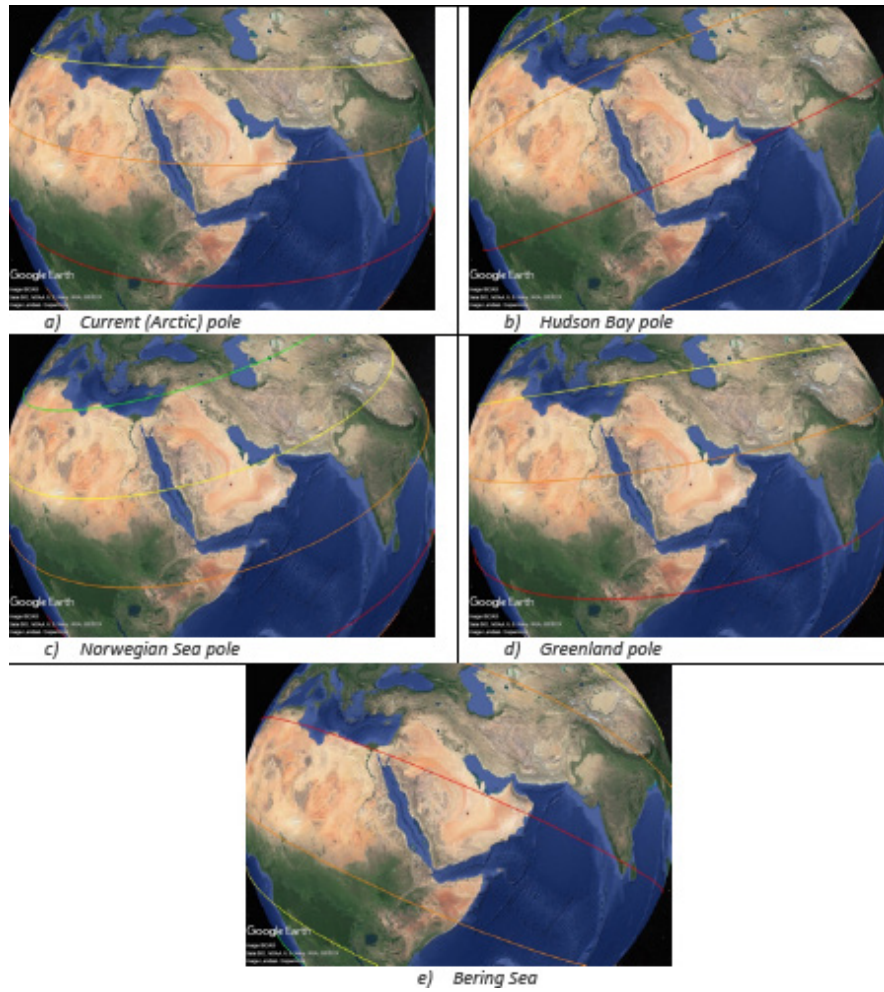


Figure 13. Changes in the climate zone of the Arabia peninsula and surrounding areas due to pole shifts. Wet tropical climates are in the zone between red and orange lines, arid climates in the zone between orange and yellow lines, temperate climates in the zone between yellow and green lines, and polar climates north/south of green lines. (Google Earth)

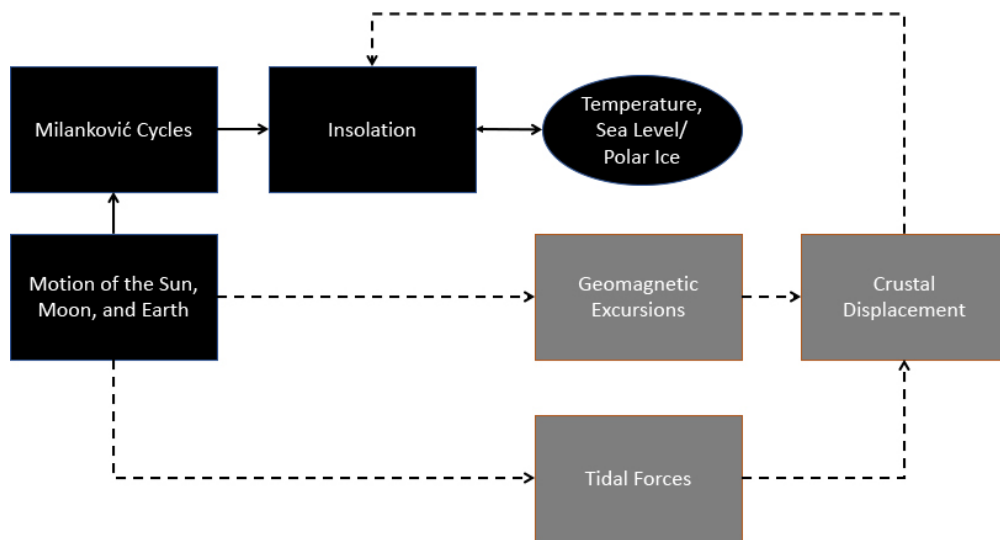


Figure 14. Summary of a new theory builds upon Milanković climate cycles (black boxes and solid lines) incorporating a revised version of Hapgood’s theory in which crustal displacements are triggered by geomagnetic excursions and driven by tidal forces (gray boxes and dotted lines).

thousands of years. We address this problem with a new hypothesis—that crustal displacements are triggered by geomagnetic excursions, which occur over the appropriate timescales, and are driven by tidal forces of the earth–moon–sun system, the same forces that move the earth’s oceans.

A second “problem” with Hapgood’s theory is the lack of geophysical (paleomagnetic) evidence (Brass, 2002). Lack of paleomagnetic data does not disprove the existence of short-duration pole shifts, only that such techniques are incapable of detecting them. Radiometric dates for rock samples typically have a temporal uncertainty of a half-million years, far too coarse to temporally resolve events occurring on timescales of tens of thousands of years. Radiocarbon techniques cannot date archaeomagnetic samples older than 50,000 years. In place of geophysical evidence, Gaffney’s analysis of MAZ data using marine isotope stage dating provides strong (albeit circumstantial) evidence of significant climate change events in Britain over the past 100+ Kya that are consistent with the pole shift hypothesis.

The problem of “hot spots”—locations on the earth’s surface not on plate boundaries that have experienced active volcanism for long periods—is a third reason Hapgood’s theory has been rejected by mainstream science. While some hot spots such as Yellowstone have not moved, others have, resulting in the creation of chains of volcanic islands. Wilson (1963) postulated that the formation of the Hawaiian Islands resulted from the slow movement of a tectonic plate over a stream of anomalously hot magma rising from the Earth’s core-mantle boundary in a structure called a mantle plume. Assuming the position of a mantle plume is fixed relative to the earth’s spin axis, hot spot tracks are records of plate motion and TPW (Woodworth & Gordon, 2018).

That hot spot tracks do not record Hapgood pole shifts is seen as a fundamental problem with his theory (Wilson & Flem-Ath, 2000). An alternative to the mantle plume theory is the plate theory (Foulger 2010) that postulates the mantle beneath a hot spot is not anomalously hot, rather the crust above a hot spot is weaker allowing molten material from shallower depths to rise to the surface. If this theory is correct, hot spot tracks result from lithospheric displacements within plates and move with the crust.

IMPLICATIONS AND APPLICATIONS

If longer-term TPW/plate tectonic events occurred with periods of increased volcanism and mass extinction events following long-term geomagnetic reversals, correlations between short-term reversals (geomagnetic excursions) and super-volcanic events suggest the possibility

that shorter-term pole shifts such as those suggested by Hapgood could have occurred. If so, we show how Hapgood pole shifts working in conjunction with Milanković cycles provide a possible explanation for climate changes over past glacial cycles. That the crust does not appear to be in equilibrium with the whole earth in terms of their moments of inertia suggests the possibility that an unknown force could be at work. We propose earth–moon–sun tidal forces may be responsible, and that these forces, which move the earth’s oceans, might provide sufficient energy to displace the crust a significant distance during a geomagnetic excursion. It is our hope that the preliminary results presented in this paper will lead to further work in these and other related areas of research.

NOTE

¹ The climate depends on temperature and precipitation, which depend in large part on latitude. The zone of the tropics (tropics of Cancer and Capricorn), which have warm and wet climates, extend 15–25° from the Equator. Dry climates tend to exist 15–35° from the Equator. In the Northern Hemisphere, this zone is wider than in the Southern Hemisphere. Arabia together with northern Africa lie in a dry belt approximately 20° wide (from 15–35° N). Australia and Southern Africa lie in a thinner dry belt that is only 15° wide from (20 to 35° S). Temperate climates are on average 35–50° from the Equator, and polar climates are above 50°.

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APPENDIX

Computing the Principal Moments of Inertia of Earth’s Crust

Key to understanding the movement of the earth’s crust relative to the mantle are the moments of inertia, which determine the rotational axis. The moments of inertia defined in earth-centered earth-fixed (ECEF) coordinates are

$$\begin{aligned}
 I_{xx} &= \sum_{x,y,z} (x - \mu_x)^2 m(x, y, z) \\
 I_{yy} &= \sum_{x,y,z} (y - \mu_y)^2 m(x, y, z) \\
 I_{zz} &= \sum_{x,y,z} (z - \mu_z)^2 m(x, y, z) \\
 I_{xy} &= \sum_{x,y,z} (x - \mu_x)(y - \mu_y) m(x, y, z) \\
 I_{yz} &= \sum_{x,y,z} (y - \mu_y)(z - \mu_z) m(x, y, z) \\
 I_{zx} &= \sum_{x,y,z} (x - \mu_x)(z - \mu_z) m(x, y, z)
 \end{aligned}$$

where $m(x, y, z)$ is the mass distribution, and (μ_x, μ_y, μ_z) are the centers of mass. In practice, the moments are computed by adding up volume elements $r\Delta\theta \times \Delta\lambda r \cos\theta \times \Delta r$ of density $\rho(r, \lambda, \theta)$ in polar coordinates

$$\begin{aligned}
 I_{xx} &= \sum_{r,\lambda,\theta} (X(r, \lambda, \theta, h) - \mu_x)^2 m(r, \lambda, \theta) \\
 I_{yy} &= \sum_{r,\lambda,\theta} (Y(r, \lambda, \theta, h) - \mu_y)^2 m(r, \lambda, \theta) \\
 I_{zz} &= \sum_{r,\lambda,\theta} (Z(r, \lambda, \theta, h) - \mu_z)^2 m(r, \lambda, \theta) \\
 I_{xy} &= \sum_{r,\lambda,\theta} (X(r, \lambda, \theta, h) - \mu_x)(Y(r, \lambda, \theta, h) - \mu_y) m(r, \lambda, \theta) \\
 I_{yz} &= \sum_{r,\lambda,\theta} (Y(r, \lambda, \theta, h) - \mu_y)(Z(r, \lambda, \theta, h) - \mu_z) m(r, \lambda, \theta) \\
 I_{zx} &= \sum_{r,\lambda,\theta} (X(r, \lambda, \theta, h) - \mu_x)(Z(r, \lambda, \theta, h) - \mu_z) m(r, \lambda, \theta)
 \end{aligned}$$

where $m(x, y, z)$, and (μ_x, μ_y, μ_z) are the ECEF coordinates as a function of radial distance r , longitude λ , latitude θ , and height h above the ellipsoid.

A 1° by 1° global model, CRUST1.0 (<https://igppweb.ucsd.edu/~gabi/crust1.html>) provides estimates of crustal thickness $t(\lambda, \theta)$ and depth $d(\lambda, \theta)$ to the Moho discontinuity between the earth’s crust and its mantle. This sets the latitude and longitude quantization, $\Delta\theta$ and $\Delta\lambda$. Gridded elevations $h(\lambda, \theta)$ derived from the Global Land One-km Base Elevation (GLOBE) project (<https://www.ngdc.noaa.gov/>

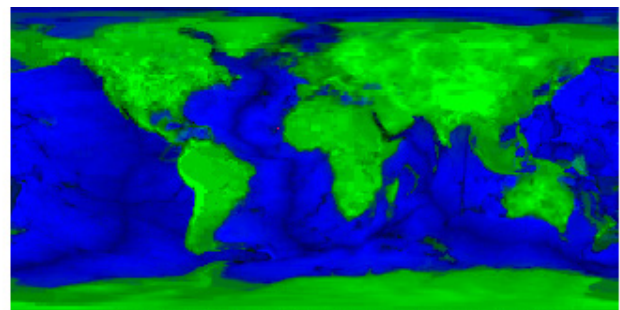
mgg/topo/globe.html) are referenced to the WGS84 reference ellipsoid. Ice maps $g(\lambda, \theta)$ representing the extent of ice sheets at the LGM were generated from global climate data visualizations (http://waikiki.zhaw.ch/radar.zhaw.ch/bluemarble3000_en.html).

The mass distribution $m(r, \lambda, \theta)$ is computed over a series of spherical shells $\Delta r = 250$ meters thick, using density values of 2.7 g/cm³ for the continental crust, 3 g/cm³ for ocean crust, 1 g/cm³ for water, and 0.9 g/cm³ for ice according to the logic in Appendix Table 1.

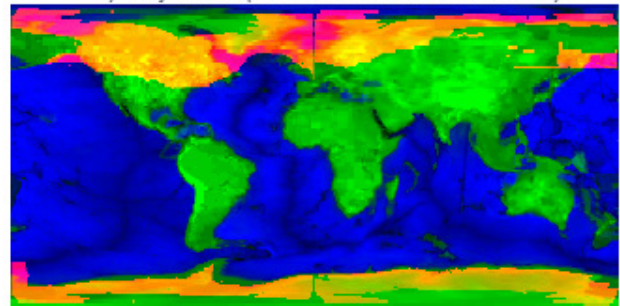
APPENDIX TABLE 1

Above Moho?	Land/water?	Ice?	Radius, r	Density, $\rho(r, \lambda, \theta)$
$r > d(\lambda, \theta)$	$h(\lambda, \theta) > s$		$r \leq h(\lambda, \theta)$	2.7
		$g(\lambda, \theta) > 0$	$r \leq h(\lambda, \theta) + g(\lambda, \theta)$	0.9
	$h(\lambda, \theta) \leq s$		$r \leq d(\lambda, \theta) + t(\lambda, \theta)$	3
		$g(\lambda, \theta) > 0$	$r \leq s$	1
otherwise				0

Figure 15 is a cylindrical projection of the summed mass distribution of the crust. Also shown are estimated ice distributions at the time of the last glacial maximum (LGM) when the ice sheets were at their maximum extent and thickness (4500 meters) and sea levels were 140 meters below current levels.



a) Ice-free model (sea level 70 meters above current levels)



b) Estimated ice sheets at the last glacial maximum (sea level 140 below current levels)

Figure 15. Crust/ice models used to assess Hapgood’s original hypothesis. Depth of water is depicted in blue, thicknesses of the crust in green, and ice sheet in red. Ice over water appears pink and ice on land orange. The small gap in the ice sheet at the prime meridian (middle) is an artifact in the shapefile.

We are interested in understanding the degree to which the LGM ice sheet could have affected the crust's moments of inertia and rotational axis. The inertia tensor

$$I = \begin{bmatrix} I_{xx} & -I_{xy} & -I_{xz} \\ -I_{xy} & I_{yy} & -I_{yz} \\ -I_{xz} & -I_{yz} & I_{zz} \end{bmatrix}$$

summarizes an object's moments of inertia with respect to the center of mass. The eigenvalues of the inertia tensor are the principal moments of inertia, and the corresponding eigenvectors define their direction. The longitude and latitude of the crust's rotational axis are

$$\lambda = \tan^{-1}(b/a)$$

$$\theta = \tan^{-1}\left(\frac{c}{\sqrt{a^2 + b^2}}\right)$$

where $[a \ b \ c]$ is the eigenvector corresponding to the largest eigenvalue.

To assess Hapgood's original hypothesis that polar ice sheets created a mass imbalance that could have caused the crust to move over the mantle shifting the location of the geographic poles, we estimated the moments of inertia of the crust with and without LGM ice. Using our implementation of the CRUST1.0 model, the crust's rotational axes with and without LGM ice are:

$$(\theta_1, \lambda_1) = 1.32^\circ\text{N}, 18.41^\circ\text{W}$$

$$(\theta_0, \lambda_0) = 1.12^\circ\text{N}, 18.62^\circ\text{W}$$

The difference (shift) in the rotational axis is

$$\Delta\sigma = \cos^{-1}(\sin \theta_0 \sin \theta_1 + \cos \theta_0 \cos \theta_1 \cos \Delta\lambda)$$

If the crust were free to move over the mantle, the change in the moments of inertia caused by the ice could have caused it to move approximately 0.195° or 21.68 km. It thus would seem unlikely that Hapgood's hypothesis in its original form is correct.

What is particularly interesting is that the crust's rotational axis is not where we expected to find it. In analyzing different crustal mass distribution models, Caputo and Caputo (2012) plot the value of the maximum moment of inertia (MMI) of the crust as a function of its theoretical rotational axis (TRA) (Figure 16) and discover that the TRAs with the largest MMIs tend to be far from the geographic pole. Our model places the crust's TRA almost at the equator. A possible implication of this finding relative to Hapgood's theory is discussed in the paper.

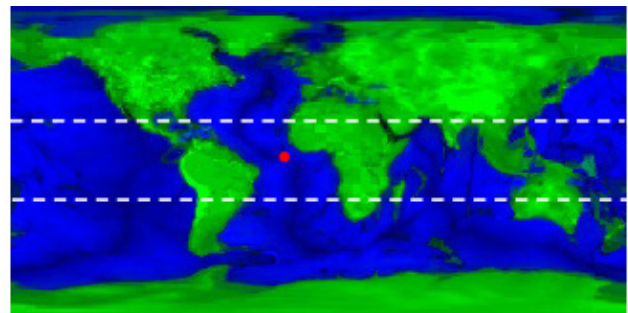
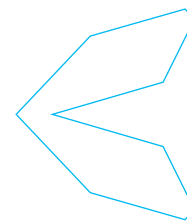


Figure 16. Location of the theoretical rotational axis of the crust (red dot in center) is at $1.21^\circ \text{ N}, 18.52^\circ \text{ W}$. Dotted lines delimit the tropical zone (23.4° N to 23.4° S).



RESEARCH
ARTICLE

Scrutinizing the Relationship between Subjective Anomalous Experiences and Psychotic Symptoms

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HIGHLIGHTS

New analyses show that subjective paranormal experiences do not have the same psychological and statistical patterns as clinical symptoms of psychosis. This finding challenges psychiatric explanations for some reportedly parapsychological phenomena.

ABSTRACT

This research was exploratory, and its main objective was to analyze whether anomalous experiences related to parapsychology had statistical behavior similar to psychotic-like experiences (e.g., hallucinations). If psi phenomena have a different ontology from psychotic-like experiences, then they should have a different statistical representation and measurement. In this hypothetical scenario, there would be empirical–statistical grounds for discriminating between psychotic perceptual distortions and anomalous experiences without clinical origin. Different clinical variables common in psychotic disorders were measured in 562 participants. Psychotic-like experiences (such as hallucinations) and anomalous experiences (such as experiences outside the framework of psychosis) also were quantified. Several forward stepwise multiple regression models and techniques based on Exploratory Factor Analysis were used. The EFA extracted 2 factors; the first grouped the variables that measured anomalous phenomena from the continuum of psychosis models and the second gathered the variables that measured them as anomalous perceptions without scientific explanation. Both EFAs explained more than 70% of the variance. Only 3 clinical variables were necessary to predict 75.9% of psychotic-like experiences assessed from the psychopathological model. Up to 5 indicators were necessary to predict 73.4% of the unexplained anomalous experiences. Empirical–statistical indicators in the sample used enable differentiation of the anomalous phenomena into 2 prominent models: the psychotic-like experiences model and the anomalous experiences unexplained model. Variables that characterize the psychotic phenotype more successfully predict psychotic-like experiences than they do anomalous experiences. The implications of these findings in relation to psi phenomena and how to distinguish them from psychotic symptoms are discussed.

KEYWORDS

Anomalous experiences, schizotypy, psychotic-like experiences, paranormal beliefs, parapsychology

INTRODUCTION

Anomalous experiences can be described in many ways (French & Stone, 2016). Although they represent behavior phenomena that are difficult to explain in scientific terms, two main interrelated conceptions prevail. On the one hand, the clinic model justifies/explains these anomalous phenomena as hallucinatory behaviors (Stefanis et al., 2002; Shapiro et al., 2019) (for example, hearing voices that do not exist) or non-pathological perception disruptions (for example, perceptive distortions, illusions/delusions, pseudo-hallucinations, and cognitive biases) (Jaspers, 1993; Belloch et al., 1995). On the other hand, there is a second model which conceives of anomalous phenomena as events that challenge the foundations of the current scientific paradigm (Jinks, 2019). This is the case with psi phenomena, which cover experiences related to *precognition* (Bem, 2011; Bem et al., 2016), *mind-to-mind communication* (Honorton, 1985), and *mind-matter* interaction (Radin et al., 2012). There are many scholars who do not accept that these phenomena may have any ontological validity and therefore choose to disapprove of their inclusion in scientific subject matter (Shermer, 2011; Wagenmakers et al., 2011; Reber & Alcock, 2020). However, there are several studies with significant results in favor of psi phenomena that can be reported throughout the scientific literature (Bem, 2011; Bem et al., 2016; Utts, 2018). Within the psychiatric field, there is an obvious constraint for understanding anomalous phenomena, and any investigation should be multi-centered (Bell et al., 2005).

There are some events in science, considered unexplained—although not necessarily incomprehensible (Mabbett, 1982)—that can be observed and consequently question the limits of scientific knowledge (Deary, 1999). This does not imply rejecting or denying the ontological basics of contemporary science (Brown, 2004), but reflects the need to review all theories and knowledge accepted so far (Utts, 2018). A case in point is the intoxication with *sodium phenobarbital* which a patient survived after tripling the minimum lethal dose of the drug (Escobar-Román et al., 2012). She was in a coma (in a clinical death situation) and her vital functions required artificial aid. The authors simply speculated they could save her life thanks to the optimal physiological response to the applied treatment. Another example can be found in a patient with no psychiatric history, who claimed to hear voices in his head that warned him of the presence of a brain tumor in a certain part of the organ (Azuonye, 1997). The subject had not had any previous medical tests. After taking several diagnostic tests based on neuro-imaging, the doctors found a meningioma in one of the temporal lobe areas of the brain. The case was published in *Medical Hypotheses* (Bobrow, 2003).

For further information about this kind of anomalous phenomena, see Bobrow's other publications (Bobrow, 2003; Nordgaard et al., 2019).

The research activity using the scientific method should be the model for responding to the problems arising from these cases (Carter, 2012). Moreover, calling the conventional theoretical model into question does not imply the denial of scientific laws, nor that the ontological determinism of science should be rejected (Jinks, 2019). The same idea can be extrapolated to psi phenomena as well as to some events that are considered anomalous behaviors close to psychotic experiences (Carter, 2012; French & Stone, 2016). There is no consensus on the ontological and etiological value of anomalous phenomena (whether they are understood as unexplained events or *psychotic-like experiences*) (Bobrow, 1983; David, 2010). Nevertheless, despite these two constructs being conceptually different, in psychiatric practice they are assessed from the same perspective, as they are considered hallucinations close to psychosis (or, at least, attributes of the *psychotic phenotype*) (Fonseca-Pedrero et al., 2011; Nordgaard et al., 2019).

From a psychiatric perspective, the prevailing line of research emphasizes the idea that the most crucial thing, rather than being the empirical and ontological value of anomalous behaviors (Lawrence, 2016), is their psychopathological importance, making this a priority objective. While psychiatric interventions would not have to be modified based on whether the assessed behavior was empirically real or not, they could change—and they should (Shapiro et al., 2019)—when the psychopathological contents also differ or are just not the same (Badcock & Paulik, 2020). Thus, in psychiatry it is not that important whether *telepathy* (which is a psi phenomenon) exists or not. Probably, the most essential fact relies on the analysis of the psychopathological impact any possible telepathic experience could have on the life and well-being of the patient (Lawrence, 2016). In this regard, the *psychosis continuum* model addresses the clinical value of this kind of anomalous phenomena (Johns & van Os, 2001; van Os et al., 2008). This model has been tested and validated because it represents a useful alternative to the predominant categorical model in the old DSM-IV-TR (Bell et al., 2005). Its basic principle states that the classic psychotic symptoms observed in patients with a diagnosis of schizophrenia also show up in the general population. The differences between pathological and non-pathological symptoms are: (1) their level of duration (persistence); (2) the cognitive-affective disruption they cause (impairment); and (3) their intensity levels during the clinical course (pattern/trend/tendency) (Stefanis et al., 2004; Badcock & Paulik, 2020). Likewise, the *psychosis continuum* states that, if anomalous phenomena appear in subjects in the clinical population, they could also

pose a psychopathological risk that would allow specialists to predict future psychotic episodes (Fonseca-Pedrero et al., 2011). That is why the concept of *psychotic phenotype* is proposed as a risk indicator related to the development of crisis or pathological psychotic states (Shapiro et al., 2019). Several studies support this construct and have proposed tools that enable its psychometric assessment (Stefanis et al., 2004; López-Ilundain et al., 2006; Fonseca-Pedrero et al., 2010; Pasricha, 2011).

Although it is a widely recognized model, there is certain scientific evidence that contradicts and questions the *psychosis continuum* when applied to anomalous phenomena (Pasricha, 2011). Three kinds of critique are identified: The first one refers to the majority of studies not differentiating between variability (in terms of all types of anomalous phenomena that are perceived by the patient) and severity (depending on the tendency or intensity of the behavior) (David, 2010). It is not yet clear what dimensions or indicators should be taken into consideration to typify the variability of the anomalous experiences. The second critique states that anomalous phenomena are neither right nor wrong per se and recommends avoiding value judgments about them (Harary, 2012). Thus, their pathological value would depend not only on persistence, tendency, and impairment. It is possible that other subclinical psychological factors moderate and define the *psychotic phenotype* in a different but complementary way to the one that the *psychosis continuum* proposes (Badcock & Paulik, 2020). Moreover, even if the perceived content of the experience is negative (for example “I hear voices in my head that insult me”), the interpretation or opinion that the patient might have about the insults must be properly understood due to its psychopathological impact, but it must not be replicated because doing so would constitute a moralistic decision beyond the psychiatric diagnosis.

Some professionals recommend considering the *systems of beliefs* as information sources to understand the different meanings given to perceived anomalous phenomena (Irwin et al., 2013). Studies that follow this line of research can be classified under two groups: on one side, those who conclude that subjects with paranormal beliefs (about for example ghosts, witchcraft, divinatory arts, etc.) tend to normalize their anomalous perceptions using adaptive interpretations that contribute to a sense of control and “meaning,” which lessen their discomfort (see also Irwin, 2009; Lange et al., 2019). On the other hand, other studies question if paranormal beliefs are actually useful as a therapeutic resource in psychiatric evaluations and treatments (Cameron, 2016). Nevertheless, it is essential to remember the difference between “system of meaning” (as a process of cognitive representation of the stimuli) and “belief” (as the act of accepting the real existence of some

content with no underlying empirical evidence) (Font, 2016). Studies from the first group refer to the systems of meanings rather than to the beliefs per se. Instead, studies from the second group inform us about the dysfunctional consequences for the patient who accepts the existence of the paranormal as valid.

The third critique arises from other studies that try to explore whether some attributes of psychotic episodes taking place in “healthy” subjects also correlate with the perceived anomalous phenomena (Irwin, 2009). Dissociation is probably the clinical variable related to anomalous experiences that is most commonly investigated in relation to this kind of hallucinatory episode (Jinks, 2019). Many studies have concluded that people with anomalous experiences (outside the psychopathological context) also showed high levels of dissociation (Cardeña & Carlson, 2011; Acunzo et al., 2020). However, this dissociation is not yet clear because there are other studies which did not show statistically significant summaries when the same hypotheses were tested (Vencio et al., 2018). The same can be said about other attributes related to the *psychotic phenotype*, like *schizotypy*. Numerous studies pointed out the presence of positive correlations between this clinical attribute of the personality and perceived anomalous phenomena (Simmonds-Moore et al., 2019), whereas others differed and showed non-significant correlations (Williams & Irwin, 1991; Williams, 1995). This contradiction in the statistical results can also be observed for other clinical variables such as the presence of traumatic experiences during childhood (Velikonja et al., 2019), symptoms related to impulse control, risky behaviors, and cognitive deficits (Irwin, 2009).

Other lines of study have indeed provided strong evidence of psychiatric and psychological factors frequently found in subjects with anomalous experiences (French & Stone, 2016). An example of this is represented by the symptoms associated with subclinical features of the histrionic, narcissistic, and paranoid personality disorders (Font, 2016). Similarly, psychotropic substances use and abuse constitute another element that leads to states of altered perception and is, as well, one present factor in this kind of subject (Sideli et al., 2019). Other symptoms associated with anxiety disorders and emotional lability also have been observed in this context (Roe & Bell, 2016). Another possibility might be related to patients faking or being deceitful about the experienced perceptive distortions (Wilson & French, 2006). In any case, all these variables question what kind of relationship schizotypy and those psychological attributes have.

The objectives of this research are to contrast the predictive value of (1) schizotypy levels, (2) psychotic phenotype, and (3) the existence of paranormal beliefs, in re-

lation to perceived anomalous phenomena. Unlike other studies, the aim is also to examine whether anomalous phenomena have a different characterization either when they are evaluated as attenuated psychotic symptoms, or as unexplained perceptions or abnormalities outside the hallucinatory context. Therefore, the purpose of this study is to analyze to what extent the unexplained anomalous experiences (including psi phenomena) are linked to a vulnerability to psychosis.

METHODS

Participants

There were 562 subjects (of which 49.3% were women and 50.7% were men) aged 18 to 57 (average age = 37.86; standard deviation = 11.952) who willingly participated in this study. 33.1% of the sample completed secondary education or received basic vocational training, 31.5% had an upper secondary education or received advanced vocational training, and 35.4% studied at university at a graduate or post-graduate level. 52.7% of the participants lived in Madrid, whereas the other 47.3% lived in Barcelona. All the subjects came from the non-clinical general population.

Procedure

This is a correlational and multifactorial study. The sample was taken between 2019 and January 2020. Participants were Statistics Consulting and Organizational Psychology college students and active workers. Required informed consent and necessary permits were handled prior to data collection, and the materials were digitally designed and applied through the Internet and email. In some rare cases, pencil-on-paper format materials were used and the data was digitized. Then the data was transferred to a raw matrix. Once the data was stored in the raw matrix, all cases with missing values or outliers, as well as those indicating the presence of psychiatric antecedents, were deleted during the data cleaning exercise. Then, after recoding the study variables, scales scores were calculated for each one of the subjects. In total, 66 cases (41 women and 25 men) were eliminated, and 562 sample subjects were retained. When the data matrix was cleaned, statistical contrast and analysis of the study hypotheses were run. Those hypotheses can be summarized as follows: *Schizotypy and psychotic phenotype significantly predict anomalous phenomena*. The anomalous phenomena were evaluated from both the clinical perspective (including hallucinations and the psychosis continuum) and the model that questions the clinical value of these experiences, considering them as frontier experiences between the scientifically explained and the unexplained (but not unexplainable, see Mabbett, 1982).

Instruments

Community Assessment of Psychic Experiences-42 (CAPE-42). This scale evaluates the psychotic phenotype with three dimensions: (1) *Positive Dimension* (PD) (consisting of 20 items), (2) *Negative Dimension* (ND) (consisting of 14 items), and (3) *Depressive Dimension* (DD) (consisting of 8 items). Answers are coded using a Likert scale between 1 (which means “rarely”) and 4 (which means “almost always”). The Spanish adaptation of the scale was used in this study (Fonseca-Pedrero et al., 2012).

The positive dimension of the CAPE-42 contains items expressing anomalous experiences with supernatural and paranormal interpretations (e.g., Have you ever had the feeling that people can communicate telepathically?). It also contains items about delusional tendencies and strange beliefs based on the power of witchcraft. The negative dimension collects the affective symptoms that are common in psychosis: difficulties in relating socially, lack of emotional expression, emotional incomprehension, tendencies to isolation, etc. The depressive dimension is related to deep feelings of sadness, lack of meaning, and suicidal ideation. This dimension feeds psychotic episodes with negative symptoms, as it hinders emotional understanding and affective expression.

CAPE-42 is endorsed for its validity and reliability (Stefanis et al., 2004). CAPE-42 has satisfactory reliability indices in most studies, including the Spanish version (alpha coefficients greater than 0.8). This makes it one of the most widely used questionnaires in the field of psychosis diagnosis.

Launay-Slade Hallucination Scale-Revised (LSHS-R).

This scale analyzes predisposition to develop hallucinations that are classed within psychotic behavior. This test has 12 items for anomalous phenomena on a psychosis continuum. It is a one-dimensional scale in which every answer is scored following the same Likert model described for CAPE-42. Therefore, final scores range from 12 to 48 points. The items on this scale focus on anomalous experiences with paranormal, religious, and supernatural interpretations. The content differs from CAPE-42 in that it involves reports of severe and serious perceptual disturbances (e.g., “hearing the voice of the devil”).

LSHS-R provides a statistical justification that proves its validity and reliability (Launay & Slade, 1981). In fact, Cronbach’s alpha coefficients for this scale were >0.8, and indicated that LSHS-R had good internal consistency. The Spanish adaptation of the scale was used in this study (Fonseca-Pedrero et al., 2010).

Schizotypal Personality Questionnaire (SPQ). This questionnaire evaluates the characteristic features of the schizotypal personality profile. It consists of 74 items

whose answers are coded in a dichotomous form: Value 0 means “no”, while value 1 means “yes”. The questionnaire has 9 dimensions: (1) *Reference Ideas* (RI) (9 items); (2) *Magical Thinking or Odd Beliefs* (MT) (7 items); (3) *Unusual Perceptive Experiences* (UPE) (9 items); (4) *Paranoid Ideation* (PI) (8 items); (5) *Social Anxiety* (SA) (8 items); (6) *Lack of Friends* (LF) (9 items); (7) *Flat Affect* (FA) (8 items); (8) *Eccentric Behavior* (EB) (7 items); and (9) *Strange Language* (SL) (9 items). SPQ also has a total score that is the sum of the scores of all its dimensions. The total score ranges from 0 to 74. This questionnaire also has evidence for its validity and reliability (Fonseca-Pedrero et al., 2012). As an example, Cronbach’s alpha coefficients for this scale were greater than 0.8 and in some cases greater than 0.9. The Spanish version used in this study has reliability indices above 0.8 (Raine, 1991).

Multivariable Multiaxial Suggestibility Inventory-2 (MMSI-2). MMSI-2 is a psychometric inventory developed by Escolà-Gascón (2020a) consisting of 174 broad spectrum items, whose subject matter focuses on anomalous phenomena as frontier experiences that cannot be explained from a psychopathological perspective. In this study only 9 of the 20–22 total scales of the test were used. The scales were: (1) *Visual-Auditory Anomalous Phenomena* (Pva) (11 items); (2) *Tactile Anomalous Phenomena* (Pt) (7 items); (3) *Olfactory Anomalous Phenomena* (Po) (7 items); (4) *Cenesthetic Anomalous Phenomena* (Pc) (9 items); (5) *Inconsistencies* (K) (12 items); (6) *Lies/Fabrications* (L) (23 items); (7) *Frauds* (F) (20 items); (8) *Simulation* (Si) (6 items); and (9) *Schizotypy* (Ez) (11 items). On the one hand, scales K, L, F, and Si form the IMA higher-order scale (*Inconsistent Manipulations*). On the other hand, scales Pva, Pt, Po, and Pc form the APP scale (*Anomalous Perceived Phenomena*). A description of the meaning of these scales may be found in Escolà-Gascón (2020a, 2020b). In general, the MMSI-2 items assessing anomalous experiences do not contain paranormal, parapsychological, or supernatural causal interpretations. Unlike previous scales, these items are limited to the respondent’s perceived anomalous or unexplained experience. This feature is important because the MMSI-2 was not designed with the assumption that the anomalous experiences are hallucinations or perceptual disorders. The perspective of this test is neutral and intended to measure perceived unexplained experiences in an aseptic way. MMSI-2 offers guarantees of validity and reliability (ordinal alpha >0.9; omega coefficients >0.8) (Escolà-Gascón, 2020a, 2020b; Escolà-Gascón et al., 2021).

Statistical Analysis

Data underwent analysis using the statistical software JAMOV (see The Jamovi Project, 2020). A *multiple regres-*

sion model, using the *enter* and *forward stepwise* methods, was used. The *forward stepwise* method allowed for the examination of the degree to which each predictor variable contributed to reduce prediction error and by extension, generated an increase in the explained variance (represented by the adjusted R^2). It also facilitates the fit of a more parsimonious model than the one based on the *enter* method (Pardo & San Martín, 2015). This process was only applied to the variables that previously presented *Beta* (β) coefficients that were significantly different from “0” in the *enter* method. Other studies use Pearson correlation coefficients as a reference to decide which independent variables should be included in the model. This choice would only make sense when the theoretical background offers conclusive statements regarding which predictor variables must be tested in the *stepwise* model, whether maximizing R^2 or minimizing the error associated with the predictions is the objective (Pardo & San Martín, 2015). Although the theoretical framework of this study is quite clear, results are more inconsistent and no definitive predictor covariates are specified when the difference between anomalous psychopathological and non-clinical perceptions is introduced (French & Stone, 2016; Houran et al., 2019). In cases like this, the recommendation is reliance on regression coefficients as a decision criterion to establish which variables should be tested in the *stepwise* method (Pardo & San Martín, 2015). By applying a multiple regression using the *enter* method, we can obtain semipartial correlations when the beta coefficients are standardized. These semipartial correlations are more consistent than Pearson’s correlations.

An *exploratory factor analysis* (EFA) was also applied to all scales that evaluate anomalous phenomena, from both the psychopathological and the unexplained frontier experiences perspective. The extraction method was the *unweighted least squares*. To set the number of factors to extract, the *parallel analysis* method was used (Reise et al., 2000). Furthermore, no axes rotation was applied. As an assessment of the model fit, several measures were used: *proportion of variance explained* (derived from the EFA eigenvalues), RMSEA index (*root mean square error of approximation*), TLI (*Tucker-Lewis index*), CFI (*comparative fit index*), and BIC (*Bayesian information criterion*), as well as the χ^2 and *normalized* χ^2 values.

In conjunction with the other mentioned independent variables, the *paranormal beliefs* variable also was assessed. This covariate was evaluated on a scale of 0 to 10, in which each subject had to indicate to which degree they believed in the existence of the paranormal, where 0 meant “nothing” and 10 meant “absolute belief” in it. In all analyses, the risk of error was 1%.

RESULTS

Exploratory Factor Analysis

Table 1 shows the descriptive statistics. Taking into account the minimum and maximum scores of each scale, similar average values were obtained for the majority of the perceptive scales (note scales are in different metrics). However, this does not mean that all scales have similar covariances–correlations. Therefore, both the covariance and the correlations between these scales also should be examined.

Considering the previous conceptual background of this study, it is possible that these scales measure different psychological constructs; one could be based on hallucinatory perceptive disruptions, while other scales could be linked to an unexplained/frontier experiences model. Therefore, Tables 2 and 3 show the correlation matrix of these scales, as well as the EFA with 2 extracted factors according to Figure 1. For Table 2, results indicate that psychosis-oriented scales strongly correlate with each other (r 's = .76 to .63, $p < .01$), whereas subscales from the MMSI-2 are much more weakly correlated (r 's .34 to .23, $p < .01$) to psychosis-related measures. As such, findings indicate that MMSI-2 subscales only weakly covary with standardized psychosis measures.

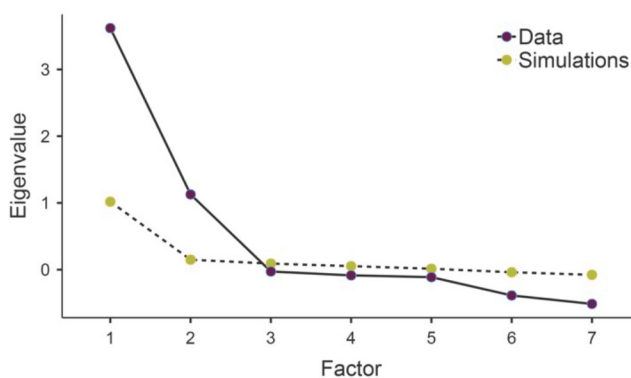


Figure 1. Scree-plot of parallel analysis.

As Tables 1, 2, and 3 display, the factorial model delivers 2 factors that explain a total of 75.5% of the variance. The first factor contains the MMSI-2 scales (which assess the frontier anomalous experiences), and the second factor contains the scales that evaluate the anomalous experiences related to the psychotic symptomatology. Results suggest that the scales specified as dependent variables do not measure the same construct. Specifically, eigenvalues for the psychosis-related measures load equivalently on both factors ($\lambda = .53$ to $.66$) for LSHS-R, UPE, and PD scales. However, per Table 3, MMSI-2 subscales (i.e., Po, Pt, Pva) show factorial differentiation, where these MMSI-2

scales load heavily on Factor 1 ($\lambda = -.82$ to $.87$), while inversely loading on Factor 2 ($\lambda = -.29$ to $-.33$). Given the low correlation between variables in Table 2, the current factor analysis shows MMSI-2 scales heavily weigh within Factor 1 and its theoretical construct but are inversely related to the components of psychosis-oriented scales captured in Factor 2 of this EFA. Meanwhile, fit indices support the validity of the factorial model. Notably, the Chi-square statistics in the EFA model failed to reach appropriate significance against the model fit. However, Chi-Square fit statistics are highly sensitive when there is a large sample size (Brown, 2015).

Multiple Regression Analysis

Table 4 shows the regression coefficients and the model R^2 statistic when using the *enter* method when we regressed subscales of CAPE, SPQ, and MMSI 2 on the LSHS-R scale (in this analysis representing psychopathology), and the APP scale (representing unexplained anomalies). The R^2 statistic makes it possible to quantify the proportion of mismatch reduction. This indicator is added into the analyses in order to know how strongly the psychological variables can explain the variability of the LSHS-R and APP scales per Table 4. All predictor variables that are measured by CAPE-42, LSHS-R, SPQ, and MMSI-2 have been included in the model. As can be seen, the regression was applied taking into consideration the difference between the psychopathological anomalous experiences and the non-clinical ones (following the factorial model from Table 3). Results indicate that the majority of variables were significant predictors in both models (see Table 4), but in many cases show weak predictive power for most variables in both models (For LSHS-R β_z 's = $-.14$ to $.17$, but see Ez subscale, $\beta_z = .52$; for APP β_z 's = $-.17$ to $.23$, but see K subscale, $\beta_z = .46$). The R^2 for the LSHS-R criterion variable had a weight of 60.6%. For the APP variable it was 54.2%. Overall, results indicate approximately equal low predictive power for both dependent variables, with the exception of the MMSI-2 Ez subscale strongly predicting LSHS-R, and the MMSI-2 K subscale strongly predicting APP.

Considering the R^2 statistic of unexplained abnormal experiences (APP $R^2 = 54.2\%$) and the R^2 of psychotic-like experiences (LSHS-R $R^2 = 60.6\%$), we can observe that, within the weak prediction made by psychotic variables, the strength of the prediction is lower when the anomalous experiences are not psychotic. This result is aligned with previous observations. It was not possible to merge the scores from the PD, UPE, and LSHS-R scales—in contrast to the other scales, which could in fact join in the APP scale (that was already typified in MMSI-2, see Escolà-Gascón, 2020a, 2020b)—due to their different metrics and the lack of any scale that could



TABLE 1. Summary of Descriptive Statistics

Tests	Scales	Means	Standard Deviation	Variance	Skewness ^a	Kurtosis ^b
CAPE	PD	38.464	9.388	88.132	-0.122	-1.039
	ND	35.173	9.227	85.145	-0.125	-0.766
	DD	18.843	4.696	22.050	-0.226	-0.708
SPQ (complete version)	RI	5.361	2.434	5.925	-0.071	-1.109
	MT	3.181	1.963	3.853	0.186	-0.937
	UPE	3.523	2.229	4.970	0.321	-0.6
	PI	4.028	2.103	4.423	0.007	-1.075
	SA	4.132	2.084	4.343	-0.124	-0.925
	LF	5.429	2.443	5.967	-0.311	-0.808
	FA	4.322	2.226	4.953	-0.049	-1.065
	EB	3.126	1.978	3.911	0.018	-1.107
	SL	4.612	2.529	6.395	-0.143	-1.001
MMSI-2	Ez	35.36	7.48	55.955	-0.058	-0.476
	K	15.97	2.936	8.621	0.817	0.083
	L	52.94	22.715	515.953	0.526	-1.063
	F	49.28	22.347	499.374	0.31	-1.264
	Si	15.63	4.138	17.125	0.871	0.226
	Pva	22.48	9.376	87.904	0.824	-0.57
	Pt	15.48	6.798	46.214	0.689	-0.834
	Po	16.1	7.615	57.993	0.697	-0.807
	Pc	16.11	5.151	26.534	0.757	-0.38
General scales	PF	92.480	19.261	370.988	0.081	-0.998
	SPQ	37.715	16.004	256.129	0.112	-0.729
	APP	70.167	26.736	714.810	0.381	-1.324
	IMA	133.810	44.571	1986.543	0.289	-1.099
	LSHS-R	15.573	2.658	7.065	0.519	-0.598
Beliefs ^c		5.612	2.974	8.844	-0.163	-1.046

^aError = 0.103. ^bError = 0.206. ^cDegree to which the individual believes in the existence of the paranormal (scale of 0 to 10). PD = Positive Dimension; ND = Negative Dimension; DD = Depressive Dimension; RI = Reference Ideas; MT = Magical Thinking; UPE = Unusual Perceptive Experiences; PI = Paranoid Ideation; SA = Social anxiety; LF = Lack of friends; FA = Flat Affect; EB = Eccentric Behavior; SL = Strange Language; Pva = Visual-Auditory Anomalous Phenomena; Pt = Tactile Anomalous Phenomena; Po = Olfactory Anomalous Phenomena; Pc = Cenessthetic Anomalous Phenomena; K = Inconsistencies; L = Lies; F = Frauds; Si = Simulation; Ez = Schizotypy; IMA = Inconsistent Manipulations; APP = Anomalous Perceived Phenomena; LSHS-R = Launay-Slade Hallucination Scale-revised; SPQ = Schizotypal Personality Questionnaire; PF = Psychosis Phenotype.

TABLE 2. Linear Correlations between Scales That Measure Anomalous Perceptions

	PD	UPE	Pva	Pt	Po	Pc	LSHS-R
PD	1						
UPE	0.628*	1					
Pva	0.27*	0.26*	1				
Pt	0.298*	0.309*	0.805*	1			
Po	0.296*	0.3*	0.838*	0.836*	1		
Pc	0.238*	0.23*	0.726*	0.8*	0.779*	1	
LSHS-R	0.679*	0.76*	0.301*	0.346*	0.332*	0.259*	1

*p < 0.01. PD = Positive Dimension; UPE = Unusual Perceptive Experiences; Pva = Visual-Auditory Anomalous Phenomena; Pt = Tactile Anomalous Phenomena; Po = Olfactory Anomalous Phenomena; Pc = Cenessthetic Anomalous Phenomena; LSHS-R = Launay-Slade Hallucination Scale-revised.

TABLE 3. Exploratory Factorial Analysis*

	Factor 1	Factor 2	Uniqueness
Po	0.874	-0.309	0.14
Pt	0.872	-0.293	0.154
Pva	0.823	-0.313	0.225
Pc	0.78	-0.33	0.283
LSHS-R	0.617	0.665	0.178
UPE	0.560	0.625	0.296
PD	0.527	0.533	0.439
Explained variance	54%	21.5%	

*The model fit indices for this analysis are $\chi^2 = 25.5$ with $p < 0.001$; χ^2 normalized = 3.187; RMSEA = 0.062 (0.036-0.09); TLI = 0.985; CFI = 0.994; BIC = -25.1.
 PD = Positive Dimension; UPE = Unusual Perceptive Experiences; Pva = Visual-Auditory Anomalous Phenomena; Pt = Tactile Anomalous Phenomena; Po = Olfactory Anomalous Phenomena; Pc = Cerebral Anomalous Phenomena; LSHS-R = Launay-Slade Hallucination Scale-revised.

TABLE 4. Multiple Regression Models Using the “Enter” Method

		LSHS-R (Psychopathological Model)				APP (Unexplained Anomalies)			
Scales		r	β	Error	β_z	r	β	Error	β_z
CAPE ¹	ND	0.573*	0.017	0.012	0.060	0.401*	0.090	0.126	0.031
	DD	0.606*	0.021	0.022	0.038	0.369*	-0.037	0.244	-0.007
SPQ ¹	RI	0.631*	0.102	0.048	0.094*	0.434*	0.137	0.520	0.013
	MT	0.477*	-0.188	0.056	-0.139*	0.281*	-2.320	0.609	-0.170*
	UPE	0.572*	0.025	0.052	0.019	0.362*	-0.323	0.563	-0.025
	PI	0.591*	0.095	0.054	0.074	0.444*	1.999	0.581	0.156*
	SA	0.663*	0.184	0.047	0.169*	0.452*	0.741	0.505	0.068
	LF	0.63*	0.079	0.053	0.066	0.380*	-0.552	0.571	-0.046
	FA	0.599*	-0.008	0.060	-0.006	0.4*	0.378	0.652	0.028
EB	0.589*	-0.056	0.050	-0.053	0.39*	-0.038	0.538	-0.004	
MMSI-2 ¹	Ez	0.746*	0.187	0.032	0.527*	0.493*	0.822	0.351	0.230*
	K	0.37*	0.011	0.033	0.012	0.665*	4.185	0.354	0.460*
	L	0.068	-0.008	0.004	-0.071	0.296*	0.068	0.048	0.058
	F	0.072	-0.004	0.004	-0.033	0.197*	-0.161	0.049	-0.134*
	Si	-0.17*	-0.006	0.023	-0.010	0.158*	0.052	0.254	0.008
Beliefs ⁴		-0.033	-0.042	0.031	-0.047	0.411*	2.048	0.332	0.228*

¹ PD, UPE, Pva, Pt, Po, and Pc have been deleted since they had collinearity with LSHS-R y APP.

² Concerning LSHS-R model: R^2 (corrected) = 0.606; Intersection = 7.246 (error = 0,722); Durbin-Watson Index = 1.034.

³ Concerning APP model: R^2 (corrected) = 0.542; Intersection = -39.115 (error = 7,834); Durbin-Watson Index = 0.499.

⁴ Degree to which the individual believes in the existence of the paranormal (scale of 0 to 10).

* $p < 0.01$; β = regression coefficients; β_z = standardized regression coefficients; r = Pearson correlation coefficients; ND = Negative Dimension; DD = Depressive Dimension; RI = Reference Ideas; MT = Magical Thinking; UPE = Unusual Perceptive Experiences; PI = Paranoid Ideation; SA = Social anxiety; LF = Lack of Friends; FA = Flat Affect; EB = Eccentric Behavior; K = Inconsistencies; L = Lies; F = Frauds; Si = Simulation; Ez = Schizotypy; APP = Anomalous Perceived Phenomena.



enable the standardization of the scores. As an alternative, the LSHS-R scale has been selected for these regression models as the representative variable for testing the predictive power of other scales on psychopathological abnormalities. In fact, this previous scale has the highest factorial weights; therefore, it will also show a high *commonality*.

The aim of the Table 4 analysis was to select those predictors that generated the highest variability and change on the dependent variable. For this purpose, standardized regression coefficients were used. Results from Table 4 show that the variables that most strongly predict when other variables are being held constant on the LSHS-R scale were RI $\beta_z = .09$, MT $\beta_z = -.14$, SA $\beta_z = .17$, and Ez $\beta_z = .53$. For the APP scale, the selected variables were MT $\beta_z = -.17$, PI $\beta_z = -.16$, Ez $\beta_z = .23$, K $\beta_z = .46$, F $\beta_z = .13$, and Paranormal Belief $\beta_z = .28$.

Thus, these scales were selected to fit several stepwise multiple regression models in order to examine the additive or subtractive variance contributed by the subscales toward predicting both LSHS-R and APP scales, respectively. Results can be seen in Tables 5 and 6.

From Table 5, the hallucinations assessed by the LSHS-R scale can be successfully predicted to 75.9% using only Model 3, which includes the Ez, SA, and MT variables. However, it should be noted that predictive weights are low for most of these variables (excluding Ez, β 's < .21), and the total variance increase when adding these variables is approximately 0.6% up to Model 3. When introducing the RI variable, the observed increase in R^2 is not significant (see Table 5). Thus, analysis indicates that SA and MT do significantly add to the model that predicts LSHS-R, but not practically so, as the variance explained is minimal. Further, results show that the RI variable does not significantly contribute to the prediction of the criterion variable. Thus, it is not necessary to incorporate the RI scale into estimated models for LSHS-R. In addition, the anomalous perceptions assessed by the MMSI-2 APP scale from the current analysis, are predicted at 73.4% taking the K, paranormal beliefs, Ez, Fraud, and MT covariates into consideration. However, as with LSHS-R, with the exception of variable K, the predictor variables beliefs, Ez, F, and MT contributed only 6.9% of the variance explained. This means that for practical purposes the psychotic spectrum variables (with the exception of K) are not useful in predicting unexplained abnormal experiences. The variable K should be considered the main variable explaining 66.5% of the variance.

DISCUSSION

This research had two main objectives: on one hand, to assess whether the different scales evaluated anomalous perceptions within the same construct or not using an

EFA; on the other hand, to test if certain clinical variables related to psychotic phenotype and schizotypy could predict anomalous perceptions understood as hallucinatory and unexplained phenomena. Results indicated that the CAPE-42, SPQ-UPE, and LSHS-R scales evaluated anomalous experiences in a different way than the Pva, Pt, Po, and Pc (from MMSI-2 scales). This result may be due to the fact that the MMSI-2 items examining anomalous experiences do not include paranormal inferences or interpretations. In contrast, the LSHS-R items do include, in addition to psychotic-like experiences, magical and delusional interpretations.

Regression analyses showed that the variables related to psychotic symptomatology (such as RI, MT, SA, and Ez) predicted anomalous perceptions assessed by LSHS-R in a greater and more effective way than the other scales. This leads to further reflection about three critical points. (1) What differences exist between the perceptive scales from MMSI-2 and the CAPE-42, SPQ-UPE, and LSHS-R scales? (2) Why do psychopathological variables predict anomalous perceptions assessed by LSHS-R in a better way than the ones assessed by APP scales? (3) What other variables should be taken into account to optimize the fit indices of the regression models?

Firstly, it should be considered that the CAPE-42 scales (especially the PD), SPQ-UPE, and LSHS-R were designed for the examination of hallucinatory behaviors and psychopathological perceptive disruptions (Fonseca-Pedrero et al., 2011; Fonseca-Pedrero et al., 2012). This means that the evaluated content group observed symptoms in clinical psychotic episodes (Pasricha, 2011). In contrast, APP scales (Pva, Pt, Po, and Pc) were developed to evaluate perceptions that are similar to hallucinations, for whose sensorial objects or content there are experimental studies with significant results that question science's limits (Escolà-Gascón, 2020b). An example of these behaviors can be found in psi phenomena (Jinks, 2019). Regardless of whether these phenomena actually exist or not, this kind of research poses the idea of how to investigate if a hallucination or delusion really constitutes a psychopathological psychotic symptom.

The correlation matrix between these scales indicate that they were positively inter-correlated and the EFA could differentiate two predictor factors that grouped the scales into both groups mentioned. The initial correlations represent the basis on which the EFA works. What is done in an EFA is to analyze the pattern of variability and covariability of these variables. This is important to keep in mind, since the Pva, Pt, Po, and Pc scales have high correlations with each other, and in EFA these scales form a different factor from the rest of the scales. This detail is a point in favor of distinguishing between the two factors in the

TABLE 5. Stepwise Multiple Regression Models (Criterion Variable = LSHS-R)

Models	Variables	β	Error	β_z	r	R^2	ΔR^2	F	p
1	Intersection	6.202	0.361	-	0.746*	0.556*	0.556	702.47	$p < 0.01$
	Ez	0.265	0.010	0.746					
2	Intersection	5.320	0.413	-	0.755*	0.568*	0.014	17.695	$p < 0.01$
	Ez	0.311	0.015	0.876					
	SA	-0.237	0.056	-0.175					
3	Intersection	5.808	0.446	-	0.759*	0.574*	0.006	7.950	$p < 0.01$
	Ez	0.277	0.019	0.780					
	SA	-0.238	0.056	-0.176					
	MT	0.136	0.048	0.124					
4	Intersection	6.078	0.460	-	0.762*	0.577	0.004	5.189	$p = 0.023$
	Ez	0.259	0.021	0.728					
	SA	-0.260	0.057	-0.192					
	MT	0.124	0.048	0.113					
	RI	0.123	0.054	0.096					

¹ Degree to which the individual believes in the existence of the paranormal (scale of 0 to 10). * $p < 0.01$; β = regression coefficients; β_z = standardized regression coefficients; r = Pearson correlation coefficients; Ez = Schizotypy; SA = Social Anxiety; RI = Reference Ideas; MT = Magical Thinking; N.S. = Not significant.

TABLE 6. Stepwise Multiple Regression Models (Criterion Variable = APP)

Models	Variables	β	Error	β_z	r	R^2	ΔR^2	F	p
1	Intersection	-26.472	4.667	-	0.665	0.441*	0.442	443.302	$p < 0.001$
	K	6.053	0.287	0.665*					
2	Intersection	-25.557	4.551	-	0.686	0.469	0.029	30.526	$p < 0.01$
	Beliefs ¹	1.653	0.299	0.184					
3	Intersection	-37.646	4.699	-	0.716	0.511	0.043	48.775	$p < 0.01$
	K	4.064	0.349	0.446					
	Beliefs ¹	2.067	0.293	0.230					
4	Intersection	-38.214	4.630	-	0.727	0.525	0.016	18.339	$p < 0.01$
	K	4.408	0.353	0.484					
	Beliefs ¹	2.282	0.293	0.254					
	Ez	0.943	0.126	0.264					
	Fraud	-0.165	0.039	-0.138					
5	Intersection	-45.498	5.066	-	0.734	0.534	0.010	11.460	$p = 0.01$
	K	4.370	0.350	0.480					
	Beliefs ¹	2.222	0.291	0.247					
	Ez	1.330	0.169	0.372					
	Fraud	-0.146	0.039	-0.122					
	MT	-2.013	0.595	-0.148					

¹ Degree to which the individual believes in the existence of the paranormal (scale of 0 to 10). * $p < 0.01$; β = regression coefficients; β_z = standardized regression coefficients; r = Pearson correlation coefficients; K = Inconsistencies; Ez = Schizotypy; MT = Magical Thinking.



EFA. Nevertheless, the factor loadings indicated that some scales could be correlated with the two extracted latent factors. This is not a problem because the two extracted factors need not be mutually exclusive, but they are not clearly differentiated in the factor solution of our analyses: In the obtained EFA, scales from factor 2 also saturate highly in factor 1, indicating that both factors are not orthogonal or independent.

Therefore, factorial analysis would suggest that scales from factor 2 represent a construct-dimension that identifies the pathological perceptive disruptions (or potentially pathological) and factor 1 describes a different construct, which is related to the magical beliefs systems and frontier perceptive abnormalities. The fact that there are cross-loadings and that some of them are negative can have two interpretations: They can be a statistical artifact that is not useful or justified in the report, or they can be interpreted as meaning that the presence of psychotic-like experiences reduces the number of non-pathological anomalous experiences. Consequently, a distinction must be made between the scientific debate associated with the discussion of the existence or non-existence of psi phenomena and the debate related to the discussion that focuses on the psychopathological impact of anomalous perceptions.

In any case, this evidence is relevant because it supports 2 types of hypotheses: On the one hand, the anomalous experiences related to psi phenomena are not the same at the psychological level as the psychotic-like experiences of psychosis. On the other hand, the correlations and the EFA also support the idea that psychotic symptoms do not predict unexplained anomalous experiences versus psychotic-like experiences in the same way. Therefore, we can question whether the clinical model of psychopathology should be employed as a rational, psychiatric explanation of psi phenomena. However, this will have to be explored and confirmed in further research. Likewise, it would also be advisable to replicate the findings of Stefanis et al. (2004) and van Os et al. (2009), but using the MMSI-2 and APP scales. These results open up the opportunity for a new line of research. Namely, which Factor 1 scales from our EFA constitute an etiologically different phenomenon from the content of the Factor 2 scales? In reality, there is still the variability between 41.2% and 45.5% left to explain, which suggests that there would be other psychological predictor variables apart from the psychotic symptoms.

As mentioned in the Introduction, perhaps the psychological and subclinical features of histrionic, narcissistic, and paranoid personality should be added as covariates (Cardena & Carlson, 2011; Font, 2016; Acunzo et al., 2019). Moreover, these last features should be followed up with other variables such as psychotropic substances abuse

(Sideli et al., 2019) or the symptoms associated with emotional instability (Roe & Bell, 2016). Nevertheless, analysis of these variables was not a priority in this study, which focuses on the relationship between anomalous phenomena and the psychological features of subclinical psychosis. In this regard, the degree to which the subject believes in the existence of the paranormal also seems to predict APP-type anomalous phenomena and leads us to question whether belief systems could covary with these kind of anomalous perceptions, too (Irwin, 2009). In fact, some studies conclude that the belief system—understood as the cognitive representation and meanings ascribed to the perceived object—make a difference between psychopathological anomalous phenomena and those that are considered frontier (Irwin et al., 2013). Therefore, as stated by Lange et al. (2019) in their review, the perceived anomalous experience could be reinforced by the belief in the existence of the paranormal. Paranormal belief is an attribution that in this study is only identified for the CAPE-42 and LSHS-R questionnaire scales. These tests contain items expressing anomalous experiences with paranormal interpretations. In contrast, items in the MMSI-2 scales are neutral and do not contain any interpretation. In this case, each item expresses an anomalous experience without causal inference. This is crucial because it could justify and explain why the prediction of the MMSI-2 scores need more predictor variables than the scores of the other scales. Thus, based on the findings of the regression models and this theoretical background, it can be concluded that this study's results also support this hypothesis. As initially discussed, this conclusion is also supported by the correlations in Table 2, which show how the MMSI-2 scales have a weak association with the PD, UPE, and LSHS-R scales.

Regarding the limitations of this study, it is necessary to outline 2 main points. On one hand is the fact that APP scales could represent a behavioral phenomenon different from the construct assessed by the CAPE-42, LSHS-R, and SPQ-UPE scales. It is clear that APP cannot be the same object as the one in the LSHS-R scale; however, discarding the hallucinations related to the psychotic phenotype does not imply confirming any other alternative theory (nor the psi hypothesis). Although several psychological perception phenomena (for example, the *Barnum effect*, *pareidolia*, and other non-pathological cognitive biases [see Belloch et al., 1995; Shermer, 2011]) could be contributing to the etiological explanation of the abnormalities assessed by the APP scales, it can be said that these results provide evidence that APP scales do not assess pathological hallucinations and perceptive disruptions directly. This is consistent with previous research (Irwin et al., 2013; Vencio et al., 2018), but does not allow us to verify the alternative hypotheses

from these studies (see Belloch et al., 1995; Shermer, 2011).

On the other hand, other limitations can be related to the applied methodology. By using a design based on EFA—instead of *confirmatory factor analysis* (CFA)—it is not possible to confirm the hypothesis or theory that defends both extracted factors being different. For the proposed factorial model to be more valid, it should be tested whether the *parameters* of the measurement and structure model reproduce the *empirical variances-covariances matrix* properly. This inevitably requires the use of *structural equation modeling* and CFAs (Brown, 2015). However, the fact that this hypothesis cannot be validated does not invalidate the second conclusion of this research; in fact, with the obtained results, there are more reasons to support the second conclusion's validity and not the other way around. Nevertheless, statistically and methodologically speaking, it would not be correct to mention any “validity confirmation” of these hypotheses. More research is required to replicate these findings.

As a complement and limitation to this second critique, it is also necessary to remember that there are other psychometric instruments that measure non-clinical perceptive disruptions (French & Stone, 2014). In this regard, it could be interesting to replicate these procedures with other measures of perceptive disruptions within the phenomenological (Jaspers, 1993; Irwin, 2009) and illusion phenomena (Shermer, 2011) frameworks. As a suggestion, the *Australian Sheep-Goat Scale* (ASGS) (Drinkwater et al., 2018) is cited. Likewise, it could be possible to verify if the obtained EFA changes and generates new classifications or, on the contrary, maintains its two-dimensional structure.

Finally, another limitation to be considered is related to the predictor variables of the regression models. Although the multiple regressions used are correct, when forward *stepwise* regression is applied some predictors have very low and significant standardized beta values (the same happens with the *enter* regression). The fact that these values are low and significant warns that we should be cautious with the interpretation of the variance explained (R^2). In particular, it should be noted that the Ez and K scales (see Tables 5 and 6) were the variables that contributed the most weight to the prediction of psychotic-like experiences and abnormal experiences. The other variables also contribute to the variance explained in each step, but they have a smaller contribution that should be analyzed in future studies to check their statistical stability. Low values of standardized beta coefficients have an explanation. As previously mentioned, beta coefficients are partial–semipartial correlations. This means that predictor variables with low beta coefficients share the same source of variation as the other variables that also obtained low values in these coefficients. Since they share the same

source of variation, partial–semipartial correlations penalize the original Pearson linear correlation by subtracting the amount of variation they share with respect to the dependent variable. This suggests the following: In future research these variables or scales with low beta values could be operationalized in a more precise way, so as to avoid overlaps between the sources of variability.

IMPLICATIONS AND APPLICATIONS

The results obtained in the current study support the conclusion that anomalous phenomena/experiences have different statistical behavior from hallucinations and perceptive deceptions. Therefore, there is statistical evidence that differentiates unexplained experiences from conventional clinical classifications and explain them as perception errors or pathological behaviors.

This indicates the need for research into new clinical assessment scales that enable the discrimination between patients' hallucinations, perceptual deceptions, and anomalous phenomena. In accordance with the applied EFA, the use of MMSI-2 is proposed for future research in this area.

This research offers an alternative to the conventional clinical approach that explains the anomalous experiences/perceptions that are related to parapsychological beliefs as psychotic hallucinations. Although certain schizotypy psychotic features can correlate with these kinds of abnormalities, there are statistical reasons that support the hypothesis that some anomalous perceptions represent behaviors and frontier science phenomena that seem factorially different from classic psychotic hallucinations.

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Authors' contributions. AEG conceived and planned the study, collected the sample, performed the statistical analyses, and wrote the manuscript in consultation with JR.

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Data availability statement. The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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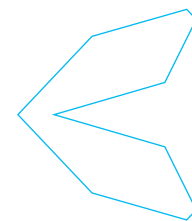
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RESEARCH
ARTICLE

Isotope Ratios and Chemical Analysis of the 1957 Brazilian Ubatuba Fragment

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HIGHLIGHTS

Analysis of the trace elements in a metallic sample from a 1957 'UFO' were inconclusive about its non-terrestrial origin. But tests indicated that the debris was mostly composed of extremely pure magnesium with an odd strontium impurity. This formula was not used in the manufacture of magnesium at the time.

ABSTRACT

A sample from the Ubatuba fragment collected in Brazil in 1957 was tested with the intent of examining the isotope ratios of its primary element, magnesium, and the trace elements strontium, barium, copper, and zinc. As background, the history of chemical testing of the Ubatuba fragments during the 1960s-1980s at multiple labs with varying capabilities is reviewed and then the remainder of the paper examines recent tests completed in 2017 and 2018 that for the first time used HR-ICPMS techniques to look at the isotopic ratios of the minor constituents as well as the primary magnesium component of the sample. The magnesium isotope ratios were found to fall within terrestrial limits while the results on the isotope ratios of the trace elements were inconclusive. Recommendations are made for improving the process of examining the trace elements.

KEYWORDS

Ubatuba, isotope, magnesium, HR-ICPMS, UFO

INTRODUCTION

The vast majority of UFO sightings involve only witness testimony, without physical evidence that can be examined in a laboratory. However, in a very small fraction of cases, there has been material available for later analysis. These include falls of angel hair (although these often evaporate rapidly), slag-like material, powdery deposits, or physical samples that appear manufactured. The Ubatuba, Brazil, samples, the subject of this paper, fall into this latter category. Other notable examples of physical traces include those in Campinas, Brazil (1954), Vaddo, Sweden (1954), Redding, CA (1969), Delphos, Kansas (1971), and Carlisle, NY (1975).

The ideal UFO artifact useful for isotope testing should 1) be something physical in a solid state, 2) have been witnessed or otherwise determined to be clearly involved with a UFO, and 3) have acceptable provenance and adequate data collection. These criteria are not easy to meet, first because the events themselves are rare (far less than 0.1% of UFO reports), and also because of the lack of investigative resources to meet points 2 and 3. Although the Ubatuba samples are not conclusively tied to a UFO event, the rarity of such a sample, the interesting circumstances of how it became available, and the long history of prior testing motivated this new analysis.



Sample History

The Ubatuba sample originated in Brazil in mid-1957. It was first mentioned in a Rio de Janeiro newspaper, *El Globo*, on September 14, 1957, with the title "A Fragment from a Flying Disk!" Pieces of a supposed flying disk were provided to the newspaper by a subscriber whose name was illegible but wrote in a very educated manner. The subscriber claimed that he had been fishing near the coastal town of Ubatuba when he saw a flying disk that was climbing rapidly just before it exploded into a shower of thousands of fiery fragments. Most of the fragments fell into the sea except for a few that fell on the beach and were collected. Three samples of a very light, dull, grayish metal that were received by the newspaper were turned over to Dr. Olavo Fontes. Fontes had the samples tested in Brazil before he turned the samples over to Coral Lorenzen of the Aerial Phenomenon Research Organization in late 1957. In 1987 Lorenzen turned the samples over to Dr. Peter Sturrock of Stanford University. The latter is the source of the sample tested by the authors of this paper (Sturrock, 2001).

It is not possible to know if these samples originated from an unknown aerial explosion or from the town of Ubatuba, Brazil. We can only be reasonably confident that the sample originated in Brazil sometime before September 1957 as that is when the samples first appeared at the Brazilian newspaper office of *El Globo* (Sturrock, 2001). This paper will examine the possibility of whether the material has a possible extraterrestrial origin based on an examination of the isotope ratios of the elements within the sample. Independent of the history of the samples, the isotope ratios of the elements within the sample should fall within the range of elements that originate on Earth. The isotope distribution of elements vary across the planet and those ranges have been established (CRC, 1998–1999).

Bulk Chemical Makeup

Close to a dozen different labs examined the elemental makeup of the Ubatuba sample from the 1950s through the 1990s. The surface chemical constituents will be ignored due to the lack of proper handling and contamination from contact with the ground. The bulk chemical makeup of the material from various labs will be reviewed as these tests involve removal of surface coatings prior to analysis, which eliminates the surface contamination issues.

Dr. Fontes arranged for the first testing of these samples, completed in Brazil in November 1957 by a Brazilian government lab, the Mineral Production Lab. Tests on the material using a Hilger Spectrograph detected no

trace elements present, indicating 100% magnesium (Mg) as far as the equipment could determine (*APRO Bulletin*, 1960). This seems to be the origin of statements that the Ubatuba sample was extraterrestrial because it was 100% pure magnesium. This was an erroneous conclusion as the material was not truly pure Mg; the trace elements were not detectable with the equipment used in Brazil at the time (Sturrock, 2001).

The Ubatuba sample was next tested in September 1958 at Oak Ridge National Laboratories by chemists Dr. Ellison Taylor and Dr. Cyrus Feldman, physicist Dr. T. A. Welton, and metallurgist Dr. Robert Gray. The chemical analysis was made by burning a small amount of the sample with an arc and using an Applied Materials two-meter grating spectroscopy to measure the elemental makeup. The results showed an overall purity of the Mg measured as 99.8%. Trace elements detected included iron (Fe), silicon (Si), and aluminum (Al) in the 100–1000 parts per million (ppm) range and calcium (Ca) and copper (Cu) in the 1–10 ppm range. (It is worthwhile to note that two elements that will be found in future tests, barium (Ba) and strontium (Sr), could not be measured if below 1200 ppm.) In their report, the scientists noted that the sample had fissures within the Mg crystalline lattice that indicated oxidation at high temperature, supportive of the story as to how it was found (ORNL report, 1958). Indications of high temperature oxidation based on lattice inspections were also noted in later examinations of the material by two metallurgists (Walker & Johnson, 1970; Walker, 1992). It was also noted that the form of the Mg ruled out pyrotechnics, and the properties of Mg ruled out this being any type of aircraft or missile that had burned up in the atmosphere. Oak Ridge National Labs believed it could still be man-made and that the sample was sufficiently interesting that it warranted further study (ORNL report, 1958).

Dow Chemical was the next laboratory to test the samples, in December 1961. They used an electron beam that sputtered into the sample to a distance of 1-4 microns. The system's sensitivity was generally 1000 ppm but with lower levels of detection for certain elements. Results indicated the purity of the Mg at 99.98% with traces of Sr and Ba at 30 ppm and Ca at 100 ppm (Sturrock, 2001).

February 1968 was the year that the University of Colorado UFO Study (Condon Committee) under the supervision of Dr. Roy Craig evaluated the Ubatuba samples. Craig used the government's Alcohol & Tobacco Laboratory to complete the testing. The lab removed the surface areas of the sample with hydrochloric acid and then rinsed it in distilled water before they utilized neutron activation followed by measurement of gamma ray activity using gamma-ray spectroscopy to measure the

sample's elemental makeup. The purity of the Mg was 99.9% with Sr at 500 ppm, Ba at 160 ppm, zinc (Zn) at 500 ppm, manganese (Mn) at 35 ppm, chromium (Cr) at 32 ppm, and copper (Cu) at 3 ppm. The lab's published measurement errors varied by element but they were all roughly +/-20% of the measured value. (NOLAT Report, 1968). Craig noted in the Condon report that the traces of Sr were not known to be added to commercial Mg (Condon Committee, 1968). This lab also measured the Mg isotope ratios, which will be discussed later in this paper.

The capability to test <100 ppm and parts per billion (ppb) levels of trace elements advanced considerably in the 1990s with the advent of the inductively coupled plasma mass spectrometer (ICP-MS). For background,

ICP-MS is a type of mass spectrometry that uses an inductively coupled plasma to ionize the sample. It atomizes the sample and creates atomic and small polyatomic ions, which are then detected . . . It can detect different isotopes of the same element, which makes it a versatile tool in isotopic labeling. (Wikipedia, 2022)

Sturrock had two samples tested in March 1997 by Elemental Research in Vancouver using a laser ablation ICP-MS. With this new technique 37 trace elements were detected. This is not unexpected as many of these elements were in the ppb range and almost any metal tested with such a system will have many trace contaminants. Only the significant trace elements will be discussed. Calcium was detected at 4600 ppm and 3230 ppm and titanium (Ti) at 283 ppm in one sample. The Ca is much higher than ever reported previously. It is likely that this is due to surface contamination as laser ablation vaporizes the sample from the surface downward. Surface analysis tests had shown large amounts of sodium (Na), Ca, Mn, and Ti all present in seawater, which was near where the samples were claimed to have been found. The more interesting trace contaminants in order of amount were as follows: Sr (916 ppm and 568 ppm), Ba (301 ppm and 248 ppm), Zn (27.8 ppm and 17.5 ppm), Cu (3.0 ppm and 16.6 ppm), tin (Sn) (7.7 ppm and 11.3 ppm), and lead (Pb) (7.1 ppm and 10.5 ppm) (Sturrock, 2001).

In summary, the Ubatuba sample's bulk constituents were approximately 99.8% Mg with the main two trace metals being Sr (500–000 ppm) and Ba (150–300 ppm). Present in smaller amounts were Zn (<100 ppm), Cu (3–20 ppm), and both Pb & Sn (7–11 ppm). The use of Sr as a trace element in Mg had been done by Dow Chemical but was not considered a normal practice during the time this sample was first obtained (Sturrock, 2001). Although finding such a pure form of Mg with trace levels of Sr in

Brazil in 1957 was very unusual and difficult to explain, this was not sufficient evidence to establish a non-terrestrial origin for the sample. The next tests discussed attempted to do that by examining the isotope ratios of the Mg in the Ubatuba sample.

Isotopic Analysis of Mg

The value of isotopic analysis rests with the unique isotope ratios of elements that originate in different locations on earth, different time periods, other areas of our solar system, or in other star systems. We know the range of isotopes that can occur naturally on Earth, so unless a material is treated in such a way as to shift the isotope ratios of a given element, we expect it to fall within the normal terrestrial range. Elements that originate in meteorites, on the Moon, Mars, etc., will have slightly different isotope ratios for some of the elements such as Mg, Cr, Sr, Ba, Ti, and Ni due to the inhomogeneous development of the solar system's protoplanetary disk as well as the decay of ²⁶Al (Paton et al., 2013; Young & Galy, 2004; Lugaro et al., 2018). A material from outside of our solar system would be expected to have even more variation in isotope ratios (Lugaro et al., 2018; Vangioni & Olive, 2019). The isotope ratio in and of itself cannot prove that an object has an extraterrestrial origin but it is a clue as to a material's origin.

The first analysis of Mg isotopes in the Ubatuba sample was done in February of 1968 by Craig as part of the Condon Committee and was performed using neutron activation by the National Office Laboratory of the Alcohol and Tobacco Division (NOLAT, 1968). The analysis looked at only one of the three isotopes of Mg, ²⁶Mg. As reference, the nominal terrestrial abundance values for these isotopes are: ²⁴Mg = 78.99%, ²⁵Mg = 10.00%, ²⁶Mg = 11.01% (the abundances of the common isotopes of an element in a sample should add to 100.0%, so in the Ubatuba sample, ²⁴Mg + ²⁵Mg + ²⁶Mg = 100.0% within measurement error). The report indicated that the isotope abundance of ²⁶Mg was 14.3% with an error of 0.7% and noted that the value "is in reasonable agreement with ²⁶Mg in the literature." (NOLAT, 1968) This statement is incorrect, and to further compound the error, Craig, in the Condon Committee report, left out the value obtained by the lab and simply stated (Condon Report, 1968), ". . . the Brazil sample did not differ significantly in ²⁶Mg isotope content from other magnesium samples (p. 142)." It is difficult to understand how Craig, with a PhD in chemistry, could have made this error, but he did. A chemist's bible, *The Handbook of Chemistry and Physics*, lists the nominal abundance of ²⁶Mg as 11.01% (CRC, 1998–1999). The terrestrial range of this magnesium isotope is 10.99% to 11.03% (USGS, 2006). This gross error was not known

until Dr. Michael Swords obtained and then reviewed the actual papers of Craig from the Texas A&M Cushing Library in 2008. A further error was found by Brad Sparks in 2018 when he noted that the lab calculations used the weight of the wrong Ubatuba sample (there were two samples prepared) and if the correct weight had been used then the ^{26}Mg value would be 23.1% (Sparks, 2019). It is clear that whether the ^{26}Mg was 14.3% or 23.1%, this first attempt at measuring the isotope ratio was a failure.

The second analysis of Mg isotopes was done by Sturrock in the spring of 1997 and the testing was completed by Charles Evans and Associates using SIMS (Secondary Ion Mass Spectrometry) instrumentation. This analysis evaluated all three common magnesium isotopes. The exact values for each isotope obtained were not provided but instead the ratios of the isotopes were displayed in a chart that compared the ratio of $^{26}\text{Mg}/^{24}\text{Mg}$ to $^{25}\text{Mg}/^{24}\text{Mg}$. Figure 1 (from Sturrock, 2001) shows these ratios for an Ubatuba sample as well as four different samples provided by DOW Chemical. Also plotted is the point corresponding to the ratios for the nominal values of the Mg isotopes: $^{26}\text{Mg}/^{24}\text{Mg} = 0.1394$ and $^{25}\text{Mg}/^{24}\text{Mg} = 0.1266$.

The last attempt to measure the magnesium isotopes was made later in 1997 by Sturrock using Elemental Research in Vancouver, Canada. They used a laser ablation ICP-MS. Sturrock indicated that there were results for two Ubatuba samples and two magnesium standards, one of

which came from the National Institute of Standards and Technology (NIST). However, his paper displays results from only one of the Ubatuba samples, the two standard samples, and states the other Ubatuba results “looks” just like the other one. The three displayed magnesium isotope distributions look similar, indicating a terrestrial origin for the Ubatuba sample as shown in Figure 2 (from Sturrock, 2001). The data counts for the graphs are supplied in the paper but not the actual magnesium isotope percentages.

The authors have converted the data counts in Figure 2 into percentage values, which are shown in Table 1. Uncertainties for these ratios are not available as errors were not published with figure 2 in Sturrock (2001). Even so, the deviations of the values of the Ubatuba sample from the terrestrial norms are very small in magnitude and not inconsistent with a terrestrial source (differences could be due to the capability of the equipment used).

In summary, the three past attempts to measure magnesium isotopes in the Ubatuba samples have been inconclusive. We next report on more recent results using modern equipment that allows measurement of not only the magnesium isotopic distribution but the isotopic components of the trace metals in the sample that are in the 10–100 ppm range. This will allow for examination of more metals than just the magnesium which makes up 99.88% of the sample with trace metals accounting for the remaining 1200 ppm.

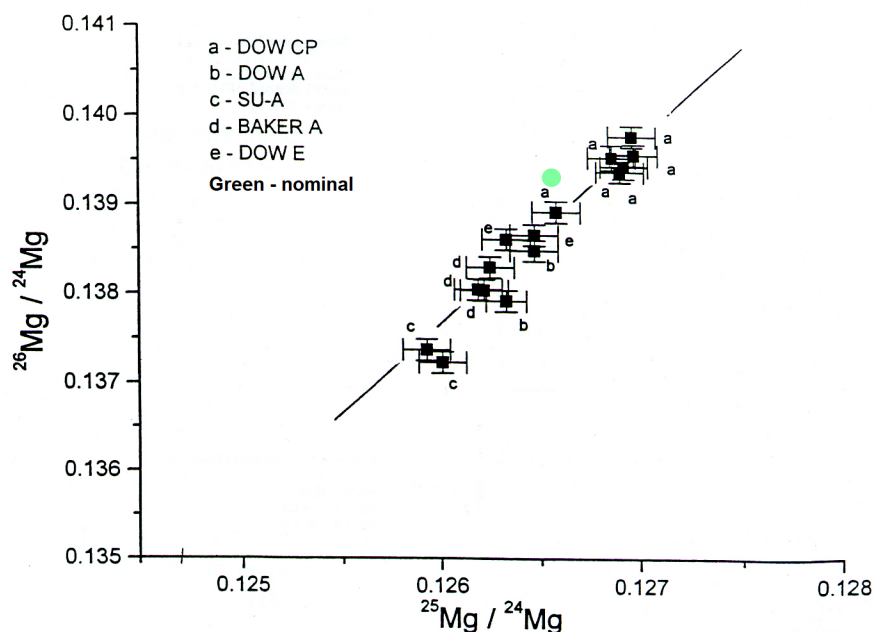


Figure 1. Plot of the determination of the isotope ratios $^{25}\text{Mg}/^{24}\text{Mg}$ and $^{26}\text{Mg}/^{24}\text{Mg}$. From figure 1 from Sturrock (2001). (a) DOW CP is the DOW sample of triply sublimed magnesium used in the Colorado Project; (b) DOW A is a sample of triply sublimed magnesium supplied by DOW Chemical to Peter Sturrock; (c) SU-A is one of the Ubatuba samples; (d) Baker A is a magnesium standard used by the Johnson Space Flight Center; (e) DOW E is another sample of triply sublimed magnesium supplied by DOW Chemical to Peter Sturrock; and (f) the added green circle is the calculated nominal value based on the established nominal values for the 3 magnesium isotopes.

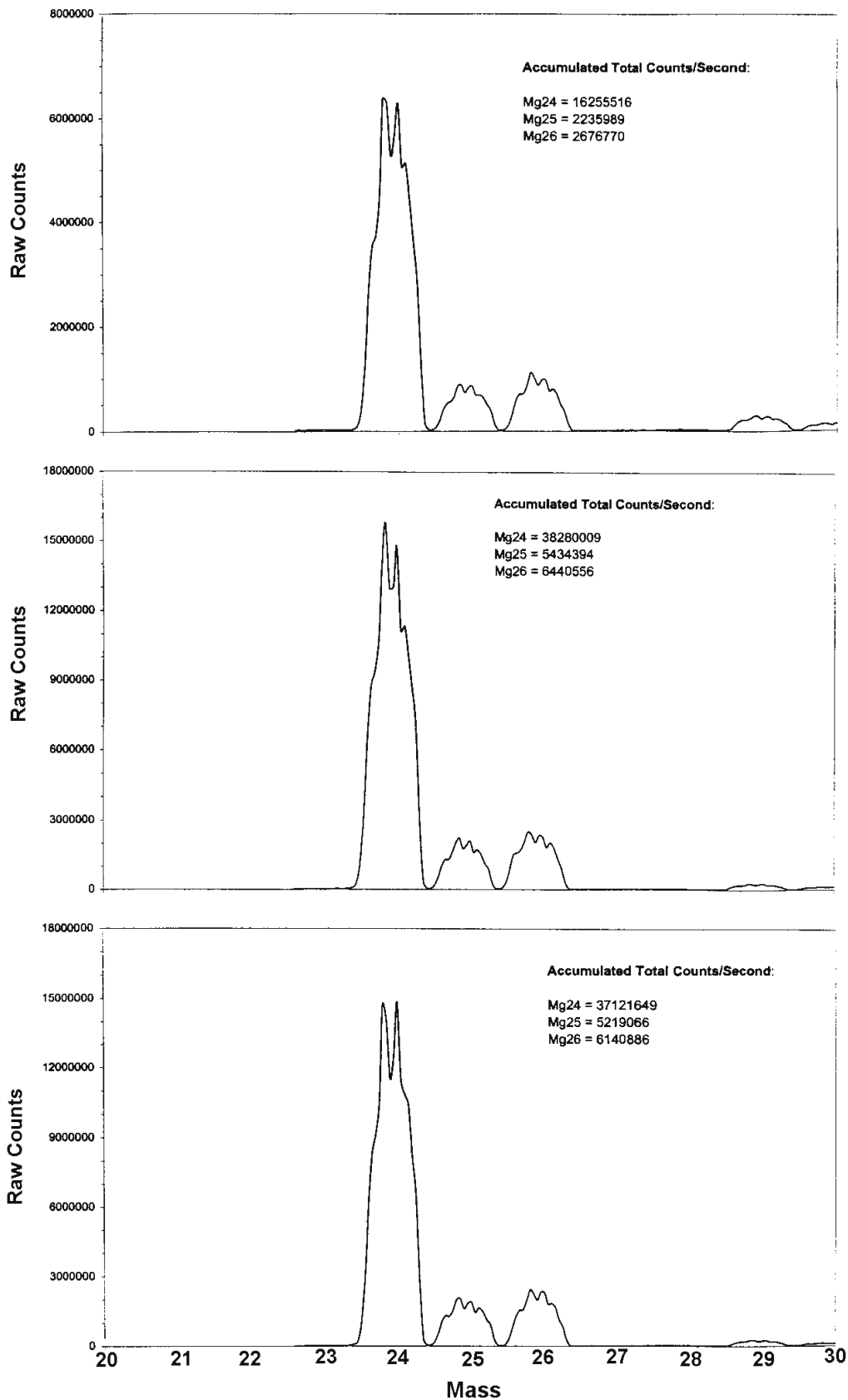


Figure 2. Isotope composition as determined by Elemental Research using ICP-MS (from figure 2 in Sturrock, 2001). Top display is of the Ubatuba Mg sample SU-H; center display is Mg sample ALFA-a; and bottom display is NIST sample ISO-A.

TABLE 1. Mg isotope abundance for distributions shown in Figure 2.

Isotope	NIST Standard ISO-A (%)	Ubatuba SU-H (%)	Standard Sample ALFA-a (%)
²⁴ Mg	78.99	79.25	78.76
²⁵ Mg	10.00	9.81	10.07
²⁶ Mg	11.01	10.99	11.16

2017–2018 ISOTOPIC ANALYSIS OF MG, SR, BA, ZN, AND CU

During the twenty years since the Ubatuba sample was last studied, the ability to analyze isotope ratios has improved significantly. Not only can the isotopes of Mg be analyzed, but so can the minor constituents that are in the 100–1000 ppm range. Based on the previous analysis of the chemical constituents of the Ubatuba sample, we identified the trace elements of Sr, Ba, Zn, and Cu as targets for isotope analysis.

Michael Swords obtained from Peter Sturrock a small piece from an original Ubatuba sample. Cerium Laboratories in Austin, Texas, was identified as the lab of choice to do the isotope analysis. Cerium has an ISO 17025 accredited laboratory for testing and calibration and is well-known in the nanotechnology field. The instrument used for isotope analysis was their High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICPMS) manufactured by Thermo Finnigan and known as the Finnigan Element2. The equipment is capable of measuring below parts per trillion levels of trace elements. This same system has been used to measure Pb isotopes in peat bogs (Krachler et al., 2004), Sr isotopes in sediments (Hulme et al., 2008), and is capable of separating most of the elemental isotopes (Element Series, 2020).

Two of us (MS and RP) met with Dr. Tim Hossain, the chief scientist at Cerium, along with the director of their lab and the chemist who would be running the HR-ICPMS. The sample and testing procedures were discussed and agreed upon. The sample was prepared in a Class-1 clean area, which means there is no more than one particle larger than 0.5 microns in size per cubic meter of air. It was agreed that 50 angstroms (5×10^{-7} cm) of the sample's outside surface would be removed in order to eliminate contaminants introduced from handling. From the cleaned sample 0.00570 grams was dissolved in 1% ultra-pure nitric acid at 22 °C for 30 minutes. The Sr, Cu, Zn, and Ba were diluted 100:1 while a solution to test the Mg was diluted 10,000:1.

The latter was required due to the large amount of Mg making up the sample. Calibration of the HR-ICPMS was done using NIST traceable standards.

The more highly diluted Mg sample was tested first on July 28, 2017. The results are shown in Table 2. The ²⁶Mg abundance of 10.58% in the Ubatuba sample was substantially different from the nominal abundance of 11.01%. No standard error was provided by Cerium so we cannot conclude that the ²⁶Mg abundance was outside of the terrestrial norm.

TABLE 2. Ubatuba sample Magnesium isotopes abundances from a 10,000:1 sample dilution from Cerium Labs with nominal abundance for comparison.

Isotope	Nominal Abundance (%)	Ubatuba Unknown (%)
²⁴ Mg	78.99	79.31
²⁵ Mg	10.00	10.10
²⁶ Mg	11.01	10.58

The results of the isotope analysis on the lower concentration elements were received on September 8, 2017, and are shown in Table 3. Unfortunately, again no standard deviation error was provided by the lab.

Strontium had the most unusual variations with the Ubatuba ⁸⁴Sr abundance at 0.74% compared to the nominal value of 0.56% and the ⁸⁶Sr at 9.10% compared to the nominal value of 9.86%.

Once these results were reviewed, we planned a second lab analysis of the same dissolved samples that had been originally prepared by Cerium Labs. This would provide independent verification of the Cerium results. We had hoped to use a university laboratory for the second analysis. Among the labs contacted were the University of Texas, Rice University, University of Maryland, and the University of Houston. We were unsuccessful in getting any university lab to commit to analyzing our sample once they asked about the source of the sample and were told it was of an unknown source of almost pure magnesium that had supposedly burned up in the atmosphere. Unsuccessful in the university arena, another commercial laboratory was chosen: ICP and ICP-MS Services in Cleveland, Ohio. The lab was run by Dr. Arthur Varnes and used a Thermo Scientific iCAP-Q inductively coupled plasma mass spectrometer.

TABLE 3. Ubatuba sample Strontium, Copper, Zinc and Barium Isotopes abundances from a 100:1 sample dilution from Cerium Labs with nominal abundances for comparison.

	Isotope	Nominal Abundance (%)	Ubatuba Unknown (%)	Absolute Percent Difference*
Strontium	⁸⁴ Sr	0.56	0.74	32%
	⁸⁶ Sr	9.86	9.10	8%
	⁸⁷ Sr	7.00	7.03	0%
	⁸⁸ Sr	82.58	83.12	1%
Copper	⁶³ Cu	69.17	70.26	2%
	⁶⁵ Cu	30.83	29.74	4%
Zinc	⁶⁴ Zn	48.6	49.41	2%
	⁶⁶ Zn	27.9	27.73	1%
	⁶⁷ Zn	4.1	4.09	0%
	⁶⁸ Zn	18.8	18.77	0%
Barium	¹³⁴ Ba	2.42	2.28	6%
	¹³⁵ Ba	6.59	6.27	5%
	¹³⁶ Ba	7.85	7.55	4%
	¹³⁷ Ba	11.23	10.85	3%
	¹³⁸ Ba	71.7	73.05	2%

* Absolute percent difference = $(\text{Abs}(\text{Unknown} - \text{Nominal})/\text{Nominal}) \times 100$

The ICP-MS used was calibrated based on NIST traceable reference solutions with concentrations of Ba, Cu, Mg, Sr, and Zn in the 1000 ppm range. The lab report from ICP-MS Services was received on July 3, 2018.

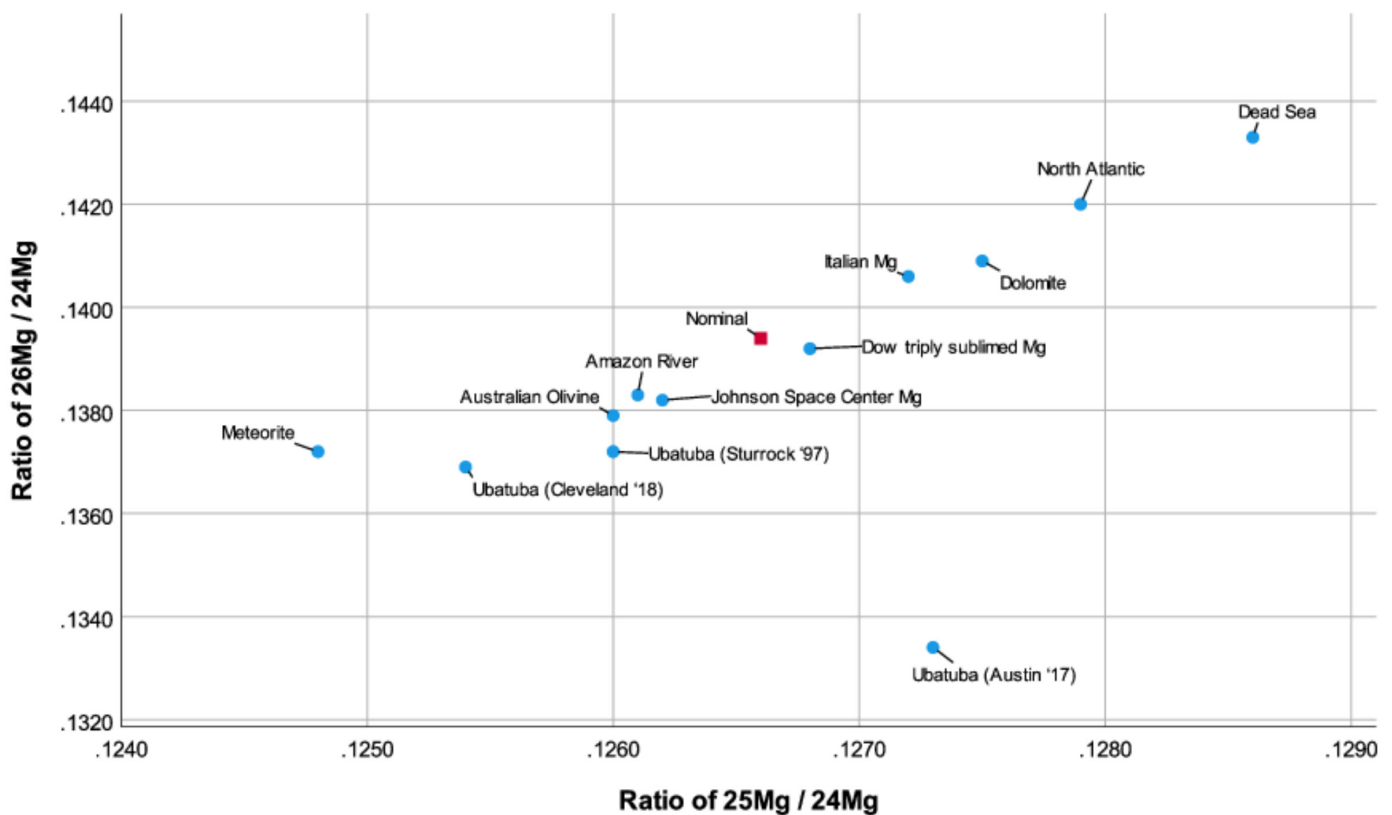
The results of the Mg isotopic abundances will be examined first. Table 4 shows for comparison the same information as Table 2 plus the addition of the results from ICP-MS Services in Cleveland, which included information on error of measurement allowing us to calculate a 95% confidence interval. The Cleveland results are consistent with terrestrial abundances for ²⁶Mg and ²⁵Mg, although not quite for ²⁴Mg. As noted earlier, non-terrestrial sources can lead to different abundances. For example, from results of models reported in Vangioni and Olive (2019), we calculate the abundances produced by a star with 15 solar masses (only stars with 2 or more solar masses produce magnesium) as ²⁴Mg = 82.4%, ²⁵Mg = 8.7%, ²⁶Mg = 8.91%, quite different from terrestrial values. Conversely, abundances for stars in the Hyades cluster are very close to terrestrial

values because these stars are in the Local Group with the Sun (Yong et al., 2004).

It is most useful to look at the ratio of ²⁶Mg and ²⁵Mg to the dominant form ²⁴Mg to determine possible origin. This was first examined by Sturrock as shown in Figure 1. Figure 3 includes this same information, with additional data for Mg isotopes from a meteorite, Dead Sea Mg, Amazon River Mg, and the North Atlantic as well as the values obtained on the Ubatuba sample from the Austin and Cleveland labs. The results from the Cleveland lab fall on the same diagonal line as other terrestrial samples while the Austin lab falls well off the line. Since both of these labs are measuring the same sample solute, it is most likely that some error occurred in the measurement of the Mg isotopes by the Austin lab. (As comparison to a potential non-terrestrial source, the point corresponding to the two ratios derived from the abundances reported above for a 15 solar mass star falls well outside the plot area.)

TABLE 4. Ubatuba sample Magnesium isotopes abundances in 10,000:1 sample dilution from Austin and Cleveland labs with nominal abundances for comparison.

Isotope	Nominal Abundance (%)	Ubatuba Unknown Austin (%)	Ubatuba Unknown Cleveland (%)	Cleveland 95% Confidence Interval
^{24}Mg	78.99	79.31	79.28	79.16 – 79.40
^{25}Mg	10.00	10.10	9.94	9.64 – 10.24
^{26}Mg	11.01	10.58	10.85	10.70 – 11.00

**Figure 3.** Magnesium isotope fractionation, plot of ratio of $^{26}\text{Mg}/^{24}\text{Mg}$ with ratio of $^{25}\text{Mg}/^{24}\text{Mg}$ from a variety of samples.

The other trace isotopes measured by ICP-MS Services are listed along with the results from Cerium Labs in Table 5. Given the results for Mg we place more weight on the ICP-MS Services analysis. There is no consistent variation between the two labs as compared to the nominal terrestrial isotope abundance measured for the various elements. ^{84}Sr and ^{87}Sr were below nominally measured terrestrial values as measured by ICP-MS Services yet the Cerium Lab value for those isotopes were above the nominal terrestrial values. The same can be seen with some of

the Zn isotopes. ICP-MS Services measured ^{64}Zn as below the nominal value for the Ubatuba sample and measured ^{67}Zn and ^{68}Zn above the nominal values while Cerium Labs measured ^{64}Zn above the nominal value and the rest of the Zn isotopes as meeting the nominal terrestrial values.

DISCUSSION AND CONCLUSIONS

One of the key lessons from this paper are the difficulties inherent in identifying whether the elements in a

TABLE 5. Ubatuba sample Sr, Cu, Zn, Ba Isotopes abundance in 100:1 sample dilution from Austin & Cleveland labs with nominal abundances for comparison. Standard deviation included for Cleveland data.

Element	Isotope	Nominal Abundance (%)	Ubatuba Unknown Austin (%)	Ubatuba Unknown Cleveland (%)
Strontium	⁸⁴ Sr	0.56	0.74	0.53 +/-0.01
	⁸⁶ Sr	9.86	9.10	9.85 +/- 0.31
	⁸⁷ Sr	7.00	7.03	6.83 +/- 0.05
	⁸⁸ Sr	82.58	83.12	82.77 +/- 0.32
Copper	⁶³ Cu	69.17	70.26	69.14 +/-0.47
	⁶⁵ Cu	30.83	29.74	30.86 +/-0.42
Zinc	⁶⁴ Zn	48.6	49.41	46.99 +/- .024
	⁶⁶ Zn	27.9	27.73	28.00 +/- 0.13
	⁶⁷ Zn	4.1	4.09	4.37 +/- 0.04
	⁶⁸ Zn	18.8	18.77	19.70 +/- 0.20
Barium	¹³⁴ Ba	2.42	2.28	2.41 +/- 0.01
	¹³⁵ Ba	6.59	6.27	6.65 +/- 0.03
	¹³⁶ Ba	7.85	7.55	7.85 +/- 0.04
	¹³⁷ Ba	11.23	10.85	11.21 +/- 0.08
	¹³⁸ Ba	71.7	73.05	71.67 +/- 0.10

material are composed of isotopes that match the nominal terrestrial isotope values. One of the primary challenges is identifying two labs with sufficient experience in measuring specific isotopes so that duplicate results can be verified. Although both labs were very experienced in the use of HR-ICPMS and ICPMS systems, neither were experts in the specific isotopes being measured. This is a real challenge as most labs with experience in isotopic analysis of specific elements are at universities. Most of these labs have their own projects and it is difficult to get a university lab to do an analysis on an outside project especially if the sample source is tied to a subject that is not of interest to the university, and perhaps as controversial as the UFO phenomenon. As the demand for isotopic analysis increases, hopefully there will be an increase in the expertise at commercial labs as these are less concerned with sample origin.

The difficulty in obtaining consistent isotope values in the trace metals between the two labs may be related to the high concentration of Mg in the samples which was three orders of magnitude greater than the trace metals. This can lead to swamping of the HR-ICPMS detector

sensitivity at the expense of the trace metal isotopic analysis. Should the Ubatuba samples be tested again, it would be advisable to chemically separate the heavier trace isotopes from the Mg so that all elements in the sample tested are in the same concentration range. Low ppm levels of trace elements can be tested effectively once separated and there now exist even more accurate testing capability with multiple collectors on a HR-ICPMS. These systems are known as Multicollector Inductively Coupled Plasma Mass Spectrometers (MC-ICPMS) and most exist at universities that do isotope analysis.

No conclusion can be drawn from the data obtained from Cerium Labs and ICPMS-Services as to whether the Ubatuba sample consists of trace elements whose isotopes do not match the normal range of terrestrial isotopic ratios. Although both labs found isotope distributions outside of normal terrestrial values, the lab values were not consistent with each other.

One definite strangeness with the Ubatuba sample does remain. All testing consistently indicates that the Ubatuba sample is 99.88% pure magnesium with traces of Sr, Ba, Zn, and Cu. The strontium impurity is not a normal

by-product in the manufacture of magnesium and would have been intentionally added. Dr. Beaman and Dr. Solaski of DOW Chemical were surprised by the presence of strontium as was Dr. Couling of Battelle Labs (Sturrock, 2001). It is still a mystery as to how high purity magnesium with the addition of strontium impurities showed up at a Brazilian newspaper office in 1957.

IMPLICATIONS AND APPLICATIONS

The current study illustrates both the promise, and difficulties, of doing elemental analysis on samples from anomalous events, whether UFO-related or otherwise. The study aims to distinguish a possible extraterrestrial artifact from terrestrial ones, but this is not a straightforward exercise. Limitations of instrument precision and the cost of testing make definitive results difficult to achieve, even with the improvements in analytical technology (unless a sample has isotope ratios far outside normal abundances). So too do developments in materials science, which construct ever-more esoteric materials (although this is less of a complication with a sample from an earlier era, as with Ubatuba).

The use of isotope analysis within the field of ufology should be expanded to analyze landing traces, and close encounter cases generally, where odd substances or extreme effects are seen. Such cases could conceivably have remnant materials of abnormal isotope ratios. A concerted focus on this type of evidence by investigators and UFO organizations is an essential strategy.

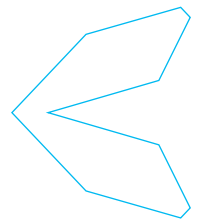
Thinking beyond the UFO box, if any researcher obtains unusual seeming material from incidents like cryptozoological encounters, strange falls from the sky, or paranormal objects such as apports, this approach can be employed. We need more reliable, physical data on all types of paranormal events, and purported physical samples allow the most in-depth studies. However, this is limited by the serious expense of these tests. They cannot be casually applied.

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RESEARCH
ARTICLE

Do the ‘Valentine’s Day Blues’ Exist? A Legacy Report on a Purported Psychological Phenomenon

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HIGHLIGHTS

New research reveals that the ‘Valentine’s Day Blues’ is not an urban myth but a real form of situational depression. It can affect people of different ages or gender who do not receive gifts, although men seemingly rebound faster than women.

ABSTRACT

The ‘Valentine’s Day Blues’ is an enduring concept rooted in pop psychology that has unfortunately received little empirical attention. On this point, it is commonly assumed that the increasing commodification of romance plus the social trappings of Valentine’s Day can elicit stress similar to that evoked by traditional holidays. This view might predict that women’s greater experience of ‘mattering’ and greater tendencies toward depression and rumination should place women at a greater risk of ‘Valentine’s Day Blues’ than men. Accordingly, when no Valentine’s Day gift is received such distress likely lasts longer in women than in men in addition to being stronger in general. These hypotheses were tested based on the data of 2,070 participants in a 2004 consumer sentiment survey who completed a 34-item online questionnaire within four weeks following Valentine’s Day. This questionnaire addressed (a) anxiety, (b) depression, (c) rumination, and (d) social anxiety as derived from existing instruments. Rasch scaling analyses found that men and women’s generalized depression (i.e., a combination of the four aforementioned item types) was greater for those not receiving a gift relative to that expressed by those who did receive a Valentine’s Day gift. However, while men rebounded after two weeks, women’s greater depression continued after three weeks. Of greatest clinical concern are 30-to-40-year olds, whereas those least affected were respondents over 40 years of age.

KEYWORDS

Holiday depression, invented syndromes, pop psychology, Rasch scaling, stress reactions

INTRODUCTION

Popular (pop) psychology is an umbrella term for psychological ideologies, therapies, or other techniques that gain popularity through mass or social media and thus are deemed credible by the general population. An adverse trend in this context is the rise of health scares via ‘invented disorders and syndromes.’ Along with criticisms (e.g., Allsopp et al., 2019) levied at mainstream psychology and psychiatry for ill-defined diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-

5, American Psychiatric Association, 2015), the penchant for pop psychologists, activist scientists and clinicians, or other social influencers to propose new, or expand on existing, biomedical conditions, disorders, or syndromes has promoted a culture of ‘medicalization’ (Frances, 2013; Lack & Rousseau, 2020), i.e., an increase in ‘mentally ill’ individuals or the pathologizing of ‘normal’ behaviors. This can cause an influx of new patients who are exposed to unnecessary or even counterproductive medications or therapeutics (for discussions, see Bradford, 2010; Frances, 2013; Kirschner, 2013; Pickersgill, 2014; Roy et al., 2019).



One potential example of an invented syndrome is the phenomenon known colloquially as the 'Valentine's Day Blues.' The authors became intimately aware of this reputed affliction during research projects with different online dating services (e.g., Houran & Lange, 2004, 2010; Houran et al., 2004, 2005; Lange et al., 2004b, 2005). Part of that prior work supported product development and marketing initiatives for these websites. This allowed us to conduct focus groups and consumer sentiment surveys with individuals seeking romantic relationships. Interestingly, there was a consistent though anecdotal pattern to the type of feedback that single (i.e., unpartnered) adults shared during the Valentine's Day season. The following narrative is highly representative of the emotional state described by many such individuals:

I didn't have a valentine this past Valentine's Day—as usual. I've never had a valentine or been someone's valentine. I felt nothing. I felt numb. I felt full from eating too much chocolate. I cried when I got home. Valentine's Day . . . the one day set aside in the entire year where lovers affirm to each other in front of the world that they love and cherish and adore one another. I wanted this desperately. (Lily, a 43-year-old female member of an online dating site, personal communication, 2004)

This raises the question of whether poignant and disquieting experiences like this are typical of most contemporary singles or if select cases are being dramatized to create what essentially amounts to an urban myth.

The popular view argues that the commercial and societal norms surrounding St. Valentine's Day in Westernized societies have a detrimental impact on the psychological well-being of adult singles not involved in romantic relationships and/or those who do not receive tokens of love on this holiday (see e.g., DB&MH, n.d.; Hoffman & Davis, 2014; Patrick, 2022). Pressure to conform to these norms might have credence as evidenced by recent statistics on Valentine-related festivities. For example, Americans are estimated to spend \$23.9 billion for associated merchandise in 2022 (National Retail Federation & Prosper Insights and Analytics, 2022). Trend analyses show that consumers purchase approximately 1 billion greeting cards each year (McLaughlin, 1997) excluding packaged valentines for classroom exchanges by children (Greeting Card Association, 2019), 58 million pounds of chocolate (George, 2022), and 250 million roses (Society for American Florists, n.d.).

Zayas et al. (2017) demonstrated the importance of Valentine's Day on perception and expectation in a large, diverse US sample. Their findings indicated that as Valentine's Day neared, evaluations of roses and chocolates (but

not a comparison object) were evaluated more positively. Further consistent with societal depictions of Valentine's Day as romantic, another study using sentiment analysis—i.e., a technique that extracts opinions and feelings through the analysis of text—found that tweets about Valentine's Day mostly focused on emotions and material aspects of the celebration versus sexual elements (Sansone et al., 2021). But what happens when the flowers, candy, and cards are not forthcoming and there is no romantic partner in the picture to provide them?

Although there is little academic research specifically relating to Valentine's Day, some studies on mental health during holiday periods are available. For example, one review documented increases in dysphoric moods following holidays (Friedberg, 1990), and Sobel et al. (1998) similarly found a significant increase in emergency contacts at a rural mental health clinic coinciding with holidays. Increases in deliberate (but non-fatal) self-harming behavior at a London hospital on Valentine's Day did not reach statistical significance in one study (Culham et al., 1993), but Davenport and Birtle (1990) reported that the rates of parasuicide among adolescents on this holiday were significantly increased. Finally, Baier (1988) described 'holiday blues syndrome' as a situational stress reaction related to social demands, unmet expectations, and biological stressors such as lack of sleep.

Accordingly, her proposed interventions involved reducing the specific stressors activated by the holidays and promoting and mobilizing the support and coping mechanisms already in operation for an individual. These suggestions echo Goin (2002), who discussed how the 'holiday blues' have great potential for being associated with anniversary reactions. Unfortunately, the sociocultural milieu surrounding certain holidays can make it quite difficult for individuals like Lily in the earlier quote to effectively enact Baier's (1988) proposals. As we review next, Valentine's Day certainly seems to be a prime event given its strong psychological and societal reinforcements.

SOCIALIZATION AND VALENTINE'S DAY EXPECTATIONS

St. Valentine's Day as it is currently practiced is a modern, commercial holiday with vague origins (Schmidt, 1993), although many sources suggest that it has roots in the pagan culture of ancient Rome combined with later Christian and secular modifications (for overviews, see e.g., *Encyclopaedia Britannica*, 2021; History.com, 2022; Nelson, 2020). In particular, February marked the beginning of spring and a time of purification for ancient Romans. This involved celebrations of the fertility festival, *Lupercalia*, commencing February 15th. Young women practiced the ritual of plac-

ing their names in an urn from which bachelors would select the year's companion. Often these pairings resulted in marriage. Later, in A.D. 498, Pope Gelasius declared February 14th as St. Valentine's Day, and the Roman lottery system—frowned upon as an un-Christian practice—became outlawed.

The problem is that there were at least three different saints who went by the name Valentine or Valentinus, each of whom have his own martyrdom story. One legend contends that Valentine was a priest who was martyred February 14th in 270 ad for secretly marrying young couples, in direct defiance of Emperor Claudius II, who believed marriage interfered with their military service. Then there is also Saint Valentine of Terni, a bishop also put to death by Claudius II, who the day reportedly commemorates. Another potential explanation is that there was a martyr by the name of Valentine who, while imprisoned, fell in love with a young girl—possibly his jailor's daughter—who visited him during his confinement. Before his death, it is alleged he wrote her a letter signed "From your Valentine," a popular expression still used by many in cards and other expressions of love (Saint Leo University, 2018, para. 3–5).

However, a news story from CaribbeanNationalWeekly.com (2021, para. 6–19) reported that Valentine's Day evidently did not come to be celebrated as a day of romance until about the 14th century. During the Middle Ages, it was commonly believed in France and England that February 14 was the beginning of birds' mating season, adding to the idea that Valentine's Day should be a day for romance. The English poet Geoffrey Chaucer was the first to record St. Valentine's Day as a day of romantic celebration in his 1375 poem "Parliament of Fowles," writing, "For this was sent on Seynt Valentynes day / When every fool cometh there to choose his mate." In Great Britain, Valentine's Day began to be popularly celebrated around the 17th century. The tradition quickly spread over the years globally, including the U.S. and the Caribbean region.

The idea of valentine's cards and related gifts became culturally solidified over time. Valentine greetings were popular as far back as the Middle Ages, though written valentines did not begin to appear until after 1400. The oldest known valentine greeting still in existence was a poem written in 1415 by Charles, Duke of Orleans, to his wife while he was imprisoned in the Tower of London. Several years later, it is believed King Henry V hired a writer named John Lydgate to compose a valentine note to his first wife, Catherine of Valois. By the middle of the 18th century, it was common for friends and lovers of all social classes to exchange small tokens of affection or handwritten notes. Americans probably began exchanging hand-made valentines in the early 1700s.

Soon, printed cards began replacing written letters

due to improvements in printing technology. Ready-made cards were an easy way for people to express their emotions in a time when direct expression of one's feelings was discouraged. In the 1840s, Esther A. Howland of Worcester, Massachusetts, began selling the first mass-produced valentines in America. Known as the "Mother of the Valentine," she made elaborate creations with real lace, ribbons, and colorful pictures. The enduring popularity of this tradition makes Valentine's Day the second largest card-sending holiday (National Retail Federation & Prosper Insights and Analytics, 2022).

Various other trappings of love and romance also continue to be universally synonymous with Valentine's Day, but the psychological pressures of romantic relationships themselves are significant stressors irrespective of any commercial efforts to promote this day. Illustratively, Joyner and Udry (2000, p. 371) cited evidence that adolescents sometimes become romantically involved in order to elevate their social status, express their maturity, individuate from their parents, or deny homosexual tendencies. That review also suggested that females' greater vulnerability to romantic involvement explains a large part of the emerging gender difference in depression during adolescence. These findings are consistent with other research indicating that females and feminine individuals regardless of biological sex are significantly more likely than males and less feminine individuals to say that Valentine's Day is important to them (Ogletree, 1993). Moreover, it was found that they reported giving and receiving more valentines, as well as were more likely to have purposely worn the color 'red' for Valentine's Day.

Compounding these types of individual motivations and expectations are social influences. In Western culture no holiday experience is complete without shopping, and some research indicates that the gift-giving occasions start earlier every year (Mortelmans & Damen, 2001). Recently, the rise in US consumer activity has been accompanied by pressure to keep up with increasingly high status and high dollar acquisition (Twitchell, 2002), and Valentine's Day is no exception. In fact, with its ritual of gift-giving to symbolize the importance and worth of a love relationship, the pressure could be greater than on most other holidays as evidenced by some recent consumer surveys (see, e.g., National Retail Federation & Prosper Insights and Analytics, 2022).

For instance, 38% of men contemplate terminating a relationship rather than face the task of choosing a 'really good' gift for their partners (Lund, 2004). Rugimbana et al. (2003) further noted that individual motivations for gift-giving on Valentine's Day can be based on a confluence of obligation, self-interest, and altruism, and that these motivations have deep manifestations in the perceived social

power relationship between the genders. Faced with prospect of a gift-less Valentine's Day, 20% of women in the US acted on their own and ordered flowers for themselves in 2003 (Ipsos-Insight, 2003).

Boden and Williams (2002) discussed the commodification of romance and romantic relationships in their critique of Colin Campbell's (1987) seminal contribution to consumer sociology. They theorized that the act of 'buying romance' alters society's connection with genuine emotion and the reality of how individuals experience the relationship itself. When people are focused on acquiring 'just the right gift to send just the right message,' they become distracted from what is happening on a more direct interpersonal or intrapersonal level. At the same time, our own unique expressions of emotion are supplanted by mass-produced physical representations of our feelings, marketed to us as the definitively appropriate means of demonstrating our love for another.

Boden and Williams further argued how the female experience necessitates consumption on a vigorous scale in order to meet the exacting demands of our cultural images of beauty, considered a requirement in romantic relationships. Ironically, this consumption feeds into the development of women into "consumable objects" themselves, to be acquired by a man. Indeed, Illouz (1997) believes romance has fallen to the increased social pressures around accumulation of wealth and status and is now as much a capitalist activity as a genuine expression of emotion. Whether similar trends extend to homosexual relationships is not clear (see, e.g., Newman & Nelson, 1996).

But much of the marketing around romance involves fantasy and false promises, and consumers are constantly faced with the shortcomings of reality as compared to these illusions. According to Boden and Williams (2002), disappointment is not necessarily a bad thing in this context as it drives home the sometimes sad truths about life and love. Whether such disappointments are accompanied by—or develop into—depression has not been investigated in the literature. However, the relationship between feeling that one matters to others and levels of depression has been studied by Taylor and Turner (2001). They concluded that women experience higher levels of 'mattering' to others than men, and that such mattering correlates negatively with depression. Conversely, it would appear that not-mattering—as is implied by not receiving Valentine's Day gifts—should lead to greater depression in women than in men.

The preceding is consistent with Nolen-Hoeksema and Jackson's (2001) study on gender differences in rumination, which can be seen as the expression of low levels of depression (Lange et al., 2002). Women expressed feeling less control over negative events in their lives than men

did, and they tended to engage in rumination as an alternative to taking direct action, perhaps as the result of socialization to remain femininely passive. Because women are still expected to play a recipient's role in the Valentine's Day ritual, they might be more likely to resort to 'brooding,' i.e., a passive comparison of one's current situation with some unachieved conduct—rather than problem-solving behavior. Such brooding is related to higher concurrent depression but lower depression over time (Treyner et al., 2003).

The Present Report

Based on the preceding review, we hypothesized that the 'Valentine's Day Blues' is a real phenomenon that might extend beyond depressive feelings to include other forms of situational distress such as anxiety, social anxiety, and rumination. In addition to diminishing over time after Valentine's Day, we also anticipate different intensities in reactions by age and gender. Specifically, it seems likely that Valentine's Day is less important for older people than for younger ones. Further, given women's greater incidence of depression and rumination, a main effect of gender is expected. Finally, we expect to replicate the earlier findings by Lange et al. (2002) indicating that men and women show qualitative differences in their expressions of depression, resulting in different hierarchies of symptom perception.

Our data derived from a 2004 consumer sentiment survey, which was part of a larger product development research project for the online dating industry. The analysis of 'legacy' (or heritage) data is admittedly not ideal and an obvious limitation, but our approach is not without precedent or rationale. Retrospective studies and case-control designs are standard within biomedical research (Talari & Goyal, 2020), and such data is especially useful to (a) buttress a sparse literature, and (b) serve as published norms to compare and contextualize future findings (Griffin & DAR-TG, 2015; Pasquetto et al., 2017). To be sure, comparative research will be needed to explore some published hints that attitudes toward Valentine's Day are undergoing cultural shifts (see, e.g., Dare, 2019). Moreover, testing our hypotheses with current data collection would undoubtedly be tainted by the concurrent prevalence of negative psychological effects from social and travel restrictions in response to the ongoing COVID-19 pandemic (Hossain et al., 2020; Tang et al., 2020; Tintori et al., 2020). Market research ostensibly corroborates this view, as Valentine's Day spending during the pandemic has notably softened (e.g., Tighe, 2022). Therefore, we argue that these reasons collectively justify the publication of our legacy data.

This study relied heavily on Rasch (1960/1980) scaling,

because this statistical approach is suited to address qualitative and quantitative issues within the same basic framework. The Methods section provides an overview of the relevant aspects to Rasch scaling and interested readers are referred to Bond and Fox (2001) and Lange (2017) for additional details. Finally, data collection was conducted online, as this provides a powerful method to investigate psychological constructs efficiently using large samples of individuals other than self-selected samples of university students who take introductory psychology courses (Gosling et al., 2004; Naglieri et al., 2004; Skita & Sargis, 2006). Of course, online psychological testing does not automatically overcome the self-selection problem of participants. However, Rasch scaling provides a partial solution to this confound by determining the extent to which questionnaire measurements are distorted by response biases across subgroups of participants (see, e.g., Lange, 2017).

METHODS

Participants

A convenience sample of 2,070 respondents participated at the Queendom.com website where this study was identified as a special research project that was approved by the Ethics Committee at Integrated Knowledge Systems. Moreover, a news release via an online dating site announced the study and solicited volunteers for a study on the "emotions, thoughts, and behaviors they experienced this past Valentine's Day." Respondents received no compensation for their participation. The respondents completed a 'Valentine's Day Blues Test' on average about two weeks ($M = 14.9$ days, $SD = 5.21$) after Valentine's Day ($range = 7$ to 25 days).

The sample comprised 394 men, 1,033 women, and 643 individuals who did not specify their gender. The ages of 1,462 respondents were known (608 unknown), yielding a mean of 22.3 years ($SD = 8.23$, $range = 18$ to 65 years). The relationship status of 567 respondents was unknown, but about half (49.4%, $n = 1022$) identified themselves as single and looking for a relationship, and about a quarter (23.2%, $n = 481$) identified themselves as single, but not looking. Unfortunately, most of these 1,503 singles ($n = 789$, or 52.5%) are under 20 years of age and the ages of 648 of the 714 remaining singles (or 90.7%) are unknown. Accordingly, it will not be possible to compare the effects of looking vs. not looking for a relationship by age.

Measures

'Valentine's Day Blues' Test. As is shown in Table 1, a 34-item, study-specific measure was developed to assess several factors potentially related to 'emotional/

psychological' problems arising before, around, and after major holidays, namely depression, anxiety, social anxiety, rumination, and unrealistic expectations. Specifically, (a) depression, anxiety, and social anxiety items were derived from two different public domain assessments described below (DASS-21 & CES-D), (b) the rumination scale was adapted from the work of Nolen-Hoeksema (2003), (c) a 16-item depression subscale was taken from the CES-D questionnaire (Radloff, 1977), (d) eight anxiety and three social anxiety items were based on the anxiety scale of the DASS-21 (Lovibond & Lovibond, 1995), and (e) seven items were created to address rumination. The number of items totaled 50 due to additional questions about demographic variables and the respondent's relationship status [i.e., "in a relationship" (married, engaged, living together, or living apart) versus "not in a relationship" (actively vs. not actively looking for a romantic partner)].

The Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) measures the severity and frequency of depressive symptomatology during the previous week. It is best utilized as a screening, rather than diagnostic tool, as it has not been validated in terms of accuracy of diagnosing clinically significant depression. It has been employed among both the general population and among specific clinical samples, including alcohol and drug abusers, the elderly, and cancer patients. It is useful for the purposes of the Valentine's Blues study due to the brief time period that the questions refer to because it is sensitive to changes as time passes after Valentine's Day. The test has a coefficient alpha (Spearman-Brown, split-halves) of at least .85 across studies.

The Anxiety scale from the Depression, Anxiety and Stress Scale—21 Items (DASS-21) (Lovibond & Lovibond, 1995) is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect.

The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive, and impatient. Scores for depression, anxiety, and stress are calculated by summing the scores for the relevant items. Antony et al. (1998) validated the DASS-21 by comparing scores on the different scales of this test (depression, stress, and anxiety) of various diagnostic groups. Groups with panic disorder scored significantly higher on the anxiety scale than normal volunteers and groups with

depression. Cronbach alpha for the DASS-21 anxiety subscale was .87.

Rating Scale Analysis

We analyzed the items in Table 1 using the Rasch rating scale model (Andrich, 1978). This model assumes that respondents r with trait levels R_r encounter rating scale questions q indicative of trait levels Q_q with internal category boundaries (or 'steps') B_g . Then, these respondents will select category b with probability $P_{r,q,b}$ subject to:

$$\ln\left(\frac{P_{r,q,b}}{P_{r,q,b-1}}\right) = R_r - Q_q - B_b \quad (1)$$

In the following, the quantities R_r and Q_q will also be referred to as the respondents' and items' locations, respectively. Note that all parameters are expressed in a common metric on the latent Rasch dimension. Given the log-odds in the left-hand side of Equation 1, the units of this Rasch dimension are called *Logits*.

Item Fit. The various model parameters and their standard error of measurement (SE) will be estimated using the *Winsteps* (Linacre, 2003a) and *Facets* (Linacre, 2003b) software. In addition to indices of reliability, this software also computes questions' mean-square deviation of the Rasch model, called their *Outfit*. The optimal value of this statistic is 1.0, but *Outfit* values ranging from 0.6 to 1.4 are generally acceptable (Bond & Fox, 2001). Items with $Outfit_q > 1.4$ are said to be 'noisy' as such values result from response patterns with greater variability than is implied by Equation 1. Noisy items form a greater threat to the Rasch model than do 'muted' items ($Outfit_q < 0.6$), i.e., items receiving responses that are too predictable (e.g., due to item redundancy). Since noise may reflect lack of unidimensionality, multidimensional models will be fitted using *Conquest* (Wu et al., 1998). This software provides competitive model tests, as well as estimates of factors' direct (i.e., attenuation-corrected) correlation.

Item Shifts. The *Facets* software optionally provides statistical tests to determine whether items' relative locations differ across subgroups of respondents *regardless* of these groups' average response levels. Identifying such "shifts" is important because this means that questions have a group-specific semantics (for discussions, see Lange et al., 2000, 2001). Conversely, the absence of item shifts indicates that scaling results generalize across subgroups. In addition, large shifts (e.g., greater than 0.5 *Logits*) impede measurement as this biases the estimates of respon-

dents' trait levels (Wright & Douglas, 1975). This research will address item shifts as related to the respondents' demographics.

RESULTS

Preliminaries

The 34 items in Table 1 were scaled using the *Winsteps* software. As is indicated under the heading 'Item fit,' all but three items show acceptable fit to a unidimensional Rasch model (i.e., *Outfit* < 1.4). All items are positively correlated with the latent Rasch variable ($M = 0.57$), and the overall Rasch reliability of respondents' measures is 0.92 (Cronbach alpha = 0.94). The preceding indicates that (almost all) items form an actual hierarchy, in which items with higher locations consistently receive lower ratings than do items at lower locations.

Item Hierarchy

As an aid in interpreting the Rasch dimension, the items in Table 1 are shown sorted according to their 'locations' (or *Logit* positions). That is, items with the lowest endorsement rates (high Q_q) are listed first and items with the highest endorsement rates (low Q_q) are listed last. It can be seen that almost all rumination items tend to be endorsed before any of the other items—i.e., such items define the lowest form of depression. Indicators of low levels of depression (e.g., "feelings of being depressed, lack of enjoyment, trouble sleeping") occur next, followed by more severe signs such as "feeling like a failure, crying spells, and lack of appetite." Finally, the highest levels of depression are characterized by signs of anxiety like "trembling, feeling close to panic, and breathing difficulties." Interestingly, signs of social anxiety (i.e., "feeling lonely, feelings of being disliked, and others being unfriendly") occur across the entire hierarchy.

Dimensionality

As a dimensionality-check, the Depression, Social Anxiety, Anxiety, and Rumination items as identified in Table 1 were entered as separate factors in a four-dimensional Rasch model using *Conquest*.¹ Indicative of multidimensionality, the four-factor model provides significantly better fit ($\chi^2_{12} = 837.19, p < .001$) than does the one-dimensional version consisting of all 34 items.

Table 2 shows the reliability of the four subsets of items, as well as their Pearson correlations (above diagonal) and their direct (i.e., unattenuated) correlations (below diagonal). It can be seen that all but one direct cor-

TABLE 1. Summary of Scaling Analyses

Item	Type ^a		Item fit			DIF Analyses					χ^2_4
			Location ^c	Outfit ^d	Item - Total r	Age	Gender ^{e,f} 19 or younger	20 to 29	30 to 39	40 or older	
27	A	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness)	1.46	0.91	0.54	-0.01	1.35	1.75	2.07	1.41	9.50
23	A	I felt I was close to panic.	1.24	0.77	0.59	0.09	1.22	1.20	1.50	0.65	5.98
21	A	I felt scared without any good reason.	1.04	0.88	0.59	0.00	1.08	0.99	1.15	0.41	6.50
25	A	I experienced trembling (e.g., in the hands).	1.01	0.95	0.55	0.01	0.80	1.58	1.66	0.82	23.15
26	A	I was aware of dryness of my mouth.	0.98	1.12	0.49	0.35	0.92	1.17	1.21	0.73	2.23
15	SA	People were unfriendly.	0.90	0.95	0.52	0.09	0.91	1.01	0.97	0.41	6.73
22	A	I was aware of the action of my heart in the absence of physical exertion	0.89	1.32	0.46	0.13	0.75	1.08	1.47	0.19	15.77
2	D	I did not feel like eating	0.69	1.06	0.50	-0.17	0.67	0.66	0.92	0.41	1.48
10	D	I felt fearful.	0.56	0.91	0.57	0.17	0.75	0.28	0.30	0.57	14.45
24	A	I was worried about situations in which I might panic and make a fool of myself.	0.51	0.99	0.55	0.26	0.33	0.81	1.24	0.65	20.65
17	D	I had crying spells.	0.49	0.96	0.58	-1.28	0.48	0.48	0.26	0.65	1.54
9	D	I thought my life had been a failure.	0.38	0.80	0.66	0.29	0.43	0.40	0.20	0.19	3.91
31	R	I am decisive ^b	0.28	2.72	0.24	-0.22	0.34	0.36	0.32	-0.14	1.36
13	D	I talked less than usual.	0.11	0.93	0.54	0.21	0.14	0.07	-0.01	-0.01	0.93
19	SA	I felt that people dislike me.	0.03	0.80	0.65	0.02	-0.08	0.40	0.41	0.19	13.49
20	A	I could not get going	0.00	0.75	0.65	0.11	0.10	-0.04	-0.53	-0.15	11.22
11	D	My sleep was restless.	-0.02	0.99	0.54	0.06	0.10	-0.05	-0.44	-0.47	9.29
1	D	I was bothered by things that usually don't bother me.	-0.11	0.81	0.59	-0.15	-0.04	-0.13	-0.32	-0.28	3.42
7	D	I felt that everything I did was an effort.	-0.17	1.38	0.41	0.22	-0.05	-0.30	-0.44	-0.08	6.19
3	D	I felt that I could not shake off the blues even with help from my family or friends.	-0.21	0.84	0.66	-0.11	-0.18	-0.13	-0.49	-0.28	2.14
16	D	I enjoyed life.	-0.31	0.75	0.65	0.13	-0.27	-0.28	-0.51	-0.15	0.46
12	D	I was happy.	-0.36	0.72	0.65	0.08	-0.32	-0.48	-0.76	-0.08	5.96
4	D	I felt that I was just as good as other people.	-0.37	1.26	0.51	-0.17	-0.52	-0.19	0.22	0.19	15.74
8	D	I felt hopeful about the future.	-0.43	1.21	0.48	-0.08	-0.42	-0.41	-0.76	-0.15	3.23
5	D	I had trouble keeping my mind on what I was doing.	-0.51	0.96	0.55	0.00	-0.54	-0.47	-0.16	-0.60	4.70
6	D	I felt depressed.	-0.60	0.70	0.71	0.09	-0.55	-0.62	-0.87	-0.28	2.50
34	R	No matter what I do, I can't get my mind off my problems.	-0.62	1.00	0.67	0.12	-0.68	-0.56	-0.48	-0.66	1.24
18	D	I felt sad.	-0.64	0.65	0.71	-0.11	-0.61	-0.72	-0.87	-0.28	2.91
29	R	I tend to focus on upsetting situations and events happening in my life.	-0.73	1.16	0.61	-0.01	-0.71	-0.87	-0.74	-0.69	2.09
33	R	I think a lot about why I do the things I do.	-0.96	1.59	0.52	0.08	-0.98	-1.17	-0.82	-0.76	7.10
32	R	I spend time alone wondering why I feel the way I do.	-0.97	1.34	0.62	-0.04	-1.02	-1.01	-0.77	-0.44	4.71
14	SA	I felt lonely.	-1.08	0.86	0.66	0.25	-1.00	-1.24	-1.45	-0.60	6.64
30	R	I can think about a problem for hours, and still not feel that the issue is resolved in my head	-1.15	1.26	0.60	-0.17	-1.17	-1.22	-1.09	-0.94	2.21
28	R	A loved one snaps at you. You ...	-1.34	1.54	0.43	-0.15	-1.22	-1.56	-1.69	-1.61	9.13

^aD = Depression, SA = Social Anxiety, A = Anxiety, R = Rumination

^bRating scores reversed

^cThe SE of each item's location is about 0.04 Logits

^dValues outside the range 0.6 to 1.4 are marked in bold

^eNegative (negative) Logit difference reflect that men's (women's) ratings are lower than those of women (men) with similar trait levels.

^fDue to varying error terms, smaller effects may reach statistical significance, whereas larger effects do not.



TABLE 2. Sub-Scale Reliabilities and Correlations between the Four Sub-Scales

Subscales	Sub-Scale	Sub-Scales				Sub-Scale ^d
	Reliability	D	A	SA	R	All 34 items
Depression (D)	0.86	1	0.71 ^a	0.80	0.66	0.93
Anxiety (A)	0.41	0.82 ^{b, c}	1	0.78	0.50	0.80
Social Anxiety (SA)	0.69	0.98	0.85	1	0.75	0.83
Rumination (R)	0.73	0.81	0.66	0.82	1	0.82

^a Pearson correlations are shown above the diagonal

^b Direct (i.e., attenuation corrected) correlations are shown below the diagonal

^c All direct correlations are based on sub-sample of 602 respondents (see text)

^d Pearson correlations

relation exceeds 0.80, the exception being that between rumination and anxiety (0.66). Given these high direct correlations, the items were treated as a unidimensional measure of generalized depression in most analyses. However, selective multivariate analyses were performed as well, and their results are reported whenever some subscales show significantly different patterns.

Differential Item Functioning (DIF)

To detect whether the items' locations are statistically similar within subgroups, omnibus test for differential item function were performed across various groups using the *Facets* software. As is shown in Table 3, the time

expired between Valentine's Day and taking the questionnaires, respondents' sexual orientations (heterosexual vs. gay or lesbian), their countries of residence, self-reported conditions, or whether they received gifts for Valentine's Day did not appreciably alter the Rasch locations of the 34 questionnaire items (all $p > .15$). In other words, the item hierarchy generalizes across the aforementioned independent variables. However, Table 3 also shows that items' locations differed significantly across respondents' relationship status ($\chi^2_{102} = 175.6, p < .001$), gender ($\chi^2_{68} = 128.0, p < .001$) and age ($\chi^2_{136} = 228.5, p < .001$). We discuss each DIF effect in turn, as well as their overall impact on measurement.

TABLE 3. Omnibus Tests for DIF for Eight Independent Sub-Variables

DIF Variable ^a	χ^2	df	p
Weeks since Valentine's Day (1, 2, 3 or more weeks)	59.8 ^b	102	> 0.50
Sexual orientation (M-F + F-M, M-M, F-F)	105.0	102	>0.35
Country where respondents reside (Canada, UK, US, Other, Unknown)	130.4	170	>0.50
Self reported psychological condition (No, Yes)	74.8	68	>0.20
Received gift (No, Yes)	79.7	68	>0.15
Relationship status (In relationship, Single-not looking, Single-looking)	175.6	102	<0.001
Gender (Men, Women)	128.0	68	<0.001
Age group (10's, 20's, 30's, 40+)	228.5	136	<0.001
Gender by Age interaction	444.7	272	<0.001

^a Only cases with known values for independent variables were included

^b *Facets* reports results with one decimal only



Relationship Status

Separate respondent groups were created by first dividing those in relationship (i.e., married, engaged, living together, or living apart) versus those not in a relationship. This last group was then further divided into those who were currently looking for a romantic partner versus those who were not. Although Facets' omnibus DIF test was significant, the individual item shifts were very small, ranging from -0.13 to 0.18 Logits ($SD = 0.049$). As these changes are relatively small (Wright & Douglas, 1975) they are not further discussed.

Gender Effects

The 'Gender' entries listed in Table 1 reflect the *Logit* difference between men and women's item locations. Statistically significant differences are marked in boldface, and it can be seen that men and women differ significantly ($p < .01$) with respect to four items. That is, relative to men with similar levels of generalized depression, women disproportionately think that "my life is a failure," and they are more aware of "dryness of my mouth." By contrast, men seem

more likely report being "less decisive" than do comparable women (note that this item was reverse scored). Further, in agreement with cultural stereotypes, men are far less likely (by 1.26 *Logits*) to report having "crying spells" than did women with similar levels of generalized depression.

Age Effects

The item locations R_i (in *Logits*) in the "19 or younger," "20 to 29," "30 to 39," and "40 and older" groups are listed in the right side of Table 1. As is indicated by the χ^2_4 value listed in the final column of this table, six items show significant age related DIF ($p < .01$). For instance, Item 25 ("I experience trembling [e.g., in the hands]) respectively assumes locations 0.80, 1.58, 1.66, and 0.82 in the four age groups, and these locations differ significantly ($\chi^2_4 = 23.15$, $p < .001$). The preceding indicates that those 19-or-younger, or 40-or-older are more likely to report trembling (lower item locations) than those with similar levels of overall depression but aged between 20 and 29, or between 30 and 39 years (higher item locations).

While no clear pattern in the individual items' age DIF can be discerned, the item-location distributions clearly

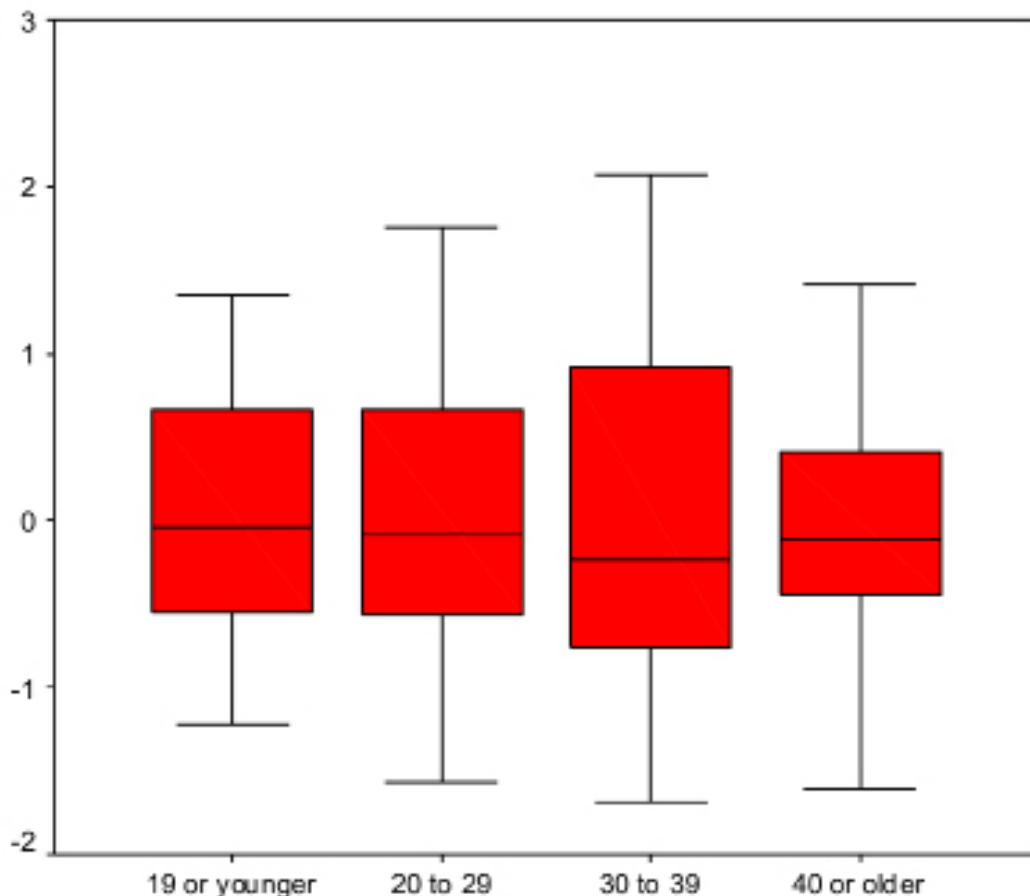


Figure 1. Boxplots of item locations by respondent' age categories.

differ in the 19-or-younger, 20 to 29, 30 to 39, and 40-and-older groups (see Figure 1). Specifically, the variance of the Q_i in these groups are 0.53, 0.72, 0.92, and 0.36, respectively, and these quantities differ significantly (Levene's test, $F_{3,132} = 3.50, p < 0.02$). The greater variance in the 30 to 39 group (i.e., 0.92) indicates that "easier" items (i.e., with lower Q_i) received disproportionately high ratings, whereas "harder" items (higher Q_i) received disproportionately low ratings in this age group. The 40-and-older group shows the smallest variance (0.36), signifying that these respondents gave disproportionately low ratings to 'easy' items (thus making them appear 'harder') and disproportionately high ratings to 'hard' items (thus making them appear 'easier'), thereby blurring the distinction among the items. Taken together, the variance differences suggest that Valentine-related issues gain in importance with increasing age, but then quickly lose importance for older individuals (i.e., > 40 years of age).

Impacts

We already noted that pronounced item shifts could distort the estimation of the Rasch person measures. Ac-

cordingly, the raw-sum to Logit transformations were computed *separately* for respondents in the "19 or younger," "20 to 29," "30 to 39," "40 and older" groups. Figure 2 shows the estimated *Logit* values (Y-axis) as a function of the raw sums (X-axis), together with pooled local errors of estimate (vertical lines) based on the combined sample of respondents. Note that in many places the raw-sum to Rasch translation for the 40-and-older group falls outside the band formed by +1 SE around the common estimates—thus yielding less extreme Rasch estimates for the lowest and highest raw-sums. This pattern is reversed in the 30–39 year old group, which shows more extreme Rasch estimates for the lowest and highest raw-sums. In other words, the item-level age DIF effects are sufficiently strong to introduce systematic distortions into the measurement of overall depression across the age levels studied here. Similar analyses by relationship status and gender indicate that the raw-sum to Rasch translation curves (not shown) nearly coincide in the sub-groups defined by these variables. Thus, the DIF associated with relationship status and gender introduced no noticeable bias into the measurement process.

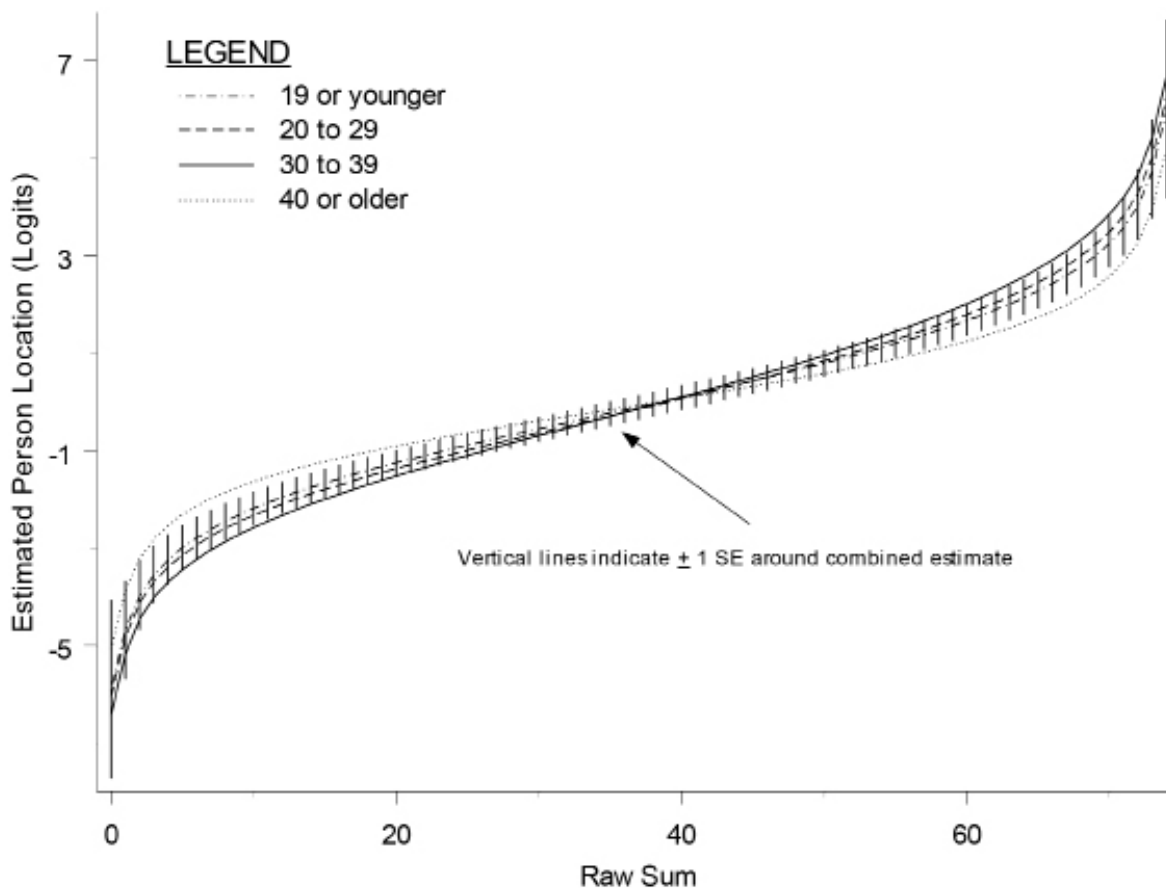


Figure 2. Raw-sum to Rasch Person Measure Transformation in four age groups.

Group Comparisons

This section reports the effects of age, gender, gift, relationship status, and the time elapsed since Valentine's Day on respondents' measures on the Rasch Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales. These dependent variables can be rescaled arbitrarily—hence, for ease of interpretation z-score versions of these dependent variables are used throughout. We note that, due to missing data (see Methods section) the independent variables cannot all be crossed simultaneously. Instead, separate analyses were performed by (a) age, (b) gender, elapsed time, and gift across all respondents, and (c) gender, relationship status, elapsed time, and gift for the youngest respondent group (under 20 years of age) only.

Given the severe biasing effects of respondent's age, any main or interaction effects involving this variable must

be treated with caution. We note that a Multivariate Analysis of Variance (MANOVA) over the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales by Respondent Age (19 or younger, 20 to 29, 30 to 39, and 40 or older) showed a significant main effect ($F_{12,4371} = 6.86, p < 0.001$). Figure 3 shows that all five variables decrease with increasing age (smallest univariate $F_{3,1458} = 7.88, p < .001$).

Univariate Analysis of Variance (ANOVA) by Age with repeated measures over the Depression, Anxiety, Social Anxiety, and Rumination subscales showed a significant interaction effect ($F_{7.28, 3537.35} = 4.67, p < 0.001$),² indicating that this age effect is not uniform across these dependent variables. As is shown in Figure 3, the age decrease in Anxiety and Social Anxiety is less pronounced than that in Depression and Rumination. However, the differences are quite small, and they are also susceptible to the age-related distortions that were described earlier (see Impact). Hence, while respondents' age was ignored in all major

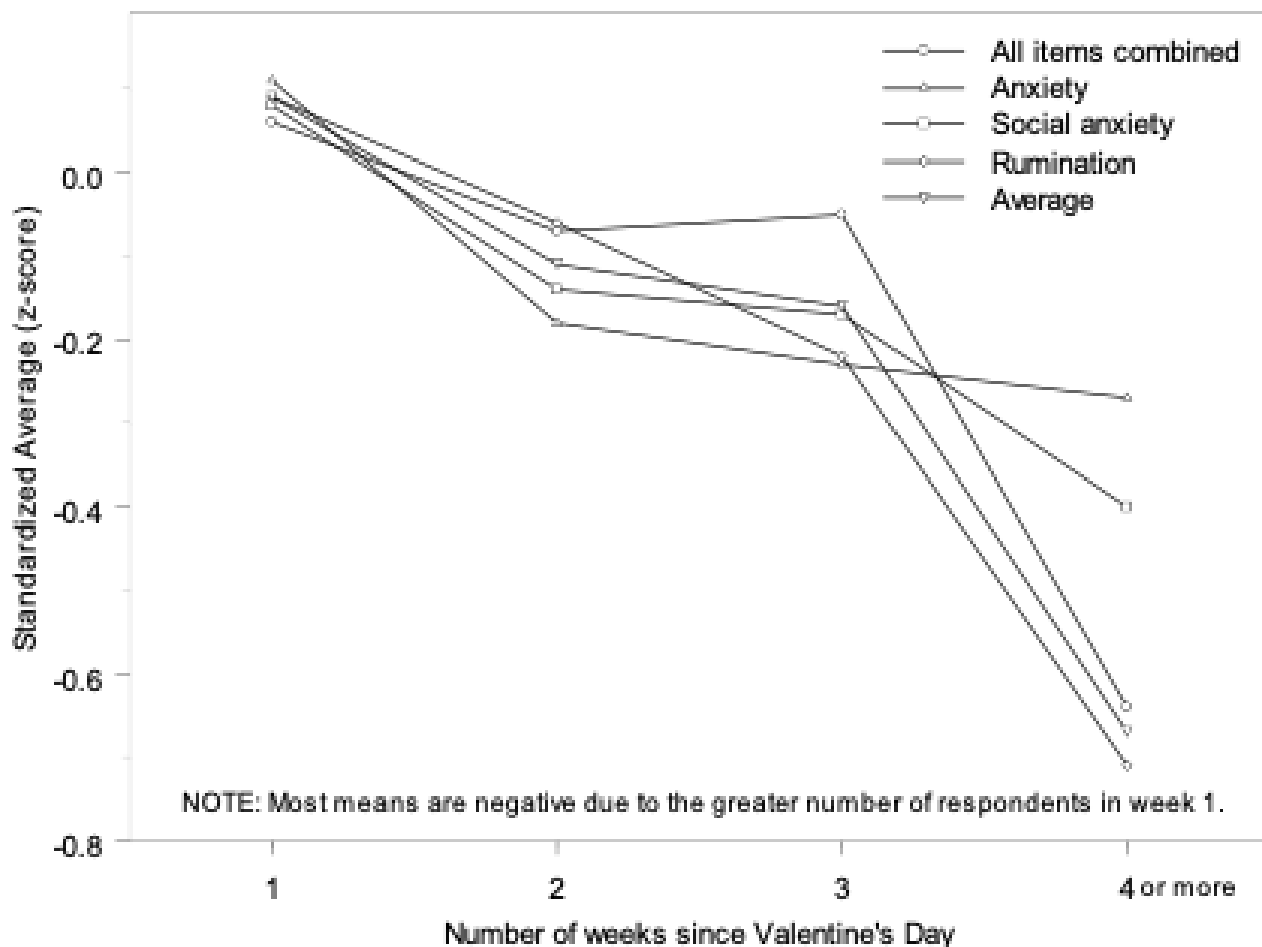


Figure 3. Average over all subscales, Anxiety, Social Anxiety, Rumination, and generalized measure derived from all 34 items by age (all variables were standardized).

analyses reported below, additional tests were performed to determine whether age distortions might explain particular effects.

Gender, Elapsed Time, and Gift Interactions

The standardized Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales were subjected to a Gender x Gift (Received gift: No vs. Yes) x Elapsed Time (No. of weeks since Valentine's Day: Up to 2 weeks, 2 to 3 weeks, and 4 or more weeks) MANOVA. The findings showed significant multivariate main effects of Gender ($F_{4,1393} = 5.46, p < 0.01$) and receiving Gifts ($F_{4,1393} = 5.07, p < 0.01$), as well as Gender x Time ($F_{8,2788} = 1.95, p < 0.05$) and Gender x Time x Gift ($F_{8,2788} = 1.94, p < 0.05$) interactions.

To gain greater insight, a univariate ANOVA was performed which treated the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales as repeated measures (see Note 1). Consistent with the literature, a main effect of Gender indicates that women report slightly more intense depressive symptoms across the four subscales than do men ($M_{\text{Women}} = 0.06$ vs. $M_{\text{Men}} = -0.09, F_{1,1396} = 8.05, p < .01$). Additionally, and as hypothesized, respondents who received gifts reported less intense depressive ($M = -0.10$) symptoms than those who did not ($M = 0.07$) ($F_{1,1396} = 10.29, p < .001$). As indicated by significant Gender x Measure ($F_{3,3450} = 5.90, p < .001$) and Gift x Measure ($F_{3,3450} = 3.42, p < .05$) interactions, these effects vary slightly across the subscales. In particular, men and women differ somewhat less with regard to Anxiety than the other variables. Further, receiving a gift yielded somewhat

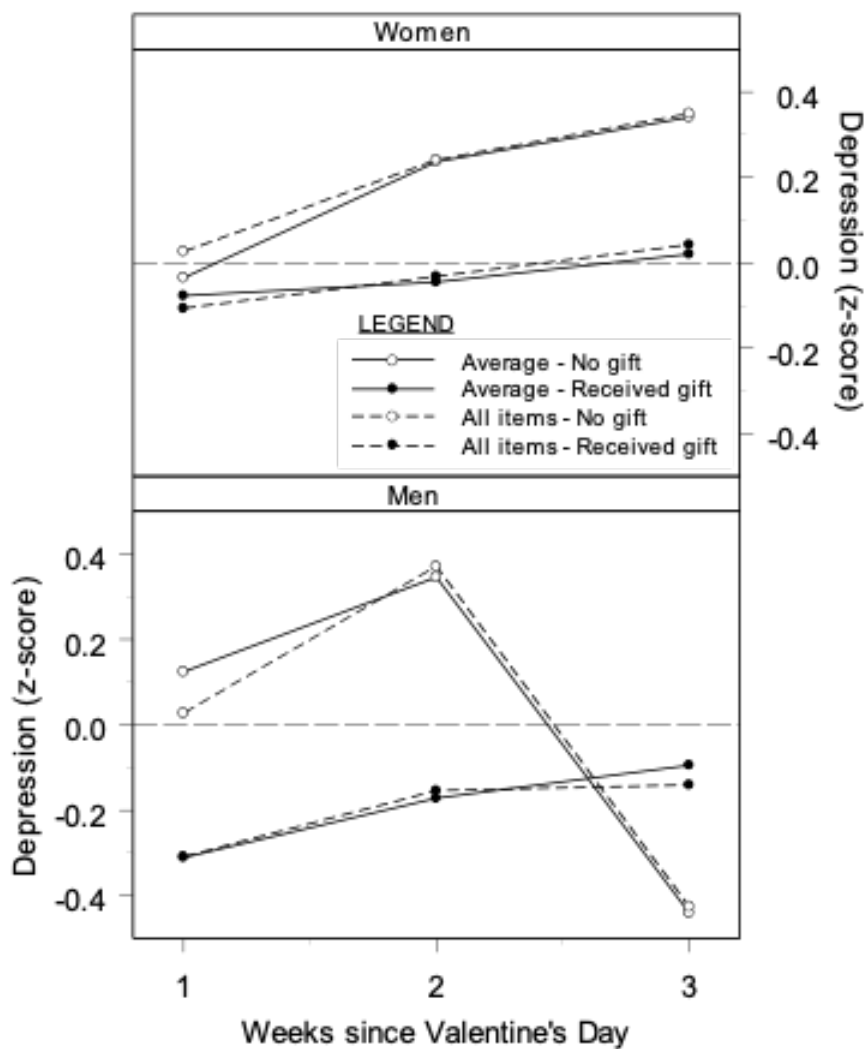


Figure 4. Overall Depression by Gender, Time Elapsed Since Valentine's Day, and Gift.

greater decreases in social anxiety and rumination than in non-anxiety depression and anxiety. However, both interactions are ordinal and they are not further discussed.

Most importantly, a powerful Gender x Gift x Elapsed Time interaction was observed ($F_{2,1396} = 5.08, p < .01$). Consistent with the Gift main effect, the solid lines in Figure 4 indicate that men's overall level of depression is greater when not receiving a Valentine's Day gift than when receiving such a gift—but only for up to four weeks after Valentine's Day. Women who did not receive gifts report more intense depressive symptoms as well, but their overall level of depression continues to rise over the entire period studied. In other words, while men rather quickly rebound from the depression induced by not receiving gifts, for women who did not receive a Valentine's Day gift the greater depression remains. As a result, the Gender x Time ($F_{2,1396} = 4.71, p < .01$) and Gift x Time ($F_{2,1396} = 3.38, p < .05$) interactions are significant as well.

We note that similar findings are obtained when the Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination Rasch subscales are averaged (dotted lines). This finding supports our conclusion that the Gender and Gift by Measure interaction effects on generalized depression described above are essentially meaningless.

Relationship Status, Gender, Elapsed Time, and Gift Interactions

As before, a MANOVA over the Rasch Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination subscales was performed. The results showed qualitatively similar main effects of Gender, receiving Gifts, as well as significant Gender x Time and Gender x Time x Gift interactions with analogous interpretations (all $p < .05$). Rather unexpectedly, Relationship Status did *not* show a statistically significant main effect ($F_{4,977} = 1.33, p > 0.30$), and all interactions involving Relationship Status also failed to reach statistical significance (all $p > 0.05$). This pattern was confirmed by follow-up analyses in which Non-Anxiety Depression, Anxiety, Social Anxiety, and Rumination were treated as repeated measures. In interpreting the above, we should emphasize that the available cases consist almost exclusively of younger respondents only (i.e., under 20 years of age, see Methods section). The possibility thus remains that future research will find that relationship status does play a significant role for older individuals (> 40 yrs).

DISCUSSION

Our title asked whether the 'Valentine's Day Blues' is a valid psychosocial phenomenon. The present findings

strongly suggest that it is, although the concept should not be sensationalized as a form of so-called 'toxic stress' (see Scheeringa, 2022). Like the experience of Lily in the Introduction, our respondents reported significant levels of adverse emotions and cognitions coinciding with this holiday. This distress was neither gender-specific nor restricted to singles that identified themselves as specifically looking for a romantic relationship. These findings speak to Baier's (1988) assertion that the 'holiday blues syndrome' is a situational stress reaction related to social demands and unmet expectations. However, previous literature on depression and romantic relationships extends this idea to help explain the differential pattern of findings that we observed.

First and foremost, the term 'blues' alone is an inadequate descriptor of this phenomenon, since reports of distress around Valentine's Day extend beyond depressive feelings to include anxiety, social anxiety, and rumination. Younger respondents tended to score higher on all these symptoms, which is generally consistent with the results of Joyner and Udry (2000). Those authors found that both male and female adolescents experience higher levels of depression, demonstrate higher levels of delinquency and problems with alcohol, and report more issues with school performance and parents when they become involved in romantic relationships. So, regardless of the events surrounding a given Valentine's Day, the potential angst and turmoil of adolescent love could be reflected in our findings.

The findings further imply that 30-to-40-year olds may be of greater clinical concern than adolescents. It seems reasonable to assume that individuals in this age range have different expectations concerning relationship than other age groups. While adolescents and 'twentysomethings' are still exploring the brave new frontier of romantic relationships, 30-to-40 year olds likely feel social pressures to develop relationships that match specific expectations concerning monogamous and long-term commitment. The celebration of Valentine's Day provides evidence of such commitment, while signaling compliance with social norms if the gift giving and other ritual expressions of love were carried out in accordance with cultural expectations. Flowers, roses, and candlelit dinners all send a message that the relationship—and the individual's life at this point in time—is 'on track.' At this age romance is expected to have solidified into marriage or a long-term, committed relationship. By contrast, not receiving Valentine's Day gifts indicates failure and, especially for women, a running out of time to 'get it right.' However, those age 40 and above are more likely to have experienced a full relationship cycle that includes marriage and divorce, and they are thus no longer subject to the pressures of the never-

married. They also may have grown past the age of investing heavily in society's approval concerning their love life.

As was anticipated, respondents who received a Valentine's gift reported fewer symptoms of psychological distress than those who did not receive a gift—and this effect was robust irrespective of their gender. We interpret this as support for Boden and Williams' (2002) argument for the commodification of love in Western culture, as well as the sheer volume of participation in Valentine's Day consumerism. That is, when we engage in shopping and gift-giving to such an extent, there can be no question about the social pressures to be included in the game. Our findings thus indicate that those who are left out demonstrate a response not only to their internal emotional cues (depression, anxiety), but to external societal cues as well (social anxiety).

But while men and women both seem to experience psychological distress related to Valentine's Day, and this distress persists over time for both, our data suggest that men rebound earlier than do women. For example, the men reported a marked decrease in psychological distress following the second week after Valentine's Day, whereas the symptoms of distress in the women actually appeared to increase over the weeks following the holiday. Some caution is needed when interpreting these findings, however, since our data are based on a cross-sectional rather than longitudinal sample.

We interpret our findings as representing different reactive styles in men versus women. For instance, Nolen-Hoeksema (1987) argued that men's responses to dysphoria tend to be more behavioral and distracting and therefore dampen their dysphoric episodes, whereas women's responses to dysphoric episodes tend to be more ruminative and therefore amplify and prolong dysphoria. Nolen-Hoeksema and colleagues have repeatedly shown in laboratory and questionnaire studies that ruminative and self-focused responses to distressed states exacerbate and prolong depressed mood and that active distraction remedies distressed mood. Furthermore, women are more likely than men to use ruminative responses but are no less likely to use distraction (Nolen-Hoeksema et al., 1993). Nolen-Hoeksema (1987) argued that the sex differences in rates of depression arise because women's ruminative response styles amplify and prolong their depressive episodes" (p. 276). According to this view, ruminative responses may prolong distress by "enhancing the effects of depressed mood on thinking, interfering with instrumental behaviors, and interfering with effective problem solving" (Nolen-Hoeksema, 1993, p. 311). This contrasts with men's distracting responses that allow for more positive thinking, generation of solutions, and increases in positive mood.

Therefore, while men may ruminate initially over Val-

entine's Day, perhaps they are characteristically adopting a *reflective* style of rumination that propels them to engage in some kind of problem-solving behavior which leads to a resolution, or simply brings closure. In contrast, women tend to engage more in *brooding*. Thus, they may not reach conclusions about next-steps or problem-solving actions that could ameliorate their symptoms. Rather, brooding tends to increase their negative emotional state, and thus symptoms worsen rather than abate. Further research is needed here since as gender differences in everyday stress might play a role as well—for example, gender role perspectives contend that women are inherently more distressed than men as their roles expose them to more stressors (for a discussion, see Almeida & Kessler, 1998).

Future studies might best use measures of *reflective* and *brooding* forms of rumination (cf. Treynor et al., 2003, pp. 248–251) in the context of longitudinal designs to confirm these and other hypotheses for holiday-related stress. New research can also leverage other improvements to overcome limitations of the present study. For instance, the presence of symptoms associated with psychological distress does not automatically elucidate their ultimate source(s) or cause(s). Our results clearly implicate situational stress reactions to the commercial holiday itself, but contextual influences like demand characteristics or expectancy-suggestion effects might also play a key role. Thus, the degree to which the 'Valentine's Day Blues' involves 'reflexive' (or naturally-occurring) symptoms versus 'factitious' (or performative) symptoms should be examined. We also note that retrospective and case-control studies can be important tools for model-building although their findings should form the basis on which prospective research is planned (Talari & Goyal, 2020).

In the meantime, we might offer some guidelines for addressing the 'Valentine's Day Blues' based on the implications from this study coupled with previous work on stress reactions:

— For those not in a relationship, Valentine's Day can be an occasion to engage in deliberate acknowledgement and acceptance of oneself. One's degree of self-compassion directly influences the capacity to love others and be loved (Neff & Beretvas, 2013). Moreover, adult singles who exhibit happiness and contentment in their life can be positive role models for adolescents, who are especially susceptible to premature romantic relationships due to psychological and social pressures.

— When social pressures to celebrate through consumption become intense, individuals can respond on their own behalf just as couples do for each other. Shopping for one's own Valentine's gift is empowering if it is not a se-

cret act, but instead an act of self-expression (e.g., Sirgy et al., 2016). Alternatively, a reasoned choice to refrain from spending can act as a gift to one's financial health, with the simpler pleasures in life serving as cost-free substitutes.

— Gestures of love need not be limited to the romantic sort on Valentine's Day. Donations of time, money, and creativity through volunteering tend to benefit the donor as much as the recipient (Yeung, Zhang, & Kim, 2017). Seeing firsthand the real-life needs of the less fortunate can help keep romantic disappointment in perspective.

— A 'partner-less' Valentine's Day can serve as a call-to-arms when individuals take the time to self-reflect and correspondingly define what they are looking for in a romantic relationship, the obstacles to achieving their goals in this area of their lives, and what steps are needed for success (e.g., Stein & Grant, 2014).

Lastly, planning ahead to stay active during the day and evening can help prevent the rumination and escalation of dysphoria discussed earlier. Optimal choices will avoid prime dating environments, such as movies or romantic restaurants, and involve supportive friends and family members. But we should likewise note on balance that challenges and uncertainties carry over to those who find and sustain committed relationships. Indeed, the psychology of love and attachment exemplifies a topic that is squarely within mainstream science but nonetheless characterized by perpetual controversy and mystery (see, e.g., Basili & Sacco, 2020; Finkel et al., 2012; Masuda, 2003).

IMPLICATIONS AND APPLICATIONS

This preliminary research underscores the point that ideas or claims originated, or reinforced, by pop psychology are not necessarily dubious. At the same time, common health assumptions—including those that seem inherently reasonable—should always be rigorously scrutinized to promote public education and trust in science, as well as to inform responsible clinical approaches as needed. In this way researchers can combat the problem of medical sensationalism or misinformation from pop psychologists or activist platforms (Suarez-Lledo & Alvarez-Galvez, 2021). Moreover, we argue that Modern Test Theory is the best practice approach to validate, describe, and measure the phenomenology of symptom perception across various biomedical or psychological contexts, while also identifying nuances associated with demographic or cultural variables (Lange et al., 2000, 2002; Lange et al., 2015). To be sure, all forms of distress, including the formal psychiatric diagnostic categories of the DSM-5, are locally shaped (Ecks, 2016). This also certainly includes the measurement of core features, nuances, and confounds with perceptions

in altered or anomalous experiences (e.g., Houran et al., 2019; Lange, 2017; Lange et al., 2019; Lange et al., 2004a; Merckelbach et al., 2017).

NOTES

¹ Fitting a four-factor model over all respondents proved to be prohibitively time-consuming. For this reason, the analyses are based on a randomly selected subset of 602 respondents.

² The Greenhouse-Geisser method was used to correct for the violation ($p < .001$) of the assumption that the error covariance matrix of the orthonormalized transformed dependent variables should be proportional to an identity matrix.

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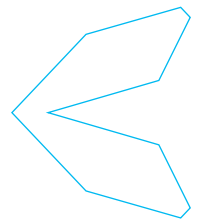
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RESEARCH
ARTICLE

The Badlands Guardian: A Human Portrait with Feathered Headdress

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HIGHLIGHTS

A famous pattern within a glacier-related landform in Canada might not be a natural formation but man-made artwork depicting a human head in a feathered headdress. If this idea is confirmed, it would represent an important new archaeological discovery.

ABSTRACT

This is an analysis of a large facial formation known as the Badlands Guardian, set within a glacial moraine along the southeast corner of Alberta, Canada. The formation is presented here in one aerial and three satellite images acquired over the past 70 years by the Alberta Department of Lands & Forests and Google Earth. The images reveal a profiled portrait of a human head wearing a feathered headdress. The facial features include an eye, nose, mouth, chin, neck, and jawline. The headdress consists of a headband containing a staggered set of feather-shaped extensions. When taken together these aesthetic features create the visual impression of a left-facing portrait of an indigenous tribesman wearing a feathered headdress. A claim of intelligent shaping is offered, and a geologist and geoscientist examine natural mechanisms that could contribute to the formation of these aesthetic features. A comparison of the iconographic tribal motifs of both North and South America is presented and a request for an extensive ground exploration and additional satellite images of this formation is encouraged.

KEYWORDS

Badlands Guardian, Medicine Hat, Alberta, Mayan, geoglyph, archaeology, proportional image analysis

HISTORY

A large, profiled portrait resembling a left-facing human head wearing a feathered headdress was discovered in the southern region of Alberta, Canada, by Lynn Hickox in November 2006 (Figure 1). The formation was found while accessing Google Earth in search of directions to a local dinosaur museum (Rajkumar, 2014). Hickox noticed a large facial portrait with a feathered headdress set within the winding hills and shallow gullies of the region. The image resembled a portrait of an indigenous tribesman whose people occupied the surrounding area that encompasses a portion of the western plains of the United States and Canada. The facial features included a forehead and

brow, an eye, nose, and mouth with lips. It continues with a chin, jawline, and neck which are supported by a pair of shoulders. There is also a linear road that leads up the neck to a small structure.

THE HUMAN PROFILE WITH FEATHERED HEADDRESS

The Alberta Department of Lands & Forests

Before the advent of Google Earth, an aerial image of the area was acquired by the Alberta Department of Lands & Forests (ADLF) during a mapping period between 1949 and 1951 (Figure 2). The aerial photographs





Figure 1. Badlands Guardian. Alberta, Canada (Google Earth, 2006).



Figure 2. Badlands Guardian (circled) in Alberta region, Canada. Detail of Alberta Department of Lands & Forests image (1949–1951). (Photo credit: University of Lethbridge Digitized Collection)



Figure 3. Badlands Guardian in Alberta, Canada. Detail of Alberta Department of Lands & Forests image (1949–1951). University of Lethbridge Digitized Collection.

of the area acquired by the ADLF are currently available at the University of Lethbridge Digitized Collection (Spatial Data Collection, 1949/1950/1951).

The ADLF image shows a distinct human profile with a large, feathered headdress. One can see the contours of a nose, mouth, chin, and jawline (Figure 3). There is also evidence of the neck, shoulders, and shirt.

Google Earth (Alberta Region)

Over the past twenty years, three satellite images of the Alberta region have been acquired by Google Earth that includes the area surrounding the Badlands Guardian. The formation is located between the coordinates of 50° 0'38.20"N, 110° 06' 48.32"W. This set of satellite images track the seasonal effects on the facial features and headdress observed by Hickox in 2006. The first Google Earth image was released on November 13, 2002 (Figure 4). This image provides the highest clarity and resolution of the overall formation. It provides evidence of the forehead and brow, an eye with eyelid, a nose, and a mouth with full lips. It also shows a chin, jawline, and neck, which are supported by a pair of shoulders. The headdress is created by a set of feather-like extensions that flow from the back of the head toward the east. One can see a small structural compound with a linear road leading down its neck.

The second satellite image was posted on December



Figure 4. Badlands Guardian in Alberta, Canada. Image detail, Google Earth, 2002.

30, 2012 (Figure 5). This image was taken in early winter and its contours are dark and slightly distorted. The dark areas appear to be caused by dense foliage obscuring linear detail. You can see the forehead, eye, and eyelid. The formation has a defined nose bridge; however, the nostril area is severely darkened by shadow or foliage. The lips are also dark and appear swollen. The contours of the chin are slightly dissolved, while the jawline and neck are pronounced by the darkened terrain. The feathered headdress is still recognizable; however, it lacks the detail observed in the 2002 image.

The most recent image of the area was taken during midsummer and released on August 31, 2015 (Figure 6). The facial detail in this new image is faint and appears washed out in some areas. This may be the result of harsh sunlight or being partially obscured by foliage.

Geological Context

The topographical landforms in the Alberta region of Canada include relief forms that range in size from mountains to sand dunes, eskers, moraines, sandy beaches, and floodplains (Mollard, 1972). The landforms in the area of the Badlands Guardian are dominated by the remnants of glacial moraines left behind by the Laurentide ice sheet Kulig (1996). The glacial maximum occurred about 20,000 years ago and reached a thickness of more than one kilo-



Figure 5. Badlands Guardian Alberta, Canada. Image detail, Google Earth, 2012.



Figure 6. Badlands Guardian in Alberta, Canada. Image detail, Google Earth, 2015.

meter thick (Cavanaugh et al., 2006). The ice surrounding the area was completely gone roughly 11,000 years ago (Campbell, 1997), and further alteration of the landscape was left to the effects of rain, snow, and wind (Museum of Archaeology & Ethnology, no date). To fully understand the present landscape we have to consider the effects of glaciation and glacial meltwater processes.

The glacial impact entered the region on a southwestern trajectory, as evident by the streamlined subglacial bedforms that are illustrated by the black lines in Map 1 (Atkinson et al., 2014). Glacial moraines are unconsolidated deposits of rocks, sand, silt, and clay called till (illustrated by the brown lines in Map 1). Within the moraines are minor meltwater channels which carved themselves into the glacial till creating coulees and gullies (illustrated by the thick and thin blue lines in Map 1). Although in a semi-arid region, the moraines and coulees have seen further alteration by rain and snowmelt over the millennia since the final meltwaters disappeared. The face and headdress are, in most part, concave features defined by the surrounding ridgeline. The interspersing of smaller ridges adds definition to the facial contours and shape of the headdress.

The curvaceous topography that supports the overall facial formation of the Badlands Guardian is blanketed with prairie grass and sparse vegetation cover and conforms to the surrounding lithologies which are dominated by active smectite clays and steep slopes that are associated with well-defined rill systems (Kerr & Cooke, 2017).

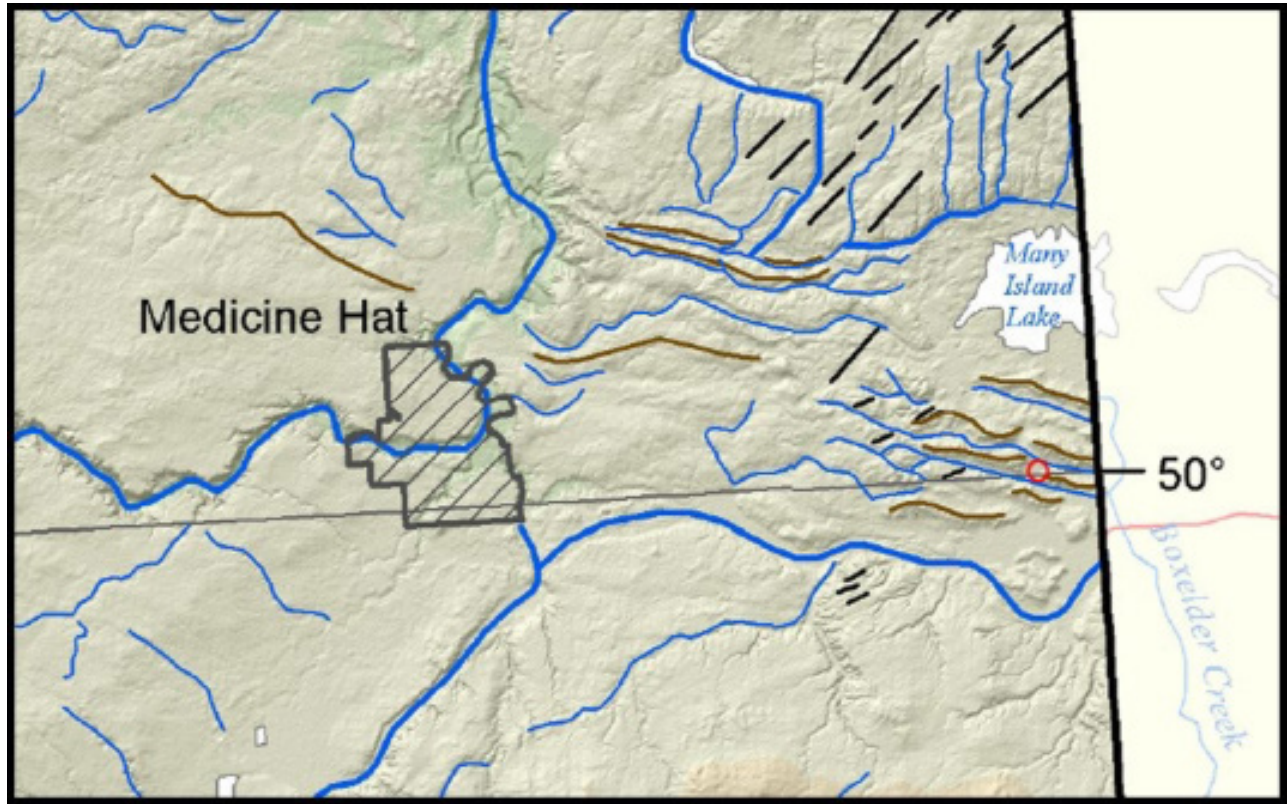
The central axis of the head is perfectly aligned to due north while its gaze is due west. Its interior basin contains a structural compound with a linear feature running down its neck that many observers have interpreted as an iPod

or earphone, with an attached wire leading down its neck (Hutcheon, 2006). The “iPod” and attached “wire” are a gas wellhead and access road that are situated in one of Canada’s key natural gas fields (50° 0’38.20” N, 110° 6’48.32” W). The nearest urban center to the site is the city of Medicine Hat (Map 1). The city, which claims to be Canada’s sunniest spot, has more than 63,000 residents and is known as “The Gas City.”

Anatomical Analysis and Measurements

The facial features and headdress of the Badlands Guardian are illustrated in an analytical drawing provided in Figure 7, while its features are highlighted in Figure 8 with each of its proposed features labeled A through T.

The features notated in Figure 8 include a forehead (A) with brow (B) and eye socket and eyelid (C) that support a profiled view of an eye (D). The eye is positioned correctly, by showing a side-view orientation. The face also has a defined cheek form (L), a nose (E) with a defined nostril (F), and a pair of upper (G) and lower lips (H). The area in which an ear should be located has been obscured by an odd feature that resembles an earphone or earbud with an attached wire (M). This odd feature is an access road leading up to a building that supports a natural gas drilling lease and wellhead. The original ear feature may have



Map 1. Alberta Geological Survey Map 604 [detail] (Atkinson et al., 2014). Red circle = location of Badlands Guardian. Black lines = streamlined bedforms. Brown lines = moraine ridges. Thick blue lines = major meltwater channels. Thin blue lines = minor meltwater channels.



Figure 7. Badlands Guardian, Alberta, Canada. Image source: Google Earth, 2002. Analytical drawing by George J. Haas.

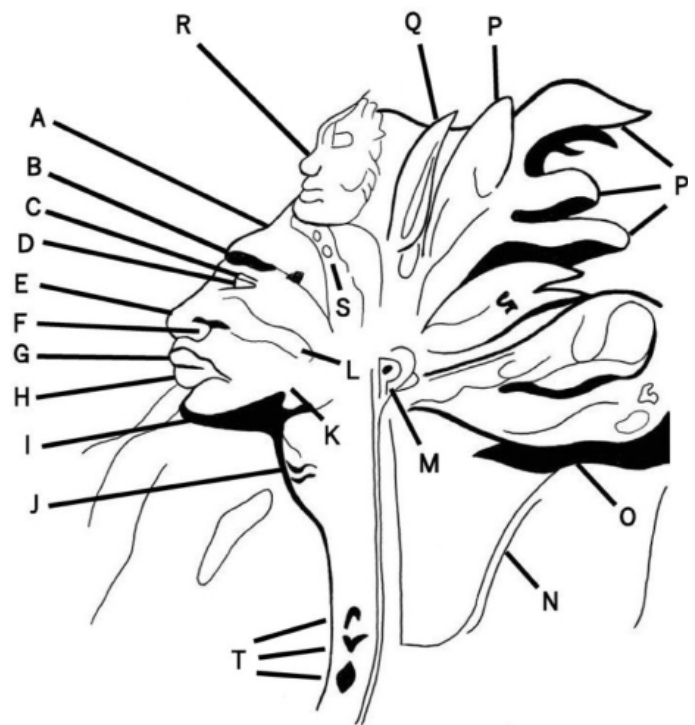


Figure 8. Badlands Guardian, Alberta, Canada, with notated features. Image source: Google Earth, 2002. Analytical drawing labeled A–T by George J. Haas.

been destroyed when constructing the drilling pad and access road. The contours of the head show a highly defined jawline (K) and chin (I), which are supported by a thick neck with aligned marks (J) and a lower neckband of embedded symbols (T). The portrait is further supported by a broad pair of flanking shoulders. The right shoulder (O) has two parallel ridgelines that flow from the top of the shoulder, down to the neck. The closest ridge line curves under the neck suggesting the partial figure is wearing a vest or sleeveless shirt (N). The main headdress includes what appears to be a single feather or a sharp horn-like feature (Q) which stands before a set of large feathers flowing from the back of the headdress toward the east (P). There is also evidence of a linear headband or facial tattoo with a dot pattern (S) that runs down along the forehead. The front of the headdress has a small facial portrait (R) of an effigy head that is attached just above the Badlands Guardian's forehead (A). The left-facing effigy head has a large nose, an eye socket, and fish barbs along the top of its head and side of the jawline.

The standard proportions of a human head, when viewed in profile, can be divided into ten sections that start from the forehead (A) to the bottom of the chin (J) (Figure 9). Beginning with the eye (F), it is positioned halfway between the top of the head (D) and the bottom of the chin (J). The nose and nose bridge occupies an area between the center of the eye (F) and lob of the ear (B), which is twice as long as the area between the bottom of the nose (G) and the center of the lips (H). The bottom of the nose (G) is positioned halfway between the eye (F) and the chin (J). The mouth and lips (H) are one-third of the distance between the nose (G) and the chin (J), while the distance between the eyes (F), in a frontal view, is equal to the width of one eye. The corners of the mouth (H) line up with the centers of the eyes (F). The ear (B) is located at the center of the head. Horizontally it lies between the forehead (A) and back of the head (C), while vertically it lies between the eyebrow (E) and the bottom of the nose (G). The top of the ear (B) lines up slightly above the eye (F) and is in line with the outer tips of the eyebrows (E). The bottom of the ear lines up with the bottom of the nose (G). The distance between the chin and the bottom of the nose is divided into three equal sections. The first is the distance from the bottom of the nose (G) to the center of the mouth and lips (H). The second section is the area that lies between the central line of the mouth to the beginning of the anterior mandible region of the chin (I). The third area begins where the anterior mandible region starts (I) and ends at the bottom of the jaw (J). The width of the shoulders is equal to the length of two heads (Hogarth, 1965).

When the analytical drawing of the facial features of the 2002 Google Earth image of the Badlands Guardian is

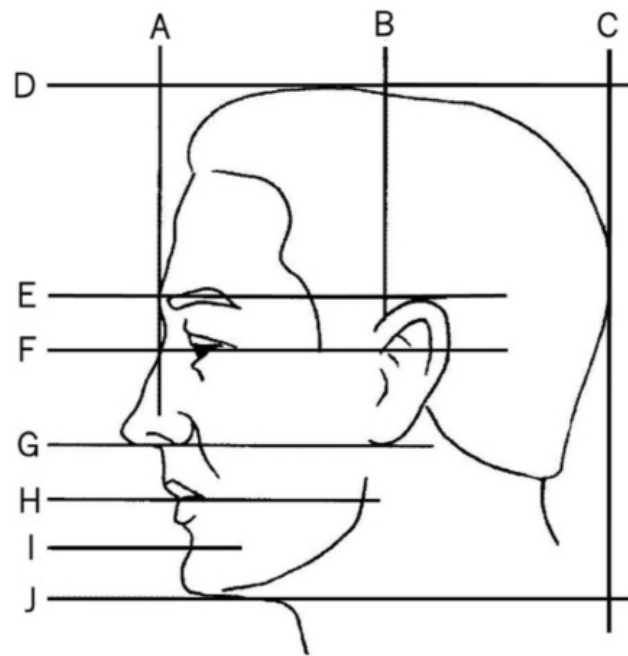


Figure 9. Standard proportions of human head, profile. Analytical drawing and notations by George J. Haas.

compared to the standard facial proportions of a human profiled head (Figure 9), a high degree of anatomical correctness can be observed (Figure 10). The position of the eyebrow (B) and eye (C) feature observed within the Badlands Guardian is aligned correctly with the location of the human eyebrow (B) and eye (C). The area extending between the human eye (C) and the bottom of the nose (D) is equal to the area between the eye (C) and nose formation (D) observed within the Badlands Guardian. The three segmented areas of the human profile located between the bottom of the nose, which includes the mouth and lips (E) and mental region of the chin (G) are also equal to the same facial features observed within the Badlands Guardian. The horizontal alignment of the corner of the mouth of the human profile with the side of the nose and the center of the eye can also be observed within the Badlands Guardian.

Utilizing the 2002 image of the Badlands Guardian and the measuring tool provided on Google Earth, we found that the overall dimensions of the formation fell within those of a template for a human head. The measurements were found to be proportional and adhered to the proper orientation of a human face.

The structural perimeters from the tip of the nose to the back of the head equals the distance from the chin to the top of the forehead, which measures 230 m. The distance from the base of the chin (labeled G in Figure 10) to the top of the mental region (labeled F in Figure 10) measures 20 m, from the mental region to the center of the lips (labeled E in Figure 10) is 22 m. The distance from the

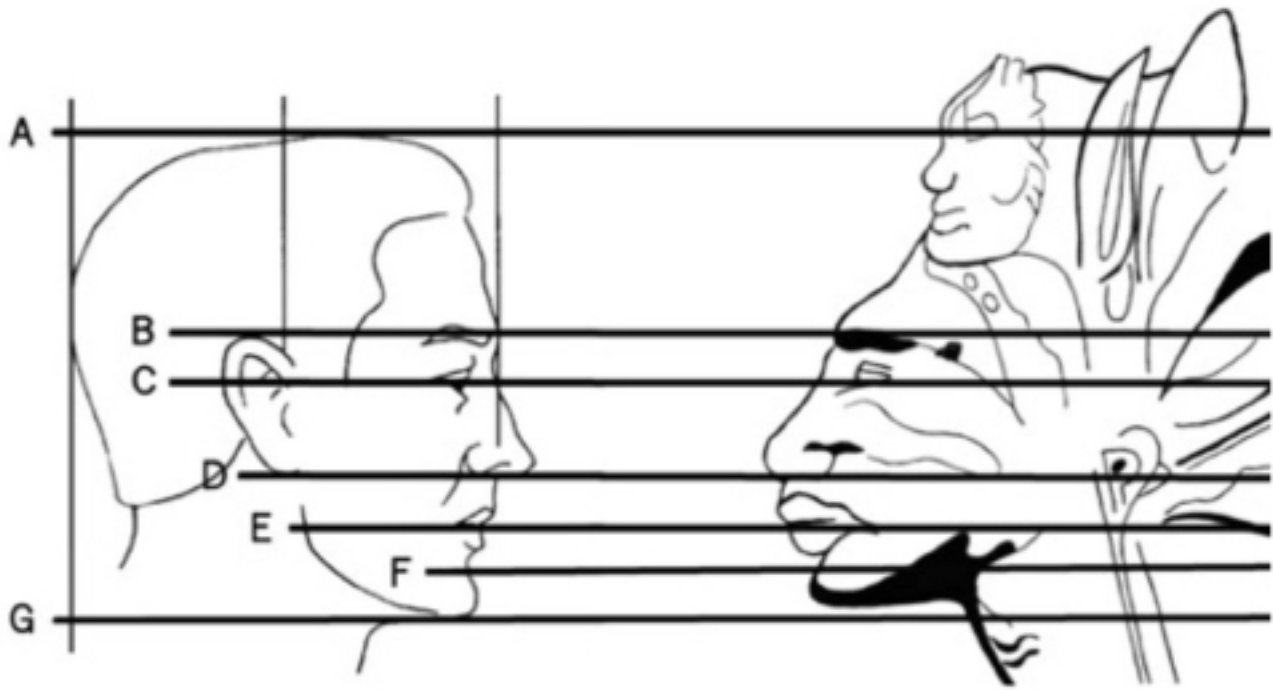


Figure 10. Proportions of human head, profile with Badlands Guardian. Left: Human head. Drawing by George J. Haas. Right: Badlands Guardian. Image source: Google Earth, 2002. Analytical drawing by George J. Haas.

center of the lips to the base of the nose (labeled D in Figure 10) measures 22 m. The distance from the base of the nose to the center of the eye (labeled C in Figure 10) measures 65 m. The measurement from the center of the eye to the brow and forehead (labeled B in Figure 10) is 22 m. The width of the mouth is 44 m, while the width eye socket is 22 m.

Utilizing a vintage portrait of a Native American Indian taken in the early 1900s by the American photographer Edward Curtis, a comparison of common facial features can be examined (Figure 11). Notice the alignment shared between the eyebrow (a) and the eye (b) of the Native American Indian with the carved features of the Badlands Guardian. There is also a common alignment between the start



Figure 11. Profile comparison. Left: Profile of Native Man, Edward Curtis (circa 1907). Right: Badlands Guardian. Image detail Google Earth, 2002.

of the nose bridge (b) and the bottom of the nose (c). The full lips and strong chin of the Native American Indian are directly aligned with its companion features located on the Badlands Guardian in Alberta, Canada.

CULTURAL REFERENCE

The Badlands Guardian is located roughly forty kilometers east of the city of Medicine Hat, Alberta. The name "Medicine Hat" is the English translation of 'Saamis' (SA-MUS), which is a Blackfoot word for the eagle tail feather headdress worn by medicine men called the Medicine Hat (Peters, no date). Several legends are associated with the name Medicine Hat. One tells of a mythical "merman" or river serpent named Soy-yee-daa-bee—the Creator—who appeared to a hunter and instructed him to sacrifice his wife to get mystical powers which were manifest in a special hat. Another legend tells of a battle that took place long ago between the Blackfoot and the Cree in which a retreating Cree "Medicine Man" lost his headdress in the South Saskatchewan River (Levasseur et al., 2014).

The stern facial features and feathered headdress worn by the Badlands Guardian (Figure 4) have a remarkable resemblance to indigenous tribal peoples of both North and South America. Figure 12 provides a photograph from 1872 of a Sioux medicine man, known as Many Horses, wearing a Medicine Hat. Notice the open arrangement of large eagle tail feathers.



Figure 12. Many Horses wearing a Medicine Hat (detail). Teton Lakota (Sioux), 1872. Note the eagle tail feather headdress.

The facial features of the Badlands Guardian also strongly resemble the portraits of young lords often depicted on Mesoamerican vessels such as those produced by the Maya. On a Codex-styled vase, from Mexico (Figure 13), is the image of a young lord presented with a similar profile showing a prominent nose bridge and nose. The young lord also wears a headdress adorned with a staggered set of eagle feathers.



Figure 13. Maya lord with feathered headdress, detail of Codex style vase K1229, Mexico. Drawing by George J. Haas.

Terrestrial Geoglyphs

The majority of comparative examples of manipulated terrestrial geology come to us in the form of earthworks that were created by ancient cultures throughout North and South America. Many of these huge mounds and earthworks were shaped like animals and human figures, while others took the form of geometric symbols. It is estimated that the number of earthworks found throughout North America number in the hundreds of thousands. However, over time almost all of these monuments have been either destroyed by natural erosion or by the rapid expansion of rural and urban development.

There are a limited number of terrestrial examples of profiled heads that exhibit the same level of detail and content observed within the superior profiled face of the Badlands Guardian. The best examples are found in figurative and facial portraits that were created recently. Two such marvels were created in the 20th century in South Dakota. The first is Mount Rushmore with four portraits depicting U.S. presidents George Washington, Thomas Jefferson, Theodore Roosevelt, and Abraham Lincoln. The second is the Crazy Horse Memorial. Moving east there is the Civil War memorial at Stone Mountain in Georgia fea-

turing Jefferson Davis, Robert E. Lee, and Thomas “Stonewall” Jackson. Looking to the other side of the globe we must recognize the colossal facial carving of Decebalus, the last king of Dacia, carved on a mountain in Romania. Unfortunately, none of these faces can be seen from above. They are all designed to be viewed from the ground within a horizontal plane.

Since there are a limited number of examples of facial portraits to be viewed from above within the available database, only five meet the criteria of this study with comparable detail and content.

There are two surviving examples of humanoid faces etched on the surface of the Nazca plains of Peru. The first is a round humanoid face (Figure 14). Notice the formation’s basic simplicity, which consists of two round mounds forming a pair of eyes, a rectangular shape as a nose, and an oval impression forming a mouth. The circular head measures about 9 m by 8.5 m. The formation also has an arrangement of radial lines on the left and right sides (Levasseur et al., 2014) (Figure 14).



Figure 14. Round humanoid face, Nazca, Peru (400 BCE).

The second example is a figurative geoglyph with a round head known as the Astronaut or the Spaceman (Figure 15). Notice its facial features are very basic. It has a bulbous head with two circular eyes and a round mouth. It has a long slender body with two legs and blocky feet that resemble the clay animation figure Gumby. It also has an outstretched left arm above its head.

A third example is a simple rendering of an immense human head located just beyond an ancient complex of half-buried pyramids found within the ruins of Caral, Peru (Figure 16). The half-faced formation was discovered in early 2000 at a site that has been dated to well before 2600 BCE (Solis et al., 2001). Produced by precisely placing stones across the surface, a D-shaped head is created with a sweeping mat of raked hair and a large gaping mouth. The forehead appears incomplete and there is no evidence of an ear or neckline. Its facial features include a large nose and a small, undefined, football-shaped eye.



Figure 15. Astronaut (spaceman), Nazca, Peru (500 BCE).



Figure 16. Grotesque Face, Caral, Peru (2500 BC). Courtesy of Smithsonian, August 2002, Vol. 33. No. 5, page 64.



Figure 17. Marcahuasi Face, Marcahuasi, Peru.

The fourth example is the Marcahuasi Face or the Monument to Humanity (Docore, 2006), also located in Peru. It is found within a plateau in the central Andes of Peru known as Marcahuasi (Figure 17). The rock formation takes on the shape of a profile face of a woman. The head includes a smooth helmet-like feature that ends with a curling hairline that covers the ear and the side of the face. Its facial features include a forehead and recessed eye socket with an eye. It has a slightly curved nose bridge that ends with a rounded tip. Below the nose is space for a philtrum that meets the mouth. The mouth is parted, and a darker coloring of the rock highlights the lips. The face ends with a strong chin and a short jawline. All these features appear to be spaced within the standard proportions of a human head.

The last example is the most recent. It is a 455-foot portrait of the founder of the Mongol empire, Genghis Khan

that was produced on a hillside in the south of Ulaanbaatar, Mongolia in 2006 (Figure 18). Local Chinese artists created this gigantic face on a Mongolian hillside to mark the summer festival celebration of Naadam. Genghis Khan's portrait was created by exposing the white stone under the surface of the hillside (Chris, 2007).

The contoured linear portrait of exposed white rock creates an elongated head wearing a small hat with a rectangular brim. The oval-shaped head has an ear on the left side of the head with an earring. The eyes are almond-shaped with simple linear eyebrows. The right eyebrow flows down forming the ridge of the nose while a large arching line forms a mustache above a trapezoid-shaped mouth. The shoulder line is not parallel, with his right shoulder sitting higher than the left. The jaw is bracketed by a pair of vertical lines suggesting the collar of a V-necked shirt.



Figure 18. Genghis Khan, hillside in the south of Ulaanbaatar, Mongolia, 2006.



Figure 19. Genghis Khan, hillside in the south of Ulaanbaatar, Mongolia. Left: Google Earth, 2006. Right: Google Earth, 2022.

Google Earth (Ulaanbaatar Region)

Over the past 14 years, 3 satellite images of the Ulaanbaatar region of Mongolia have been acquired by Google Earth that include the area surrounding the Genghis Khan geoglyph. This set of satellite images tracks the seasonal effects on the facial features since it was created. The first Google Earth image was released in 2008 and provides the highest clarity and resolution of the overall formation (Figure 18). The second Google Earth image was released in 2013 (Figure 19). This image shows that the linear portrait has maintained much of the clarity and resolution and is comparable to the first. The third Google Earth image was released in 2021 (Figure 19). The current image reviewed in 2022 shows massive erosion of its left eye and eyebrow. The contours of the left side of the nose and mouth are also highly diminished along with the vertical lines of the collar.

As was done with the profiled view of a human head with the Badlands Guardian, we have created a comparative portrait of a frontal view of a human head with the Genghis Kahn portrait. In this comparison, we obtained a portrait of a native Mongolian man provided by the photographer Cyril Galline (Figure 20). Starting with the hillside portrait of Genghis Kahn, notice the alignment between the top of his head or hat (a) are not in alignment with the similar features seen in the portrait of the Mongolian man (a). The intersection of the forehead and hat line is almost in agreement within the two portraits (b). The eyebrow (c) and eye line (d) of the Genghis Kahn portrait is above the eyebrow (c) and eye line (d) of the portrait of the Mongolian man. There is, however, a common alignment between the start of the nose bridge (d) and the bottom of the nose (e) in both portraits. The full lips of the Genghis Kahn portrait are also directly aligned with the lips of the portrait of the



Figure 20. Portrait comparison (frontal view). Left: Genghis Kahn, hillside in Ulaanbaatar, Mongolia (2006). Right: Portrait of Mongolian man by Cyril Galline.

Mongolian man (f). The strong chin of the Genghis Kahn portrait (g) falls far below the chin seen in the portrait of the Mongolian man (g). Unlike the portrait comparison between the Badlands Guardian and the profile of a Native Man, in which every facial feature fell within the standard proportions of a human head, the geoglyphic portrait of Genghis Kahn does not.

FALSE IMAGES

The types of facial formations we see within a random landscape, along rolling hills and mountain ranges can be referred to as false faces. They are normally viewed from the ground with the sky as a backdrop and the facial formation rarely points skyward. They normally require unique lighting conditions and a particular viewing perspective to be fully recognized. The Old Man of the Mountain located in New Hampshire is a common example used to show how these false faces are created within the natural landscape (Figure 21). Notice the jagged profile of the old man's face only vaguely resembles a profile. The facial formation includes a pointy chin, a blocky nose, and a heavy brow. The profile is very basic, there isn't much detail.

The Old Man of the Mountain was so popular that it became an iconic monument, which was used as the state's emblem. It was also featured on license plates along with a U.S. postal stamp and a coin. Unfortunately, after many years of structural fatigue, the popular formation collapsed in 2003 (Dakss, 2003).



Figure 21. Old Man of the Mountain, New Hampshire.

Like the Old Man of the Mountain, most of these natural facial formations are crude or grotesque in some manner and generally consist of only an outlined silhouette with very little facial detail. They don't conform to the right size, shape, and orientation of a properly proportioned face. At best they are generic imprints of a face and project only the slightest hint of an eye, nose, and mouth. They never contain secondary features, such as an iris, nostrils, cheeks, defined lips, hair, or even ears. Despite the lack of an official reference guide providing a standard for designating an acceptable facial formation as artificial, it can be agreed that the pattern-seeking mind needs only the barest of features to see a face. One can argue that the mind's eye needs only the modest hint of a face, such as a triangular grouping of mounds set within a vacant landscape (Figure 22). Although the mind forms a visual projection of a facial formation by transforming this group of mounds into a pair of eyes and a nose (Levasseur et al., 2014),¹ we are aware that these are mounds and not a real face.

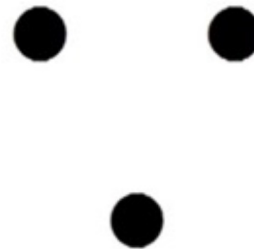


Figure 22. Facial projection with 3 mounds. Graphic by the authors.

Simulacrum and Pareidolia

The observation of unnatural formations that resemble recognizable animals and face-like structures within any given landscape should be challenged by secondary observers and mainstream scientists. These types of formations are often dismissed and reduced to nothing more than the brain's tendencies to find faces in rock formations by creating recognizable patterns. These facial formations are thought to be the effects of our imagination or illusion-based conditions known as simulacrum or Pareidolia.

The word simulacrum is based on a Latin word meaning likeness or similarity. It is a word often used by skeptics referring to the human mind's ability to anthropomorphize inanimate objects and for the eye to perceive facial and figurative representations in the natural environment (Mamiya, 2016). They classify them as visual projections created by chance and that were not intentionally created.

The origin of the word “pareidolia” finds its roots in the study of mental illness. It is a visual disorder that haunts a patient’s psyche with facial hallucinations as opposed to anthropomorphic projections. The word first appeared in an 1868 paper published in *The Journal of Mental Science* describing a mental disorder where patients see faces everywhere around them (Longman et al., 1868).

The word was misused in the early 1990s by UFO debunker Steven Goldstein in an article published in the *Skeptical Inquirer* magazine (Goldstein, 1994). Subsequently, the word has been used to reduce any visual acknowledgment of formations such as the Face on Mars to mere projections or hallucinations. From that point on, the word pareidolia became politicized and quickly adopted by skeptics to discredit any facial or figurative pattern observed within a random landscape. The slanderous accusation of pareidolia is now used to convince the inquisitive public that the human eye not only seeks patterns but also can see facial features everywhere, in everyday objects (Palmer & Clifford, 2020).

IMPLICATIONS AND APPLICATIONS

The individual facial features that produce a recognizable portrait of an indigenous tribesman wearing a feathered headdress within the province of Alberta, Canada, are persistent in four images. One of the images is an aerial photograph taken over the past seventy years and three satellite images taken between 2002 and 2015. All of the images were obtained at different times of day and during different seasons of the year. The surface features are accurately depicted in a 1949–1951 aerial photograph provided by the University of Lethbridge and again in 2002, 2012, and 2015 Google Earth satellite images. This diverse set of images shows the geoglyphic formation is consistent and has maintained structural integrity over the past 72 years. The synthetic impression of the facial features and feathered headdress remains exceptional with regard to its tonality, plasticity, and anatomical appearance. The continuity of cultural references is eloquently expressed within the iconographic motifs of artwork produced in North American and Mesoamerican cultures and shows a common aesthetic design.

The facial features observed in this Badland Guardian (Figure 4) are well proportioned and highly detailed despite the actions of natural depositional and erosional agents. While there are known geological mechanisms that are capable of creating and destroying the individual facial features presented in this formation, the natural creation of aesthetically designed formations within the limited boundaries of anatomical correctness seems to go well beyond the probability of chance. Considering the historic

study of geoglyphic formations that span from the half-face profile observed at Caral Peru and the Genghis Khan geoglyph in Mongolia, it is becoming clear that there is growing evidence to support the artificial origins of this formation.

The projections of pareidolia and simulacrum were discussed and dismissed as an explanation for the creation of the Badlands Guardian formation. The perception of its facial features within the landscape is not a mental projection, but a real work of design. The facial features observed within the Badlands Guardian are exquisite and appear to have suffered little alteration despite the effects of seasonal growth and the modern construction of a road and a natural gas compound. It has even survived the effects of natural erosion despite the absence of any conservation or maintenance programs that support the preservation of such national monuments as Mount Rushmore (2017).

Therefore, we conclude that the surface features that produce the unique facial components of a human portrait with a feathered headdress are real and exhibit a high level of consistency that is highly suspect not to have been created naturally. In his review of the dataset, image analyst Mark Carlotto concluded that “it is not impossible that a pre-existing landform could have been modified in specific ways to produce this face” (Carlotto, 2019).

We recommend, therefore, that both archaeologists and geologists examine this area with the aid of a qualified imaging team to direct their satellite cameras and acquire additional data and images of this anomalous formation. New satellite images should be acquired at different times of day and under various sun angles for further analysis. The use of LiDAR (light detection and ranging) should also be utilized to create digital 3-D representations of the formation’s topography. If these facial features are found to be consistent, we would encourage the archaeological and geological pursuit of ground truth, which would provide an intense survey and analysis of this sculptural formation.

Since its discovery in 2006 the Badlands Guardian has attracted worldwide attention and much debate concerning its origins and its tribal connections with the indigenous peoples of Canada. It has been described as a “net sensation” by the *Sydney Morning Herald* (Hutcheon, 2006) and a “geological marvel” by *PC World* magazine (PC World, 2007). It was ranked as the seventh most visited site in *Time* magazine’s Top Ten Google Earth finds (Fletcher, 2019) and named a “curious, hidden wonder” in the book *Atlas Obscura* (Nerman, 2016). It has also been featured on numerous programs such as *What on Earth?* (2015) and *Ancient Aliens* (2019). Despite its popularity, its care and preservation have not been addressed. The creation of a conservation committee to maintain and preserve the integrity of this geoglyphic formation should be established. Such a committee could protect the area and increase

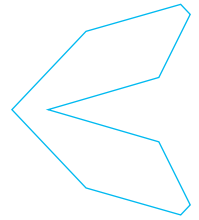
awareness of its value and vulnerability from stakeholders and society. Tourism to the site is limited due to the fact that when it is viewed on the ground its facial features are almost indistinguishable from its surrounding terrain. It can only be fully realized when viewed from above. Viewers can safely explore the site from the comforts of their own homes by accessing Google Earth and becoming online tourists. Hopefully, its importance and preservation will be recognized as a World Heritage Site that has cultural, historical, and scientific significance.

ACKNOWLEDGMENTS

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COMMENTARY

Editor's Preface to the Commentaries about the Leininger Case

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KEYWORDS

Adversarial collaboration,
citizen science, cross-disciplinary,
participatory team science, public education

The popularity of survival-related research over the past decade plus has been accompanied by critical analyses by parapsychologists (e.g., Cunningham, 2012; Roll, 2006; Sudduth, 2009), as well as intense debates between advocates and skeptics (see e.g., *Journal of Parapsychology*, 80, pp. 169–264). Of course, these are not unexpected trends with highly controversial topics that can also challenge the belief systems of investigators and authors. The commentaries that follow thus underscore the importance of methodology and rules of evidence relative to cases of the reincarnation type (CORT).

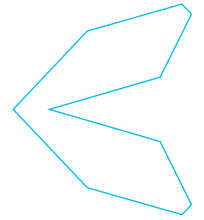
The opposing views of Jim Tucker versus Michael Sudduth are augmented by an invited, two-part commentary by James G. Matlock. He was tasked with identifying key lessons in the Sudduth–Tucker exchange to advance new studies and resulting knowledge above and beyond the present controversy. In Part 1 (published in this issue), Matlock aims to clarify critical aspects of the Leininger case that speak directly to data accessibility, quality, and interpretation. Part 2 (appearing in a forthcoming issue) will discuss protocols that might pre-emptively close gaps between the viewpoints of CORT critics and advocates. Matlock's second essay will then be followed by some final reflections from Sudduth, which will formally close this series of exchanges and commentary.

This approach strives to fulfill our mission of constructive bridge-building as outlined in this issue's Editorial. Matlock's independent analysis and suggestions are not necessarily endorsed by the Journal, but hopefully the collective content of the commentaries will spark healthy debate and the development of improved research designs in this challenging domain.

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COMMENTARY

Response to Sudduth's "James Leininger Case Re-Examined"

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In the last journal issue, Michael Sudduth (2021) presented a reexamination of the case of James Leininger, who as a young boy appeared to remember the life of James Huston, a pilot killed during World War II. Sudduth clearly put a tremendous amount of time into exploring the case. Unfortunately, his report is filled with distortions, mischaracterizations, and at times, outright misinformation. There are too many instances to list every one, but large and small, they all contribute to an inaccurate picture that denigrates the credibility of James's parents as informants and my competence as a researcher.

PERSONAL MEMORIES

The two most important issues in any case of the reincarnation type (CORT) are what the level of evidence is that the child possessed accurate information about the life of the previous personality and whether the child could have learned this information through ordinary means. Answering these requires first determining what information the child actually conveyed, particularly before the previous personality was identified. In some of the cases, families or investigators have documented at least some of the child's claims before the identification was made (Keil & Tucker, 2005). Schouten and Stevenson (1998) termed these B cases, differentiating these with documentation made *before* verification from cases with documentation only made *afterwards*, which they termed A cases. In such cases, the B items are critical since they do not rely on the memories of witnesses who might have been influenced by things they learned about the previous personality after the person was identified.

So it is in the James Leininger case. James's parents, Bruce and Andrea Leininger, reported that beginning at the age of 2, he made various statements about a purported past life. These eventually led them to identify James Huston as the previous personality in the fall of 2002, when James was 4 ½ years old. We were able to verify that some 30 of the statements ascribed to James were indeed accurate for Huston. No one recorded a number of them before confirming that they matched Huston's life, but we have documentation that was made before the fall of 2002 for ten of them. These thus count as B items, and they form the most evidential part of the case.

Sudduth uses the term "early-bird claims" for the B items. His analysis of them is, to put it mildly, idiosyncratic. First of all, he uses the wrong table. He focuses on one from my paper about the case (Tucker, 2016), rather than the one from the longer report I published in one of my books (Tucker, 2013). The table in the paper was not a complete list of the B items. Instead, it was a list of items that were part of a 2002 ABC News feature that included an interview with the Leiningers conducted before Huston was identified. The items there do count as B items (with one exception to be discussed later), but they are not the complete list. Sudduth chooses to focus on it, however, and then adds items of his own for which there is *not* documentation made before Huston was identified. Predictably, he finds them wanting.



Here is the list of James's B statements and behaviors from my book, which I'll address one by one:

- Signed drawings "James 3"
- Flew off *Natoma*
- Flew a Corsair
- Shot down by the Japanese
- Died at Iwo Jima
- "My airplane got shot in the engine and it crashed in the water and that's how I died."
- Nightmares of plane crashing and sinking in the water
- Jack Larsen was there

Signed Drawings "James 3"

We have numerous battle drawings that James signed "James 3." Like Sudduth, I wondered if this was because he was three years old. Sudduth says it doesn't matter that he continued to sign his name James 3 even after he turned four and that there would be nothing psychologically peculiar about it. It sounds pretty peculiar to me. When I interviewed each of his parents, they both stated that James clearly said he signed his name that way because he was "the third James." As it happens, James Huston was James, Jr., which would make James Leininger the third James.

Flew off *Natoma*

James's parents report that James told them one night that the name of the ship he flew off of was "Natoma." After that conversation, Bruce searched the Internet for a ship with that name, eventually finding information about USS *Natoma Bay*, an escort carrier stationed in the Pacific during World War II. He printed out the material, and the footer on the document shows when he printed it: 08/27/2000, when James was 28 months old. Three years later, Bruce sent a chronology to John DeWitt, the Natoma Bay Association historian. In it, he estimated that James had given the name in late October–November 2000. Later, when he checked the document, he saw that James had said it two months earlier. Sudduth tries to make this seem somehow suspicious, connecting it with when the Leiningers first emailed Carol Bowman, the author of two books on children's memories of previous lives (Bowman, 1997, 2001). He posits that Bowman could have gotten involved before James gave the name Natoma and other details. Since she suggested that Andrea tell James that his nightmares were memories from a past life, Sudduth says she and James's parents may have guided James, intentionally or not, to construct the reincarnation narrative he voiced.

We are aware of the possibility that parents could unconsciously guide children into thinking they remembered

a past life. This is particularly true when families in cultures with a strong belief in reincarnation are hoping that a deceased loved one will return. In such a situation, the parents know all about the past life and may be happy to accept any sign suggesting the child knows about it, too. Here, Bowman presumably knew little about World War II escort ships and absolutely nothing about James Huston. Her instruction to tell James he was remembering a past life conceivably could have guided him to construct a fantasy past-life narrative—but not the narrative that matched precisely with the end of Huston's life.

Sudduth says that I didn't list *Natoma* as an "early-bird claim" in my 2016 case report. Well, it's true I didn't include it in a table entitled "Statements and Behaviors by James Leininger Reported in ABC News Interview," and that's because it wasn't mentioned in the interview. Instead, I described in the text of the paper how James had given the name long before the previous personality was identified. In preparing that paper, I talked with one of the producers of the ABC segment, Shalini Sharma. Sudduth mischaracterizes what she told me, stating that I claim that she explained that the 8/27/2000 printout might have been excluded from the segment because other producers judged it as too weak as evidence. What she actually said was that she didn't remember why it was not included. She thought that perhaps a producer had decided that, at that point, there was not enough evidence indicating that James was remembering an actual past life to justify naming a specific ship. A previous personality had not been identified, so James's memories were unverified. But no one was doubting the printout. And no one thought there wasn't sufficient evidence that James had given the name. Even Sudduth doesn't challenge that fact that *Natoma* was part of the story at that time.

Sudduth (p. 1005) says "there is no justification for including [*Natoma*] as an early-bird item." But there is every reason to. The original printout is not the only documentation for it, as there are also emails and postings about it, and it is indisputable that it was part of the story before Huston was identified.

Flew a Corsair

Sudduth does not dispute that James said he flew a Corsair in his past life. He does point out, reasonably enough, that James's parents thought he was saying that he was flying a Corsair when he was killed, which James Huston was not. Sudduth says I should state the claims as they were attributed to James prior to the identification of the previous personality. In fact, in both the book and the paper, I say that James seemed to say he was flying a Corsair when he crashed. The Corsair was a special plane

that was developed during World War II. Huston did indeed fly one; he was part of the squadron that tested it for the Navy. But he was flying a different plane, an FM-2, off *Natoma Bay* when he was killed. Thus, we can view this item as partially correct.

Sudduth argues that James may have seen or heard about Corsairs, perhaps at the Cavanaugh Flight Museum where he and his father visited. The museum did not have a Corsair on display at the time, but Sudduth thinks James could have seen a toy model in the gift shop or perhaps overheard someone say the name. He then concludes that I haven't ruled out the museum as a source for the information.

Sudduth shows a fundamental misunderstanding here of what is most important in these cases. James doesn't get credit for the item based on whether or not he had heard of a Corsair; he could have been standing in front of a Corsair when he said he had flown one and still gotten credit. What makes the statement significant is that he claimed he flew a Corsair in his past life and, in fact, the previous personality did indeed fly one. We know that James was exposed to many types of World War II planes—Sudduth argues he might have been exposed to planes in ways we don't even know about. Out of all those planes, the one James named—the one discussed in the ABC interview before Huston was identified—was one that the previous personality flew. Absolutely no one suggests that James learned at the museum that *Huston* had flown a Corsair. And that is what counts.

Shot Down by the Japanese

James Huston was indisputably shot down by the Japanese military. Sudduth (p. 993) says that statements about being a pilot whose plane was shot down and crashed in the water are "highly general claims and (unsurprisingly) correct." In actuality, slightly fewer than half of the airplane losses during combat missions in Pacific Ocean areas during WWII were due to enemy fire (Office of Statistical Control, 1945). In addition, thousands of pilots were killed in training accidents before they even went overseas. So a claim of being shot down by the Japanese is more specific than it might appear.

Died at Iwo Jima

Sudduth says this statement is false because Huston died in Futami Harbor at Chichi Jima, an island some 150 miles away from Iwo Jima. He says this is analogous to claiming someone died at Gettysburg instead of Mt. Pleasant, Pennsylvania, or in San Diego instead of Santa Monica.

Well, no. Iwo Jima didn't have its own harbor, so when the Japanese were defending it, they were forced to dock

their transport ships at Chichi Jima. They would then load troops and various supplies onto small vessels and transfer them to Iwo Jima. The Americans targeted this route as part of its attack on Iwo Jima (Wright, 1999).

Pilots from *Natoma Bay* took part in the Iwo Jima operation. They made 123 flights in the lead-up to the invasion and 52 more on the day the assault began. In the weeks that the battle continued, they also participated in strikes against the transport vessels in the harbor at Chichi Jima. It was during one of these strikes when James Huston was killed. His death is described in a confidential history of his squadron that was completed days after he was killed. It is included in the section entitled Iwo Jima Operation.

Sudduth then completely mischaracterizes my handling of James's first statement about Iwo Jima. Bruce recalled that when James was 2½ years old, he pointed to a picture of Iwo Jima and said that was where his plane was shot down. Bruce stated this in a 2004 interview when James was 6 years old, after Huston had been identified. Several years later, he remembered James's statement as "when my plane was shot down" rather than "where." As I've just pointed out, this is a minor quibble regardless, since the strikes at the transport vessels were part of the Battle of Iwo Jima. But Sudduth says I accepted the later version and interpreted it to mean James was referring to the time period in which his plane crashed. This is incorrect. In my paper, I only give the earlier quote with "where." In my book, I explain how Bruce's memory of the statement had changed after a few years, but I didn't accept the later version. In fact, I would generally favor earlier recall over later.

"My airplane got shot in the engine and it crashed in the water and that's how I died."

This is a quote that Andrea, James's mother, reported in the ABC interview. The statement includes three items: my airplane got shot in the engine; my airplane crashed in the water; that's how I died. The latter two unquestionably fit James Huston's death. The first one is harder to verify. On the day Huston was killed, eight fighter pilots from *Natoma Bay* had joined eight bombers from another ship, USS *Sargent Bay*, in the attack on shipping in the harbor on Chichi Jima. The *Natoma Bay* pilots were there to strafe the ships and ground positions to keep the anti-aircraft fire down. Huston was the last to dive in the first strafing run, and none of the ship's other pilots saw his plane get hit. What people did see was that his plane suddenly nosed over and went crashing into the water, where it exploded, burned, and quickly sank.

After posting on a Chichi Jima website, Bruce heard from a crewmember of one of the *Sargent Bay* planes and

eventually talked to four veterans who had seen Huston's plane hit. This was not a case of Bruce's questions stirring up vague memories. One of the veterans, Jack Durham, had written an informal war memoir years before Bruce talked to him. In it, he wrote this about Huston: "One of the fighter pilots from the squadron assigned to give us cover, was hit with a direct hit on the nose and all I could see were pieces falling into the bay." Another one, John Richardson, began sobbing as he told Bruce about that day. He talked about seeing Huston's plane and said, "We were no more than thirty yards apart when the pilot deliberately turned his head and looked at me. I caught his eyes and we connected with each other. No sooner had we connected than his plane was hit in the engine by what seemed to be a fairly large shell." He added, "I have lived with that pilot's face as his eyes fixed on me every day since it happened. I never knew who he was. I was the last guy who saw him alive" (Leininger & Leininger, 2009, p. 217).

Sudduth says the testimony of the veterans "*happens* to fit James's description of events." The italics is his. I don't know if he's trying to impugn the integrity of Bruce or that of the veterans, but in his effort to dismiss their eyewitness reports, he is acknowledging that they do in fact match James's statement that his plane got shot in the engine.

Nightmares of Plane Crashing and Sinking in the Water

In the ABC interview, Bruce described how James had nightmares of his plane crashing on fire and sinking, and his being unable to get out. The first two are confirmed for Huston, with records stating his plane crashed in the water and exploded and burned. It then sank "with no wreckage left afloat."

Sudduth challenges the last aspect: James said he was unable to get out of the plane after it crashed, and Sudduth argues this is inconsistent with Huston's death as described in the Aircraft Action Report (AAR). Sudduth says the AAR indicates that the impact of the crash killed Huston. But it doesn't. The AAR said Huston's plane went "crashing into the water, exploding and burning" and that "it is believed that it would have been impossible to survive the crash and resulting explosion." Not only is the report only surmising what happened, but dying in an exploding, burning plane is clearly not the same as being killed on impact.

James screamed in his nightmares that his plane crashed on fire and he couldn't get out. Huston's plane crashed in the water, exploded and burned, and quickly sank. Despite Sudduth's protestations, James's statements were completely consistent with how Huston died.

Jack Larsen Was There

James's parents reported that when they asked who else was present when he was killed in his past life, he gave the name Jack Larsen. I have a copy of when Bruce searched for Jack Larsen in the WWII database on the American Battle Monuments Commission website on 10/16/2000. At that time, James was just under 2½ years old, and this was two years before Huston was identified as the previous personality.

Sudduth cannot deny that Jack Larsen was present when Huston was killed, but he tries to cast doubt on the significance of the fact. He says that when the ABC production team was trying to help the Leiningers locate a Jack Larsen, they ignored the crew of *Natoma Bay* and instead looked elsewhere, finding a naval pilot named John M. Larsen with no connection to *Natoma Bay*. He considers this "bizarre" since a veteran had previously told Bruce that a Jack Larsen had served on *Natoma Bay*. Sudduth doesn't seem to understand that Bruce and the production crew were in fact trying to find out more about the Jack Larsen who was on *Natoma Bay*. Shalini Sharma, the segment producer, emailed Bruce after the filming and told him to keep following the Jack Larsen lead. She had asked a contact at the Center for Naval History about a Jack Larsen. He found records of a John M. Larson, but he turned out to be a different man than the one on *Natoma Bay*.

Sudduth also invokes *the law of near enough*. It says that with wide parameters or vague descriptions, events that are sufficiently similar may be regarded incorrectly as identical. He says that not only does the Jack Larsen on *Natoma Bay* fit James's statement that Jack Larsen was there, but many other Jack Larsens (and men with similar names) in World War II would fit as well. I agree it can be hard to know sometimes where to draw the line to say an item is close enough to count as a match. But there is absolutely no doubt which side of the line this one is on. The AAR includes a diagram showing Larsen's plane right next to Huston's on the day he was killed.

Adding up these personal memories, we see that there are ten B items—ones with documentation that was made before the previous personality was identified—and they are all correct for James Huston (if we give full credit for the Corsair). Sudduth tries to discount the *Natoma Bay* and Jack Larsen items. He says I didn't put them in the category of "early-bird claims" in my 2016 paper but included them in the expanded list in my book. In actuality, I listed all of the statements and behaviors that were recorded before Huston was identified—in other words, all the B items—in my 2013 book. I described all of them in my subsequent 2016 paper, and in addition, I included a table in the paper of "Statements and Behaviors . . . Reported in ABC News In-

terview." *Natoma Bay* and Jack Larsen count as much as the others, and they add remarkable specificity to his claims.

Sudduth (p. 1001) creates his own "Alternative List of Early-Bird Claims" and arrives at a score of 4 out of 11. He says his matches are all very general claims, but that's partly because he excludes two of the most specific ones—*Natoma Bay* and Jack Larsen. He also adds two items that are not part of the record: "I died by drowning" and "My plane was on fire before crashing in the water."

Regarding the question of drowning, Sudduth says I confirmed in correspondence on 08/06/21 that I understood that the claims included that he died by drowning. I did not. He gets the date of my email wrong, but more significantly, I did not say James claimed to have drowned. He asked me if Andrea had ever told me that James said he died by drowning as opposed to being killed by anti-aircraft fire or the crash and subsequent explosion. I responded, "Andrea said that James reported he died when his plane crashed in the water and he couldn't get out." I said nothing about drowning. (Sudduth then audaciously says I seemed to have Andrea's version in mind when I confirmed this item, when in fact he was the one who asked me what Andrea had told me.)

When Sudduth referred to Andrea's version, he was talking about a somewhat ambiguous post she made on reincarnationforum.com three years after Huston was identified. It said, in part: "James Huston was shot down at the battle of Iwo Jima, flying at a relatively low altitude. After his plane was hit in the engine, it crashed nose first into the water. From what my little James told me after his nightmares, he was alive in the plane when it went into the water, and was kicking to try and break out the canopy to escape the sinking plane. His friends who flew over said that no wreckage was seen floating on the water; just an oil slick. James Huston drowned in the plane, not as a result of the crash." She seems to have deduced that Huston drowned. I can find no instance in which Bruce or Andrea reported that James actually said he drowned, and there is definitely no record of such a statement that was made before Huston was identified. (This is not to say definitively that Huston did not in fact drown, the Aircraft Action Report stating only that "it is believed" that he could not have survived the crash and explosion.)

Sudduth's "alternative" list aside, a fair assessment of the actual list of documented items shows that James's purported memories are an extremely impressive match with details from the end of James Huston's life.¹

GENERAL KNOWLEDGE

One item from the ABC interview does not count as a B statement. James is shown in the segment saying that

Corsairs got flat tires when they landed. That constitutes general knowledge rather than memories of a specific life, so although the statement is documented, it would not count as a past-life memory.

Sudduth changes the item in his "alternative list" to "Corsairs had a unique problem of getting flat tires when they landed." We can be confident that the little 4-year-old did not say that Corsairs had a "unique problem." Sudduth (p. 995) also says, "Tucker cites an unnamed Air Force historian he didn't personally interview in support of the claim." Although literally true, this is an example of when Sudduth, with apparent intent, misleads the reader into drawing a negative inference. What I did was describe how after James said that Corsairs got flat tires, the ABC crew interviewed a military historian (his name was Michael Modica) who was shown stating that Corsairs bounced quite a bit when they landed so they would lose tires.

Although James clearly knew a remarkable amount about planes for a young child, we typically place little significance on general knowledge the children convey. This is for the very reason that Sudduth belabors so extravagantly: We can never know with certainty what the child may have learned through ordinary means. Yes, James watched videos about planes and visited flight museums. As I stated in my paper, his passion about planes may have led to some of the knowledge of planes and aviation that he often surprised his parents by voicing. But not even Sudduth supposes that he learned about the specific past life, James Huston's life, from videos or flight museums. And it is the specific past life that is the core of any case of purported past-life memories.

Sudduth quotes Stevenson regarding potential ordinary sources of information and his emphasis on the need to "show a specific matching between a subject's statements and a definitive source of information providing the ingredients of those statements." Sudduth believes he has done that with a video on the Blue Angels, the Navy flight demonstration squadron formed in 1946, along with two trips James took to a flight museum.

But of course he hasn't. Yes, James was exposed to information about planes and World War II. It is not enough, however, to show that he learned that planes can take off from boats or that planes can crash. It is also not enough to show that James was exposed to imagery² of planes crashing or burning or even imagery of a pilot named Larsen or a Corsair plane. He was exposed to many, many images and names in his young life, including many planes. What is important is whether the ones he said were part of his past life actually matched a life someone lived. James reported memories of being a particular person in a particular place. You would need to show that he learned that a pilot took off from the *Natoma* and that his plane crashed during the

Battle of Iwo Jima in a particular way and that his friend Jack Larsen was nearby when it happened. Sudduth has not done that.

BEHAVIORS

Sudduth says that I "admit" that James's behavior when he was little, such as his nightmares and his repeated play or drawings of plane crashes, is important. It's hardly an admission to say that James showed behaviors consistent with the memories he reported, but the behavioral features are an ancillary part of the case, not the crux of it.

I commented in my book that children who have witnessed a traumatic event sometimes develop post-traumatic play in which they repeatedly reenact the event. I said it wasn't obvious in James's case how to distinguish normal behavior from post-traumatic play, but when combined with his recurrent nightmares, his repetitive behaviors suggested a child trying to work through a traumatic event, which in this case seemed to be one from a past life.

Sudduth takes exception to this and accuses me of misapplying clinical work on childhood trauma, an odd criticism to come from a philosopher. He says that two psychiatric sources, Terr (2003) and *DSM-5* (American Psychiatric Association, 2013),³ presuppose that the clinician has observed the subject engaged in play. In fact, Terr (2003, p. 325) says "the presence or absence of behavioral reenactments may at times be better determined from interviews with third parties," and I can think of no diagnosis in the *DSM* that requires that the patient show specific symptoms while in the psychiatrist's office. Certainly, the criteria for posttraumatic stress disorder do not.

CONCLUSIONS

Much of Sudduth's paper is ultimately beside the point. Yes, James was exposed to materials about WWII and airplanes; we already knew that. How much of it a 2-year-old could have taken in during his visits to the museum is unclear, but young children can surprise us at times. And yes, in telling their story over the years, Bruce and Andrea Leininger may have been inconsistent at times on some of the details. *That's why we go by the documentation.* The documentation shows that James provided a number of specific details he said were from his death in a previous life, details that precisely matched a pilot who was killed in WWII. That was one James M. Huston, Jr., a 21-year-old pilot from Pennsylvania, who was killed only days before his ship was scheduled to leave Iwo Jima. Try as he might, Sudduth is not able to change that. The case remains unscathed.

A final note: Sudduth generally uses measured language in his paper. But he shows no such constraint on his blog ([http://michaelsudduth.com/crash-and-burn-james-](http://michaelsudduth.com/crash-and-burn-james-leininger-story-debunked/)

[leininger-story-debunked/](http://michaelsudduth.com/crash-and-burn-james-leininger-story-debunked/)). He titles his post about the paper "Crash and Burn: James Leininger Story Debunked." In it, he calls the case "a fiction James's parents exaggerated." He says it is an example of "drawing bogus inferences from alternative facts" and that it's based on "falsehoods." He finishes the post by saying we need to cultivate more conscientiousness in our inquiries to prevent us from "promoting bullshit." I see no justification for disparaging the Leiningers' integrity in that way. It would be one thing if Sudduth had proven fraud. But he has not.

Nonetheless, his paper, in its own strange way, represents a significant contribution. Sudduth has demonstrated that the case is so strong that a determined critic can devote endless time and energy trying to debunk it and still not make a dent in it. His accomplishment is marred only by his inability to see what he has done.

NOTES

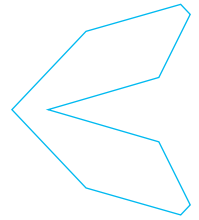
- ¹ Sudduth evokes the law of combinations to dispute this in a way I find deceptive. He says that although the multiple elements of the B statements might seem to limit the range of possible matches, they actually increase it because the law of combinations says that the number of combinations of interacting elements increases exponentially with the number of elements. A well-known example of the law of combinations is the "birthday problem." It asks how many people have to be in a room for there to be a greater than 50% chance that two of them have the same birthday. The answer is 23, which seems surprisingly low. If I'm in a room with 22 other people, the chances that one of them has *my* birthday are extremely small. But the chances that *any two of us* have the same birthday are more than 50% because there are so many potential combinations (22 + 21 + 20 . . .). If you add more people to the room, you increase the number of potential matches even more, thereby increasing the chances that two of the group will have the same birthday. But that's not analogous to the situation here. Adding elements to the list of claims is more like looking for three people in the room with same birthday instead of two, rather than increasing possible combinations by adding more people to the room.
- ² Sudduth seems to suggest that James pointed to the photograph of Iwo Jima as the place where his plane was shot down because he had seen the picture at the museum. Or perhaps he's saying there was a similar picture there. Either way, the painting he shows in figure 12 is from another battle and looks nothing like the aerial photo of Iwo Jima that James identified.
- ³ Sudduth writes it as "DSM-V" and does not provide a reference.

ACKNOWLEDGMENTS

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COMMENTARY

Response to Jim Tucker

Michael Sudduth

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Let me begin by thanking Jim Tucker (Tucker, 2022) for offering his thoughts on my *JSE* paper on the James Leininger case (Sudduth 2021). I appreciate his clarifying his interpretation of several facts in the case, as well as his providing further context to some of them. I also appreciate his acknowledgement of Bruce Leininger’s authorship of the 2003 chronology which I uncovered in my investigation and made use of in my paper. That’s all helpful. For the rest, I wish I could say what St. Augustine said to Evodius when responding to the latter’s criticisms—“you have knocked vigorously.” Alas, I cannot say this about Tucker’s response.

My paper developed a number of different concerns about the evidential value of the James Leininger case (hereafter, JL case). The paper was lengthy and the scope of the material I presented was broad, often involving considerable detail regarding different aspects of the case. I realize this can make writing a concise and salient response a daunting task. To effectively navigate the landscape, therefore, it’s crucial to properly understand the structure and content of my *arguments*, as well as how I intend to leverage various facts in the service of specific lines of argument. One must not miss the forest (the argument) for the trees (particular facts).

Tucker’s response is largely focused on defensive posturing and cherry-picking claims I make in the course of arguments—some of the claims he attributes to me I actually *don’t* make—and trying to show that my depiction of the James Leininger case involves various “distortions, mischaracterizations, and outright misinformation” (p. 84). This could be instructive and effective as a critique, but only if Tucker showed how his purported corrections and narrative amendments were consequential to the cogency of my *arguments*. He’s not done that. He doesn’t say much, if anything, about my arguments—for example, what specific conclusion I draw from the facts I present, and how that conclusion feeds into a wider argument. On occasion, he tries to address what he thinks I’m arguing, but his objections betray various confusions about the content and structure of my argument—for example, not understanding how cumulative case arguments work or how to distinguish claims essential to an argument from those that are of minor significance or tangential. Tucker’s response may be a passionate exercise in apologetics, but it does little to address the cogency of my arguments.

Most importantly, though, Tucker’s entire critique depends on a variety of unstated assumptions about how we should understand *evidence*. When is one statement evidence for another statement? When would it be good evidence? Ultimately, my paper was designed to drive the reincarnation train into a collision course with these crucial questions in epistemology. Tucker failed to see this, or he chose to ignore it. Either way, he has squandered a valuable opportunity to address the kind of questions that underlie his favorable assessment of the JL case and his unfavorable assessment of my paper.

In what follows, I’ll address the above shortcomings of Tucker’s response.



Preliminaries

I should begin with two closely related preliminaries.

First, Tucker begins his paper with a straw man fallacy. He claims that my alleged errors “contribute to an inaccurate picture that denigrates the credibility of James’s parents as informants and my competence as a researcher” (p. 84).

While I don’t think the Leiningers are sufficiently credible as informants, I didn’t claim nor imply that we should question Tucker’s *competence as a researcher*. Tucker portrays my criticisms in this way, but he never shows that I say this, nor does he show how it follows from anything I actually said. I point out problems, errors, and flaws in his investigation and analysis in the JL case. As far as I can see, these are consistent with being a competent researcher. Competence doesn’t require infallibility or anything close to it. A competent baseball player sometimes strikes out. What’s true in baseball is true in research: Competence tolerates error.

The straw man fallacy is unfortunate in another respect. It’s a deflection from the central issues and problems that Tucker’s investigation and analysis raise for the kind of research he and others have been doing since the days of Ian Stevenson. This is not ultimately about Tucker, but about the challenges and problems that characterize the investigation and analysis of cases of the reincarnation type.

Since Tucker obfuscates the main threads of my paper, let me briefly restate them.

I argued that:

- (I) The Leiningers are not reliable as informants.
- (II) James was exposed to specific ordinary sources of information that (a) raise the probability of non-reincarnation explanations of the presumed facts in the case and which, therefore, (b) lower the probability of the reincarnation hypothesis relative to those same facts.
- (III) Tucker’s investigation was blind to several important ordinary sources of information to which James was exposed proximate in time to important claims and behaviors his parents attributed to him.
- (IV) (I), (II), and (III) jointly and severally severely undercut Tucker’s favorable evaluation of the case as evidence for reincarnation.

As I’ll show below, nothing Tucker says by way of his alleged corrections and amendments to the JL chronology in his response effectively challenges the arguments I present for these main claims. This is because Tucker doesn’t address the arguments I offered for these claims, or he only addresses some aspect of the argument, often in a way that is question begging and ignores the bigger pic-

ture. Tucker’s strategy isn’t adequately calibrated to track the essential features of my arguments. It’s more akin to shooting at duck targets at a carnival—*how many of these little guys can I shoot down in the time allotted?* That’s how you win big stuffed animals, but it’s not how you achieve the ends to which dialogue and argument are directed.

Tucker’s Verdict on My Paper

In his conclusion to his paper, Tucker makes the following claims:

Much of Sudduth’s paper is ultimately beside the point. . . . The case remains unscathed . . . Sudduth has demonstrated that the case is so strong that a determined critic can devote endless time and energy trying to debunk it and still not make a dent in it. His accomplishment is marred only by his inability to see what he has done. (p. 89)

I’ll set aside Tucker’s rhetorical mischaracterization of my critical approach to this case. What’s more interesting is his dismissive verdict. Although cloaked in imprecise language, it seems he thinks that nothing I’ve presented (significantly?) lowers the plausibility of the JL case as (good?) evidence for reincarnation. That’s an easy thing to say, of course. It’s more difficult to show. And I don’t see that Tucker has shown it. He presents no clear argument for his net assessment. He’s merely appended this verdict to a selection of *alleged* corrections to a small subset of claims I *allegedly* made in the course of my arguments. Since he has not engaged my arguments—he doesn’t even state them—he predictably fails to show how any of his counterpoints and gripes are consequential to the cogency of my arguments.

Tucker’s verdict is as understandable as it was predictable. It’s symptomatic of the very problem my paper was designed to ferret out—the lack of clarity in much reincarnation research concerning criteria that would sufficiently underwrite the kinds of evidential claims that reincarnation researchers would like to make. There’s an elephant in the conversation room here: *what makes any fact evidence for the truth of a claim?* If we’re not clear about the answer to this question, we can’t be clear about why the presumed facts of the JL case—for example, what Tucker presents in his tables—are evidence for reincarnation, much less why they would be good evidence. And if we’re not clear about this, we’re not going to be clear about why anything I’ve said undercuts the JL case as evidence for reincarnation.

If Tucker wishes to provide a serious engagement with the kinds of criticisms I have offered, he needs to do a number of things.

□ He needs to state more precisely the evidential claim he's willing to make about the JL case. Does he think the facts in the JL case are *mere* evidence for reincarnation? Or are they *good* evidence? And if the latter, approximately how good?

□ He needs to explain his understanding of evidential strength. After all, Tucker appears to think the presumed facts of the JL case provide strong evidence for reincarnation, or at least strong enough to deflect anything I've said. Does he think the presumed facts merely *raise* the probability of the reincarnation hypothesis? Does he think the facts make the reincarnation hypothesis more probable than not? Highly probable? What exactly? Opacity here is a recipe for dodging criticisms not answering them.

□ Tucker needs to present an *argument* that backs up his evidential claim(s). And to do this he must explain what logical principles justify his evidential claims. For example, does he wish to endorse a Likelihoodist approach to evidence? Perhaps a Bayesian view? Or maybe some other approach? If he wishes to appeal to reincarnation as the best explanation of the facts in this case, he needs to explain his explanatory criteria and elaborate how such criteria convert to evidential cash value. I frankly don't care which approach to evidence he takes. I'm just requesting clarity on a fundamental issue. What rules does he think sanction his purported inferences?

The JL case, like all other CORTs, has no established evidential relevance until we are clear about at least provisional answers to fairly remedial epistemological questions. Tucker has not made that clear. And if he hasn't done that, he can't effectively argue that the JL case has any evidential merit. And if he can't do that, his criticisms of my JSE paper are premature and ultimately beg the question. Worse, his criticisms mask a fundamental problem that vitiates much of survival research (see Sudduth, 2016, pp. 10–17).

I'll refer back to the core evidential issue in what follows to show how it hampers Tucker's ability to offer a salient response to my paper.

Tucker's Table Talk

In connection with my exposition of his analysis of the case, Tucker accuses me of using the "wrong table" for the purposes of analyzing the alleged early-bird claims of the case.

First of all, he [Sudduth] uses the wrong table. He focuses on one from my paper about the case (Tucker, 2016), rather than the one from the longer report I published in one of my books (Tucker, 2013). The

table in the paper was not a complete list of the B items. Instead, it was a list of items that were part of a 2002 ABC News feature that included an interview with the Leinigers conducted before Huston was identified. The items there do count as B items (with one exception to be discussed later), but they are not the complete list. Sudduth chooses to focus on it, however, and then adds items of his own for which there is *not* documentation made before Huston was identified. Predictably, he finds them wanting. (p. 84)

In section 1 of my JSE paper (Sudduth, 2021, 939–941) I explain that Tucker provides *two* sets of early-bird claims. He has one in his 2016 paper based on material presented in the 2002 ABC program, and he presents an expanded list in his 2013 *Return to Life* which he justifies on the grounds of a broader range of documentation. So, I make the very point Tucker makes above about the content and rationale for each of his tables. Yes, I have considerable discussion of the items in Tucker's 2016 table. But Tucker's gripe here is a red herring. First, the tables overlap, so much of what I say about items in Tucker's 2016 table applies to what he says in his 2013 table. Second, I devote an entire section of my JSE paper—section 7 (pp. 1002–1009)—to discussing the items that only appear in Tucker's 2013 table, and I provide further discussion of one of those items—the *Natoma* attribution—in section 6 (pp. 990–992).

Tucker's complaint is especially bizarre given that he makes terse references to a small fraction of what I say about those other items. So, he is aware that I address those items. If they are so important, he should have spent more time addressing *why* I find *all* the items he lists wanting, rather than incorrectly suggesting that I've rigged the discussion in some way by ignoring a more complete list of items. Tucker may be disappointed that I didn't include the extra items in my table analysis. I'm disappointed that Tucker failed to see how my criticisms of those extra items bear on my analysis of Tucker's 2013 table, especially since I explained it. More disappointing still is that he chose not to engage the full set of considerations I adduced to doubt the evidential force of those extra items he regards as so impressive.

Finally, in the above quote, Tucker makes reference to my alternative table (p. 1001). To clarify, I had previously shown (pp. 998–1000) how the material from earlier sections of my paper bears on the kind of analysis Tucker engages in in his 2016 table. I argued two things. First, the appearance of a genuine match with Huston in Tucker's 2016 table depends on logically dubious maneuvers (p. 999), and a non-reincarnation explanation of the facts Tucker cites would sufficiently account for what James got right

and what he got wrong. (I later make the same point after considering the extra items in Tucker's table in 2013.) My alternative table (p. 1001) was a supplemental way of explicating why Tucker's 2016 table was problematic, and I argued that we either have overriding reasons to prefer my table to Tucker's or we have no overriding reason to prefer either table. Tucker does not comment on my argument.

Tucker criticizes my alternative table because it includes claims for which there is no early-bird documentation, but this betrays Tucker's misunderstanding of the function of my alternative table. As noted above, it was another way of highlighting the problems in Tucker's uncritical and dubious dependence on the case's alleged early-bird items. The documentation and related background assumptions that Tucker uses as the scaffolding for much of the case suffers from a variety of unacknowledged liabilities which I explained in detail in sections 6 and 7 of my essay. How serious these liabilities are will in part depend on what kinds of (evidential) claims we wish to make on behalf of the early-bird items, but these issues need to be addressed head-on. In the JL case, some of the early-bird claims involve ambiguity, others are false or disconfirmed, and others are not clearly confirmed. There is the additional problem of selection bias, analogous to the file-drawer problem. And that's particularly acute in the JL case. If the Leiningers are reliable informants, then the early-bird items Tucker lists in his 2013 and 2016 tables are not the only claims we're justified in attributing to James before the previous personality was identified. What's relevant is not whether these other claims have early-bird status, but whether they are part of the Leiningers' narrative and how they bear on the evidential status of the case. Tucker is opaque at this juncture.

Ultimately, though, Tucker's table talk is little more than a distraction from more substantive issues. Regardless of what gets included in the tables, Tucker must state why the content of such tables is evidence for the claim that James Leininger is the reincarnation of James Huston. And he must explain his respective weighting of early-bird claims and claims not in this classification. What degree of evidential support do early-bird items confer on the reincarnation hypothesis compared to the degree of evidential support non early-bird items confer? We have a bunch of claims scattered through a chronology. Tucker needs to explain how he's allocating evidential support.

Tucker repeatedly brandishes the notion of "matches," but this begs the evidential question. Even if Tucker could clearly distinguish between a genuine and merely apparent match—and he hasn't—why should any number/kind of matches be regarded as evidence, much less good evidence, for reincarnation? And what number/kind of mismatches would count as evidence *against* the reincarnation

hypothesis? Until this is done, appeals to matches between the claims of James Leininger and the life of Huston beg the evidential question. Tucker's reasoning about this, lacking any normative evidential criteria, remains merely impressionistic.

Documentation and B Cases

In connection with Tucker's table complaint, he distinguishes between claims that are documented *before* the previous personality has been identified (B cases) and claims that are documented *after* the previous personality has been identified (A cases). The JL case, as Tucker notes, is a B type case since some of the claims attributed to James were documented before the Leiningers had decided on Huston as the previous personality.

All good and fine, except that Tucker's distinction between A and B cases overlooks a *third* classification of cases which Stevenson wrote about and which I briefly discussed in note 4 of my *JSE* essay (pp. 1011–1012): documentation made before *anyone* has even *attempted to verify* the claims of the subject (Stevenson, 1974, pp. 4, 71, 270–271). Identifying a previous personality is subsequent to and based on a (possibly lengthy) process of attempting to verify a subject's claims. There are many ways the process of attempting to verify a subject's claims can contaminate the facts, especially when the inquiry is conducted by someone close to the subject. If attempts at verification provide information about a previous personality, we have not adequately insulated the "facts" from contamination.

The concern about contamination is especially acute when information acquired during the verification process includes (i) information acquired specifically about the person later designated as the previous personality, (ii) information later used to identify a particular person as the previous personality, (iii) the subject has access to the information in (i) and (ii)—for example, by overhearing chatter about it or reading documents, and (iv) the process of verification is protracted, extending over years, and is proximate to the genesis of the story and its early evolution.

In the JL case, some of James's claims were documented *before* the previous personality was identified—that is, *selected or decided on* by the Leiningers as the result of an inference they drew. But these claims were documented *after* Bruce Leininger had been attempting to verify the claims. The Leiningers were the first ones to "identify" James Huston, Jr., as the previous personality, apparently after they ruled out Jack Larsen. They did so sometime between fall 2002 and December 2002. But according to the Leiningers' official chronology, they were attempting to verify James's claims as early as August 27, 2000. At that

time, Bruce allegedly had detailed information about the *Natoma Bay*. Among other things, he knew the carrier supported US operations at Iwo Jima from February to early March 1945. In December 2000, *Natoma Bay* veteran Leo Pyatt told Bruce that Jack Larsen was a crew member on the *Natoma Bay* around the time the carrier was supporting operations at Iwo Jima. In January 2001, Bruce acquired a list of *Natoma Bay* crew killed in action. The list included the name of James Huston, Jr., and indicated that he was a pilot on the *Natoma Bay* and had died on March 3, 1945, while the *Natoma Bay* was supporting operations at Iwo Jima. By the fall of 2002 the Leiningers learned that the Jack Larsen who was stationed on the *Natoma Bay* during the Battle of Iwo Jima was still alive. By December 2002, Bruce Leininger acquired details concerning the circumstances of Huston's death.

Tucker appeals to the 2002 ABC program and a small assortment of other documents to piece together a set of claims attributed to James before Huston was identified. But significant attempts at verification had been under way for nearly two years at that point. The Leiningers collected the above information, had it on hand, were ruminating over it, and discussing it in their household for two years, before deciding that Huston was the previous personality. If we could trust the Leiningers' ability to provide a reasonable guarantee that their "facts" were not contaminated, that would be another matter. But we can't trust them in this way. They have demonstrated that they are incredibly poor judges of obvious ordinary sources of information that shaped James's experience, claims, and behavior—see the next section for a summary of this. We have good reason to suppose that, if facts were contaminated, the Leiningers would be poorly situated to detect it.

Moreover, apart from the problem of selection bias, the ABC program only documents the Leiningers telling of the story in spring of 2002. Documenting *what* they said is not equivalent to documenting the *accuracy* of what they attributed to James. The mind isn't a video recorder. Memory represents a reconstruction of earlier events. It's considerably less reliable than we assume, especially at the level of detail required in the JL case. And Bruce Leininger's memory is no exception. It actually fits the rule. He has, by his own admission, misremembered multiple important facts in this case.

So, the documentation in this case prior to the identification of the previous personality is problematic in ways that Tucker has not acknowledged. There are more ways to get things wrong than to get them right, and I don't see that Tucker has alleviated these concerns. Consequently, the reliability of the early-bird documentation in this case is at best anyone's guess.

I raise the above issues only because Tucker has em-

phasized documentation in this case. Although the concerns I expressed above are serious, they are not central. The central question is evidential. Until Tucker provides clarity on what counts as evidence and why, whether cases are A or B or some other type is a distinction without a demonstrable evidential difference.

Ordinary Sources of Information

Tucker's response to my extensive discussion of the content of ordinary sources of information James was exposed to involves considerable obfuscation and misdirection. On the one hand, he acknowledges that James was exposed to information about planes and WW2. On the other hand, he doesn't think this is significant because the important stuff can't be explained in this manner.

Sudduth shows a fundamental misunderstanding here of what is most important in these cases. James doesn't get credit for the item based on whether or not he had heard of a Corsair; he could have been standing in front of a Corsair when he said he had flown one and still gotten credit. What makes the statement significant is that he claimed he flew a Corsair in his past life and, in fact, the previous personality did indeed fly one. We know that James was exposed to many types of World War II planes—Sudduth argues he might have been exposed to planes in ways we don't even know about. Out of all those planes, the one James named—the one discussed in the ABC interview before Huston was identified—was one that the previous personality flew. Absolutely no one suggests that James learned at the museum that *Huston* had flown a Corsair. And that is what counts. (p. 86)

First, while I acknowledge the significance of sources of information James might have been exposed to but which we don't know about—the so-called dark data problem—the focal point of my argument concerns *what we know he was exposed to*, and which apparently Tucker didn't know about.

Second, if we're considering the plausibility of ordinary sources of information shaping a claim a subject makes at time *t*, then we have to consider what sources were available to him *at time t*, the time at which he made the claim in question. I outlined the claims the Leiningers say James made in the period of March 2000 to August 2000 (Sudduth, 2021, 956, 958), the period of the genesis and early evolution of the story. James's allegedly claiming *he flew a Corsair in a past life*—Tucker's attribution—is not among those claims. Nor is *Huston had flown a Corsair*. Initially, in

August 2000, James gave the name *Corsair* when answering his parents' questions about the content of his dreams. He made no reference to a past life *at that time*—the time I'm concerned with. According to Bruce Leininger, James's first explicit reference to living a past life was in fall 2001. This would have been months after the Leiningers had been telling James that what he was experiencing had happened to him before—this was the advice Carol Bowman gave them. In my paper, I outlined the chronology of claims James made at specific times and the content of sources to which he had been exposed *at the time he made those claims*. There's no need to rehash the detailed argumentation here. Tucker's tactic seems to be to ignore the Leiningers' own chronology, invent a new one, and substitute stronger claims (which James possibly made at a later date) for weaker ones (he made at the time in question). This is a logical sleight of hand.

Third, Tucker's reasoning is otherwise implausible. He says, "What makes the statement significant is that he claimed he flew a Corsair in his past life and, in fact, the previous personality did indeed fly one" (p. 000). Tucker chides me for allegedly not understanding what's significant in these cases. I understand that Tucker *thinks* this particular item is significant in some sense, but he hasn't shown that it's evidentially significant. And that's what matters if we wish to make evidential claims. Tucker has not answered the evidential question. Until he does so, his reasoning is question begging and merely impressionistic.

Tucker later adds obfuscation to his implausible line of reasoning.

Yes, James was exposed to information about planes and World War II. It is not enough, however, to show that he learned that planes can take off from boats or that planes can crash. It is also not enough to show that James was exposed to imagery of planes crashing or burning or even imagery of a pilot named Larsen or a Corsair plane. He was exposed to many, many images and names in his young life, including many planes. What is important is whether the ones he said were part of his past life actually matched a life someone lived. James reported memories of being a particular person in a particular place. You would need to show that he learned that a pilot took off from the *Natoma* and that his plane crashed during the Battle of Iwo Jima in a particular way and that his friend Jack Larsen was nearby when it happened. Sudduth has not done that. (pp. 88–89)

First, as far as my argument goes, the issue is not simply whether James was exposed to WW2 imagery, etc., *in his young life*. The issue is whether James was exposed to

salient sources. As I repeatedly explained and illustrated (Sudduth, 2021, pp. 944–945, 950–953, 956–965) that's not merely a matter of whether the content of a subject's claims match the sources. It's also a matter of where such exposures occur in the chronology of claims and behaviors attributed to James. When a subject is exposed to content-relevant sources prior to having experiences, making claims, or engaging behavior which matches the content of the sources, we acquire reasons for supposing that any match (between the subject and a previous personality) is less surprising than it would otherwise be. Tucker may challenge this point if he wishes, but he must first acknowledge it if he intends to address the argument I presented.

Second, Tucker's "*It is not enough*" is unclear. Not enough for what exactly? *You would need to show . . .* I would need to show this for what exactly? This is a good example of how Tucker's discussion is saturated with the very lack of precision that characterizes his analysis of the JL case in the first place. It's unclear what goal requires that I satisfy what Tucker here demands.

Third, the plausibility of the reincarnation hypothesis depends on there being no equally good non-reincarnation hypothesis. But ostensible non-reincarnation explanations need not maintain that every (actual) fact in the case is explicable by James's exposure to some ordinary source of information which he assimilated. I certainly don't claim this. As I made clear in section 7 of my *JSE* paper, *different* factors, one of which is ordinary sources of information, may converge to create the appearance of a genuine case of reincarnation. Tucker is strawmanning my actual argument.

Fourth, my modest claim is that Tucker hasn't ruled out plausible ordinary sources of information. I can't see that I *need* to do any of what Tucker says above to show *that*, and Tucker provides no argument showing otherwise. The stronger claim I argue for is that the considerations I adduce are among those that lower the plausibility of the reincarnation hypothesis (for this case) by increasing the plausibility of ordinary sources of information. As far as I can see, Tucker hasn't even addressed that argument. And I don't see that he can address it without spelling out his criteria of evidence and his view of how defeasibility or disconfirmation works. Until then, it's at best unclear what the net evidential result is of my not showing what Tucker specifies above.

But let me comment further on the above point.

Tucker and the Leiningers regard the presumed facts in this case as evidence for the claim that James Leininger is the reincarnation of James Huston, Jr. Tucker never states what he thinks the evidential force of the total set of facts is, nor what normative criteria would justify this inference. But let's set that aside and simply make a remedial point about defeasibility and cumulative case arguments. Let

N represent the total evidential force of some set of facts $f_1 \dots f_n$ for the reincarnation hypothesis R . Suppose further that N depends on there being no plausible ordinary sources of information for $f_1 \dots f_n$. In that case, as you get plausible ordinary sources of information for some of the facts, the total force of $f_1 \dots f_n$ for R will decrease—this is an example of incremental defeasibility. In other words, the probability of R given $f_1 \dots f_n$, where some of the members of $f_1 \dots f_n$ has a plausible ordinary explanation will be less than the probability of R given $f_1 \dots f_n$, where none of the facts has a plausible ordinary explanation. One can effectively argue that the kinds of source-relevant facts I disclose in my paper do lower the probability of R without having to show that every fact or even the most important of the lot can be traced to an ordinary source of information. Curiously, I made a similar point in my JSE paper (p. 1003). Tucker chose to ignore it.

Of course, I have no idea how Tucker thinks of evidence. I can only appeal to principles baked into widely endorsed views of defeasibility, total evidence, and cumulative case arguments. Tucker can challenge them if he likes and present his own. I wish he had. After all, there might be a fruitful area of dialogue concerning just how much the kinds of source-relevant facts I introduce lower the probability of the reincarnation hypothesis. Among other things, that will depend on how individual facts in the JL case contribute to the total force of the facts. Again, I had hoped Tucker would offer something like that in his critique. He brought stones, but what's needed is bread.

The Credibility of the Leiningers

I devoted considerable space in my JSE paper (sections 4 and 5) to showing that the Leiningers were unreliable in ways that diminish the credibility of their narrative. Tucker chides me for going after the Leiningers' integrity, but he ignores most of the reasons I gave for doubting their reliability as informants. While I don't expect Tucker to have addressed all the reasons I presented, I should have thought it in his best interest to provide a more substantive response. Anyone who carefully reads my paper will see that Tucker ignored most of the credibility-diminishing issues I presented, as well as how I was leveraging them.

Tucker says, "in telling their story over the years, Bruce and Andrea Leinger may have been inconsistent at times on some of the details" (p. 89). *May have been . . . on some of the details?* This from Tucker who admits that Bruce Leinger placed James giving the word *Natoma* in late October/early November 2000 in the 2003 chronology but in the official 2009 chronology (in the book *Soul Survivor*), the Leiningers said James gave the word *Natoma* on August 27, 2000—this is an inconsistency. Furthermore, Tucker

has presumably seen the 2003 chronology I acquired and so knows that the 2003 and 2009 chronologies are inconsistent on several other crucial details of the story. Tucker has presumably read Mr. Leinger's prize-winning Bigelow essay (Leinger, 2021), in which Mr. Leinger introduces more inconsistencies in the latest iteration of the story—for example, locating James's highly specific claims about the Corsair plane in summer 2000, when the 2009 chronology explicitly indicates that James never made these claims until spring 2002. (See Sudduth 2022 for my critical examination of Bruce Leinger's Bigelow essay.)

Consider the above. Tucker can't bring himself to acknowledge that the Leiningers were inconsistent despite this being a clear entailment of Tucker's own words. And despite the myriad other examples. Why not say, *yes, you know, they were inconsistent, but let me show why, contrary to what Sudduth argues, these inconsistencies are not significant*. Instead, Tucker chose the path of denial and offered no argument at all.

The attention Tucker brings to the possibility of the Leiningers' inconsistency is another example of Tucker's failure to address my actual arguments. My argument isn't that the Leiningers are inconsistent therefore they're not credible. I invoked several issues in a cumulative case manner to raise doubt about the Leiningers' reliability as informants. Inconsistency is only one of several credibility-diminishing issues in my cumulative case argument.

Let me restate some of these considerations.

□ Andrea Leinger misrepresented the content of the Cavanaugh Flight Museum when dismissing the possibility that James could have acquired relevant information from the museum, but the exhibits are relevant sources of information for what she attributed to James. This counts against her credibility.

□ The Leiningers have repeatedly given assurance that James wasn't exposed to imagery of burning or crashing planes prior to the genesis of his nightmares which contained such imagery, but such images were on the Blue Angels video he regularly watched prior to the nightmares and for over a year while the nightmares were ongoing. Similar images were also on display at the Cavanaugh Flight Museum. This counts against the Leiningers' credibility.

□ Bruce Leinger has repeatedly referred to the Blue Angels video referenced above by the title *It's a Kind of Magic*. This is incorrect. There is no Blue Angels video by that name. This counts against Bruce Leinger's credibility.

□ Bruce Leinger attributes to his son a statement derived from a pilot in a Corsair video Mr. Leinger elsewhere admits James watched prior to making the statement, but he still regards the statement he attributes to James as dumbfounding evidence that his son lived a previous life. This counts against Mr. Leinger's credibility.

□ Bruce Leininger claimed that Carol Bowman began counseling the Leiningers in the summer of 2000, but really it wasn't until February 2001. This counts against his credibility. In his 2021 Bigelow essay, Mr. Leininger cuts Bowman out of the narrative altogether, thereby masking the fact that when James first refers to having lived a past life (fall 2001), the Leiningers had been instilling this narrative in him for months as part of Bowman's therapeutic advice. Given the relevance of Bowman's advice, cutting her out of the narrative counts against Mr. Leininger's credibility.

□ Bruce Leininger authored a chronology in 2003 that is inconsistent with the official 2009 story on multiple vital points of the story—for example, what James said, when he said it, contextual details between 2000 and 2002. This counts against his credibility.

□ Bruce Leininger said that James pointed to a map and said that's *where* his plane crashed, but later—after Mr. Leininger discovered that Huston's plane didn't crash there—he changed what James said to that's *when* my plane crashed. The former attribution is obviously false; the latter is not obviously false. The narrative change is evidentially salient. Lapses in memory on important matters count, and here it counts against Bruce Leininger's credibility.

□ The Leiningers suppress or otherwise mask statements in the *Natoma Bay* aircraft action report that don't fit their narrative—for example, the plane was not on fire and no damage to the plane was observed. They also ignore (as does Tucker in his response) the ways in which the aircraft action report makes any struggle to escape a sinking plane improbable. This counts against their credibility.

□ In the 2009 version of the story, the Leiningers claim James first made specific statements about the Corsair—the plane got flat tires on landing and tended to turn left on takeoff—in spring 2002. In the chronology Mr. Leininger provided in his Bigelow essay, he placed these statements in summer 2000. This counts against Bruce Leininger's credibility.

Then we come to Tucker's response. He calls attention to my misciting the date of a particular email correspondence with him, but he gives the Leiningers a free pass, ignoring most of what I've summarized above. Tucker seems more interested in posturing than addressing the credibility-diminishing issues I've detailed. And if he thinks the above examples are not credibility-diminishing, he should explain why and state what he would consider credibility-diminishing, other than an indisputable demonstration of fraud.

The logical inconsistency of the Leiningers' story is clearly only one of several considerations that I present to raise significant doubt about the Leiningers' credibility. The post hoc alterations to their story is also a problem. Not acknowledging the ways in which the aircraft action report conflicts with James's claims also is a problem. But what's

most important is the Leiningers' failure to acknowledge plausible if not obvious ordinary sources for the content of James's nightmares (the genesis of the story), his behavior, and the information he provided at the various stages in their chronology. This lack of situational awareness contaminates crucial aspects of the case—from the documents Tucker brandishes to our ability to retroactively rule out ordinary sources of information to the Leiningers' two-year process of connecting dots. That the Leiningers insist with certitude on the impossibility of ordinary sources informing the items I catalogued in my paper further diminishes their credibility as informants. A reliable informant always understands the limits of their own perspective.

The *Natoma* Claim

Tucker spends a few paragraphs discussing what I say—not my argument—for the *Natoma* attribution to James. Since Tucker mishandles this aspect of my paper, let me clarify. There are three issues concerning this feature of the case: its actual veracity (whether James actually said what's attributed to him), its early-bird status (when the claim attributed to him was documented), and its evidential weight if we grant its veracity and early-bird status.

Regarding the veracity of the attribution, in section 5 of my *JSE* paper I presented several reasons to doubt its veracity. I won't repeat the argument here, especially since Tucker didn't respond to the cumulative case considerations. If there's no response to my *argument*, no counterargument is required.

Regarding the claim's early-bird status, Tucker is correct that I claimed there is no justification for including the *Natoma* claim as an early-bird claim. He is also correct that I'm not challenging the "fact that *Natoma* was part of the story at that time" (p. 85). It's unclear whether Tucker understands the difference between arguing that we don't have good enough reason to affirm *p* and arguing that we have good reason to deny *p*, but the distinction is important. With respect to the early-bird status of the *Natoma* claim, I argued the former, not the latter.

Tucker presents reasons to think the *Natoma* claim is an early-bird item. Okay. So what? It's commonplace to have reasons, even good reasons, to believe opposite conclusions. This is why you can't refute an argument for some statement *p* by simply claiming *not-p*. Even presenting reasons for *not-p* is insufficient. One must show that the reasons for *not-p* outweigh the reasons offered for *p*. That's how you critically respond to an argument. Tucker doesn't do this. He doesn't even present my argument.

What I argued (p. 1004) was that what Tucker presented in Tucker (2013) was not an adequate justification for including the *Natoma* attribution as an early-bird item. In other words, given the evidence Tucker presented there,

there's no justification for including the claim as an early-bird item. Tucker (2013, p. 69) refers to the printout of the *Natoma Bay* entry from *the Dictionary of American Naval Fighting Ships*. But that document by itself is not documentation of what James said. More precisely, it's not—as Tucker later says (2013, p. 77)—an example of “definite documentation” in the form of a “printed record” of a statement from James Leininger. At most, it documents something Bruce Leininger printed out on 08/27/2000. Tucker then infers the early-bird status of the claim from this document and the narrative Bruce Leininger later provided about the circumstances surrounding the printout.

The crucial question is when Bruce Leininger's narrative about the document was itself first documented. If the narrative was itself documented in spring 2002 in connection with the filming of the *Strange Mysteries* program, then yes, that would be a sufficient justification for regarding the attribution as early-bird in Tucker's sense. But as Tucker admits, it wasn't in the 2002 ABC program. And I don't see a reference in either Tucker 2013 or Tucker 2016 to any specific piece of documentation that would be a record of the *Natoma* narrative prior to fall 2002. It's reasonable to raise the concerns I did given Tucker's previous presentations of the case.

Now, in his response to my paper, he provides amendments. He appeals to “emails and postings about it” (p. 85) and what Shalini Sharma told him. This looks like a stalemate to me. Sharma told me something different. But more importantly, until Tucker can provide more details about the emails and postings to which he vaguely refers—when, where, and what's the content?—his rejoinder is too diffuse.

But this is neither here nor there, or—if I may pilfer one of Tucker's phrases—beside the point. Even if the *Natoma* attribution is afforded early-bird status, this is nowhere nearly sufficient to underwrite the kind of big claims Tucker wants to make about the evidential force of this particular item, the Jack Larsen claim, or any other item in the JL case, much less the net assessment of the case as a whole. Apart from the concerns expressed earlier about Tucker's B-type cases, it's unclear why any early-bird item is (good) evidence for reincarnation. Tucker has clearly not provided an adequate response to the other kinds of issues I discuss in section 7 of my *JSE* paper, much less the underlying evidential questions.

Concluding Remarks

Tucker's response, though it clarifies a few issues, fails to engage the arguments I presented. He cherry-picks claims I made here and there in the course of arguments I presented, then responds to these claims—not the arguments—with question-begging assertions. His narrative is largely a deflective rehashing of what he's already written about the JL case, peppered with passionate rebukes that

evade my arguments rather than adroitly address them. A considerable portion of his response is little more than a hairsplitting of tangential details and distinctions, as well as quibbling over minutiae of the case and the micro-exegesis of content of his terse correspondence with me. Tucker manufactures a handful of errors, most of them of dubious consequence, which he then attributes to me, but he grants the Leiningers full-blown immunity despite their cacophony of demonstrable error and misdirection. The inconvenient facts he cannot deny, of course. So, he's content to dismiss by simply redescribing them as insignificant, not realizing that it's precisely *significance* that is under scrutiny here.

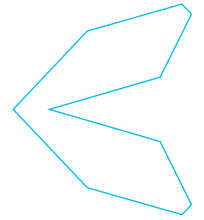
The most disappointing aspect of Tucker's response isn't the large swath of material and argumentation he ignores. It's his failure to address the central question my paper was designed to ferret out: *Why are any of the presumed facts of this case evidence—decent, dandy, or damn good evidence—for reincarnation?* If we're not clear about this fundamental epistemological question, we can't possibly be clear about whether, or to what extent, anything I present undermines such a claim. Tucker has squandered a wonderful opportunity to address this evidential question. Until he does so and addresses my actual arguments, I'm afraid he has prematurely popped the celebratory cork. Unlike Evodius's response to St. Augustine, Tucker has not knocked vigorously. He has not knocked at all.

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INVITED
COMMENTARY

Clarifying Muddied Waters, Part 1: A Secure Timeline for the James Leininger Case

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HIGHLIGHTS

A well-publicized case of a young boy's 'past life' memories remains highly controversial due to a debatable chronology of the reported details and events. Recent research arguably offers the most accurate timeline that supports early witness testimony in favor of reincarnation.

ABSTRACT

Drawing on dated emails and unpublished materials unavailable to Michael Sudduth, this paper establishes a secure, detailed timeline for the James Leininger reincarnation case. This secure timeline invalidates the timeline used by Sudduth in his critique of the case, while validating that of the Leininger family and investigator Jim Tucker. Links are provided to PDFs of supporting documents posted to the Psi Open Data repository.

Confusions and Controversies in the Case of James Leininger

The James Leininger case has become one of the best-known American reincarnation cases, thanks to the Leiningers' many media appearances and their best-selling book, *Soul Survivor: The Reincarnation of a World War II Fighter Pilot* (Leininger & Leininger, with Gross, 2009). This tells the story of a Louisiana boy who claimed to have died when his plane was shot down during the Battle for Iwo Jima. The Leininger case has become one of the most controversial reincarnation cases, in part because of confusions over the role of counselor and author Carol Bowman and the order in which major developments transpired.

The case was initially investigated by James's father, Bruce Leininger. The independent investigation by Jim Tucker did not begin until after the publication of *Soul Survivor*. Tucker wrote about the case in *Return to Life* (2013), following this with treatments in a scholarly book chapter (Mills & Tucker, 2015) and a paper in the journal *Explore* (Tucker, 2016). Carol Bowman (2010, pp. 54–57) wrote about the case and her involvement in it for *Subtle Energies and Energy Medicine*. Leslie Kean (2017, pp. 17–42) surveyed

the case in *Surviving Death*, and it was featured in an episode of the Netflix series spinoff of the same name. Bruce Leininger (2021) summarized it in a submission to the Bigelow Institute for Consciousness Studies (BICS) essay contest for "best available evidence for the survival of human consciousness after permanent bodily death," for which he received an honorable mention.

Skeptical pushback began online after a 2005 replay of an ABC *Primetime Thursday* segment featuring the Leiningers (Skeptico, 2005). The anonymous blogger gave a brief overview of the case, then offered an interpretation alternative to reincarnation. He presumed that James's fascination with aircraft began after the visit to the Cavanaugh Flight Museum outside Dallas, Texas, where supposedly he saw a Corsair, "the plane James will later say he flew." After this, the blogger submitted,

The child's grandmother, for no obvious rational reason I can think of, suggests he is remembering a past life. She brings in Carol Bowman (an author of several books on reincarnation), to "affirm" James' nightmares. . . . Bowman "encourages" James in his fantasies, also with leading questions. Unsurpris-



ingly, the child cooperates in this fantasy building. After all, they're telling him he was a real pilot.

From the TV program we know they bought him a toy plane big enough for him to sit in, and every shot showed him in pilot's goggles or by a plane. Carol Bowman asked him leading questions and encouraged his fantasy at every turn. Being a young child, he loved making up fantasies of being a pilot, to go with the toys he had been given. But they were just stories.

Bowman is the author of two books on reincarnation (1997, 2001), not several. This is a forgivable mistake, but not so the assertion that she asked leading questions of James and encouraged fantasizing. The latter charges are readily controvertible by viewing the segment—Bowman was interviewed at the ABC studios in New York City, not with the Leiningers in Lafayette, Louisiana.¹ Two other assertions—that James's grandmother had no reason to suspect that he might be recalling a past life and that his nightmares of dying in a plane crash were triggered by seeing a Corsair at the Cavanaugh Flight Museum—were undermined with the appearance of *Soul Survivor* in 2009 and *Return to Life* in 2013, respectively. Bruce Leininger told Jim Tucker that there was not a Corsair on display when he visited the Cavanaugh with James and Tucker confirmed this with a call to the museum (Tucker, 2013, p. 69). The Cavanaugh's Corsair had been loaned to a Wisconsin airshow where it crashed in July 1999 and was not replaced until 2003.

John Fischer and Benjamin Mitchell-Yellin (2016, pp. 124–131) took a constructionist position similar to the Skeptico blogger, starting with James seeing a Corsair in a museum he and his parents visited “when he was eighteen months old.” According to Fischer and Mitchell-Yellin, James not only saw the plane, he walked around it on this occasion. “His parents have even claimed that he was conducting a flight check” (p. 127). In support of this notion they give a footnote citing page 114 of *Soul Survivor*, which refers to a visit to the Lone Star Flight Museum in Galveston on June 29, 2002, taped for the (unaired) pilot of a series to be called *Strange Mysteries*, not the Cavanaugh Flight Museum in the Dallas suburb of Addison that James visited with his father at 22 months. The aircraft inspection did not occur in Galveston, but during a Blue Angels performance at the Lafayette, Louisiana, Sertoma Airshow on October 30, 2001, and it was not James's parents but *Strange Mysteries* interviewer Shari Belafonte who observed that he appeared to be conducting a preflight check.

In their conclusion, Fischer and Mitchell-Yellin proposed that the reason James “had the dreams, told the sto-

ries, played the games, and said the things he did may be due to a *combination* of various factors,” including “chance coincidence, past events, normal childhood tendencies, and even suggestions and projections on the part of the adults involved in the case” (p. 129, their emphasis). Michael Shermer (2018, pp. 102–106) further extended this line of reasoning, again building on the idea that James's fascination with World War II aircraft began after seeing a Corsair at the Cavanaugh Flight Museum. However, because James's memories had largely faded by age 11, when he met him on *Larry King Live*, Shermer thought that James's parents must have imposed the James Huston identity on him. Shermer averred,

the boy's experiences, nightmares and fantasies that resulted in this apparently coherent narrative were constructed only *after* the trip to the World War II museum featuring a Corsair plane, *after* the grandmother suggested past lives as an explanation, *after* the reincarnation therapist was consulted and engaged the boy in guided fantasy, *after* the father read to the boy books about World War II fighter planes, *after* the parents bought the boy toy planes, and *after* the parents became less skeptical and began to look for evidence to fit the reincarnation scenario. . . . (Shermer, 2018, p. 105, italics in original)

This series of skeptical exegeses becomes progressively more extreme and detached from the facts of the case. Shermer's maligning of Bowman is especially egregious. She is, he said, “a reincarnation counselor and past lives regression therapist who guided the boy to ‘recover’ more details about the plane crash and the deadly incident” (Shermer, 2018, p. 103). Bowman does sometimes employ hypnotic regression with adult clients, but not children. She never had the opportunity to lead James in guided fantasy. Her role in the case is much more limited than has been portrayed by critical commentators. When contacted by James's mother Andrea after she read *Children's Past Lives*, Bowman did advise encouraging James to talk more about his memories during the day, which had the salutary effect of making his nightmares subside.² From then until the *Primetime Thursday* segment, Bowman had no contact with the Leiningers, however. They had a brief period of email and telephone contact afterward and Andrea contributed a few posts to Bowman's Past Life Forum (since renamed the Reincarnation Forum) in 2004 and 2005, but Bowman met James only once, during the *Strange Mysteries* taping in 2002, and on that occasion did no more than say hello to him with others in the room.³

The most concerted skeptical treatment of the case is that by Michael Sudduth, who has addressed it in several

blog posts (2021a, 2021b, 2022) and in a recent paper in this journal (2021c). Sudduth appears to be more open to the possibility of fraudulent contrivance than his fellow skeptics.⁴ Although toned down in a revised version of his blog (2021a) and in the peer-reviewed publication (2021c), in the original blog posting⁵ he clearly insinuated fraud by the Leiningers. “The James Leininger story is a sham,” he asserted. The story “is based on outright falsehoods, factual distortions, and bogus reasoning.” More precisely, “The James Leininger story nearly everyone knows about is a story the Leiningers evolved over many years beginning in 2002. They altered their story in multiple ways in the light of what they later discovered.” In his recent blog concerning the submission to the BICS contest (B. Leininger, 2021), Sudduth (2022) attempts to hold Bruce to academic standards of discourse inappropriate to his lay contribution. Sudduth ridicules Bruce for holding that he has provided “definitive proof” of reincarnation and questions his veracity at every turn.

Sudduth (2021c) also goes after the investigation of Jim Tucker, to which Tucker has responded in this issue. Tucker alleges that Sudduth’s “report is filled with distortions, mischaracterizations, and at times outright misinformation” (p. 84) and addresses some examples. Not surprisingly, Sudduth (in this issue) rejects Tucker’s response and doubles down on his criticisms of Tucker and the Leiningers. It is not the purpose of the present study to examine each of the contested points. To the extent that Sudduth’s arguments rest on a faulty timeline, however, my analysis unquestionably supports Tucker and the Leiningers. A confirmed timeline also reveals the representations of the case by the Skeptico blogger (2005), Fischer and Mitchell-Yellin (2016), and Shermer (2018) to be largely conjectural.

Establishing a Secure Timeline

Sudduth (2021c, 2022) is rightly concerned with chronology. The evaluation of any reincarnation case⁶ depends on having an accurate chronology not only of memories, behaviors, and happenings in the case, but of these in temporal relation to events that might potentially impact them. Fortunately, Bruce provided me with a “James 3 Master Timeline” that he and Andrea helped Ken Gross work out in 2007 in preparation for writing *Soul Survivor*.⁷ Bruce reports that this was painstakingly constructed, using emails, letters, and dated internet downloads, as well as placing James’s statements and behaviors in relation to occurrences whose dates were known. I have checked this Master Timeline against other sources and I think we may trust it as authoritative. I have augmented it with additional materials, most importantly emails from the Leiningers

to Carol Bowman in 2001 and 2002.

My introductory synopsis of the case furnishes a comprehensive overview, not only of the development of James’s memories and behaviors related to the previous life, but also of the way the case was investigated by Bruce Leininger. By the time Tucker became involved in the case, James’s memories were presenting much less insistently, so it is important to look at exactly what Bruce did, how he did it, and when he did it, especially inasmuch as Sudduth (2021c, 2022) gives extensive attention to this topic.

The timeline dates in Bruce’s BICS contest essay (B. Leininger, 2021) are sometimes confusingly at variance with the Master Timeline and *Soul Survivor* (as Sudduth 2021c, 2022, has observed), but importantly, Bruce tried to include scans of documents he collected during his investigation. Unfortunately, BICS wanted to publish only PDF versions of submissions on its website, to prevent unauthorized copying or tampering. Bruce prepared a Microsoft Word version of the essay’s appendix, which includes the supporting documents, but this is not available through the BICS website. Bruce sent me the Word file and granted permission to make the embedded PDFs publicly available. I have sent them to the Psi Open Data repository, to which I supply references in the Notes to the following narrative.⁸

Little Man Can’t Get Out

James Madison Leininger was born on April 10, 1998, in San Mateo, California. He was named after his maternal great-great-great-great grandfather, James Madison Scoggin. Shortly after his birth, the family relocated to Richardson, Dallas County, Texas, where he spent the remainder of his first year. According to an email from James’s mother Andrea to Carol Bowman in February 2001 one of his first words was “airplane.” Soon thereafter he began to say “airplane crash,” as often as twenty times a day. Passenger jets traveling in and out of the Dallas-Fort Worth international airport regularly flew overhead, so James had many opportunities to see and hear them as an infant. Andrea added that the only kind of toys he wanted were airplanes, particularly WWII airplanes. James had a collection of wooden planes, some resembling vintage aircraft with propellers on their noses, even before the family moved again, to Lafayette, Louisiana, in March 2000. Most were gifts from his extended family, in response to the strong interest in them he evinced from an early age.⁹

On August 15, 1999—while they were still in Richardson—James’s parents Andrea and Bruce went out for the evening, leaving him with Andrea’s mother Bobbi. They returned to find James shrieking and crying in his sleep, although what he was saying was unintelligible. This was the first incidence of what would become his recurrent

nightmare. He was then 16 months old. During this period Bruce recalls seeing James standing at the side of his crib, looking up and jabbering as if holding a conversation with someone unseen.¹⁰

Shortly before they left Richardson in February 2000, Bruce took 22-month-old James to the Cavanaugh Flight Museum. On the way in, James wanted to look at the toy planes in the gift shop and Bruce purchased a plane along with a Blue Angels video for him.¹¹ Not surprisingly, when they reached the World War II hangar, James was transfixed by the real thing. He kept returning to the WWII planes and Bruce was able to get him out the museum only with considerable difficulty after almost three hours. Upon their return home, James watched the Blue Angels video over and over until it was worn out and had to be replaced.¹²

One day in mid-March while on a shopping outing in Lafayette, Andrea pulled a toy airplane from a bin in a store and commented that it had a bomb fixed to the bottom. "That's not a bomb, Mommy," said James, not yet two years old. "That's a dwop tank." He was correct—the finless vessel on the bottom of the plane represented a drop tank, an external fuel tank—but how he knew this Andrea could not fathom. The term was not mentioned in the Blue Angels video he had been watching and certainly was not used in the children's TV shows of which he was fond.

Not long thereafter, James began to experience nightmares on a regular basis, several times a week. He would scream and kick his legs in the air and wake up crying. Andrea consulted his pediatrician, who told her that they were night terrors, normal for children, and would resolve on their own. But the nightmares continued. Gradually James's words became clearer. When she first understood them, Andrea called Bruce to hear them too. James was screaming, "Airplane crash! Plane on fire! Little man can't get out!" Other members of the family witnessed the nightmares over the ensuing months. One of Andrea's sisters told Jim Tucker that "they were like someone in terror fighting for his life" (Tucker, 2013, p. 68).

Around this time, James started bashing his toy planes on a coffee table in the family room of his home, breaking the propellers off their noses, proclaiming variations of, "Airplane crash on fire! Little man can't get out!" Then on August 11, 2000, at three years and four months, he began talking about the little man in his waking state. He did this the first time when his mother was reading him a Dr. Seuss book before going to sleep. He lay on his back "and said 'Mama, the little man's going like this,' and then he kicked his feet up at the ceiling, as if he were upside down in a box, trying to kick his way out. 'Little man's going like this.' And he kicked again. It was the same kind of kick as in his nightmares, but now he was wide awake" (Leininger & Leininger, with Gross, 2009, p. 54).

When Andrea asked James who the little man was, he said "me." Andrea went to get Bruce, so he could witness this development. James repeated the scene for his father. Bruce asked what happened to his plane and James said that it had crashed on fire. Why did it crash? Because it was shot. Who shot it? The Japanese! At this juncture, Andrea's mother Bobbi proposed they begin to think "out of the box"—maybe James was recalling a previous life. This suggestion was readily adopted by all the family except Andrea and Bruce.

Not long thereafter, when James was again talking about the little man and identified him as himself, Andrea asked what his name was. James, he said. As this was his own name, she and Bruce dismissed it as a lack of comprehension on his part. Bruce asked what sort of plane he had flown and James said a Corsair. From where had it taken off? A boat. And the name of the boat? *Natoma*. Bruce asked Andrea to fetch paper and pen so he could jot down the name. A few days later, on August 27, he discovered in an internet search that there was a ship, the USS *Natoma Bay* (CVE-62), which had served as an escort aircraft carrier during World War II.¹³ This was the first indication that James might be recalling a real event, not simply exercising his imagination. Around the 1st of September, James was heard to say, "Before I was born, I was a pilot and my airplane got shot in the engine and crashed in the water and that's how I died."

On October 5, when Bruce came to say goodnight to James, he told him he hoped he would not dream about the little man that night. James said, "The little man's name is James too, Daddy." Andrea asked whether he could remember the little man's last name, but he could not. She then asked whether he recalled anything else from his dream. His face lit up, and he said, "Jack!" Did he remember Jack's last name? "Larsen. It was Jack Larsen." Bruce again asked Andrea to fetch pen and paper so he could make a note of the name. When he asked James who Jack Larsen was, he said that he was another pilot. Bruce did not have an opportunity to search for Jack Larsen for several days, but on October 16, he checked the American Battle Monuments Commission website, which lists casualties from America's foreign wars. This listed an Army sergeant Jack Larson and staff sergeant Jack Larsen, but no Larsons or Larsens from the Navy.¹⁴ Bruce did not learn for another two years that a Jack Larsen who served as a fighter pilot on the *Natoma Bay* was still living.

Shortly after Thanksgiving, Bruce and James were leafing through a book Bruce had purchased as a Christmas present for his father, who had joined the Marines at the end of World War II and had a strong interest in the Pacific theater. The book was *The Battle for Iwo Jima 1945*, by Derrick Wright (1999). When they reached a photo of the

island, James said, “Daddy, that’s where my plane got shot down.”¹⁵ Bruce retrieved the history of the *Natoma Bay* he had downloaded on August 27 and confirmed that the ship had participated in the battle for Iwo Jima in March 1945.

On December 8, Bruce contacted *Natoma Bay* veteran Leo Pyatt. Pyatt wanted to know the reason for his interest in the ship and Bruce explained that he had heard someone in his neighborhood talk about it and was considering writing a book. He asked Pyatt about Corsairs on the *Natoma Bay* and learned that there had been none. Regarding Jack Larsen, Pyatt recalled that he had flown off one day and nothing more was heard from him. From this, Bruce formed the idea that James was remembering the life of Jack Larsen, although, inconsistently, he was still skeptical of the possibility of reincarnation. In January 2001 he made another search for Larson or Larsen, this time confining it to fatalities from escort carriers, but again without success.¹⁶ The following day, he found a list of men from escort carriers who had been killed in action during World War II.¹⁷ Among them was a James M. Huston, Jr., who was associated with CVE-62, the *Natoma Bay*, but at the time neither Bruce nor Andrea realized the significance of this.

The previous November, Bobbi had sent Andrea a copy of Carol Bowman’s (1997) *Children’s Past Lives*. Still not convinced of the reincarnation interpretation of James’s story, Andrea did not immediately read the book. After finally doing so, she emailed Bowman, on February 18, 2001, describing James’s memories and nightmares and asking for advice on how to deal with them.¹⁸ Bowman suggested encouraging James to talk about his memories of the little man during the day. In doing so, Andrea should assure him that the life he was recalling was over and that he was now safe in his new life, Bowman advised. Andrea followed the recommendations, and the nightmares, which had been recurring three to four times a week, began to come weekly or biweekly. In addition to his nightmares, James had been telling everyone they took to their local airport that their planes would crash, but his concern with plane crashes also diminished.

For his third birthday on April 10, 2001, James was given a GI Joe action figure. The doll had brown hair and he named it “Billie.” For Christmas that year he received a blond GI Joe doll, which he named “Leon.” James was greatly attached to these dolls—he played with them daily, carried them to the bath, and slept with them.

Shortly after his third birthday, James started drawing aircraft battle scenes, most of them naval. One of the first depicted a boat and a plane with the sky covered with black dots. James placed red suns on the fuselages of Japanese planes, some of which he identified as “Zekes” and others as “Bettys.” Asked about the distinction, he explained that

the boy planes (Zekes) were fighters and girl planes (Bettys) were bombers. He made drawings of this kind almost daily for a year, signing several, including the one with the black dots, “James 3.”¹⁹ Andrea and Bruce supposed that was because he was three years old, but James persisted in the James 3 signature after he turned four. Bruce wondered whether the 3 might refer to the Number 3 slot pilot in the Blue Angels video, but when asked for an explanation, James said it was because he was “the third James.”

Early in March 2002, Carol Bowman called to say that ABC’s *20/20* TV program had contacted her regarding American children with past-life memories who might be featured in a planned television program. After consideration, Bruce and Andrea agreed to have James’s case included, although this created a dilemma for Bruce, who in his interview with Leo Pyatt had not mentioned James’s memory claims. Moreover, Bruce, a fundamentalist Christian, was still not comfortable with the reincarnation interpretation, unlike Andrea, her sisters, and her mother.

In May, *20/20* field producer Shalini Sharma visited the Leiningers. She asked James to tell his story, then to show her a picture of a Corsair. He found one in a book and told her, “That’s a Corsair! They used to get flat tires all the time! And they always wanted to turn left when they took off!” These were other details he could not have learned from the Blue Angels video, but later turned out to be true of Corsairs landing on and taking off from aircraft carriers. Shari Belafonte came to the Leiningers’ house to interview them on July 12, 2002. An experienced pilot, she arrived in a flight suit. Shown a CD recording of James inspecting a plane at the Sertoma Air Show in Lafayette the previous October 30, she said he was behaving as if he were performing a preflight check. Carol Bowman was there also, but she spent most of the time being interviewed by Belafonte outside the house and had only a brief interaction with James.

James’s story was to be included in the pilot episode of a series to be called *Strange Mysteries*. The show never aired, but Jim Tucker was interviewed for it as well and he learned about the case from a tape he was sent. In *Return to Life* (Tucker, 2013, pp. 64, 74, 77), Tucker notes that the Leiningers described James’ fascination with World War II aircraft, his nightmares, and his claim to have flown off a boat. Andrea relayed that James had asserted that his plane was shot in the engine by the Japanese, then crashed into the water, and that was how he had died. Still hoping to identify Jack Larsen, following the taping Bruce enlisted the aid of ABC researchers, but they too failed to locate him.²⁰

In late May and early June the Leiningers went on a ten-day vacation to Hawaii. They made a four-hour tour of Pearl Harbor with James, who naturally was fascinated

with the facility but related no new memories as a result.²¹ Later that summer, Bruce overheard James, who liked to pretend he was a singer, talking to an imaginary audience about Pearl Harbor. He told them that the Japanese had bombed it, then added, "I was a Navy pilot and the Japanese shot me down."²² That fall, James surprised Bruce by telling him that he had picked him and Andrea because he knew they would be good parents. When Bruce asked where he had seen them, James said Hawaii, but not when they were there that summer, but earlier, when it was just Bruce and Andrea. Bruce wanted to know where he had seen them. At "the big pink hotel," James said. He had also seen them dining on the beach one night. In fact, the Leiningers had celebrated their fifth wedding anniversary in Hawaii. They had stayed at the coral-pink Royal Hawaiian resort in Honolulu and one night had dined on the beach.²³

Although Bruce remained skeptical of a reincarnation interpretation of James's memories, he was driven to understand their grounding. A breakthrough came in September, when he attended a *Natoma Bay* reunion in San Diego, continuing to pose as an author doing research on the ship with the intention of writing a book. He learned from *Natoma Bay* Association historian John DeWitt that the only fatality from the ship in the battle for Iwo Jima was 21-year-old James McCready Huston, Jr. When Andrea heard this, it closed the case for her—James Huston, Jr., must be their man, for if their James were his reincarnation, he would be the third James or James 3. For Bruce, many loose ends remained. Huston had died at Chichi Jima, an island 150 miles north of Iwo Jima, and no one from the *Natoma Bay* had seen his plane go down. Moreover, he had been flying an FM-2 Wildcat, not a Corsair.

Bruce learned at the reunion that Jack Larsen was alive and residing in Springdale, Arkansas, ruling out the possibility that James was remembering Jack Larsen's death. During Bruce's visit to Larsen later that month, Larsen related that he had flown on the mission with Huston and other members of their VC-81 squadron on March 3, 1945. They had been attacking Japanese supply ships in the Chichi Jima harbor to prepare the way for torpedo bombers. Larsen recalled that the flak was so thick that he "could have walked to the ground on it" and got out of the area as fast as he could. After two more strikes, he and the other flyers returned safely to the *Natoma Bay*, but Huston did not make it.

Larsen invited Bruce to stay the night in his home and at breakfast Bruce told him about James's deep knowledge of WW II aircraft and of the Pacific war, without mentioning his past-life memory claims. Larsen retrieved an old canvas bag which contained a cloth flight helmet with goggles and oxygen mask attached, equipment he was wearing on the mission with Huston, and sent it to James. James was

delighted with the gift and immediately incorporated it in his play.

Larsen also allowed Bruce to copy his logbook for the collection of materials he was amassing. Other documents soon were added. On September 25, John DeWitt sent Bruce the VC-81 squadron war diary. This gave the first details about the downing of Huston's plane that Bruce had seen. Eight FM-2s had participated in the attack on ships in the Chichi Jima harbor. Huston's plane was hit by anti-aircraft fire, sending it into a 45-degree dive. The plane crashed into the water, exploding on impact, leaving no wreckage visible on the surface.²⁴

The war diary account did not mention Huston's plane having been hit on the nose or its being on fire as it descended toward the water. Those details of James's dream were not confirmed—but Bruce was left with a question. The rest of Huston's squadron was flying away from the scene when his plane was hit, so none had seen him go down—thus how was it known that the plane had suddenly begun to descend at a 45-degree angle and that it had exploded upon impact with the water? Someone must have seen something. Perhaps the information came from airmen on the torpedo bombers which followed Huston's squadron. They had flown off a different escort carrier, the USS *Sargent Bay* (CVE-83). Bruce found an internet site managed by *Sargent Bay* survivors and posted a request for witnesses to the March 3, 1945, attack on Chichi Jima.

The VC-81 war diary contained an appendix that showed that Huston had shot down a Zeke, the Japanese fighter plane whose name James had mentioned.²⁵ On December 5, Bruce received nine rolls of microfilmed records about the *Natoma Bay* from DeWitt and spent the next three weeks at a library copying them. Among other things from this new trove, Bruce learned that Huston had been awarded a posthumous Purple Heart.²⁶

The Leiningers realized that the best way to redeem their subterfuge with the *Natoma Bay* veterans was to write a book about the ship and they decided to focus on the men who flew from it. Andrea managed to identify James Huston's family through census records. From there, she tracked down Huston's sister, Anne Huston Barron, then 84, and called her on February 17. Andrea described the planned book and Bruce followed up by sending Anne documents relating to Huston's death. In return, Anne sent the Leiningers a package of photos of Huston. Two showed him posed by a Corsair.²⁷ It turned out that Huston had been part of a team which had tested Corsairs for carrier landings, hence the photographs.

On June 3, Bruce was contacted by John Durham, who had just read the post Bruce made the previous September, looking for a witness to the assault on the supply ships in the Chichi Jima harbor on March 3, 1945. Durham had seen

Huston's plane go down. Before calling, he had looked up the details in a memoir he had written some years before, he told Bruce. There had been a huge barrage of anti-aircraft fire and one of the shells had struck Huston's plane. Durham had witnessed the hit, but had not known whose plane it was. "One of the fighters on our escort squadron was close to us and took a direct hit on the nose," he related. The plane, the tail-end Charlie of the escort, burst into flames after the engine was struck.

Durham gave Bruce the names of other men who had flown off the *Sargent Bay* on the torpedo bombing run and who had witnessed Huston's downing. In mid-June, Bruce drove to Nacogdoches, Texas, to interview one of them, John Richardson. Richardson confirmed the details John Durham had provided. He had made eye contact with Huston just before his plane was hit, a memory that continued to haunt him. In September, Bruce attended a *Sargent Bay* reunion and there met John Durham in person, along with two other airmen (Bob Skelton and Ralph Clarbour) who had witnessed Huston's downing. Clarbour recalled, "Huston's plane was hit right in the engine. There was an instantaneous flash of fire, and the plane immediately dove at a steeper angle and crashed into the harbor."

Bruce finally relinquished his skepticism that James was recalling the life of James Huston, Jr. He had now confirmed all the details of James's account, except for the Corsair and dying at Iwo Jima, but Huston had test-flown Corsairs and so had a connection to them and he had died on a mission that was part of the battle for Iwo Jima. At the *Sargent Bay* reunion, Bruce came clean about James's memories, to a generally positive reception.

A week later, the Leiningers received a call from Shalini Sharma, now with ABC's *Primetime*. After being apprised of the new developments, Sharma asked whether the Leiningers would be receptive to telling James's story again for *Primetime*. They agreed, although because the show wanted to interview men from the *Natoma Bay* and Anne Barron as well, this necessitated informing them about James's memories of James Huston. The Leiningers called Anne on October 12. She was surprised and asked for time to think over the revelation, but soon accepted it.

Chris Cuomo interviewed the Leiningers at their home on October 20. They were preparing to wrap when a package arrived for James from Anne Barron. It held two items of Huston's effects that were sent to his parents following his death—a small pewter bust of George Washington and a Bakelite model of a Corsair that had hung in the ready room on the *Natoma Bay* for recognition training.²⁸ James can be seen holding these in the show. Off-camera, he took the bust and placed it on his desk, the place where Huston had had it displayed, according to a letter Anne sent

along with the items.²⁹ After carefully examining the Corsair model, James sniffed it and declared that it smelled like an aircraft carrier. Indeed, it had a smoky diesel oil smell. In her letter, Anne stated that she had considered cleaning the model before sending it, but decided to leave it as it was.

The 14.26-minute segment about James aired on *Primetime Thursday* on April 15, 2004.³⁰ The next day the Leiningers received a call from Bob Greenwalt, a friend of Huston who had been a member of the unit which test-flown Corsairs designed for aircraft carriers. He reported that they landed rough and tended to blow out their tires, as James had stated. Moreover, Corsairs tended to turn to the left on take-off due to high engine torque. Also as result of the segment, Tucker emailed Bowman to inquire if she thought the Leiningers would be open to an investigation. He then wrote to the Leiningers, who at first sounded receptive, but before a visit could be arranged they asked to postpone it (Tucker, 2013, p. 65).

For Christmas 2003 James was given a third GI Joe doll. This had red hair, and he named it Walter. Bruce had noticed a Leon Conner on the list of fatalities from Huston's squadron, and when he consulted that list again he found a Walter Devlin also. When he asked James why he had given these names to his dolls, James said: "That's who met me when I got to heaven." In fact, both Leon Conner and Walter Devlin had pre-deceased Huston, prior to the battle for Iwo Jima.³¹ Further digging determined that Billie Peeler had belonged to the same squadron but had died in an off-duty accident and so was not on the war fatalities list.³² The hair colors of the three fliers matched the dolls to which James had assigned their names—Billie Peeler's hair was brown, Leon Conner's was blond, and Walter Devlin's was red.³³

The 2004 reunion of the VC-81 squadron was held in San Antonio, and Andrea, James, and Bobbi accompanied Bruce there that September. James met Bob Greenwalt, recognizing him by his voice. James was comfortable with the other flyers and sat with them during meals, although he confessed to Andrea that he was saddened by how old they had become. During a tour of the National Museum of the Pacific War (the "Nimitz Museum") in Fredericksburg, Texas, a *Natoma Bay* veteran and his wife overheard James' remark about a five-inch cannon on display, "*Natoma Bay* had one of these." When the veteran inquired where it was located, James said, correctly, "on the fantail."

Anne Barron attended the reunion as well and she and James met. When Andrea had told James that they would be seeing Anne, he had replied, "It's not Anne, it's Annie." Annie was four years older than James Huston, Jr., and he had another sister, "Roof" (Ruth), who was four years older than Annie, James added. Andrea recognized the names from the census report and Anne confirmed the age spread

when they met her. She revealed also that Annie had been her brother's pet name for her, although he alone had called her that past her childhood. Anne Huston appeared to be entirely comfortable with James addressing her as Annie.

James continued to relate memories of Huston's family after returning from the reunion. On an occasion in mid-December, when Andrea entered his room with a glass of wine, he recalled that Huston's father had been an alcoholic. When he was drunk he would smash things about the house, James said. When he (James Huston, Jr.) was 13, his father had been sent to a hospital for six weeks. During this time, his mother had worked as a maid, which upset "Roof," who was a society columnist for a local newspaper. When his father returned home, Annie moved in with grandparents. All this was later confirmed by Anne Barron. She sent James a portrait that had been painted of her brother by their mother and when she and James spoke on the telephone, James asked, "Can I have the painting Mom made of you?" Only Anne and her brother had known about this second painting, which was in the attic of her home. Anne sent James the painting of her, along with another letter.³⁴ Andrea noticed that throughout the phone call, James talked about the Huston family in a familiar way, referring to Huston's parents as if they were his own.

In March 2005 James did not re-experience Huston's downing in a nightmare, as he had on the anniversary of his death in 2003 and 2004. He was then almost seven years old, an age at which many children's past-life memories are fading, but he continued to recall occasional episodes when reminded of them. On March 3, when Bruce assembled a model of an FM-2 Wildcat, James said there was an antenna missing from the side of the plane. Bruce asked how he knew, and James said he remembered that it stuck out and you would bump into it if you didn't pay attention. Bruce researched this and found it to be true. A few days later James recalled using drop tanks as crude napalm bombs, something Jack Larsen, the squadron's armaments officer, confirmed that *Natoma Bay* airmen had done.

Bob Greenwalt called on April 1 to alert the Leiningers to an upcoming History Channel documentary about Corsairs. Bruce taped it for James, and they later watched it together. At one point James corrected the narrator's identification of a Japanese plane as a Zero, saying that it was a Tony instead. A Tony was a fighter, he explained, and was smaller and faster than a Zero, a bomber. Bruce searched his records and found a document showing that Huston had shot down a Tony, so he would have been familiar with that model of plane as well as a Zeke.³⁵ On an evening walk with Bruce shortly after his birthday that October, James paraphrased a line from the show that evidently had impressed him: "Every day is like a carrier landing—if you walk away from it you're okay."³⁶

In the late summer of 2006, the Leiningers were invited to Japan by a program called *Mystery Experience—Unbelievable* for Fuji National Television. They were in Japan the first two weeks of September. A memorial service for Huston in the Futami port on Chichi Jima was arranged for September 4. James broke down standing on a ledge overlooking the harbor, tugged on Bruce's arm, and said, "This is where the planes flew in when James Huston was killed," apparently having recognized the view. Bruce subsequently confirmed the direction of attack from an aerial map in the mission's after-action report.³⁷

While at Chichi Jima, the Leiningers took a boat ride and threw out bouquets of flowers near the spot Huston's plane had gone down. When they stopped in San Francisco on the way back home, James drew a picture of a Japanese boat anchored in the water, dolphins and a whale swimming around it, an airplane and a bird flying peacefully overhead. He signed the drawing simply "James."³⁸ It was his last drawing, Bruce reports.

The Leiningers began working with Ken Gross in 2007. *Soul Survivor* was published in June 2009 and for the week of June 28 stood in eleventh place on the *New York Times* nonfiction bestseller list. On December 22, 2009, the family appeared on CNN's *Larry King Live* (*Larry King Live*, 2009) along with Michael Shermer (Shermer, 2018, p. 103). At that time, James retained only vague memories of what he said when he was younger. In 2010, Jim Tucker was welcomed by the Leiningers to begin his investigation of the case (Tucker, 2013, pp. 66–67).

Timeline of Developments

A chronology of the James Leinger case is presented in Table 1, which includes citations to sources not provided in the narrative above. "DOPS"³⁹ indicates an unpublished tabulation of James's statements and behaviors created following Tucker's investigation of the case in 2010. In the interest of compactness, where there is additional information provided in the narrative above, this is indicated in Table 1 by the note "[see text]." Where links to supporting documents are given in Notes, this is indicated with "n" followed by the appropriate number. James's statements (S) and behaviors (B) related to James Huston, Jr., are flagged by the initials S and B in boldface font.

Sudduth and I have different views of departures from this timeline, which was followed in *Soul Survivor* but not always faithfully elsewhere. This is particularly true of the many media appearances given by the Leiningers in which they told the story, not always consistently. I find this inconsistency more excusable than Sudduth (2021c, 2022, this issue) does. I do not see evidence for changes in relation to what the Leiningers learned as the case unfolded.

TABLE 1. Timeline of Developments in the James Leininger Case

March 3, 1945.	JH's plane shot down in Chichi Jima harbor in Battle for Iwo Jima.
Late May/early June, 1997.	Leiningers visit Hawaii for fifth wedding anniversary.
April 10, 1998.	JL born in San Mateo, California.
September 1, 1998.	Leiningers move from California to Richardson, Dallas County, Texas.
April 10, 1999.	<i>James turns 1 year.</i>
1999, from about April.	JL is fascinated with aircraft, B1 points to them in sky multiple times a day. (T 67; BL phone 1/30/22)
1999, date uncertain.	S1 One of JL's first words was "airplane." He would also say "airplane crash" whenever he saw or heard an airplane. (AL in Feb. 2001 email to CB)
1999, July 29.	Cavanaugh Corsair crashes at Wisconsin airshow, not immediately replaced. (T-RTL 69)
1999, Aug. 15.	BL and AL go out for evening, leaving Bobbi babysitting. B2 They return home to find JL shrieking and crying in his sleep. (MT)
1999, before moving to Lafayette, LA.	JL had a collection of wooden airplanes given to him by his extended family in response to his obsession with aircraft. (BL phone 1/31/22) [see text]
February 19, 2000.	<i>First visit to Cavanaugh Flight Museum in Dallas.</i>
2000, Feb. 19.	At Cavanaugh Museum, BL purchases Blue Angels video and plane for JL. (MT; LLG 19)
2000, Mar. 1.	Ls move to Lafayette, LA. (MT; LLG 15)
2000, Mar. 14.	S2 JL identifies "dwop tank" on toy airplane. (MT; LLG 16) [see text]
April 10, 2000.	<i>James turns 2.</i>
May 2000.	<i>James's nightmares begin in earnest.</i>
2000, early May.	B3 JL begins having nightmares as often as five nights a week. AL consults with JL's pediatrician, who tells her that they are normal night terrors. (MT; LLG 3-4, 10; T-RTL 69)
2000, May 27.	BL and JL return to Cavanaugh Flight Museum; BL purchases replacement Blue Angels video for JL. (MT; LLG 22)
2000, May-June.	B4 JL begins bashing planes into coffee table, breaking off their propellers. (LLG 33; T-RTL 67)
2000, May-June.	B5 JL begins ritual when getting into car seat of putting on imaginary headphones, facemask, and harness (seatbelt), as if preparing to fly a plane. (L)
2000, July 1.	JL begins talking about Corsairs. (MT)
2000, Aug. 1.	B6 JL demonstrates little man trying to kick his way out of plane in his waking state. (LLG 54) [See text]
2000, Aug 11.	S3 JL identifies little man as "me", says S4 his plane crashed on fire S5 because it got shot by the Japanese. (MT; LLG 55-56) [see text]
2000, Aug. 12.	AL's sister Jenny witnesses nightmares for first time. (MT; LLG 60-61)
2000, Aug. 12.	Asked how he knew it was the Japanese who shot down his plane, JL says S6 he knew it was the Japanese by "the big red sun." (MT; LLG 59)
2000, c. Aug. 14.	First speculation about reincarnation from Bobbi. (LLG 62)
2000, Aug. 27.	JL again talks about little man, identified as "me," says S7 his name was James; that S8 he flew Corsair S9 off boat S10 named <i>Natoma</i> . (MT; LLG 68-69) [See text]
	<i>Bruce's search begins.</i>
2000, Aug. 27.	BL searches for <i>Natoma</i> on internet, finds <i>Natoma Bay</i> . (MT; LLG 69-70) [See text, note 13]
2000, Oct. 5.	JL insists little man's name was James, like his; asked if he remembers anyone else in the dream, says S11 Jack Larsen, another pilot. (LLG 78-79) [see text]
2000, Oct. 16.	BL searches for Jack Larsen or Larson on American Battle Monuments Commission web site. (MT; LLG 87) [see text, n14]
2000, c. Nov. 1.	Bobbi sends AL copy of CB's <i>Children's Past Lives</i> . (MT)

TABLE 1 *continued*

- 2000, Nov. 25. JL points to photo of Iwo Jima in book, says **S12** "That's where my airplane got shot down." (MT; LLG 91; T-RTL 73) [see text]
- 2000, Dec. 8. BL speaks with Leo Pyatt, the first *Natoma Bay* veteran he has been able to contact. (MT; LLG 97-98)
- 2000, Dec. 25. Bobbi gives James a retro-looking pedal airplane for Christmas. He is enamored of it and later is filmed riding in it.
- 2001, Jan. 6. BL makes a second search for Larson or Larsen, this time on www.escortcarriers.org. [n16]
- 2001, Jan. 7. BL finds and downloads list of people killed on aircraft carriers in World War II. James M. Huston, Jr., is included, along with the designation CVE-62, the *Natoma Bay*. [n17]
- February 18, 2001. First contact with Carol Bowman.*
- 2001, Feb. 18. AL emails CB. Following her advice to encourage James to talk about his memories, nightmares reduce from 3-4 times per week to 1 time every week or every other week, although interest in planes continues. (MT; LLG xi, 101-3; date per CB 1/31/2022) [see text]
- April 10, 2001. James turns 3.*
- 2001, Apr. 10. JL receives first GI Joe doll as birthday gift, names it "Billie." (MT; LLG 104)
- 2001, late spring or early summer. **B7** JL begins drawing aircraft battle scenes, signs some James 3. Asked why, he says **S13** "I am the third James." (MT; LLG 105-6; T-RTL 73) [see text, n19]
- 2001, July 12–21. The Ls go on 10-day vacation to Hawaii, take 4-hour tour of Pearl Harbor. (BL 2/16/2021).
- 2001, summer. **S14** JL identifies Japanese planes as "Zekes" and "Bettys", says the "boy planes" were fighters and "girl planes" were bombers. (LLG 105)
- 2001, c. Sep. 1. JL says "before I was born, **S15** I was a pilot and **S16** my airplane got shot in the engine and **S17** crashed in the water and **S18** that's how I died." (MT; T-RTL 74) [see text]
- 2001, c. Sep. 1. **B8** While playing with an airplane, JL stands up and salutes saying, "I salute you and I'll never forget." (MT; LLG 105)
- 2001, Oct. 30. JL goes to see Blue Angels perform at Sertoma Airshow in Lafayette and **B9** conducts what the Leiningers are later told looks like a preflight check on a plane. [see text]
- 2001, Dec. 25. JL given second GI Joe doll for Christmas, names it "Leon." (MT; LLG 156)
- 2001–2002. **B10** JL plays with GI Joe dolls daily, bathes with them, sleeps with them. (LLG 156)
- 2002, Mar. 1. CB calls regarding interest in JL story by 20/20. (MT; LLG 106-7)
- 2002, Mar. 2. **B11** James has nightmare on anniversary of JH's death, although this is not realized at the time. (LLG 209)
- April 10, 2002. James turns 4*
- 2002, before Apr. 15. **B12** At local air show, JL mounts cockpit of Piper Cub, grabs headgear and puts it on "with chilling familiarity." (LLG 111)
- 2002, Apr. 15. **B13** James makes cockpit in the closet of Bruce's home office from old car seat and other articles, plays at plane crashing. (MT; LLG 110; L)
- 2002, Apr. 30. Bruce receives letter from Leo Pyatt regarding *Natoma Bay* reunion in California in Sept. 2002. (MT; L)
- Summer 2002. Strange Mysteries pilot preparation and taping.*
- 2002, early May. JL remarks to Shalini Sharma: **S19** Corsairs "get flat tires all the time." **S20** "They always want to turn left on take-off." (MT; LLG 109; L) [see text]
- 2002, June 29. JL taped at Lone Star Flight Museum in Galveston for *Strange Mysteries* pilot. (LLG 113-14) [see text]
- 2002, July 2. CB and Shari Belafonte at Ls' house, Ls interviewed for *Strange Mysteries* pilot. JL says on camera **S21** that Corsairs got flat tires when they landed. (MT; LLG 114-16; T-RTL 64; L) [see text]
- 2002, early July. Following *Strange Mysteries* taping, BL corresponds with ABC producer regarding Jack Larson. [T-E 200]
- 2002, July?. BL overhears JL, who likes **B14** to pretend he was a singer, performing and addressing an imaginary audience about Pearl Harbor. He says, **S22** "I was a Navy pilot and the Japanese shot me down." (BL email to CB, July 29, 2002) [see text]
- 2002, Sep. 2. Ls visit Dallas. **B15** JL and cousin play war and "shoot Japs" at community swimming pool. AL tells JL that Americans won the war and he "goes nuts." (MT)
- September 8-10, 2002. Bruce attends Natoma Bay reunion in San Diego.*

TABLE 1 *continued*

- 2002, c. Sep. 9. At reunion, BL obtains documents showing a James M. Huston, Jr., died on Chichi Jima mission. (LLG 132-34) [see text]
- 2002, Sep. 14. BL posts inquiry for witnesses to Chichi Jima mission. (MT; LLG 139-40)
- 2002, Sep. 21-22. BL meets with Jack Larsen in Farmington, Arkansas. (MT; LLG 141-45; L) [see text]
- 2002, c. Sep. 25. BL receives war diary of JH's VC-81 squadron, confirming JH as the likely referent of JL's memories. (MT; LLG 146-47) [see text]
- 2002, Oct. 11. S23 JL tells parents he found them at "big pink hotel" in Hawaii. (MT; LLG 153-54) [see text]
- 2002, Dec. 5. BL receives 9 rolls of microfilmed records from *Natoma Bay* Association historian John DeWitt. (MT; LLG 154-55; L) [see text]
2003. Corsair acquired by Cavanaugh Flight Museum, replacing the one which crashed at airshow in 1999. (T 69)
- 2003, Feb. 17. AL locates AHB after lengthy search, calls her on the phone. (MT; LLG 198) [see text]
- 2003, Feb. 24. Ls receive package of photos from AHB. Included are photos of JH in front of Corsair. (MT; LLG 199) [see text]
- 2003, Mar. 2. B16 JL has first nightmare in a long time, as in 2002, on the anniversary of Huston's downing. (MT; LLG 209)
- 2003, June 3. BL is contacted by John Durham, responding to September 14, 2002, post re Chichi Jima mission. Durham witnessed downing of JH's plane. (LLG 213-14) [see text]
- 2003, mid-June. BL visits and interviews John Richardson, second witness to JH's downing, who saw the plane burst into flames after being hit in the engine. (LLG 216-17) [see text]
- 2003, Sep. 12-15. BL attends *Sargent Bay* reunion in San Diego, meets John Durham, Bob Skelton, and Ralph Clabour, other witnesses to downing of JH's plane. (MT; LLG 220-25) [see text]
- 2003, Sep. 19. Shalini Sharma calls. Now a producer with ABC Primetime, wonders if Ls would tell JL's story again for *Primetime*. (LLG 228-29) [see text]
- 2003, Oct. 12-17. BL and AL come clean with AHB and *Natoma Bay* veterans re JL's memories of JH. (MT; LLG 230-33) [see text]
- 2003, Oct. 20. *Primetime* crew interviews AL and BL, films JL. During taping, package arrives with JH's effects sent to JL by AHB. (MT; LLG 237-38; L) [see text]
- 2003, Oct. 20. JL appears to recognize pewter statue of George Washington and Corsair model from *Natoma Bay* from JH's effects. B17 JL places statue on desk in his room. B18 JL smells model Corsair, says S24 it smells like aircraft carrier. (LLG 238; L) [see text]
- 2003, Dec. 25. JL given third GI Joe doll, names it "Walter," says S25 Billie, Walter, and Leon met him when he got to heaven. S26 He had named them because of their hair colors—the Billie doll had brown hair, the Leon doll was blond, and the Walter doll was a redhead. (LLG 156-57; L) [see text]
- 2003, Dec. or 2004, Jan. B19 BL pieces together map and asks JL where his plane went down. JL points to vicinity of Iwo Jima and Chichi Jima. (T-RTL 73-74)
- c. 2004, Jan. S27 When JL sees BL use sanding disk, picks it up and says he has been looking for one of those because there weren't enough record albums on *Natoma Bay*. (T-RTL 82)
- 2004, Feb. 1. When AL makes meatloaf for dinner for first time in JL's life, he eats a large portion and S28 explains, "We used to get this all the time on *Natoma Bay*." "I haven't had meatloaf since I was on the *Natoma Bay*. They always had good meatloaf on board the ship. I always enjoyed eating it." (MT; DOPS; T-RTL 82)
- 2004, Mar. 2. B20 JL has nightmare on anniversary of JH's death. (MT)
- April 10, 2004. James turns 6.
- April 15, 2004. Primetime Thursday episode with Leininger segment broadcast.
- 2004, April 16. BL receives call from Bob Greenwalt, who test-flew Corsairs with JH. (MT; LLG 240; L) [see text]
- 2004, c. Apr 16-25. JT emails CB then Ls' about investigation. After initial receptivity, Ls decide to postpone meeting JT until they have decided what they want to do with their story. (T-RTL 65)
- 2004, Aug. 1. AL tells JL they will meet JH's sister Anne at JH's squadron reunion. JL says S29 "It's not Anne, it's Annie." Says JH also had sister "Roof." "Roof" was 4 years older than Annie and Annie was 4 years older than JH. (MT; LLG 236; L)

TABLE 1 *continued*

- 2004, Sept. 11. BL, AL, JL and Bobbi attend JH squadron reunion in San Antonio. S30 JL recognizes and names Bob Greenwalt by his voice. (MT; L; LLG 244) [see text]
- 2004, c. Sept 11. JL meets Anne Barron. (LLG 247-48). [see text]
- 2004, c. Sep. 12. S31 During tour of Nimitz Museum, JL notices five-inch cannon and remarks, "Natoma Bay had one of these." Asked where, correctly says "on the fantail." (LLG 249) [see text]
- 2004, Oct. 31. B21 At school, JL adds wings to pumpkin and paints it to resemble an F-16 Thunderbird. (MT; LLG 103; L)
- 2004, Dec.15. When AL enters his room with glass of wine, JL S32 talks about JH's father's alcoholism. (MT; LLG, 236-7; T-RTL 80-81; DOPS) [see text]
- 2005, Jan. 15. BL shows JL photo of Chichi Jima . S33 JL responds, "there were no fighters, only anti-aircraft fire "on this hop." (MT; L)
- 2005, Mar. 2. JL does not have nightmare on anniversary of JH's downing. (MT).
- 2005, Mar. 3. BL makes JL an FM-2 model. JL states S34 there was an antenna missing from the side. (MT; L) [see text]
- 2005, Mar. 7. S35 Looking at the FM-2 model, JL recalls using drop tanks as crude napalm bombs. "The planes would drop them. They would hit the ground and make a big fire." (MT; L; T-RTL 83; DOPS)
- 2005, Apr. 1. Greenwalt calls re History Channel show on Corsairs. JL watches, says S36 Japanese plane is not a Zero but a Tony, which "is smaller and faster than a Zero." (MT; LLG 239-40; DOPS; L)
- 2005, July 9. AL comments on case in CB's Past-Life Forum.
- 2005, Oct. 9. During evening walk with Bruce, Bruce asks James how his day went. James says "every day is like a carrier landing—if you walk away from it you're okay."
- April 10, 2005. James turns 7.
- 2005, July 7. Skeptico blog posted after rerun of *Primetime Thursday* episode with JL segment.
- 2005, late Dec. AHB sends JL painting JH's mother had made of JH. On phone thanking her, S37 JL says, "Can I have the painting Mom made of you?" (LLG 236; DOPS; L)
- 2006, Jan. 16. AHB sends JL the painting her mother made of her, along with dated note. [see text, n35]
- April 10, 2006. James turns 8.
- 2006, Aug. 30. Ls fly to Japan for two weeks to film *Mystery Experience—Unbelievable* for Fuji National Television in Tokyo. (MT; LLG 251-6)
- 2006, Sep. 4. Memorial service in Futami harbor on Chichi Jima for JH. S38 JL tells LL that he recognizes the direction from which JH arrived. [see text]
- 2006, mid-Sep. On way back from Japan, James draws his final, peaceful picture. (LLG 256) [see text, n38]
- April 10, 2007. James turns 9.
2007. Ken Gross begins working on *Soul Survivor* with Ls.
- April 10, 2008. James turns 10.
- April 10, 2009. James turns 11.
- 2009, June. *Soul Survivor* published, rises to Number 11 on *New York Times* nonfiction bestseller list for week of June 28.
- 2009, Dec. 22. Ls appear on CNN's *Larry King Live* with Michael Shermer. JL's memories are fading.
2010. JT begins his investigation. (T 66–67)

People: AHB = Anne Huston Barron. AL = Andrea Leininger. BL = Bruce Leininger. CB = Carol Bowman. JH = James Huston, Jr. JL = James Leininger. JT = Jim Tucker. Ls = Leiningers.

Sources: L = B. Leininger (2021). DOPS = Tabulation of Division of Perceptual Studies (unpublished). LLG = Leininger & Leininger, with Gross (2009). MT = James 3 Master Timeline (unpublished). T-RTL = Tucker (2013). T-E = Tucker (2016).

Feature Type: B = Behavior. S = Statement.

Media appearances began before 2007, but most followed the book's publication in 2009. If we accept the Master Timeline as authoritative, then the discrepancies look more like lapses in memory than attempts to rewrite history. More concerning are the many dating errors in Bruce's BICS contest entry (B. Leininger, 2021). I do not understand why Bruce did not check his memory before submitting the essay. However, I do not see important alterations in the sequence of events, only in some assigned dates, so this is for me evidence of carelessness, nothing nefarious.

My investigation uncovered an important neglected aspect of the story, although it is new only in emphasis. Tucker (2013, p. 67) noted that prior to his first visit to the Cavanaugh Flight Museum, James was in the habit of pointing to planes flying overhead, but James's obsession with aircraft in infancy was more extensive than this. In her February 18, 2001, email to Carol Bowman, Andrea Leininger revealed that one of James's first words was "airplane" and that he was talking about airplane crashes "about 20 times a day." Moreover, the Master Timeline records the following for August 15, 1999: "Bruce, Andrea, Jenny and Greg go to food and wine event at the Fairmont. Bobbi was babysitting. When we got home James was shrieking and crying. First nightmare?" Together, these items suggest that James's awareness of the James Huston story may have been present at a subliminal level well before the first visit to the Cavanaugh Flight Museum.

James spoke not only about Huston's death, but about many aspects of Huston's experience as a pilot, and about his personal life as well. Huston had test-flown Corsairs and knew how they handled on take-off and landing. He had shot down both a Zeke and a Tony, so had familiarity with those planes. Many of James's statements (S2, S12, S19, S20, S24, S25, S28–S38) were made in response to things he saw or heard, suggesting the importance of recognition memory in past-life recall. Sudduth takes many of James's statements to be about matters of general knowledge that he could have gained by ordinary means. Sudduth (this issue, pp. 92, 95–96) seems to think that it is enough to assert that James might have acquired this information from unspecified sources in his environment, when for his thesis to be credible not only must Sudduth show what sources on what occasions, he must explain why that information just so happens to be related to Huston.⁴⁰

James is reported to have made many statements more than once, but I have marked only the first instance of each. When it makes sense to treat a series of statements as a group (e.g., S29 and S31), I have not broken them down into discrete units. Altogether, I have documented 38 statements or statement groups. Of these, I judge two to be incorrect (he was flying a Corsair; he was killed at Iwo Jima) and two (S23, S25) as unverified. I count *Natoma* (S10) as

correct in reference to *Natoma Bay*, although others might wish to code it as partially correct. By my judgment, 34 of 38 statements or statement groups (89.4%) are correct in relation to James Huston, Jr.

Tucker (this issue) reports, "We were able to verify that some 30 of the statements ascribed to James were indeed accurate for Huston" (p. 84), in close agreement with my tally. In another place (Mills & Tucker, 2015, p. 316), he reported a substantially higher total of 58 statements, 42 (72.4%) of which were correct for Huston. At my request, Tucker sent me the DOPS coding tabulation on which he based this number. In a few instances, Tucker learned of details that I had not seen elsewhere and with his permission I incorporated these into Table 1, acknowledging them as from DOPS. Overall, I see no important discrepancies between our counts. The differences are largely attributable to the DOPS practice of breaking down into separate statements longer locutions that I have treated as units and DOPS counting as unverified statements for which Tucker was unable to get independent confirmation through either documents or interviews.

Tucker (2013, 2016; Mill & Tucker, 2015) and I agree that James Huston, Jr., is the proper referent of James's memories. I think we may take September 25, 2002, as the approximate date the case was solved. This was the date that John DeWitt sent the VC-81 squadron war diary to Bruce. Prior to receiving the war diary, Huston's association with the *Natoma Bay* and his death during the Battle for Iwo Jima were known to Bruce, but he had insufficient information to evaluate the match of James's memories with Huston.

James expressed his identification with Huston not only through his memory claims, but through his behaviors. I have documented 21 of James's behaviors seemingly related to James Huston, Jr. Several of James's memories and behaviors have an "early-bird"⁴¹ status, due to having been recorded before the case was solved. I consider these important early-bird items next.

Early-Bird Statements and Behaviors

Normally in reincarnation case studies, a child's early-bird statements about the previous life consist of items recorded in writing before attempts at their verification begin (e.g., see Stevenson & Samararatne, 1988).⁴² Because no list of James's statements existed when Ken Gross started working with the Leiningers in 2007, James's early-bird statements are established through emails, indirectly through internet searches, or mentions in the *Strange Mysteries* pilot, dated from before James Huston, Jr., was identified in the last week of September 2002. This is a retrospective listing, compiled after the case was solved, so James's behaviors corresponding to Huston are evident

and can be included along with his statements.

Tucker has provided two accounts of James's early-bird statements and behaviors. In *Return to Life* (2013, p. 78) he listed 8 early-bird statements and 2 behaviors (James's nightmares and his signing his drawings "James 3"). In his *Explore* paper, which highlighted the *Strange Mysteries* pilot, Tucker (2016, p. 204) also listed 8 statements, but they are in some measure different from those in *Return to Life*. The *Strange Mysteries* pilot does not refer to Jack Larsen or *Natoma Bay*, but it has Andrea relating that James said, "I was a pilot and my airplane got shot in the engine and crashed in the water and that's how I died" and James stating that Corsair tires had a tendency to go flat when the planes landed. Also, although James's nightmares are mentioned in the *Strange Mysteries* pilot, his drawings are not, so Tucker's *Explore* list includes only the nightmares as behavioral memories.⁴³

Sudduth (2021c, pp. 998–1002) chose to focus his critique on Tucker's *Explore* paper (2016), but as Tucker (this issue) points out, in the process he added other items, not all derived from sources with early-bird status (e.g., a web post by Andrea Leininger, 2005, in which she gave a discrepant account of what James said about how Huston died: In this place, and here alone, James is said to have remembered drowning in a submerged plane). Sudduth (this issue) justifies his expanded list on the grounds that "it was another way of highlighting the problems in Tucker's uncritical and dubious dependence on the case's alleged early-bird items" (p. 94), but Sudduth's list then is no longer a list of early-bird items and he should have considered the full inventory of James's statements and behaviors documented in *Soul Survivor* and presented in Table 1.⁴⁴ Sudduth (2021c, pp. 998, 1001) listed 12 items, the most significant of which he discounted, and because the remainder he considered to be of a general nature ("I was a pilot," "I flew a plan [sic] off a boat," "The Japanese shot my plane down," "My plane crashed and sank in the water") he concluded that the identification of James Huston, Jr., as the referent of James's memories was unjustified and that the case remained unsolved.

In Table 2, I furnish my own list of early-bird items, including some from emails to Carol Bowman not available to Tucker and Sudduth. Despite Sudduth's objections, I have accepted the searches for *Natoma* and Jack Larsen as indicative of James's having mentioned these names, because I cannot understand why else Bruce would have searched for them when he did. Similarly, I have accepted the narrator of the *Strange Mysteries* pilot stating the downing of the plane occurred at Iwo Jima as indicative of James's having said that.

Sudduth (this issue) emphasizes the need to verify early-bird items. He says, "the ABC program only docu-

ments the Leiningers telling of the story in spring of 2002. Documenting *what* they said is not equivalent to documenting the *accuracy* of what they attributed to James" (p. 95, his emphasis). This should go without saying. The value of early-bird items is that they rule out the possibility that witnesses' memories were improved after a case has been solved, but the statements' applicability to the previous person must still be evaluated. Statements may be evaluated in one of two ways, either through witness testimony or through written or other records. Of 30 published early-bird cases, 15 have records (often medical or autopsy reports) related to the previous person and these help to mitigate problems of witnesses' memory about the previous life, in the same way that early-bird records serve to mitigate memory problems regarding what a case subject said (Matlock, 2021). Tucker (2016, p. 204) showed the basis of the verifications of the early-bird statements and behaviors covered in the *Strange Mysteries* pilot. In Table 2, I do the same for my items.

My list includes 12 statements and 3 behaviors, several documented in more than one early-bird source. The statement that Huston was flying a Corsair is incorrect. I count his statement that he died at Iwo Jima as incorrect, but it could be argued that it is partially correct, because although Huston died at Chichi Jima, he was on a mission that was part of the battle for Iwo Jima. All the remaining 10 statements or inferred statements are correct for James Huston, Jr., and James's three behavioral memories fit Huston's experience as well. It is hard to avoid the conclusion that James Leininger was recalling the life and death of James Huston, Jr., from these early-bird items alone.

Had someone documented James's statements about the previous life before Bruce began to verify them, we would still have a substantial list of early-bird items, even if we took the date at which Bruce began his search for *Natoma* (August 27, 2000) as the cut-off date for early-bird testimony. By then, James was reported to have made 10 statements (including the core ones about how Huston died) and demonstrated 6 behaviors (including acting out Huston's kicking the plane's canopy in both his sleep and waking states), all of which, with the exception of flying a Corsair and having died at Iwo Jima, are correct for Huston.

Sudduth's Timeline Debunked

Sudduth's analysis is heavily dependent on an unsubstantiated chronology. This is what accounts for his conviction that the Leiningers altered their story in order to make it into a convincing tale of reincarnation.

In his journal paper (2021c), supplementary blog (2022), and now in his response to Tucker's reply (this issue), Sudduth privileges a timeline of events that Bruce

TABLE 2. James Leininger’s Early-Bird Statements and Behaviors

Statement / Behavior	Early-Bird Source	Source of Match to Huston
Early-Bird Statements		
He had been a (Navy) pilot.	AL to CB; BL to CB; SM	WD; AAR
He had flown off a boat.	AL to CB; SM	WD; AAR
The boat was named <i>Natoma (Bay)</i> .	Inferred from BL’s search for Natoma on Aug. 27, 2000.	WD; AAR
His plane was shot by the Japanese.	BL to CB; SM	WD; AAR
His plane was shot in the engine.	SM	4 eyewitness reports
His plane crashed on fire.	AL to CB; SM	4 eyewitness reports
His plane crashed in the water.	AL to CB; SM	WD; AAR
That’s how he died.	SM	WD; AAR
This happened at Iwo Jima (or during the Battle for Iwo Jima).	Inferred from SM narration.	WD; AAR
There was another pilot with him, Jack Larsen.	Mention of Jack Larsen inferred from BL’s search for Larsen or Larson on several occasions, beginning Oct. 16, 2000.	AAR
He was flying a Corsair.	AL to CB; SM	
Corsairs got flat tires when they landed.	SM	Bob Greenwalt, who had test flown Corsairs with JH. Also confirmed by naval historian contacted by SM producers.
Early-Bird Behaviors		
Recurrent nightmares of kicking canopy of plane, unable to open it.	AL to CB; SM	Unverified, but plausible for JH.
Drawings of battle scenes, mostly naval, several signed “James 3”, one showing flak in air surrounding plane.	Although not mentioned in any dated source, it is clear that JL drew these beginning when he was 3 years old, before the identification of JH.	A great deal of flak was shot at planes on the Chichi Jima mission, per AAR. A flak hit is believed to have brought down JH’s plane. JH was Jr., making JL James 3.
JL liked to pretend he is a singer and stands on head of parents’ bed and sings.	BL to CB	AHB told Ls that JH had a good singing voice, sang on radio in choir. (LLG 197)

*The AAR may be consulted in the Psi Open Data repository (see Note 8) under the name “Table 2 AAR report of Chichi Jima mission.”

People: AHB = Anne Huston Barron. AL = Andrea Leininger. BL = Bruce Leininger. CB = Carol Bowman. JH = James Huston, Jr. JL = James Leininger.

Early-bird sources: AL to CB = email from AL to CB, Feb. 18, 2001. BL to CB = email from BL to CB, July 29, 2002. SM = *Strange Mysteries* pilot, May 2, 2002.

Verification sources: AAR = Natoma Bay Chichi Jima mission aircraft action report. * LLG = Leininger & Leininger, with Gross (2009). WD = VC-81 squadron war diary.



TABLE 3. Comparison of Dates for Major Events in Different Chronologies

Event	2003 Chronology (prepared for DeWitt)	2009 Chronology (<i>Soul Survivor</i>)	Table 1 Chronology (present article)
JL identified himself as the little man in the plane and said he was flying a Corsair that had taken off from a boat.	Late Sep.–Oct. 2000	Aug. 27, 2000, according to Sudduth, omitting earlier Aug. 11	Aug 11, 2000, repeated on Aug. 27, 2000
He flew off a boat named <i>Natoma</i> .	Late Oct.–Nov. 2000	Aug. 27, 2000	Aug. 27, 2000. That night, BL searched for <i>Natoma</i> and found <i>Natoma Bay</i> —dated search results. [n13]
Jack Larsen flew with him.	Late Oct.–Nov. 2000	Oct. 5, 2000	October 5; on Oct. 16 BL searched for Jack Larsen/Larson on the ABMC site—dated search results. [n14]
Initial correspondence between AL and CB.	July–Aug. 2000	Jan.–Feb. 2001	February 18, 2001—dated email.

People: AL = Andrea Leininger. BL = Bruce Leininger. CB = Carol Bowman. JL = James Leininger.

Organization: ABMC = American Battle Monuments Commission.

prepared for *Natoma Bay* Association historian John DeWitt in or around September 2003, a copy of which he secured from DeWitt's daughter Lucinda (Sudduth, 2021c, p. 987). That timeline presents a substantially different chronology than *Soul Survivor*, but because it was composed well before the book was written, Sudduth has confidence in it. If the dates of Bruce's searches do not fit the 2003 timeline, Bruce must have performed them for some reason other than James's having said the names, Sudduth reasons. Similarly, because the dates given in the 2003 timeline for the involvement of Carol Bowman suggest something different from what is said in *Soul Survivor*, Sudduth concludes that Bowman's involvement in the case has been recast in the interests of the story the Leiningers wish to tell. Table 3 provides a comparison of entries from the 2003 and 2009 chronologies with that presented in Table 1 of the present article, which for the first time provides a secure date for Andrea's initial email to Carol Bowman.

Sudduth comments on the comparison of the 2003 and 2009 timelines as follows:

The official [2009] chronology places each of these facts at a later date than the 2003 Chronology, as little as about a month and as great as six to nine months. The later the date when James makes the

claims attributed to him, the more opportunity there is for ordinary sources to shape his claims. Not only because there are more opportunities for exposure to sources, but his verbal skills would have been more developed and so also his capacity for internalizing information, and eventually he would have had reading skills. (Sudduth, 2021c, p. 988)

No doubt, but Sudduth has the chronologies reversed—for the first three items, it is the 2003 chronology which is later than the 2009 one. I see no justification for preferring the 2003 chronology, which is not anchored in dated documents. This conclusion is important especially when it comes to appreciating Bowman's role in the case. The date of her initial correspondence with Andrea appears earlier in the 2003 chronology and if one accepts its dates, it precedes the other events. However, the email to Bowman was sent and received on February 18, 2001, well after the other events rather than before them. "Regardless of *when* (on a calendar date) Bowman got involved, the crucial issue is whether she gave her advice to the Leiningers before or after James began making apparent past-life claims," Sudduth (2021c, p. 989; emphasis his) says. He is right about that, of course, and the dated documents leave no doubt about the matter.

Clarifying Muddied Waters

Without question, the Leiningers are responsible for much of the confusion regarding this case, thanks to their inconsistent descriptions and dating of events in speaking and writing. They are not alone in contributing to the confusion. Sudduth (2021c, pp. 988–989) draws attention to Bowman’s Foreword to *Soul Survivor* (Leininger & Leininger, with Gross, 2009, p. xii), wherein she wrote that when she called the Leiningers in March 2002 on behalf of ABC, Andrea told her that following her recommendations of the previous year, James’s nightmares had all but ceased. Andrea also told Bowman that James had been talking about the type of plane he flew (a Corsair), the name of the aircraft carrier (*Natoma*), and the name of one of his pilot friends (Jack Larsen). James actually had related all these memories before Andrea wrote to Bowman in February 2001, but because Andrea had not included the last two in her email and she and Bowman had not spoken since they were new to Bowman and she gained the impression that James had mentioned them following her recommendation to encourage him to speak about his memories during the day. Because Bowman’s comment contradicts the narrative of *Soul Survivor*, and that contradiction is not explained, it is for Sudduth evidence that the Leiningers have altered the chronology in the interests of promoting a reincarnation interpretation of the case.

Fortunately, this case includes securely dated events at all stages, so it is possible to construct a reliable timeline and then view other chronologies in relation to it. When that is done, the 2003 timeline Sudduth employs is shown to be untenable. The only reason to favor it is to press an alternative reading of the case, but this is an alternative reading without foundation. Even absent the emails to Bowman, there were dated search downloads that suggested problems with the 2003 timeline, but Sudduth (2021c, 2022, this issue) seeks to explain these away so that he can use the 2003 timeline to cast doubt on the Leiningers’ story. He also repeatedly makes demonstrably false claims about the Leiningers’ narrative, even after having been corrected.⁴⁵ In Part 2 of this article, to appear in the Winter 2022 issue of this journal, I examine other problematical aspects of Sudduth’s critique, address the epistemological concerns he raises in his reply to Tucker (this issue), and reflect on lessons for reincarnation case studies that may be gleaned from the exchange between Tucker and Sudduth (this issue).

NOTES

¹ The *Primetime Thursday* segment featuring the Leiningers (ABC News, 2004, 2005) may be viewed on YouTube, <https://www.youtube.com/watch?v=Uk7biSOzr1k>

- ² Bowman has been much ridiculed for this suggestion, which is the recommended treatment strategy for dealing with posttraumatic nightmares (Spoomaker, 2008) and was urged to good effect also by a Canadian physician in the apparent (unsolved) reincarnation case of Heidi Hornig (Mills, 1994).
- ³ Personal communication from Carol Bowman, February 2022. Andrea Leininger’s contributions to Bowman’s forum from 2004 have been lost. A single post from 2005 (A. Leininger, 2005) survives.
- ⁴ Sudduth has shown in previous writings (2009, 2013, 2016) that he is strongly skeptical of postmortem survival in any form and believes “living agent psi” is capable of explaining the whole of the evidence put forward for it.
- ⁵ The changes in the blog are preserved by the Wayback Machine. The original September 20, 2021, version may be viewed here: <https://web.archive.org/web/20211120233751/http://michaelsudduth.com/crash-and-burn-james-leininger-story-debunked/>. On September 25, 2021, Sudduth removed the sentence, “The James Leininger story is a sham” and substituted “fallacious reasoning” for “bogus reasoning.” The September 25, 2011, language holds as of January 19, 2022.
- ⁶ I use “reincarnation case” in preference to Stevenson’s “case of the reincarnation type,” usually without qualifiers such as “apparent” or “seeming,” out of convenience. More precisely, a “reincarnation case” is a spontaneously occurring set of events that includes one or more common features, among them past-life memories. A case has been investigated, in contrast to an anecdotal account of such occurrences, which has not been investigated. Most reincarnation cases are suggestive of reincarnation but the terminology makes no assumptions about how best to interpret them.
- ⁷ Sudduth (2021c) cites the Hay House UK edition of *Soul Survivor*, given in his reference list as “Leininger, B., & Leininger, A. (2009). *Soul survivor*. Hay House UK,” rather than the original American edition (Leininger & Leininger, with Gross, 2009). By omitting Ken Gross from the authorship, Sudduth leaves the impression that the Leiningers alone are responsible for the book. When I spoke with Ken Gross by telephone in March 2022, he confirmed that he and the Leiningers worked out the Master Timeline in preparation for his writing. Tucker (Mills & Tucker, 2015, p. 317; Tucker, 2013, pp. 78–79; Tucker, 2016, p. 203) refers to notes made by Andrea Leininger which were lost, either before or after the publication of *Soul Survivor*, but Bruce does not recall using notes in constructing the Master Timeline and any

notes of James's statements may not have been dated. The Master Timeline in places includes more exact dates than are given in *Soul Survivor*, but the book seems rather clearly to draw from it. For more on the book's composition, see Gross (2009). The Master Timeline was among the documents provided Jim Tucker in 2010. It is undated, but its last entry is James's birthday in 2007 and I see no reason to doubt that it was created that year. I was sent a PDF that seems to have been produced from a Microsoft Word file.

- ⁸ The documents are collected under a single URL (<https://open-data.spr.ac.uk/dataset/supporting-documents-clarifying-muddied-waters-part-i-secure-timeline-james-leininger-case>) in the Psi Open Data repository, from which they may be downloaded collectively or individually as PDF files. Bruce will provide the Microsoft Word appendix to his BICS contest entry upon request and will open his extensive document archives to any researcher who wishes to visit him in Lafayette, Louisiana. Those who wish to contact Bruce should write to bleininger@patriceandassociates.com. He will supply photocopies of documents at the cost of 75 cents per page, plus shipping.
- ⁹ This paragraph is informed by personal communications from Bruce Leininger in February 2022 as well as an email from Andrea Leininger to Carol Bowman on February 18, 2001. The following narrative follows the account given in *Soul Survivor* (Leininger & Leininger, with Gross, 2009), with occasional supplementary information from other sources.
- ¹⁰ The nightmare precursor is taken from the Master Timeline.
- ¹¹ In *Soul Survivor* (Leininger & Leininger, with Gross, 2009, p. 21), this video is identified as "It's a Kind of Magic," but as Sudduth (2021c, p. 947) points out, this is incorrect. The correct title is *Blue Angels: Around the World at the Speed of Sound* (it includes the track of a song called "It's a Kind of Magic"). The original full-length video was posted on YouTube in 2020 (Atkeison, 2020).
- ¹² This last comes from a personal communication from Bruce Leininger, February 2022. He purchased a replacement video three months later when they returned to the museum with James's cousin on May 27, 2000. A photo taken at the museum, stamped with that date, appears in *Soul Survivor*.
- ¹³ Bruce's search for *Natoma*, dated August 27, 2000, appears in the Psi Open Source repository (see note 8) as "13 American Naval Fighting Ships."
- ¹⁴ Bruce's first search for Larsen or Larson, dated October 16, 2000, appears in the Psi Open Source repository (see note 8) as "14 Original search results for Jack Larsen."
- ¹⁵ In *Soul Survivor* (Leininger & Leininger, with Gross, 2009, p. 91), this quotation is given as "when my plane was shot down." (However, in the Master Timeline and other places, it appears as "where my airplane got shot down.") To Sudduth (2021c, p. 994) this suggests a deliberate attempt by the Leiningers to make James's statements appear more consistent with Huston's experience than they were. Tucker (this issue) discusses how the change may have come about. I think it is best to assume that James said some version of "where my plane was shot down" and that we should count this statement as incorrect or, at best, partially correct, because Huston did not die at Iwo Jima, but rather at Chichi Jima during a mission in support of the battle for Iwo Jima.
- ¹⁶ Bruce's second search for Larsen or Larson, dated January 6, 2001, appears in the Psi Open Source repository (see note 8) as "16 Second Larson search."
- ¹⁷ Bruce's search for list of fatalities associated with aircraft carriers, dated January 7, 2001, appears in the Psi Open Source repository (see note 8) as "17 Killed in action."
- ¹⁸ Bowman sent me a copy of the first page of this email so I could verify the date and contents, but prefers not have it made publicly available for ethical reasons having to do with client privilege.
- ¹⁹ James's drawing of a naval scene with flak surrounding a plane, signed James 3, appears in the Psi Open Source repository (see note 8) as "19 James 3 drawing."
- ²⁰ For an account of this effort, see Tucker (2016, p. 200). The *Strange Mysteries* pilot provides one of the earliest documentations of James' memories and is the piece on which Tucker (2016) concentrates his attention.
- ²¹ Personal communication from Bruce Leininger, February 2022.
- ²² Bowman sent me the header and excerpt from this email so that I could verify the date and contents but prefers that it not be made publicly available.
- ²³ See *Soul Survivor* (pp. 153–154). The Leiningers were in a different section of Honolulu with James and did not come near the Royal Hawaiian on that occasion (Bruce Leininger, personal communication, February 2022). Although Huston's remains were never recovered, there is a tablet in his name at the American Battle Monuments

Commission's National Memorial Cemetery of the Pacific in Honolulu, viewable here: <https://www.abmc.gov/precedent-search/huston%3DJames-1>.

- ²⁴ Sudduth (2021c, pp. 979–980, 984; this issue, p. 98) has repeatedly asserted that this information was “redacted” from *Soul Survivor* because it was inconvenient to the Leiningers. However, a lengthy passage from the VC-81 war diary giving many of the same details is quoted in the book (Leininger & Leininger, with Gross, 2009, pp. 146–147). Sudduth hammers the Leiningers for ignoring the aircraft action report, but the VC-81 war diary has essentially the same information. Bruce saw the war diary first, so the book quotes from that.
- ²⁵ An appendix page from the VC-81 war diary sent to Bruce by John DeWitt on September 25, 2002, showing that Huston shot down a Zeke (and a Tony), appears in the Psi Open Source repository (see note 8) as “25 War Diary Zeke Shootdown.”
- ²⁶ A list of Purple Heart citations including Huston's appears in the Psi Open Source repository (see note 8) as “26 Purple Heart.”
- ²⁷ A photograph of James Huston in front of a Corsair, c. 1944, appears in the Psi Open Source repository (see note 8) as “27 Huston with Corsair.”
- ²⁸ The detail about the model being provided for recognition training comes from Bruce Leininger, personal communication, February 2022.
- ²⁹ Anne Barron's first letter to the Leiningers, dated October 15, 2003, appears in the Psi Open Source repository (see note 8) as “29 Anne Barron letter accompanying artefacts.”
- ³⁰ ABC News (2004). See <https://www.youtube.com/watch?v=Uk7biSOzr1k>. A view of James's room in the Leininger house at 2:05–2:15 shows model planes suspended from the ceiling in the manner some would have been in the ready room on *Natoma Bay*.
- ³¹ A page showing the death dates of Leon Conner and Walter Devlin appears in the Psi Open Source repository (see note 8) as “31 Conner and Devlin deaths.”
- ³² A letter describing Billie Peeler's accidental death on November 17, 1944, dated December 4, 1945, appears in the Psi Open Source repository (see note 8) as “32 Billie Peeler death letter.”
- ³³ Photographs of Billie Peeler and Leon Conner appear in the Psi Open Source repository (see note 8) as “33 Photos of Peeler and Conner.” No photo of Walter Devlin is available, but he was called “Red” because of his red hair (Leininger & Leininger, with Gross, 2009, pp. 186–188).
- ³⁴ Anne Barron's second letter, dated January 16, 2006, appears in the Psi Open Source repository (see note 8) as “34 Anne Barron letter accompanying painting.”
- ³⁵ An after action report showing Huston shot down a Tony appears in the Psi Open Source repository (see note 8) as “35 Huston Tony shootdown.”
- ³⁶ Sudduth (2021c, p. 976) draws attention to James's saying this, but his date is off. Sudduth identifies the program as an A&E documentary on Corsairs, *Battle Stations: Corsair Pacific Warrior*, which premiered December 26, 2002. According to Sudduth, the original quotation was, “Each day in life is like a carrier landing. If you can walk away from it, you're in good shape.” In his BICS essay (B. Leininger, 2021), Bruce credits James with having made his remark on October 7, 2003, which is too early, if James did not watch the taped show until around the time the *Primetime Thursday* segment aired (Leininger & Leininger, with Gross, 2009, p. 239). This reference apparently is to the segment in 2005, because according to the Master Timeline, Greenwalt called to alert the Leiningers to the documentary on April 1, 2005, and James used the line on an evening walk with Bruce on October 9, 2005, two years later than Bruce remembered. Since Bruce's dates in his BICS essay are frequently wrong and the Master Timeline is reliable, I think we may assume that in writing his BICS essay 16 years after the fact, Bruce misremembered the year. Bruce now recognizes that this is what happened (personal communication, March 2022).
- ³⁷ A diagram from the after action report of the Chichi Jima mission showing the flight paths of VC-81 squadron planes appears in the Psi Open Source repository (see note 8) as “37 Diagram of strike on Chichi Jima.”
- ³⁸ James's last drawing appears in the Psi Open Source repository (see note 8) as “38 James's final drawing.” Bruce Leininger (personal communication, February 2022) told me that this was the last drawing James made.
- ³⁹ DOPS is a division of the Department of Psychiatry and Neurobehavioral Sciences at the University of Virginia School of Medicine and is Tucker's professional affiliation.
- ⁴⁰ Sudduth (2021c, this issue) suggests that James could have learned these things from the videos he watched and from the time he spent in the Cavanaugh Flight Museum gift shop, but James did not see the Corsair documentary until 2005. Neither the Blue Angels docu-

mentary nor the museum gift shop as reconstructed by Sudduth (2021c) provide any information about Huston's downing or the specific knowledge of World War II aviation James related, as Tucker (this issue) notes. Nor could they have served as models for James's behavior related to Huston. It seems more likely that repeated exposure, especially to the Blue Angels video, acted to remind James of Huston and helped pull memories about Huston closer to the surface of his awareness—indisputably an important factor in the case, but rather different from the one Sudduth imagines.

⁴¹ "Early-bird testimony" is a term introduced by Stephen Braude (2003) as a shorthand reference to a reincarnation case subject's statements recorded (usually in writing) before verification attempts began. The term was adopted by Sudduth (2021a, 2021c, this issue) and I have elected to use it here. Early-bird cases are highly valued, but they are rare. DOPS files included only 33 as of 2005 (Keil & Tucker, 2005) and reports of only 30 have been published (Matlock, 2021).

⁴² Sudduth (this issue, p. 94) appears to be confused on this point. He refers to Tucker (this issue, p. 84), where Tucker says, "In some of the cases, families or investigators have documented at least some of the child's claims before the identification was made," referring to a study by Schouten and Stevenson (1998). Sudduth wants to draw a distinction between this and what he calls "a third classification of cases" with "documentation made before anyone has even attempted to verify the claims of the subject" (this issue, p. 94, emphasis in original), but this "third classification" is the way that Schouten and Stevenson defined it and the way the term is routinely employed by Stevenson and his colleagues: early-bird cases are "cases with written records made before verification" (Schouten & Stevenson, 1998, p. 504). Generally this means before there is even a tentative identification of the deceased referent of a case subject's memories, but in two published cases Stevenson allowed cases in which there was a tentative identification but not yet attempts to verify the memory claims. The James Leininger case is unique in having a retrospective establishment of early-bird items (Matlock, 2021).

⁴³ Tucker (2016) discusses *Natoma Bay* and Jack Larsen as additional early-bird items, but does not list them in his table (p. 204), which includes only what was presented in the *Strange Mysteries* pilot.

⁴⁴ Sudduth (this issue) appears to realize this, because he says: "If the Leiningers are reliable informants, then the early-bird items Tucker lists in his 2013 and 2016 tables

are not the only claims we're justified in attributing to James before the previous personality was identified. What's relevant is not whether these other claims have early-bird status, but whether they are part of the Leiningers' narrative and how they bear on the evidential status of the case." However, Sudduth in his own analysis fails to take into account the majority of James's memory claims made before the case was solved.

⁴⁵ For instance, Tucker (this issue, pp. 84, 88) points out that James nowhere is reported to have said that he died in a sinking plane except in Andrea's 2005 web post (A. Leininger, 2005), yet Sudduth continues to insist that the Leiningers "ignore (as does Tucker in his response) the ways in which the aircraft action report makes any struggle to escape a sinking plane improbable" (this issue, p. 98). What James is reported to have said is that his plane hit the water "and that's how I died" (S18). He was overheard to say this around September 1, 2001, and Andrea repeated it in the *Strange Mysteries* pilot in July 2002, making it a documented early-bird statement. The idea that Huston drowned in a sinking plane is Andrea's inference, voiced 3-4 years later. This interpretation of what James said is not included in *Soul Survivor*, published in 2009, by which time the Leiningers had realized that the inference was mistaken.

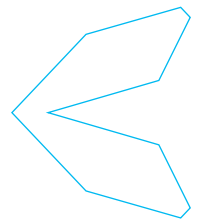
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ESSAY

Panspermia versus Abiogenesis: A Clash of Cultures

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HIGHLIGHTS

Science has been historically influenced by cultural biases and symbolism, which constrain the consideration or interpretation of certain information and evidence. This situation particularly affects critical questions and research on the origins of life.

ABSTRACT

We are led to believe that from the beginning of the enlightenment in Europe in the 17th and 18th centuries CE, science has moved forward with an abandonment of all forms of irrational prejudice. While we are aware that socio-cultural factors control large areas of science, particularly with regard to the allocation of public funds, we often forget to assess the consequent societal damage. This is true particularly in relation to the biggest questions of science such as the origin of life and the origin of the Universe. In the interests of science, it is important to recognize the role of such influences in the assessment of competing theories, particularly those relating to the origin of life.

KEYWORDS

Panspermia, abiogenesis, cosmic dust, bacteria, virus, origin of life, Big-Bang theory

INTRODUCTION

Max Weber (1864–1920), the pre-eminent social philosopher of the early 20th century, in a lecture in 1907 on “Science as a Vocation,” articulated the hope that “there are no mysterious incalculable forces” remaining in the world, and that therefore we no longer needed to invoke explanations that lie outside the realm of empiricism” (Weber, 1948; Merton, 1973). A dilemma still to be resolved, however, was how to reconcile this position with the prevailing set of Judeo-Christian cosmological beliefs in the Western world. There can be little doubt that a theologically constrained “First Cause” has silently crept into many fundamental questions of modern science—the origin of Life and the origin of the Universe being perhaps the most important examples.

From the time of the earliest philosophies in classical Greece, the struggle has been to disentangle religion and the “gods” from any involvement in explanations of the external world. Democritus (460–370 BCE) and Epicurus (341–270 BCE) held firmly to rationalist explanations including the concept of an infinite and eternal universe. They had both supposed that all matter comprises invisible particles known as atoms and that all phenomena in the natural world—including life—are the result of such atoms moving, swerving, and interacting with each other in empty space in an infinite world. Although most of Epicurus’ writings are lost, a long succession of his disciples recorded and transmitted his views, particularly Metrodorus (331–77 BCE). The surviving writings of these later authors bear testimony to a distinctly modern panspermic view of life in the cosmos. Around 400 BCE Metrodorus of Chios wrote thus:



It is unnatural in a large field to have only one shaft of wheat and in the infinite universe only one living world . . . (Metrodorus)

These ideas relating to life implied furthermore an infinite Universe that was essentially independent of control by any god or pantheon of gods.

The same freedom from theistic control was implied in the writings of the pre-Socratic philosopher Anaxagoras of Clazomenae (500 to 428 BCE). Although very few of the writings of Anaxagoras have survived, fragments handed down to St. Irenaeus (~200 CE) state clearly that Anaxagoras thought “. . . life was originally generated in moist conditions (Mansfield, 1986); and Theophrastus (born 371 BCE) had reported earlier that “. . . according to Anaxagoras the air contains the seeds of all living things, and that these, carried down by the rain, produce plants . . . ” Finally, we have the surviving writings of Diogenes Lucretius (~3 century CE) reporting that Anaxagoras held the universe to be made of particles and also that seeds of life were carried across the cosmos and took root wherever they fell on fertile soil (Theophrastus, 1999). The combination of these reports suggest clearly that Anaxagoras is the originator of panspermic theory, at any rate in its Western tradition.

We should note, however, there are earlier references to panspermia in the wider world outside Europe. Ancient Egyptian papyri and engravings have references to panspermia that go back to the Old Kingdom in Egypt (ca. 2649–2130 BCE), and similar references are also found in the *Rigveda* (1500–1000 BCE) (Temple, 2007). Vedic traditions unequivocally encapsulate ideas concerning the cosmic nature, antiquity, and eternity of life, ideas that found their way into Jain as well as Buddhist philosophy in the 5th century BCE. The non-European provenance of the concept of panspermia, in the author’s view, has played no minor role in the development of prejudice against it as well as its persistence even to the present day. Such prejudice is reinforced nowadays by the power of the internet and Google in particular which invariably refers to panspermia as a “marginalized” theory that a majority of scientists choose to disown.

EVOLUTION OF MODERN SCIENCE

In its earliest beginnings, science arose as the solitary pursuit of individual philosophers whose ideas were often opposed to the status quo. Anaxagoras, who introduced ideas of panspermia into the Western canon, also declared that the Sun was a red-hot stone and the Moon was made of earth, and for his heresy he was banished from Athens.

State control of science thus seems to be no new thing. Examples are to be found scattered throughout his-

tory—extending from the time of classical Greece, through the long saga of the Ptolemaic epicycles in the Middle Ages, and the control of science by the Papacy stretching through into modern times (Merton, 1973).

The involvement of the State or of large organizations in the conduct of science has become necessary today to varying degrees. This is due mainly to the requirement of large funds to set up projects, which are often expensive and beyond the reach of individual scientists. Moreover, these so-called “big-projects” require large teams of scientists using expensive equipment, so organization and central control becomes necessary. Examples of such ongoing big projects include the space exploration of planets by NASA and other similar space agencies, the Hadron Collider operated by CERN, and major genome sequencing projects in several countries—to name but a few. In all such projects conformity is a requirement for social cohesion, but it also too often stands in the way of progress. In the case of NASA’s declared mission to search for extraterrestrial life, the insistence on an undeclared premise that life originated in situ on Earth immediately prejudices the outcome.

European science from the time of the Renaissance onward developed ostensibly to challenge superstition and mysticism—for instance witchcraft and alchemy. The birth of scientific academies in France and England such as the French Academy and the Royal Society are markers of this process. In the process of rejecting superstition, an incidental consequence was also to reject non-Aristotelian traditions of philosophy which included concepts such as panspermia. A more general trend to persist was the rejection of all non-European traditions of knowledge as part of the growing dominance of Western imperial power, and particularly with the rapid expansion of the British Empire through the 17th and 18th centuries.

One remarkable instance of rejecting non-European ideas was the stubborn and continued rejection of the Hindu number system (later called the Indo-Arabic number system). Although knowledge of this number system had undoubtedly reached Europe long before the Middle Ages, its rejection in favor of the cumbersome Roman numerals continued well beyond the end of the 16th century (Cajori, 1993). The first Arab reference to this number system is found in a fragment of writing by the Syrian mathematician and philosopher Severus Sebokht of Nisibis (575–667 CE). Praising the wisdom and scholarship of ancient India he states thus:

I will omit all discussion of the science of the Hindus, a people not the same as the Syrians; their subtle discoveries in this science of astronomy, discoveries that are more ingenious than those of the

Greeks and the Babylonians; their valuable methods of calculation; and their computing that surpasses description. I wish only to say that this computation is done by means of nine signs. If those who believe, because they speak Greek, that they have reached the limits of science should know these things they would be convinced that there are also others who know something.

The long delay in the transition to Hindu numerals was undoubtedly connected with a deep-rooted suspicion of the alien non-Christian pagan culture from which this system had emanated. This is an example of the role of cultural supremacy in the sanctioning of philosophical and scientific paradigms. Graeco-Roman science, philosophy, and indeed the whole of classical culture, was regarded as being the direct ancestor of all European culture. Thus no other knowledge tradition was effectively given a look-in.

RESISTANCE TO PANSPERMIA

A rejection of panspermia came scarcely a century after it was first discussed in a Western context by Anaxagoras and Epicurus as we have already noted. This was mainly due to the powerful influence of the philosopher Aristotle of Stagira (385–323 BCE) who proposed a rival concept of the “spontaneous generation” of life, suggesting that life arose spontaneously from non-living matter whenever and wherever the right conditions prevailed. This was famously exemplified by his “observation” of “fireflies emerging from a mixture of warm earth and morning dew.” Although religion or theistic intervention was not explicitly invoked by Aristotle, the doctrine of spontaneous generation of life on the Earth lent itself readily to such an interpretation at a later time.

Aristotle’s influence as a pre-eminent philosopher and an astute observer of the natural world is evident in the vast number of surviving texts and commentaries that are still being studied by scholars. Following the adoption of Christianity in the Roman Empire by Constantine in the 3rd century CE it was therefore not surprising that Aristotelean philosophy had to be somehow accommodated. This was accompanied by a firm rejection of the ideas of Anaxagoras, Democritus, and Epicurus, ideas that did not lend themselves as readily to a theistic explanation.

The Aristotelean worldview later came to be fine-tuned by Christian theologians and philosophers, notably Thomas Aquinas (1224–1274 CE), who advocated a strictly geocentric model of the world, one that necessarily also included the concept of life being Earth-centered. A strict allegiance to such a model soon came to be tied up with faith rather than fact, so that overturning it became ever

more difficult as the centuries progressed. The concept of a physical universe firmly centered on the Earth persisted for several centuries, but was of course eventually dismantled by the Copernican revolution of the 16th century. The idea of Earth-centered life and biology, however, persisted right through into modern times.

FROM ABIOGENESIS TO PANSPERMIA

At the dawn of the 21st century the fundamental logical choice in relation to the origin of life lay between two competing concepts: (a) abiogenesis—life generated in situ on Earth (following Aristotelian logic) and with such life emerging and evolving independently of the wider cosmos, and (b) panspermia—life being a cosmic phenomenon, arriving on a planet such as Earth and evolving by means of the transfer and interchange of microbiota (bacteria and viruses) in a vast cosmic context. As we have already mentioned, the latter point of view has deep roots going back to the pre-Socratic philosophers, and even much earlier to ancient Egypt and to Vedic philosophies of India (Figure 1) (Temple, 2007).

It is interesting to note that over the past 500 years, panspermia has received only scant mention in scientific or literary sources in Europe. In the early 18th century the French historian Benoît de Maillet (1656–1738) wrote that the cosmos “is full of seeds of everything that can live in the universe” which is of course reminiscent of the original ideas of Epicurus and Anaxagoras (Wainwright & Alshammari, 2010). However, any reference to panspermia as a scientific proposition, let alone support for it, does not show up until the latter part of the nineteenth century.

Louis Pasteur (1822–1895) was the first to confront the subject of panspermia with a series of famous experiments—for example the souring of milk and the fermentation of wine. He showed to everyone’s satisfaction that these processes do not take place in the absence of microorganisms, and therefore that microorganisms in general must always be derived from pre-existing microorganisms (Pasteur, 1857). Pasteur thus effectively disproved the reigning dogma of “spontaneous generation,” the Aristotelean idea that life could arise spontaneously from inorganic matter. He also famously enunciated the dictum—*Omne vivum e vivo*—all life is from life, and this view was taken up and supported enthusiastically by several distinguished contemporary physicists. For instance, the German physicist Hermann von Helmholtz (von Helmholtz, 1874) wrote:

It appears to me to be fully correct scientific procedure, if all our attempts fail to cause the production of organisms from non-living matter, to raise the question whether life has ever arisen, whether it is

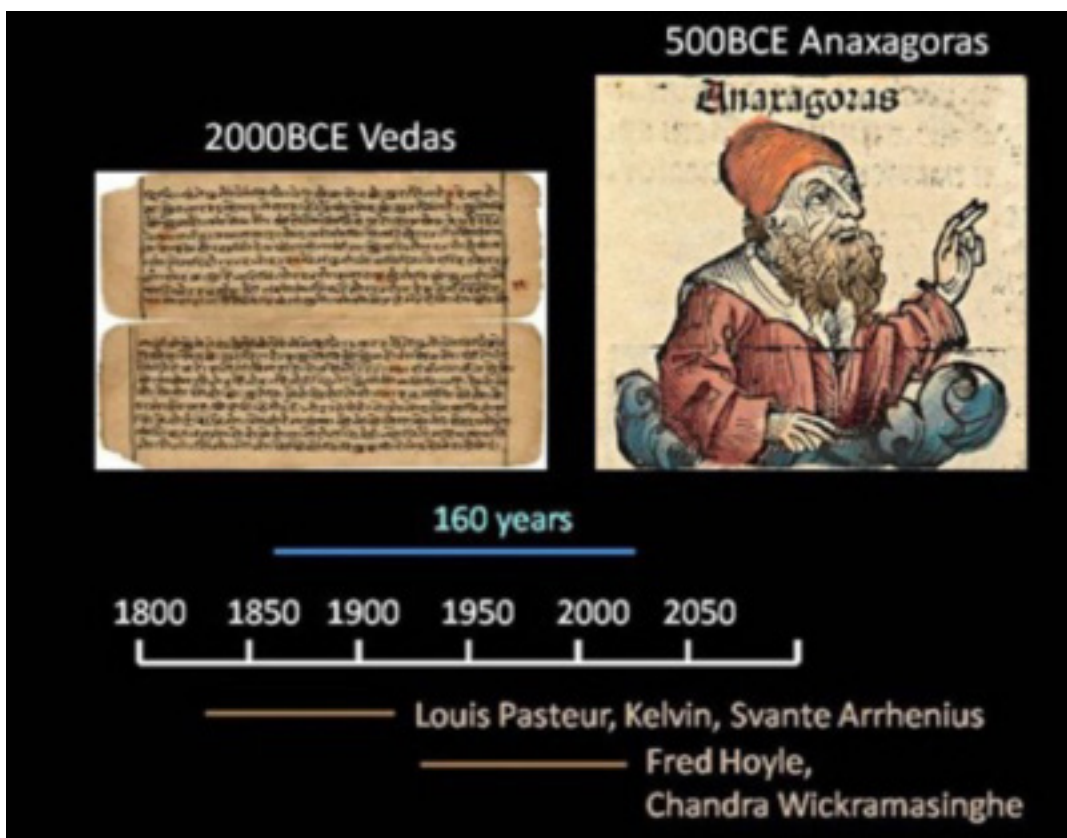


Figure 1. The trajectory of panspermia from prehistory to modern times.

not as old as matter itself, and whether seeds have not been carried from one planet to another and developed everywhere where they have fallen on fertile soil. . . .

And in Britain, Lord Kelvin (William Thomson) (Thomson, 1871) declared “Dead matter cannot become living without coming under the influence of matter previously alive. This seems to me as sure a teaching of science as the law of gravitation. . . .” In Sweden the Nobel Prize winning Chemist Svante Arrhenius was similarly swayed and enthusiastically proselytized for the “doctrine of panspermia” in his book *Worlds in the Making* (Arrhenius, 1908).

In retrospect it is difficult to believe that all such pronouncements were consistently ignored in the decades that followed. At every turn the Earth-centred Aristotelian point of view of spontaneous generation re-emerged to dominate even the strongest evidence pointing to the possibility of an alternative panspermic viewpoint. Weak and uncertain evidence of the lack of space-hardiness of bacteria was presented in the 1920s to argue stridently against the feasibility of panspermia. Over the past few decades, however, the space hardiness of bacteria has been established almost beyond refute, so all the initial objections that were raised are found to be false (Wickramasinghe et

al., 2010; Wickramasinghe, 2015; Wickramasinghe & Torko, 2014a,b). Contrary to what is often wrongly stated, in popular as well as more scientific writings, panspermia in 2022 is the furthest removed from mere speculation; rather it is firmly rooted in data and irrefutable facts (Hoyle & Wickramasinghe, 2000).

FAILURE OF LABORATORY EXPERIMENTS TO SUPPORT SPONTANEOUS GENERATION

The functioning of a living system depends on thousands of chemical reactions taking place within a membrane-bound cellular structure. Such reactions, organized in groups into metabolic pathways, have the ability to harness chemical energy from the surrounding medium in a series of very small steps, transporting small molecules into the cells, building biopolymers of various sorts, and ultimately making copies of itself possessing a capacity to evolve. Batteries of enzymes, comprising chains of amino acids, play a crucial role as catalysts precisely controlling the rates of chemical reactions. Without enzymes there could be no life.

In present-day biology the information contained in the enzymes—the arrangements of amino acids into folded chains—is crucial for life, and this information is

transmitted via the coded ordering of nucleotides in DNA. In a hypothetical RNA-world that may have predated the DNA-protein world, RNA is posited to serve a dual role as both enzyme and genetic transmitter. If a few ribozymes are regarded as precursors of all life, one could attempt to make an estimate of the probability of assembly of a simple ribozyme comprising 300 bases. This probability turns out to be 1 in 4^{300} , equivalent to 1 in 10^{180} , which can hardly be supposed to happen even once in the entire 13.7 billion year history of the entire universe. It is therefore not surprising to find that after nearly half a century of experiments in laboratories around the world no progress can be seen to demonstrate the process of spontaneous generation of life (Wickramasinghe et al., 1996). The failure to witness any trend whatsoever toward the emergence of a living system is normally attributed to the infinitesimal scale of the laboratory system when compared to the postulated terrestrial setting in which life is thought to arise. Yet, if we move from the laboratory flask to all the oceans of the Earth we gain in volume only a factor of $\sim 10^{20}$, and in time from weeks in the laboratory to, say, half a billion years, the gain is a factor of 10^{10} . In the probability calculation for the single ribozyme we thus gain only a factor of 10^{30} in all, reducing the improbability factor stated earlier from 1 in 10^{180} to 1 in 10^{150} . On this basis it is very difficult to avoid the conclusion that the emergence of the first evolvable cellular life form was a unique event in the cosmos. If this did indeed happen on Earth for the first time, it must be regarded as a “near miraculous” event that could not be repeated elsewhere, let alone in any laboratory simulation of the process. To overcome improbabilities on the scale involved here, it stands to common-sense reasoning that one would gain immensely by going for the biggest system available. And the biggest available system is manifestly the Universe as a whole.

The argument that panspermia must be rejected because it merely transfers the problem of origin from Earth to another setting is by no means scientific. The question whether life started *de novo* on Earth, or was introduced from the wider universe, is a fully scientific inquiry that merits investigation—one that is open to test and verification in various ways.

Ultraviolet and infrared spectral signatures that could be regarded as having a connection with biology are present everywhere in the universe—from the solar system to the most distant galaxies, even to distances exceeding 8 billion light years. The total amount of such organic material in our galaxy alone amounts to nearly one third of all the carbon in interstellar space. The possibility that all this organic material is the result of prebiotic chemical evolution is mere wishful thinking—particularly in view of the combinatorial arguments to which I have already alluded.

Whenever similar spectroscopic features are found on the Earth we attribute them without hesitation to degradation products of biology—indeed well over 99.99% of all the organics on Earth are indisputably biogenic.

We appear to be forbidden by culture and convention from adopting the same logic we apply on Earth to a cosmic scale—the argument being that life outside Earth is an extraordinary claim for which extraordinary evidence is called for. On the contrary, the confinement of life to the Earth can be regarded as the extraordinary claim, particularly in view of the multiple dynamical pathways available for interstellar and interplanetary transfers, and the survival properties of bacteria that have been identified and documented (Wickramasinghe et al., 2020).

GROWING INDICATIONS FOR COMETARY PANSPERMIA

Spontaneous generation or panspermia?—This is fundamentally a cultural choice at the outset, but once the choice is made it could be rigorously subjected to empirical tests and verification/falsification procedures in a Popperian sense. At the present time all such tests for spontaneous generation have produced null or at best ambiguous results as we saw earlier, whereas a wide range of tests of panspermia have led to a positive outcome. These latter results are summarized in this section.

From the 1970s onward, the present author, in collaboration with the late Sir Fred Hoyle, and later with other collaborators, began to assemble a vast body of data and evidence to support panspermia from astronomy, geology, as well as biology (Wickramasinghe et al., 1996). New data and new facts continue to provide ample verification of prior predictions with ever more compelling evidence pointing to the inevitability of panspermia as opposed to spontaneous generation as the mode of origin and propagation of life throughout the universe.

I will not dwell on details of evidence here but only summarize the salient facts that have been amply discussed in a long series of recent books and technical papers (Wickramasinghe et al., 2010; Wickramasinghe, 2015; Wickramasinghe & Tokoro, 2014a,b; Hoyle & Wickramasinghe, 2000). The following timeline of developments is worthy of note:

- 1962: The prediction and discovery that carbon was the main component of cosmic dust.
- 1974: The identification of organic polymers making up the bulk of interstellar dust, suggesting they may be the break-up products of bacteria and viruses.
- 1977: The epidemiology of an outbreak of H1N1 influenza that was consistent with viral ingress from space (Hoyle & Wickramasinghe, 1979).

- 1982: A prediction of the detailed mid-infrared absorption spectrum of interstellar dust based on prior laboratory experiments that was verified later by observations of the galactic infrared source GC-IRS7 (Hoyle & Wickramasinghe, 2000). We have regarded this as a crucial step in establishing panspermia as a process that satisfied a crucial “Popperian” test. These new infrared observations have been more conservatively interpreted by critics as merely representing the complex organic building blocks of life on a vast cosmic scale, with their assembly into primitive life occurring in cosmically augmented “primordial soups” on Earth-like planets. An objection to this is that organic molecules are a far cry from the simplest form of microbial life. The improbability of their assembly to such microbes have been shown to be on a superastronomical scale—pointing to an origin of life encompassing cosmological dimensions of space and time (Hoyle & Wickramasinghe, 2000).
- 1986: A prediction of the detailed mid-infrared emission spectrum of the dust tail of comet P/Halley based on prior laboratory experiments for freeze-dried bacteria (Hoyle & Wickramasinghe, 2000).
- 1996: Eruption of Comet Hale Bopp at large heliocentric distance at 6AU (Wickramasinghe et al., 1996).
- 2001: Prediction of bacteria entering the stratosphere verified at a height of 41 km (Harris et al., 2002).
- 2015: Rosetta Studies of Comet 67P/Churyumov-Gerasimenko showing consistency with the presence of bacteria (Wickramasinghe et al., 2015).
- 2016: Earliest evidence of life on the Earth during the Hadean epoch during a time of comet impacts (Bell et al., 2015).
- 2018: Microorganisms found on the outside of the International Space Station 400 km above the Earth (Grebennikova, 2018). There is no easy way to maintain that such microorganisms could have been lofted from the surface of the Earth, so strongly supportive evidence for panspermia continues to grow.

In addition to such explicit verifications of prior predictions, there was also the discovery after 2001 of unmistakable “viral footprints” in our own DNA and the DNA of plants and animals confirming the prediction from panspermia of cosmic viruses driving biological evolution on the Earth (Hoyle & Wickramasinghe, 1982; Wickramasinghe, 2012; Steele et al., 2018). Other astronomical and biological data decisively supporting panspermia is further summarized in two recent reviews by Steele et al. (2018, 2019).

The partial list given above can be enlarged to include more detailed facets of correspondence between

the predictions of the panspermia model and a diverse set of observations. I would argue that no wrong theory can be characterized by such an impressive record of detailed predictions of being unfailingly verified. It appears ironic that the stronger the supportive evidence has become for panspermia in recent times, the ferocity and the irrationality of opposition to it has grown stronger. It is becoming amply clear that cultural influences are beginning to play a decisive role in attempting to stall a long overdue paradigm shift in science. It is also my view that a hidden reason is that the concept of panspermia could be interpreted as being at odds with Graeco-Roman and Judeo-Christian traditions of religion and philosophy.

An aspect of panspermia that has been subject to much ridicule is the idea that viral and bacterial pathogens responsible for epidemics of disease could have an ultimate space origin. In the context of an unknown or poorly defined origin of the current Covid-19 pandemic, and with the growing evidence in support of panspermia, a panspermic primary origin of this virus as indeed all pandemic viruses cannot be ruled out (Hoyle & Wickramasinghe, 1979; Steele et al., 2020). Many aspects of the epidemiology of this new virus supports the idea of a primary atmospheric fallout modulated by atmospheric turbulence over several scales and followed by person-to-person spread. The disentanglement of the two processes presents a continuing challenge to scientists.

It is worth noting in this context that the total viral content of the Earth is truly astronomical and is by no means fully charted. For example, a single litre of seawater collected in marine surface waters has been estimated to contain more than 100 billion viruses—the vast majority of which remain unidentified (Furnham, 1999; Parsons et al., 2012). The total viral content of the oceans is estimated to be in excess of 10^{30} ; the vast majority of identified species are informationally rich bacterial phages, but with a hitherto unknown component of other viruses also included in this tally. While this number does not represent genetically distinct phages, it is nevertheless astoundingly superastronomical, exceeding by more than a factor of a million the total number of stars in the entire observable universe which is $\sim 10^{24}$. This comparison of astronomically big numbers is a startling indication of the possible connection between life on Earth and the wider cosmos.

A SUMMING UP OF THE EVIDENCE

In the past five decades abiogenesis has been confronted with a formidable array of new facts from astronomy, geology, space science, and molecular biology, all of which may have challenged its validity. Simultaneously an ever-increasing number of predictions of panspermia has

come to be verified to an astounding degree of precision. Wrong theories do not perform in this way, so it soon became clear that panspermia's star was on the ascendant! The sociology of science now took over: The apparent triumphs of panspermia over rival Earth-centered models of life began to irritate an ever-increasing number of scientists. This was aggravated by the fact that all attempts to demonstrate the validity of Earth-bound abiogenesis in the most advanced laboratories in the world have consistently led to dismal failure (Deamer, 2012).

A decisive demonstration of ongoing panspermia is the only way to resolve the cultural impasse we have reached. Such an experiment is well within the range of our current technological capabilities although it lies outside the scope of individual enterprise by lone scientists or even small groups. In 2001 a group of us working with the Indian Space Research Organisation (ISRO) collected and analysed cometary material that reached a height of 41 km in the stratosphere and discovered evidence for 0.1 tonne of microbes reaching the Earth every single day (Harris et al., 2002). Repeating this experiment—collecting microbiota at 41 km or higher and searching for evidence of biological structures that have a characteristic non-terrestrial isotope signature is well within the technological capabilities of space agencies in 2022. The fact that this has not been done until now, or even planned for the foreseeable future, is an indication of hostility to the concept of panspermia in my view. For the exponents of spontaneous generation theory, the answer is deemed to be already known—so the general reaction is—why bother? This attitude might possibly buy time for a doomed theory, but the Universe will always have the last say!

The timeline of panspermia from its early roots in the Vedas through to Anaxagoras in the 5th century BCE and into modern times is sketched in Figure 1. The last phase following on from Arrhenius led up to the verification of predictions described earlier. As we have noted, this unfolding scientific drama summarized above, is well-documented in a large corpus of scientific papers and recent books to which reference has already been made.

FROM BIOLOGY TO COSMOLOGY

We have argued in earlier sections that panspermia is well within sight of being proved and will be possibly be proved beyond any doubt in the near future. Similarly, it could be shown that the spontaneous generation of life from non-living chemicals will be proved to be impossible and untenable—requiring the overcoming of a superastronomical information hurdle as we have noted earlier. So one might well ask: Where are we in the search for our ultimate origins? This question is intimately linked to cosmology—

is the universe finite or infinite? If the latter is the answer, the information content of all life is an essential component of the Universe—dispersed as viruses and bacteria available for assembly on every habitable planetary body that forms within it.

In Vedic cosmology the universe is thought to be infinite in spatial extent and cyclic in time—strikingly reminiscent of the modern versions of oscillating universe models. In this context it is worth noting that the currently favored Big-Bang theory of the universe with an age of 13.83 billion years is by no means absolutely proven. The very recent discovery of a galaxy designated GN-z11 located at a distance of 13.4 billion light years (implying its formation just 420 million years after the posited Big-Bang origin of the universe) poses serious problems for the current consensus view of cosmology (Jiang et al., 2020). Similar problems for the Big-Bang cosmological model have been discussed over a period of some 3 decades by small group of dissenters including Fred Hoyle, Geoffrey Burbidge, and Jayant Narlikar (Hoyle et al., 2000).

Recently, Nobel Laureate Roger Penrose has joined a select group of dissenters who challenge the standard view of a unique Big-Bang origin of the universe 13.83 billion years ago (An et al., 2020). In a theory called the “conformal cyclic cosmology,” Penrose postulates that the universe undergoes an infinite number of cycles in which the Big-Bang event 13.8 billion years ago is the most recent cycle, and of which we are a part (see Figure 2). In such a class of models the origin of life and the origin of the universe are inextricably intertwined.

As I have already mentioned, clinging to cultural norms and symbolism has been common throughout history and has pervaded diverse cultures. But when there is not a great deal that rests on such symbolism it is not a matter of much consequence. The worship of Athena, for instance, served to maintain the integrity and unity of the city states of classical Greece, and although this was of course thoroughly irrational, it clearly did not detract from glories and intellectual achievements that followed! Unfortunately, a great deal does, however, rest on the acceptance or otherwise of theories relating to life in the universe.

IMPLICATIONS AND APPLICATIONS

A critical analysis of the panspermia/abiogenesis debate in relation to a large and diverse body of data as it has evolved over several decades has shown the role of cultural filtering of evidence that has undoubtedly skewed public perceptions. A similar process occurs in other multidisciplinary areas of science, and it is necessary to be aware of this process to minimize damage and arrive at ultimate “truths.”

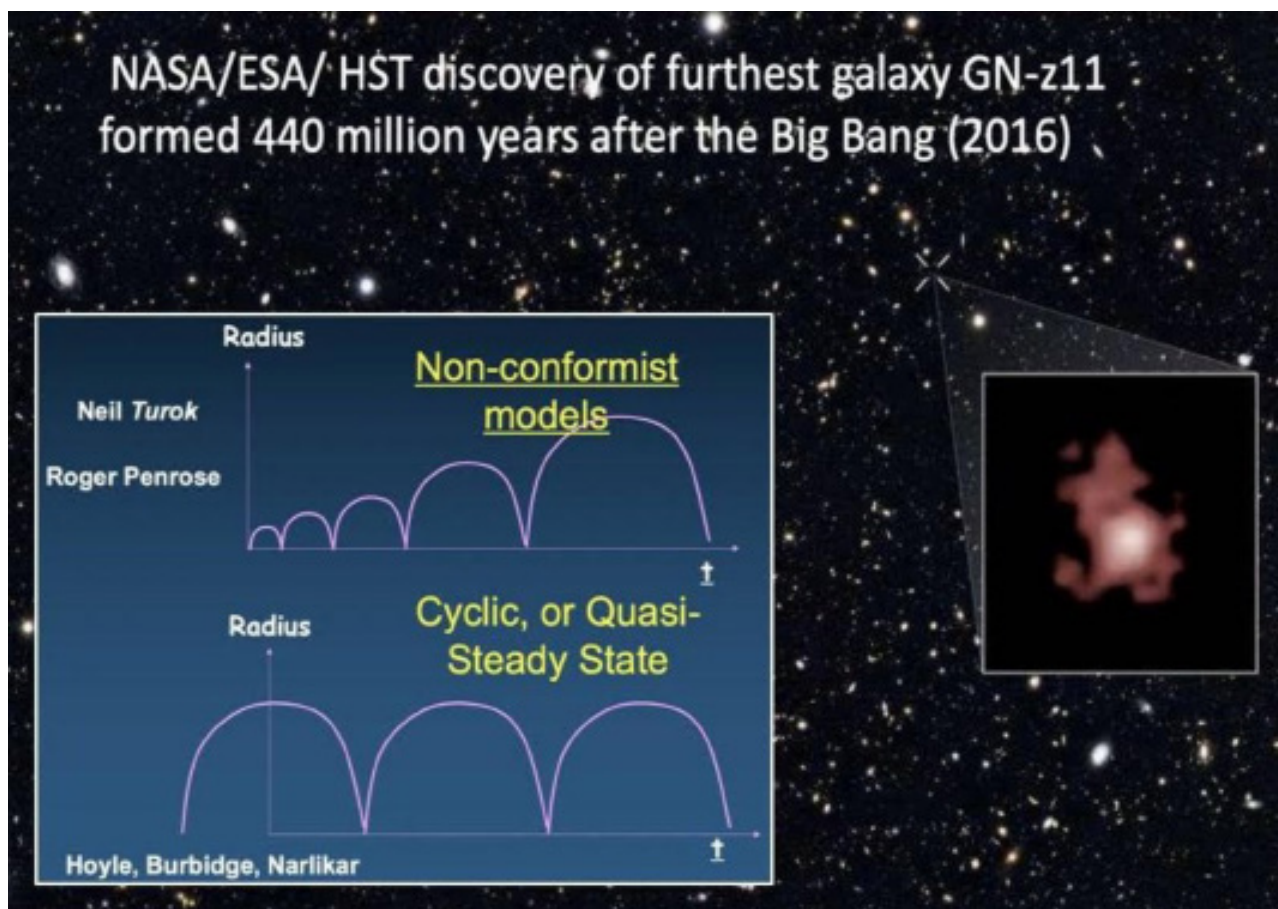
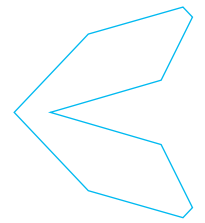


Figure 2. The most distant galaxy GN-z11 located at a distance of 13.4 billion light years from Earth challenges the consensus Big-Bang model of the universe.

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ESSAY

Adversarial Collaboration on a *Drake-S* Equation for the Survival Question

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HIGHLIGHTS

There is a sizable 39% gap between the added weight of reported evidence for an 'afterlife' minus the collective power of common skeptical explanations. This finding argues for continued research on different hypotheses for anomalous experiences that suggest postmortem survival of human consciousness.

ABSTRACT

The idea of 'life after death' transcends philosophy or religion, as science can test predictions from claims by both its advocates and skeptics. This study therefore featured two researchers with opposite views, who jointly gathered hundreds of research studies to evaluate the maximum average percentage effect that seemingly supports (i.e., *anomalous effects*) or refutes (i.e., *known confounds*) the survival hypothesis. The mathematical analysis found that known confounds did not account for 39% of survival-related phenomena that appear to attest directly to human consciousness continuing in some form after bodily death. Thus, we concluded that popular skeptical explanations are presently insufficient to explain a sizable portion of the purported evidence in favor of survival. People with documented experiences under conditions that overcome the known confounds thus arguably meet the legal requirements for expert witness testimony. The equation that led to our verdict can also purposefully guide future research, which one day might finally resolve this enduring question scientifically.

KEYWORDS

Anomalous experience, empiricism, paranormal belief, probability, survival

INTRODUCTION

A rather conspicuous 'resurrection' is happening. Whether old wine in new bottles or a reverent nod to the 19th century investigations of Spiritualism that birthed psychical research and modern parapsychology, the question of *postmortem survival of consciousness* has again become a hot button topic in the social and biomedical sciences (Alvarado, 2019; Bastos et al., 2015; Hill et al., 2018; O'Keeffe & Wiseman, 2005). Unfortunately, modern treatises are limited in offering only religio-cultural overviews of related beliefs (e.g., Nagasawa & Matheson, 2017), a

single category of evidence (e.g., Gauld, 1982a; Haraldsson & Matlock, 2016; Houran & Lange, 2001), or echo chambers of skeptical (e.g., Martin, & Augustine, 2015) or sympathetic views (e.g., Storm & Thalbourne, 2006). To our way of thinking, a widely-encompassing "adversarial collaboration" grounded in strict empiricism is the best way to summarize and advance the scientific conversation on this provocative topic. This type of exercise involves researchers with opposing views who jointly construct and implement a study that fairly addresses a controversial issue while controlling for obvious biases, weaknesses, or experimenter effects (for discussions, see Kahneman &



Klein, 2009; Sheldrake, 1998; Wagenmakers et al., 2011).

No scientific consensus on survival currently exists as consensus itself is fictitious. Novelist Michael Crichton (2003) underscored this point when he noted that, “In science, consensus is irrelevant. What is relevant is reproducible results. The greatest scientists in history are great precisely because they broke with the consensus. There is no such thing as consensus science . . . period” (para. 31–32). Likewise, survival is a thorny and fuzzy proposition because the nature and limits of “consciousness” remain highly debatable (e.g., Cardeña & Winkelman, 2011; Chalmers, 1995; Parnia et al., 2014), while the apparent evidence for survival is weakened by serious confounds (e.g., Houran et al., 2017; O’Keeffe & Wiseman, 2005; Martin & Augustine, 2015). This circumstance often reduces the question to a rhetorical battle of ideologies, i.e., passionate interpretations of certain anomalies contrasted with viable counterclaims that bolster orthodox explanations for these same touted outcomes. Accordingly, this essay offers a constructive “meeting of the minds” by computing an estimated probability of postmortem survival based on information commonly cited by parapsychologists and skeptics for their respective positions. What the famous “Drake Equation” did to scientifically frame the likelihood of intelligent extraterrestrial life within the Milky Way galaxy (Burchell, 2006; Drake, 2014; Glade et al., 2012), we hope to achieve with a first approximation of a *Drake-Survival (S)* Equation for the question of life after death.

We recognize that some academics regard *all* parapsychological claims as invalid (e.g., Reber & Alcock, 2020), while others label certain witness reports as self-evident and indisputable evidence of the paranormal (e.g., Stokes, 2017). Our exercise rejects these dogmatic views in favor of a mutual decision to take survival claims seriously but not automatically at face value. Further, and akin to the myth of consensus, we stress that science is only an approach to knowledge versus a set of ‘verified truths’ or ‘conclusive evidence’ (Jevning et al., 1994; Lilienfeld et al., 2015; Psillos, 1999). Therefore, no single study, collection of findings, or forceful philosophical argument ever conclusively proves survival. Rather, the ‘best case’ in this context represents only a current estimation based on reduced errors in inference and thus a more accurate understanding of reality. In short, scientific conclusions deal with probabilities and not possibilities. Note, too, that we strongly agree with Orzel’s (2017) position that “dealing honestly with probability and uncertainty requires *quantitative* engagement” (para. 16, emphasis added). For this reason, our exercise relies exclusively on empirical research data to formulate a conservative probability model that is practical and pertinent to accepted rules of evidence in the field of law.

The *Drake-S* Equation and *Daubert* Standard of Evidence

Trial judges use the *Daubert* standard to assess whether scientific testimony from an expert witness is based on valid reasoning that can properly be applied to the facts at issue (Bernstein, 1993; Doyle, 1984; Fisher, 1994), including clinical cases (Woody, 2016; Shuman & Sales, 1999). Under this standard, the factors that may be considered in assessing the validity of a method driving an expert conclusion are: (a) whether the theory or technique in question can be and has been tested; (b) whether it has been subjected to peer review and publication; (c) its known or potential error rate; (d) the existence and maintenance of standards controlling its operation; and (e) whether it has attracted widespread acceptance within a relevant scientific community.

Due diligence is, therefore, critical to ensure that the core facts and opinions of expert witnesses or scientific evidence maintain their probative value in the face of attempted disqualification by an opposing counsel. In a case for postmortem survival, the credibility of the witness to the *Daubert* standard of ‘*as likely as not*’ or preferably ‘*more likely than not*’ represents both (a) the sum of the witness’ veracity and expertise and (b) the resistance of the testimony to cross-examination. Here, overcoming common skeptical explanations for survival-related phenomena is the prime concern. Secondly, we must consider the specific details of the witness testimony, i.e., a ‘veridical’ (or accurate) nature that reasonably supports an interpretation of postmortem survival. In other words, any case must firmly address the key counter-arguments to determine the weight of favorable testimony.

Following this process of legal reasoning, we will first quantify skeptical explanations for survival-related phenomena using simplified mathematics on a probabilistic population-level. This arguably provides first-of-its-kind empirical estimates for these common counter-arguments. We next show that these estimates cannot, in a very conservative total, account for the variety of survival-related phenomena reported by witnesses at the population-level. Particularly, we demonstrate that witnesses who satisfy these skeptical criteria would meet the *Daubert* standard of evidence. Such vetted testimony would, in fact, present a daunting challenge for anyone seeking its disqualification using empirical evidence versus ideological rhetoric.

However, we will proceed to show that the amount of variance within skeptical explanations (i.e., the percent of another variable accounted for a statistical analysis) that actually explains survival-related phenomena is considerably short of accounting for the entire population of reported witnesses (or experients). Ergo, we contend that experients vetted for these skeptical factors would repre-

sent *prima facie* testimony of postmortem survival, which would require new and probabilistically-likely alternative explanations to successfully disqualify.

Primary Assumptions and Approaches to the *Drake-S* Equation

Our exercise is rooted in three mutually-agreed assumptions. Similar to the growing trend of pre-registered research studies, it is important to set ground rules in advance to control for undisclosed flexibility that can lead to revisionist or false discoveries or rejections (Nosek et al., 2018). Thus, we each committed to accepting the results of a probabilistic exercise that conformed to the following fundamentals and parameters.

Working Assumption 1: The Meaning of ‘Survival’

Consciousness is defined by many online dictionaries simply as “sentience or awareness of internal and external existence.” The *Oxford Dictionary of Psychology* (Colman, 2015) expands this basic premise to describe it as “the normal mental condition of the waking state of humans, characterized by the experience of perceptions, thoughts, feelings, awareness of the external world, and often in humans (but not necessarily in other animals), self-awareness.” We adopted a simple, four-facet depiction of consciousness for our exercise, i.e., a state of personal existence that collectively encompasses: (a) *Identity* (personality), (b) *Perception* (awareness of stimuli), (c) *Sentience* (awareness of feelings/sensations), and (d) *Cognition* (an understanding of perceptual, sensorial, or emotional stimuli). Accordingly, any testimony in favor of survival must include these features.

The survival hypothesis posits that human consciousness can persist somehow after biological death, as opposed to the extinction (or materialist) hypothesis that assumes biological death brings a permanent end to consciousness. Martin and Augustine’s (2015) anthology gives well-informed and thorough descriptions of the presumed materialistic workings of consciousness and its implications for survival. Their text becomes quite technical, but McCormick (2015, p. 54) clarified the skeptical perspective with a simple argument:

1. Human cognitive abilities, memories, personalities, thoughts, emotions, conscious awareness, and self-awareness (in short, the features that we attribute to the personal soul) are dependent upon the brain to occur/exist.
2. The brain does not survive the death of the body.
3. Therefore, the personal soul does not survive the death of the body.

However, not all authorities in consciousness studies

are certain of these tenets. Some researchers have pursued a comprehensive theory of consciousness that explains the traditional mind/body conundrum or what is now popularly called the “hard problem of consciousness.” This refers to the vexing challenge of understanding how matter (i.e., the human brain or any biological system) is capable of subjective experience (i.e., phenomenal consciousness, or mental states/events with phenomenal qualities or qualia) (Chalmers, 1995; Goff, 2017; Kleiner, 2020). The purely rhetorical definitions of consciousness presented above fail to resolve this mystery, which might involve the complex roles of quantum mechanics (Hameroff & Penrose, 2014; Li et al., 2019; Penrose, 1989) or resonance and phase transitions (Hunt & Schooler, 2019; John, 2002; Melloni et al., 2007; Singer, 2001; Zeman, 2001). In fact, some authorities question whether consciousness is even a brain- or biological-based property at all (e.g., Kleiner & Tull, 2021); instead, it could be an emergent phenomenon extant with the universe as in ‘panpsychism’—the idea that the cosmos is alive or at least contains the seeds of aliveness or consciousness (Jawer, 2020).

But that is only the *local* version of the ‘hard problem of consciousness.’ It can be argued that science must also contend with what can be described as the *non-local* version of the hard problem. Here, we mean how consciousness sometimes seems to display non-locality by becoming “entangled” with seemingly independent physical systems, inorganic and organic alike. Non-locality is a physics phenomenon that involves ‘(spooky) action at a distance,’ i.e., the concept that an object can be affected without being physically touched by another object. In short, we may be dealing with the non-local interaction of objects that are separated in space or time (for a discussion, see Stapp, 2011). Researchers in consciousness studies have increasingly adopted Larry Dossey’s term ‘non-local mind’ (e.g., Dossey, 2014; Laszlo, 2008; Tressoldi & Storm, 2021; Walach, 2000) when discussing apparent psi effects from experimental research or outcomes from meta-analyses of past studies. Indeed, the journal *Explore: The Journal of Science & Healing* even devoted a special issue to this concept and its implications (2015, Volume 11, Issue 2).

To clarify, meta-analysis is a statistical approach that combines the results from multiple studies to increase power (over individual studies), improve estimates of the size of empirical effects, and to resolve uncertainty when reports disagree. Several meta-analyses have been published in both niche and mainstream journals documenting potentially non-local effects related to human consciousness (e.g., Bem, 2011; Bem & Honorton, 1994; Honorton et al., 1992; Mossbridge et al., 2012; Mossbridge & Radin, 2018; Sarraf et al., 2020; Schmidt, 2012; Storm & Tressoldi, 2017; Tressoldi & Storm, 2021). However, this litera-

ture is criticized on methodological and statistical grounds (e.g., Houran et al., 2018; Hyman, 1994; Rabeyron, 2020; Ritchie et al., 2012; Wagenmakers et al., 2011), as well as on conceptual grounds in the absence of empirical explanations that square the proposed phenomena against well-established scientific models (Houran et al., 2017, 2018). That said, some researchers are diligently striving to close this apparent gap (e.g., Marwaha & May, 2019; Sheehan & Cyrus, 2018; von Lucadou, 2011).

Working Assumption 2: Human Observation Is Reasonably Reliable

Our interpretation of the *Drake-S* Equation must conform to logical and empirical assumptions that are standard in the scientific community. The first of these is the textbook premise that human observation, though subject to error, is reasonably reliable (Morris & Maisto, 2005). By this, we mean that regardless of the object or event being observed, the process of perceiving and interpreting the event is relatively fixed (Chakravartty, 2017; Psillos, 2005; Votsis, 2015). To assert otherwise would cast the entire body of scientific knowledge into doubt, nullify people's everyday experience of reality, and trap humans within an extreme philosophy of existential relativism. This argument likewise includes paranormal experiences, which are merely one kind of stimulus available for observation. However, mainstream scientists tend not to equate paranormal experiences phenomenologically with other types of witnessed events. An obvious example of this prejudice is the trite phrase, 'extraordinary claims require extraordinary evidence' (see e.g., Deming, 2016; McMahan, 2020),

Of course, 'extraordinary claims require extraordinary evidence' merely follows what is ideologically acceptable (or possible) within the belief system evaluating the claimed event (Hill et al., 2018, 2019; McClenon, 1994). To our knowledge, there are no philosophical or empirical arguments that human perception of, say, an 'office building' is fundamentally or factually different from the perception of an 'apparition,' with the exception of the perceptual or attributional errors that we address in this essay. And note that the *rarity* of a particular phenomenon does not negate its reality, only the likelihood of its occurrence or detection as exemplified by the study of extremely rare events or 'black swans' (e.g., Balesdent et al., 2016; Desirée O, 2020; Taleb, 2007).

People immersed within their belief systems are often unable to recognize their biases due to social forces and the acceptance of norms provided from birth. This situation can lead to functional fixedness, or the inability to appreciate alternative functions, ideas, or concepts due to pre-existing embedded schemas. Worse still, it is well-es-

tablished that ideological beliefs or norms can have great power regardless of their validity (Merton, 1995). 'Popular makes correct' as the saying goes, and we have addressed the cultural biases *for* and *against* the paranormal in previous works (Drinkwater et al., 2019; Hill et al., 2018, 2019; Houran et al., 2020).

Mindful of the preceding, the quantitative exercise in this essay follows simple logic. We will examine the overall percentage of evidential survival-related phenomena that remains after mathematically adjusting for major sources of error. We contend that this 'purified' percentage of observations has *prima facie* evidential value as it inherently defies—if not outright contradicts—skeptical (materialist) interpretations of the core stimuli that were initially observed or experienced.

Working Assumption 3: Defining Suitable Data for Analysis

A classic issue in statistics is the 'reference class problem,' or deciding what class to use when calculating the probability applicable to particular cases. Any attempt to formulate a *Drake-S* Equation would ideally utilize the latest and most rigorous and comprehensive information, such as from meta-analyses and systematic literature reviews that retrieve, synthesize, and appraise existing knowledge on a particular topic (Moller & Myles, 2016). Of course, such a Herculean effort would require many months, if not years, to faithfully complete. We have thus chosen to develop a first approximation of a *Drake-S* Equation by sourcing data via scoping reviews of empirical studies using keyword searches of the Google Scholar, PsychInfo, and ResearchGate databases. We then visually inspected the resulting outputs for their relevance to the four-facet definition of consciousness noted earlier.

Such reviews are extremely useful for gaining broad perspectives on topics and are comparable to textbook chapters including sections on the etiology or epidemiology of subjects (Green et al., 2006). Our reviews were further guided by Baethge et al.'s (2019) standards for high-quality reviews, namely those containing explanations of (a) the importance of and aims of the review and (b) the literature search itself while (c) referencing and presenting the (d) evidence level and (e) relevant endpoint data. We thus conducted a series of scoping reviews to identify noteworthy studies on *Anomalous Effects* (AEs) that are interpreted as evidence for survival and *Known Confounds* (KCs) that might counter this data, especially targeting information on the presence and impact of the KCs in the context of the respective EAs. The idea was to source representative, peer-reviewed evidence for and against survival using literature mutually agreeable to the authors.

Empirical Findings Consistent with the Survival Hypothesis

Preliminaries

A relevant estimate to consider first is the incidence rate of experiences in the general population that directly references either non-local mind or survival. Surveys indicate that between 36% to 65.7% of the general population has had at least one 'paranormal' experience (Castro et al., 2014; Dagnall et al., 2016; Gallup & Newport, 1991; Hay & Morisy, 1978; Irwin & Watt, 2007; Ross & Joshi, 1992; Schmied-Knittel & Schetsche, 2005). Aggregating these rates over the last several decades gives a reasonable estimate of 46.74% of people reporting these occurrences. This sizable proportion of American and UK populations unquestionably establishes paranormal experiences as *social facts* (Hill et al., 2018, 2019).

Within the large rubric of the paranormal, five categories of observations are routinely cited in support of postmortem survival of consciousness (Cardeña et al., 2014, 2015; Irwin & Watt, 2007): (a) haunt-type episodes, (b) mental and physical mediumship (including possession), (c) near-death experiences, (d) reincarnation, and (e) anomalous experiences of veridicality and independent agency. Particularly, these anomalous experiences seem to suggest the existence of discarnate "identity, perception, sentience, and cognition." We define these phenomena below, and while any of them might alone be sufficient to explore the likelihood of survival, all five categories are included here to establish the most precise probability via the collective weight of direct and conceptual replications within and across different subject areas.

Haunt and Poltergeist Episodes

From a phenomenological standpoint (Houran et al., 2019a, 2019b; Houran & Lange, 2001), *poltergeists* can be described as clusters of unusual 'subjective (S) experiences' (e.g., apparitions, sensed presences, hearing voices, and unusual somatic or emotional occurrences) and 'objective (O) events' (e.g., apparent object movements, malfunctioning electrical or mechanical equipment, and inexplicable percussive sounds like raps or knocks), which seemingly coalesce around certain people (for a recent discussion, see: Ventola et al., 2019). Similar *S/O* anomalies that tend to persist at specific locations are called *hauntings* (Gauld & Cornell, 1979/2017; Roll & Persinger, 2001). Parapsychologists typically differentiate *haunts* and *poltergeists* (e.g., Gauld & Cornell, 1979/2017; Roll & Persinger, 2001) or suggest that they involve a constellation of different phenomena (Cardeña et al., 2014; Houran & Lange, 1996).

Still, a firm distinction is problematic due to their over-

lapping characteristics (Houran et al., 2019a; Ventola et al., 2019) and a shared set of *S/O* anomalies that forms a single, probabilistic hierarchy (Houran et al., 2019b). Thus, a common phenomenon or set of mechanisms likely underlies both types of anomalies. The mystery obviously centers on what it might be. Skeptics contend that many episodes are readily explained as fraud or misinterpretations of ambiguous or unexpected events (Houran & Lange, 2001), whereas many parapsychologists argue that the best cases in this category involve some form of psychic energy emanating from living individuals (Roll & Persinger, 2001) or the actions of discarnate entities (Betty, 1984; Maher, 2015; Roll, 2006; Stevenson, 1972; Storm & Tilley, 2020).

Prevalence rates for haunt-type episodes in the general population are elusive. However, Dagnall et al. (2015) reported hauntings at 14%, whereas other sources give substantially higher estimates specifically for haunts versus poltergeists. To this point, Laythe and Owen (2012) found that 60% of their survey respondents reported some type of haunting experience, and Laythe et al. (2018) similarly reported that 51% of survey participants reported haunt phenomena. More recently, in the development of the Survey of Strange Events questionnaire (Houran et al. 2019b), approximately 83% of respondents who were recruited in a quasi-random manner reported haunt experiences across varying contexts. We estimate, therefore, that haunt-type episodes are a relatively frequent occurrence, calculating an average of these sources at 52% of the population. While this rate is higher than the overall estimates for general paranormal experience, it must be noted that estimates vary widely based on the specific details or operationalizations used across the pertinent studies.

Mental and Physical Mediumship

Gauld (1982a) described mental mediumship as communication with deceased persons that is experienced "through interior vision or hearing, or through the spirits taking over and controlling their bodies or parts thereof, especially . . . the parts required for speech and writing" (p. 4). Several authors advocate a parapsychological interpretation of these perceptions, since mediums sometimes seemingly provide specific or veridical information under blinded conditions (e.g., Beischel et al., 2015; Beischel & Schwartz, 2007; Jensen & Cardeña, 2009; Kelly & Arcangel, 2011; Roy & Robertson, 2004). Conversely, other researchers have noted the controversial methods and mixed results of research in this domain (Bastos et al., 2015; O'Keeffe & Wiseman, 2005), as well as the apparent dissociative nature of these particular experiences (e.g., Maraldi, 2014; Maraldi & Krippner, 2013; Ross & Joshi, 1992; Seligman, 2005; Wahbeh & Radin, 2017).

Physical mediumship, on the other hand, involves “paranormal physical events in the medium’s vicinity” (Gauld, 1982b, p. 4). This can include disembodied voices, raps on walls or tables, and the materialization or displacement of objects (Bocuzzi, 2017). Physical mediumship flourished in the mid-nineteenth century in the United States during the Spiritualist movement. It was supported by the belief that personal consciousness persisted after death and that gifted mediums had a direct connection to the deceased (Braude, 2014). Research into mediumship over the last century has waned due to an impasse reached by the academic community about whether the alleged phenomena are attributable to deceased agents or living agents (Cunningham, 2012; Rock, et al., 2021). While physical mediumship has been on the decline throughout the 20th century, it is still practiced and researched as seen with the popular SCOLE (Solomon & Solomon, 2006) and SORRAT (Richards, 1982) ‘sitter-groups.’ Web searches also reveal that there are many active physical mediums with devoted supporters.

However, physical mediumship has a reputation for being rife with fraud, as well as vulnerable to strong suggestion effects that induce people to perceive events that did not objectively happen (e.g., Wiseman et al., 2003a; Wiseman & Greening, 2005). The occurrence or circumstances of sitter-group phenomena has correspondingly been criticized (Bierman, 1981; Grattan-Guinness, 1999; Hansen & Broughton, 1991; Wiseman et al, 1992). Furthermore, most mediums avoid producing their phenomena under controlled conditions, or those that do agree to controls only perform in situations that can be easily manipulated (Braude, 2014). Murdie (2015) noted that the number of mediums willing to be subjected to rigorous controls has declined since 1945. This coincides with the availability of infrared photography that allows observers to document sittings in the dark (see e.g., Bocuzzi, 2017). This supposed need for darkness at séances immediately incriminates a medium’s motives and activities. Physical mediums claim the reason for darkness during sittings is that their “spirit controls” communicate to them that it is a requirement (Keen, et al., 2011; Nahm, 2014).

There are important exceptions, though. Modern medium Kai Mugge allowed for a strip search and continuous hands-on control while phenomena were occurring at a distance. Anomalous events spanned raps and knocks, object movement, and table levitation (Braude, 2014; Nahm, 2014). Anthropologist Jack Hunter (2011) similarly documented his experiences as a sitter at séances conducted at Bristol Spirit Lodge, a center focused on the development of trance and physical mediumship. He recalled one séance where he witnessed strange lights, mists, and a change in the physical appearance of the medium. After the séance,

he listened to other sitters talking about how they saw the medium ‘transform’ into a bald Chinese man. This was exactly what Hunter himself experienced. Since he did not divulge his own perceptions, he pondered how the entire sitter-group witnessed this same extraordinary event (assuming fraud was not at play).

Population prevalence rates for mediumship-related experiences are severely lacking in the scientific literature. The only population-level estimate we deemed appropriate was Gallup and Newport’s (1991) finding that put ‘trance channeling’ at 2% of the overall population.

Near-Death Experiences (NDEs)

It is well-established that some adults and children suddenly faced with the prospect of death experience a distinctive state in which their consciousness is apparently unbounded by the physical body or earthly environs (e.g., Greyson, 2001; Greyson et al., 2009; Ring, 1980). Termed an NDE, this state is defined as a transcendental experience precipitated by a confrontation with death; it does not seem to be adequately explained as the phenomenology of a dying or medically-compromised body (for a review, see Greyson et al., 2009). NDEs are among the most dramatic of anomalous experiences (Holden et al., 2009), with many percipients interpreting them partly or wholly as ‘mystical, spiritual or paranormal’ occurrences (Greyson, 2021). To be sure, the type of brain activity necessary for complex conscious experience is assumed to be abolished during the psychophysiological conditions in which NDEs are commonly reported (Greyson et al., 2009; Parnia et al., 2014).

Other findings further underscore the anomalous character of some NDEs. Notably, Lange et al. (2004) found that for those with ‘true’ NDEs (versus “false-positives or false-negatives”), Greyson’s (1983, 1985, 1990) NDE Scale satisfactorily conformed to a probabilistic Rasch (1960/1980) model. With increasing intensity, these NDEs reflected peace, joy, and harmony, followed by mystical or religious insight, while the most intense NDEs referenced an awareness of things occurring in a different place or time. Their perceptions were also consistent across the individuals’ gender, current age, age at time of NDE, and latency and intensity of the NDE, thus characterizing NDEs as core experiences whose meaning is unaffected by external variables. ‘True’ NDEs are likewise quantitatively detectable within the verbal reports of witnesses (Lange et al., 2015).

However, false-positives and false-negatives are known to arise when assessing NDEs (Greyson, 1985, 1990; Lange et al., 2004). NDE-type experiences also occur in a variety of situations, ranging from cardiac arrest and brain dysfunction to extreme fear, with no physical alteration in

brain function. Spontaneous NDEs also can occur during full consciousness and without brain pathology; such occurrences are more akin to transpersonal or mystical experiences. In other words, severe brain damage or complete loss of vital signs are *not* prerequisites for NDEs. These patterns suggest to skeptical researchers that NDEs are not paranormal perceptions indicative of postmortem survival but instead are natural events that are somehow generated by human physiology (for discussions, see: Blackmore, 2012; Facco & Agrillo, 2012; Vanhaudenhuyse et al., 2009).

The prevalence of 'true' NDEs has not been investigated using large-scale representative surveys, and the few studies that have estimated a general frequency often report different results. Ring (1980) provided a large estimate positing that one-half of all severe medical traumas would report an NDE; however, other authors provide more conservative figures. Research by Greyson (1998) and van Lommel et al. (2001) offer estimates of 10 to 15%, whereas Locke and Schontz (1983) and Parnia et al. (2001) each assessed the rate of an NDE with physical trauma patients at 6 to 7%. More recently, Dagnall et al. (2016) found that 9% of survey respondents reported an NDE within their larger sample of 42% who reported general paranormal experiences. We conservatively aggregated the percentages of NDEs by first removing Ring (1980), and thereby obtained the average rate of 9.4%.

Reincarnation

The concept of reincarnation—or rebirth of the soul—is ancient, nearly universal, and ostensibly backed by a wealth of empirical research (e.g., Kelly, 2013; Matlock, 2019; Pasricha, 2008, 2019; Playfair, 2006; Shroder, 1999). This evidence often centers on recalled memories of past lives (Dunlap, 2007). Perhaps the largest body of research was conducted by Ian Stevenson and his colleagues, who studied more than 2,000 cases of children who claimed to remember past lives (for reviews and discussions, see: Stevenson, 1997, 2001, 2003). Numerous replications have supported his findings (e.g., Haraldsson, 1995; Keil, 1996; Mills, 1989; Mills & Lynn, 2000; Tucker, 2005). This work continues to be conducted by James Tucker at the University of Virginia. As of this essay, the number of aggregate cases was between 2,700 and 2,900 with the number of "solved" (i.e., verified) cases at about 1,500. A case is considered 'solved' when a child's statements, behaviors, or memories strongly match the lived experiences of the deceased person who the child claims to be. This is determined through meticulous documentation of the child's statements and determining whether they align with the facts or testimonies of those who knew or lived with the deceased person.

Stevenson and many fellow researchers (e.g., Haraldsson, 2008; Keil & Tucker, 2000, 2005; Ohkado, 2017; Olesen, 2020; Pasricha, 2019; Pasricha, et al., 2005; Stevenson, 1990, 1997; Stevenson & Haraldsson, 2003) suggest that reincarnation is a viable explanation for such cases given: (a) the large number of witnesses and the lack of apparent motivation and opportunity for fraud (due to the vetting process), make the hypothesis of fraud extremely unlikely; (b) the large amount of information possessed by the child that is unlikely to have been obtained from his/her family (due to its being rarely if ever divulged) or from the family of the deceased person whose life is ostensibly being remembered; (c) demonstration of similar personality characteristics and skills not learned in the child's current life; and (d) the correspondence between birthmarks or birth deformities of the child and the location or shape of wounds or other marks found on the deceased person.

Nonetheless, some critics (e.g., Angel, 2015; Edwards, 1997; Wilson, 1981) have raised serious concerns about Stevenson's work and that of other reincarnation researchers. This includes charges of sloppy methodology and control procedures that allow personal biases to affect the outcomes, and too readily dismissing the possibility of fraud on the part of the children or their parents making these claims. Additionally, Wilson (1981) emphasized that inadequate information is presented in the studies about vital informants, pointing out that some of Stevenson's investigations used interviewers (including Stevenson) who did not speak the language of the interviewees. This might have led to misinterpretation that further supported personal biases. Skeptics also argue that most of Stevenson's cases occurred in cultures supportive of reincarnation, which could have affected testimony as the children and parents had a traditional cultural framework through which to interpret events (Dunlap, 2007; White, 2016).

The reincarnation hypothesis has not, to our knowledge, been assessed for overall prevalence with the exception of Barker and Pasricha (1979), who tentatively estimated out of five hundred (.002) as a general rate of occurrence.

Veridical Anomalous Experiences

Two types of death-related experiences predominantly define this category, which seemingly involve discarnate (i.e., independent) agency or veridicality (i.e., an accurate or factual basis). First, survey research suggests that veridical apparitions might be more than merely hallucinations (e.g., Haraldsson, 2009) but could be related to an external event and hence meaningful to the percipient. In cases of this kind, people have a vision of someone they know, and they learn later that this person unexpectedly died at the

time of their vision or impression. In veridical hallucinations some information unknown to the percipient is apparently gathered in an inexplicable manner. Some veridical hallucinations are even collective, that is, they are allegedly witnessed by more than one person at the same time. Second, *after-death communications* (ADCs) are spiritual experiences that occur when a living person is contacted “directly and spontaneously” by a family member or friend who has died (e.g., Kamp et al., 2020; Woollacot et al., 2021). ADCs are described as direct experiences because no psychics, mediums, therapists, rituals, or devices are needed. ADCs are also said to be spontaneous, as the deceased who seemingly control the timing and manner of their contact.

We ignored research on sleep-related anomalies when estimating effect sizes for this evidence category, as these reports often reflect experiences of sleep paralysis that are misconstrued as encounters with anomalous beings or sentient forces (Hufford, 2001; Jalal, 2016; Jalal & Ramachandran, 2017). Veridical apparitions, on the other hand, are rather well documented though somewhat scarce. Palmer (1979) found that 17% of his southern U.S. survey respondents reported apparitional experiences, while Irwin (1985) reported a 20% rate in an Australian sample. Haraldsson et al. (1977) reported a 31% rate of seeing ‘the deceased’ in his study of northern Europeans. Ross and Joshi (1992) placed apparitional experiences at 11.8% when combining all spectral events, but Gallup and Newport (1991) only found a 9% rate. New research shows a 44.5% average for survey respondents reporting ADCs (Woollacot et al., 2021), although previous studies present lower numbers. Specifically, Persinger’s (1974) survey found that 32% of respondents acknowledged apparitional experiences, and Haraldsson (2009) reported a 27.5% averaged occurrence of “visitations of the dead.” These metrics agree with Cooper’s (n.d.) intriguing survey of funeral directors, which found a 32% occurrence of anomalous auditory or visual phenomena. More recent studies offer average incidence rates between 26% and 38% for the same types of perceptions (Laythe & Owen, 2012; Laythe et al., 2018). These estimates produce an overall aggregated percentage of 26.1%.

Empirical Confounds Undermining the Survival Hypothesis

Importantly, our approach relies on the principles of probability as well as an honest application of the scientific process. An inferential statistics model dictates that an alternative explanation (i.e., a cause other than ‘paranormality’) is not an ‘either/or’ proposition. That is, a viable skeptical explanation is not necessarily a comprehensive one that *can* or *does* apply to all cases under scrutiny.

Rather, it is more accurate to say that a viable explanation can account for a varying number of paranormal reports based on its scale or scope of influence. This statement is not controversial: It reflects the standard understanding of effects and effect sizes in inferential statistics. Per the scientific process, an alternative hypothesis is not formally disproven until and unless mainstream claims can fully account for the observed phenomenon.

Along these lines, there are six basic categories of KCs (recall that this stands for ‘known cofounds’) levied against spontaneous experiences or academic studies pertinent to the survival hypothesis (e.g., Houran & Lange, 2001; O’Keeffe & Wiseman, 2005; Martin & Augustine, 2015): (a) expectancy-suggestion effects, (b) environmental influences, (c) fraud, (d) measurement error, (e) mental illness, and (f) susceptibility factors, i.e., psychological variables that can predispose healthy individuals to perceptual errors or misinterpretations of non-paranormal events. In other words, these issues can individually or collectively undermine the statistical reliability or validity of survival-related studies and hence obfuscate clear interpretations of their relevance or meaning. We, the authors, agreed that these KCs are often viable explanations for many witness reports when considered theoretically or on a per case basis.

In clustering and aggregating findings on these KCs, we treated all publications as one observation or outcome regardless of whether the report was a meta-analysis. However, meta-analyses are clearly indicated within the respective Tables by the presence of multiple studies. We reiterate that it is preferable to have meta-analyses or systematic literature reviews for all KC categories, but, as we demonstrate, research in many of these domains offers insufficient data for a meta-analysis. Thus, it would be disingenuous to weight these papers by the number of studies—as opposed to the aggregates of findings *per* published study (including meta-analysis)—since the averaged weight of additional single studies covering related phenomena that we cluster within our KC categories would be consistently less than the bulk of studies within one single meta-analysis. We repeat our assertion that percentage or variance estimates derived from a meta-analysis provide an inherently better estimate than individual studies.

Belief/ Expectancy/ Contagion Effects

The prevalence and impact of paranormal belief has a long history in social science research (e.g., Houran et al., 2002a; Kumar & Pekala, 2001; Lange & Houran, 2000; Laythe et al., 2018; Laythe & Owen, 2012; for a review, see Irwin, 2009), as well as in laboratory or fieldwork studies in parapsychology (Dagnall et al., 2015; Houran, 2002; Houran et al., 2002b; Irwin, 2015; Wiseman et al., 2002). A

wealth of studies consistently demonstrates that such beliefs preferentially influence the interpretation of certain events, sometimes even overriding people's natural physiological reactions to otherwise calm and peaceful settings (Escolà-Gascón & Houran, 2021). These social interpretation effects are generally referred to as *confirmation bias* (Hergovich et al., 2010; Klayman & Ha, 1987; Nickerson, 1998; Palmer et al., 2012) and *belief perseverance* (Ross & Anderson, 1982; Ross et al., 1975). Partiality is not limited to paranormal believers, however, as avid skeptics often incorrectly assume that confirmation bias only applies to groups with which they disagree. Instead, it is a pervasive phenomenon within the general population.

Equally important is the role of suggestion or expectancy as a result of paranormal beliefs, which can initiate or exacerbate interpretations of events as anomalous. Consistent with classic studies on conformity and peer pressure (Asch, 1956), *psychological contagion* involves the unconscious transmission of ideas, perceptions, or behaviors from person to person, from one person to a group, or from a group to a person or group of people (e.g., Freedman et al., 1980, Gump & Kulik, 1997, Lorber et al., 2007). For example, research shows that emotions often transfer across individuals (Bruder et al., 2012; Howard & Gengler, 2001; Levy, 2001; Neumann & Strack, 2000; Parkinson & Simons, 2012). Contagion can induce differing goals and produce changes in behavior (Leander & Shah 2013), including perceptions of the paranormal (Drinkwater et al., 2019; Lange & Houran, 2001). Laboratory studies have similarly demonstrated physical or somatic transference effects (Lorber et al., 2007). Although the mechanisms are poorly understood, it certainly seems that contagion can produce extreme effects as with outbreaks of mass psychogenic illness (e.g., Powell et al. 2007; Radford & Bartholomew 2001; Ryan & Morrow, 1992).

Finally, persuasion itself is relevant to this category. In fact, contagion could be redefined as either unintentional or passive marketing if viewed predominantly as an action that changes the perspectives and goals of others (Berger, 2013). The Elaboration Likelihood Model (Cacioppo & Petty, 1984; Petty & Cacioppo, 1986) has consistently shown that peripheral cues—e.g., environmental factors or other features independent of the content of a persuasive argument—can alter people's beliefs, experiences, and mood. Case in point: Laythe et al. (2017) found a statistically significant and moderately strong correlation ($r = .61$) between one person's verbal report of experiencing séance phenomena and the other group members reporting anomalous experiences within a five-second window in a well-controlled environment.

To compute an aggregate effect size for this category, we considered several meta-analyses in the contagion and

persuasion literature, as well as single studies of paranormal belief relative to paranormal experience. We made the ultra-conservative (and likely incorrect) assumption that paranormal experience is wholly explained by paranormal belief, for the sake of modeling all paranormal experiences as outcomes of bias. We combined all these studies to approximate the aggregate variance accounted by expectancy-suggestion effects as a function of the transferral of paranormal belief to others and the interpretation of environments as evidencing paranormal activity. We again note for this particular category that we make an explicit assumption in favor of skepticism with paranormal belief, i.e. that such belief leads to misinterpreting a given experience as paranormal. While this assumption may not be warranted, it serves the goal of an overall conservative estimate of survival-related phenomena.

Table 1 provides relevant details on the studies cited above; their effect sizes are shown as percentages. We correspondingly obtained an estimated incidence rate of 9.7% for the general population.

Environmental Factors

Environmental psychology is an interdisciplinary field that focuses on the interplay between individuals and their surroundings. It examines the way in which natural and built environments can unwittingly shape people's perceptions, attitudes, or behaviors (Allen & MacComber, 2020; Donohoe, 2014; Goldhagen, 2017). We recently published two thorough reviews of environmental factors related to haunt and poltergeist episodes, which revealed an urgent need for additional research due to the paucity of highly relevant studies (Dagnall et al., 2020; Jawer et al., 2020). These reviews provide the first authoritative appraisal of physical factors relative to survival-related experiences such as haunts. These include 'embedded cues, lighting levels, air quality, temperature, infrasound, and electromagnetic fields.' Gestalt-type effects also can contribute, such as "affordance, atmosphere, ambiguity and threat anticipatory processes, immersion and presence, legibility, and perceptible memory and associations." These latter variables help to form people's holistic impressions of natural or built environments.

Table 2 summarizes much of the available data on this KC, but out of all of the estimates in our *Drake-S* Equation this particular error factor requires new research to gain more robust estimates. The lack of usable data (due to low sample sizes) from published studies has forced us to rely on a few key studies that contain estimates judged to be generalizable. These studies—the best empirical research available at this time—give an estimated incidence rate of 7.8% for the general population.

TABLE 1. Estimated Effect of Expectancy/Suggestion Aggregated from Representative Studies

Source	Variable	Studies	Estimate*
Kierein & Gold (2000)	Persuasion	13	0.141
Clarkson et al. (2020)	Contagion	25	0.053
Wilson & Sherrell (1993)	Persuasion	114	0.045
Hullett (2005)	Persuasion	14	0.122
Shen et al. (2015)	Persuasion	25	0.004
Dagnall et al. (2016)	Paranormal Belief	1	0.09
Laythe et al. (2018)	Paranormal Belief	1	0.031
Gallagher et al. (1994)	Paranormal Belief	1	0.21
Laythe & Owen (2012)	Paranormal Belief	1	0.18
AGGREGATE			0.09733

TABLE 2. Estimated Effect of Environmental Factors Aggregated from Representative Studies

Source	Variable	Studies	Estimate*
Ding et al. (2016)	Air Quality	1	0.05
Wiseman et al. (2002, 2003b)	Air Quality	1	0.108
Wiseman et al. (2002, 2003b)	Lighting Levels	1	0.33
Braithwaite (2008)	Electromagnetic Fields	1	0.04
Wiseman et al. (2002, 2003b)	Electromagnetic Fields	1	0.013
French et al. (2009)	Electromagnetic Fields	1	0.002
French et al. (2009)	Infrasound	1	0.0025
AGGREGATE			0.07793



Fraud

Deliberate deceit—lying or hoaxing by experiencers or researchers—is a feasible explanation for survival-related claims, particularly if social or financial benefits are involved (for a review of general fraud motivations, see Kakati & Goswami, 2019). Braude (2014) nicely summarized the issue of fraud potentially mixed with ostensible mediumship phenomena. Cox (1961) and Roll (1977) likewise discussed ‘imitative fraud’ by people involved in putative poltergeist cases. Other, more skeptical investigators (e.g., Nickell, 2001) assume that all survival-related experiences are directly (i.e., fraud), or indirectly (e.g., through delusion or ignorance) a function of KCs. Yet, for all the emphasis that some authors place on fraud, there seems to be a critical lack of empirical data on the topic. This leads us to question whether the general incidence rate of fraud in society can be used as a reasonable estimate of deliberate deceit in survival-related accounts.

We say ‘yes,’ as two primary motivations recur for paranormal fraud. First, and perhaps most importantly, fraud requires effort toward a specific gain. The sensationalized 1975 “Amityville Horror” haunt case is a cautionary tale in this respect (Kaplan & Kaplan, 1995). Second, the gain is typically money or some form of social prestige resulting from money. Among our investigations of alleged haunts, we have twice debunked claims related to the reported occurrences (Laythe & Houran, 2019; Laythe & Owen, 2013). Both instances involved “historical fraud” by the proprietors to market the locations to paying tourists and investigators. Even so, we still documented anomalous S/O phenomena at both locations and under quasi-controlled conditions.

It is important to understand that psychics and spiritualists are consistently unregulated, which permits a greater opportunity for fraud. Laws against fraud exist in every US state, but few actually have statutes addressing scams by professional psychics or kindred practitioners. It is a vexing challenge to regulate an ‘industry’ that can charge hefty fees for services but calls itself ‘supernatural’ and thus beyond scientific understanding—and while having no educational requirements for practitioners. Some psychics claim that they perform religious activities and that their earnings should be treated similarly to donations made to other faith-based organizations. In any case, it seems reasonable to apply findings from generalized fraud research to paranormal-related claims or events.

To determine a baseline of fraud, we relied on governmental fraud analyses in Europe (Button et al., 2009; Ipsos, 2020), meta-analyses of experimental studies on lying

(Gerlach et al., 2019), a large sample study on the frequency of lying within normal populations (Serota et al., 2010), and smaller meta-analyses on fraudulent behavior (Burnes et al, 2017; George, 2016). Additionally, we reviewed Roll’s (1976, 1977) examination of documented or suspected fraud in poltergeist cases. As shown in Table 3, we derived an aggregated estimate of 20% (or approximately 1/5 of the population) for lying, general fraud, and deliberate deceit in paranormal-related claims.

Measurement Error

Social scientists, ironically via the scientific process itself, have shown that human perception is often incomplete or inaccurate. As such, both observation and measurement within the scientific process are subject to distortion due to perceptual errors, experimenter and observer biases, and the inherent imprecision of scientific instrumentation to measure various physical and psychological variables. The issue becomes even more challenging given the inaccuracies across our five senses in registering changes in light, weight, decibels of sound, degrees of smell, and intensity of taste (e.g., Stern & Johnson, 2010). Furthermore, the sensitivity or accuracy of our senses (including proprioception, i.e., self-movement and body position) varies based on both biological and psychological processes. These are not radical concepts—they are all standard reading within college-level textbooks in social science (Rosenthal & Fode, 1963; Stern & Johnson, 2010; Stevens & Marks, 1999).

Measurement error is infrequently reported in quantitative studies and often not properly addressed in research reports on standardized questionnaires. However, recent work has increasingly applied leading-edge Modern Test Theory (MTT) methods to create more reliable and valid survey and assessment tools in anomalistic psychology and parapsychology (cf. Lange, 2017; Lange et al., 2019b). We have leveraged this body of psychometric research to estimate measurement error in paranormal-related contexts. We analyzed eight MTT-based measures, taking the average for the standard error of each item within each measure. The aggregated standard error for each MTT-based measure is displayed in Table 4. These eight sources represent an average measurement error rate of 6.7%. This will serve as the initial estimate for this KC in our *Drake-S* Equation. It should be noted that measurement error can work for or against the accuracy of the measure being employed. However, we deploy this particular estimate with the assumption that measurement error always works *against* the premise of survival.

TABLE 3. Estimated Effect of Fraud Aggregated from Representative Studies

Source	Variable	Studies	Estimate*
Gerlach et al. (2019)	Lying	565	0.3225
Serota et al. (2010)	Lying	1	0.4
Burnes et al. (2017)	Fraud	12	0.011
Button et al. (2009)	Fraud	1	0.005
George (2016)	Fraud	21	0.02
Ipsos (2020)	Fraud	1	0.56
Roll (1976) — Review	Poltergeist Fraud	1	0.15
Roll (1976) — Personal Cases	Poltergeist Fraud	1	0.2
Roll (1977)	Poltergeist Fraud	1	0.163
AGGREGATE			0.2035

TABLE 4. Estimated Effect of Measurement Error Aggregated from Representative Studies

Source	Measure	Studies	Estimate*
Lange et al. (2000b)	Revised Transliminality Scale	1	0.037
Lange et al. (2004)	NDE-Scale	1	0.105
Houran et al. (2022)	Enchantment-Adjective Checklist	1	0.066
Houran et al. (2019b)	Survey of Strange Events	1	0.038
Lange et al. (2019b)	Survey of Anomalous Experiences	1	0.106
Lange et al. (2000a)	Revised Paranormal Belief Scale	1	0.04
Lange & Thalbourne (2002)	Australian Sheep Goat Scale	1	0.05
Lange & Thalbourne (2007)	Mystical Experience Scale	1	0.095
AGGREGATE			0.06713



Mental Illness

According to the continuum model of psychosis, anomalous perceptions fluctuate within a quantitative and qualitative symptomatic gradient applicable to the field of psychotic disorders (e.g., Capra et al., 2013; Chapman & Chapman, 1980; Kwapil et al., 2020). The most severe or dysfunctional perceptions are present in schizophrenics or individuals with any related psychiatric disorder (Wright et al., 2018). In contrast, less intense anomalous perceptions would be present in healthy people from the general population (van Os et al., 2009). But having attenuated anomalous perceptions implies a risk for mental health, given that they may predispose the individual to future psychotic conditions (Shapiro et al., 2019).

As we previously argued (Laythe et al., 2021), hallucinations are rarely, if ever, a feature of mental illness without substantial and persistent cognitive and affective symptoms that also often cripple the person's life (American Psychiatric Association, 2015). The exception to this rule is Delusional Disorder, which affects an exceedingly small sample of the population (see Table 5) and manifests with no cognitive or affective symptoms but otherwise

causes individuals to believe that they are seeing or hearing things that are culturally taboo. Conversely, all other psychotic disorders (which also involve hallucinations or delusions) affect a relatively small percentage of the population, well below the incidence rate of paranormal experiences in general (e.g., Laythe et al., 2021).

Table 5 shows estimates from the *DSM-5* (American Psychiatric Association, 2015) for all psychotic disorders that contain features of delusion and hallucination. Schizotypal Personality Disorder represents the largest percentage in the population (i.e., 3.9%), whereas Delusional Disorder has the smallest estimated occurrence at .002%. Notably, hallucination is not consistently present within Schizotypal Personality Disorder and often is an extreme version of this personality disorder. Nonetheless, to create a conservative error estimate of this known confounder, we summed (as opposed to averaging) the overall prevalence rates of these disorders to obtain an estimate of the probability of mental illness as a viable explanation for survival- or paranormal-type encounters.

We emphasize the descriptor 'conservative' in this case, as we used the prevalence rates for diagnosis of Schizotypal Personality Disorder itself versus the preva-

TABLE 5. Estimated Effect of Mental Illness from the *DSM-5* (APA, 2015)

Mental Disorders with Hallucinations	Percent Prevalence
Schizotypal Personality Disorder	3.9
Delusional Disorder	0.002
Brief Psychotic Disorder	Overlapped with other diagnoses
Schizophreniform Disorder	0.007
Schizophrenia	0.007
Schizoaffective Disorder	0.003
Substance Induced Psychotic Disorder	Overlapped with other diagnoses
Psychotic Disorder Due to Another Medical Condition	0.0054
Bipolar I Disorder with Psychotic Features	0.006
Depressive Disorder with Psychotic Features	0.009
SUM TOTAL	3.9394

lence within the disorder for hallucinatory tendencies. However, we did include the prevalence rates for bipolar and depressive disorder with psychotic features. We emphasize that for a conservative estimate we assume hallucinatory symptomology within *all* of these summed disorders, though in actuality hallucinations are not necessarily present within some of these diagnoses. As such, the total prevalence of mental illness equates to approximately 4% of the population. Given our conservative parameters, we thus assume that mental illness is not necessarily a factor within the population of those who report paranormal experiences.

Susceptibility to Perceptual or Cognitive Aberrations and Errors

Anomalous perceptions are clinically defined as perceptual disturbances that are present in people with *and* without psychiatric histories (Bell et al., 2006; Davies et al., 2017; Shapiro et al., 2019). Thus, the terms *psychotic-like* experiences and *anomalous* experiences are often used interchangeably (Brett et al., 2013). But some authors push to differentiate anomalous/parapsychological experiences from the disease model of mental illness (for a discussion, see Johnson & Friedman, 2008). To be sure, several conceptual frameworks other than the psychosis continuum model might more appropriately describe general susceptibilities to perceptual or cognitive aberrations. Among the most popular alternatives in the literature are (a) *dissociative tendencies* (Ross & Joshi, 1992), (b) *mental boundaries construct* (Hartmann, 1991), (c) *sensory-processing sensitivity* or *SPS* (Aron & Aron, 1997), and (d) *temporal lobe lability* (Persinger & Makarec, 1993). This latter concept has been argued to have particular merit relative to some survival-related experiences (Persinger, 1983; Persinger & Koren, 2001).

Arguably these four frameworks can be subsumed within the perceptual-personality variable of *transliminality*, or a “hypersensitivity to psychological material originating in (a) the unconscious, and/or (b) the external environment” (Thalbourne & Maltby, 2008, p. 1618). Basically, this is a refinement and extension of the Mental Boundaries construct and its proposed continuum within the general population along which normal and extraordinary forms of perception and cognition may be mapped (for overviews, see: Evans et al., 2019; Lange et al., 2019a). This might work either by looser neurological gating or hyper-connectivity among brain areas. While the exact mechanism(s) are un-

certain, research suggests that the onset or outcomes of transliminal perceptions can be exacerbated by poor emotion regulation (e.g., Aron & Aron, 1997) or a low “analytic cognitive style,” i.e., the willingness or disposition to critically evaluate outputs from intuitive processing and engage in effortful analytic processing (e.g., Ross et al., 2017).

In order to derive estimates that remain pro-skeptical, we used prevalence rates for *DSM-5* somatoform disorders which include Somatic Symptom Disorder, Conversion Disorder, and Factitious Disorder, but not Illness Anxiety Disorder as this represents anxiety about a legitimate medical diagnosis. The other somatoform disorders considered here can produce psychosomatic effects, with the conservative assumption that all diagnoses of these disorders will produce such complaints. We also included (a) information on transliminality and putative psi outcomes under the conservative assumption that transliminality alone accounts for paranormal experiences as perceptual aberrations or cognitive errors, and (b) data on Aron and Aron’s (1997) SPS measure, especially relative to anomalous experiences and neuroticism and similar sub-clinical measures of mental illness or distress, with the conservative assumption that these measures are equivalent (Ahadi & Basharpour, 2010; Lionetti et al. 2019; Smolewska et al., 2006; Takahashi et al., 2020; Vander Elst et al., 2019). Research on SPS and paranormal belief/experience is highly limited, and we only know of one moderately strong correlation ($r = .50$), as reported by Williams et al. (2021).

For the sake of conservatism, however, we have calculated this KC category by departing from some statistical rules and knowingly adopting a pair of erroneous assumptions. Our first model assumes that (a) paranormal belief and paranormal experience are perfectly correlated, and that all such experience is a product of belief alone (a likely false assumption), and (b) all forms of mental illness and distress, including neuroticism, are equivalent, and serve as direct measures of aberrations or errors misattributed as paranormal experience (also a probably false assumption). In other words, neuroticism is equal to paranormal belief, which is equal to paranormal experience, etc.—a highly presumptive model that stipulates the correlation between each of these variables is ‘1.’ To these we add findings with transliminality and psi, again assuming that all psi effects are transliminal perceptions, as well as a direct relationship between paranormal experience and transliminality (cf. Thalbourne & Houran, 2003; Thalbourne & Storm, 2012; Ventola et al., 2019). This highly conservative model yields a final estimate of 13.4% (see Table 6).

TABLE 6. Estimated Effect of Susceptibility to Aberrations and Errors Aggregated from Representative Studies

Source	Variable	Studies	Estimate*
DSM-5: somatoform disorders	Sensitivity	*	0.08
Ventola et al. (2019)	Transliminality	19	0.017
Laythe et al. (2018)	Transliminality	1	0.16
Carr et al. (2021)	Sensory Processing Sen.	1	0.06
Lionetti et al. (2019)	Sensory Processing Sen.	1	0.13
Ahadi & Basharpour (2010)	Sensory Processing Sen..	1	0.28
Smolewska et al. (2006)	Sensory Processing Sen.	1	0.2
Vander Elst et al. (2019)	Sensory Processing Sen.	1	0.041
Williams et al. (2021)	Sensory Processing Sen.	1	0.25
Takahashi et al., (2020)	Sensory Processing Sen.	1	0.124
AGGREGATE			0.1342

Synthesizing the Scoping Reviews via the *Drake-S* Equation

Background and Rationale

Proposed by astronomer and astrophysicist Frank Drake in 1961, the Drake Equation is a probabilistic argument used to estimate the number of active and communicative extraterrestrial civilizations in our galaxy. It was not intended to yield a precise number but to serve as an approximation that would stimulate debate at the first scientific meeting on the search for extraterrestrial intelligence (SETI) (see, e.g., Billings, 2013). This formula identified the main factors that must be considered in any assessment of the likelihood of sufficiently advanced alien life (SETI League, 2002). Criticisms of the Drake Equation have focused less on the equation itself and more on the estimated values for several of its variables being highly speculative; the combined multiplicative effect is that the uncertainty associated with any derived value is so large that the equation cannot be used to draw firm conclusions. Putting aside its limitations, we settled on the Drake Equation as a useful mode for our adversarial collaboration because its format can easily be modified to account for both assumed evidential effects and likely countervailing variables in the context of postmortem survival of consciousness.

Sudduth (2016) reviewed various arguments for survival, some of these being probabilistic and grounded in Bayes Theorem (cf. Crichton, 2003; McMahon, 2020). However, our approach to the survival question differs in important ways from the typical logic- or philosophy- driven arguments (e.g., Braude, 2009). A careful and rational critique of arguments for and against survival has substantial value, but there is a major difference between the analysis of *epistemic probability* (the theoretical estimation of one probability given another probability, see: Sudduth, 2016, p. 6.) versus *factual probability* (the calculation of actual estimates of variables in order to reach a predictive mathematical conclusion). Our adversarial collaboration lies firmly in the latter camp and, while not minimizing the former is meant as an initial pragmatic framework based on the best probabilistic estimates we can obtain. Of course, our approach to practical statistical estimates of postmortem survival cannot be completely independent of theoretical probability arguments. Indeed, the material contained in this essay can be re-purposed as an empirical approach to reliably quantify a posterior probability within a Bayesian framework. Or, at least as a means to reliably quantify a posterior probability of consciousness surviving based in actual empirical estimates as opposed to logical argument alone.

Technical Approach

Our proposed *Drake-S* Equation essentially adds the ‘effect sizes’ associated with the five categories of survival evidence (the AEs) and subsequently reduces this cumulative effect using the estimated influence of confounds (the KCs). This approach is based on the sound assumption that a paranormal experience is an *interactionist effect*, where a person perceives and subsequently interprets a phenomenon, and is thus subject to psychological, environmental, and trait-related effects (O’Keeffe et al., 2019; Lange et al., 2020; Laythe et al., 2021). For simplicity, we will use ‘paranormal experiences’ interchangeably with ‘survival-related phenomena’ in our subsequent descriptions.

Ultimately, the ‘purified’ probability of a genuine paranormal experience (P_p) is the probability of any given paranormal experience (P_R) minus the additive effects of error or alternate causes. For our formula, we mathematically defined alternate causes by taking the maximum covariance (as r^2) for any given alternative explanations via meta-analysis or an aggregate series of empirical findings, placed within the appropriate section of Error (E_N), then subsequently subtracted to each raw probability of P_R . Where population or sample percentages are available, we use the percentage provided. As such, the error terms of this model represent *either* the maximum covariance estimate or the percentage of occurrence of the particular type of error in the population based on the best empirical estimates available.

This yields the simplified equation:

$$P_p = (P_R * [1 - \sum E_N]) \quad (1.1)$$

which represents an adjustment of P_R from deriving the remaining percentage of P_R by subtracting all error covariance from one and multiplying, which provides the remaining percentage of P_R theoretically pure from the covariance of the proposed error effects (P_p).

E_N for our purposes represents six broad factors applied as alternative explanations for paranormal experience:

- E_M = Measurement Error
- E_E = General Expectancy Effects (Contagion, Memory, Persuasion)
- E_V = Environmental Effects
- E_F = Fraud
- E_M = Mental Illness (Hallucination)
- E_S = Susceptibility

Thus, the expansion of $\sum E_N$ is the covariation represented by the above six factors, specifically ignoring covariation *between* these six factors and treating each as an independent and additive reduction of the P_R raw paranormal probability reported by subjects. This creates a markedly conservative estimate of potential alternative causes.

Thus,

$$P_p = (P_R * [1 - \sum E_N])$$

is expanded within the sum error term as:

$$\sum E_N = (E_M + E_E + E_V + E_F + E_M + E_S) \quad (1.2)$$

Note that each factor of E may be individualized for a particular type of paranormal experience, or a constant that can generally be applied.

The equation can be expanded to include multiple types of paranormal experiences, which for the purposes of our exercise include:

- P_D = Near-Death Experiences
- P_H = Haunt-Poltergeist Episodes
- P_M = Mediumship
- P_A = Veridical Anomalies
- P_N = Reincarnation

P_p represents the sum of these five categories of survival-related phenomena whereby each type has its error covariation removed. As each type of ‘purified’ experience would constitute an ‘or’ scenario within probability theory, e.g., the purified probability of a haunting or reincarnation, each represents a valid experience of an event of a legitimately anomalous character. These terms are additive once estimated error has been removed from each occurrence. Expressed mathematically, the expanded formula is represented in Equation 1.3—where P_p represents the sum probability of paranormal experience occurring in the population, constrained by cases which probabilistically would not contain the controlled or error factors:

$$P_p = ((P_D * [1 - \sum E_N]) + (P_H * [1 - \sum E_N]) + (P_M * [1 - \sum E_N]) + (P_A * [1 - \sum E_N]) + (P_N * [1 - \sum E_N])) \quad (1.3)$$

This formula is a general approximation designed to be *maximally conservative* in quantifying its core components.



The strongest assumption in the model concerns the error estimates, which, as we detail below, were derived from as many valid meta-analyses and empirical sources as possible. As 'Cohen's D' (an effect size that indicates the standardized difference between two means) can be easily converted to a correlational (r) statistic, and subsequently squared, the model assumes that: (a) the covariation estimate is fixed and independent, whereas in real-life covariation may be less than the provided covariation statistic for each individual case but is ignored in the case of the formula (as a maximum conservative estimate); and (b) each component error term covariation or percentage is not correlated to the other error terms in the model (although this is highly likely, as we will discuss later). Hence, this model provides an overly conservative estimate, as we treat each covariance or percentage term for each error estimate as independent and additive.

Calculating the Drake-S Equation

The estimates from our narrative reviews allow us to compute a 'purified' percentage of survival-related phenomena. This yields an approximation of witness testimony that is unduly unaffected by (a) *expectancy-suggestion* effects of various kinds ($R^2_{est.} = .097$), (b) *environmental variables* that can be misattributed ($R^2_{est.} = .077$), (c) *fraud* ($R^2_{est.} = .20$), (d) *measurement error* ($R^2_{est.} = .067$), (e) all forms of diagnosable *mental illness* that can induce visual or auditory hallucinations ($R^2_{est.} = .039$), and (f) *psychological susceptibility factors* that can cause perceptual aberrations or cognitive errors ($R^2_{est.} = .134$).

As a grand aggregate, these alternate explanations sum to 61.4% using a set of assumptions highly favorable to skepticism. This leaves 38.6% of survival-related evidence free from these factors and thus unscathed by the cross-examination of known confounds. Accordingly, *this sub-group of witnesses and case material provide a reasonable inference of ~39% probability of postmortem survival of human consciousness*. These estimates are applied both to general paranormal experience and the sub-types outlined below in Table 7.

As shown above, the overall 'purified' rates for occurrence of these phenomena are estimated to be .16 for general paranormal experiences, .036 for NDEs, .077 for hauntings/poltergeists, .008 for mediumship, .100 for VAEs, and .001 for reincarnation. A significant percentage of various types of paranormal experiences in the population are thus unaccounted for by existing explanations in mainstream science. *This approximation—roughly 1/6.25 cases—represents prima facie evidence of parapsychological, and more specifically, survival-related phenomena.*

Expert Conclusion per the Daubert Standard

Federal Rule 702 (cf. Michigan Legal Publishing, 2021) permits individuals who are qualified as experts based on knowledge, skill, experience, training, or education to offer expert opinion testimony. We submit that the results of this adversarial collaboration are sufficiently credible to serve as such testimony based on scientific evidence. Specifically, the methodology used to form our opinion strongly satisfies the Daubert standard of evidence:

TABLE 7. Rates of Survival-Related Phenomena "Purified" of Known Confounds

Survival-Related Phenomena	Reported Population Rate	Error Factors Subtracted	Purified "Paranormal" Percentage
General Paranormal Experience	0.415	0.614	0.160
Near-Death Experiences	0.094	0.614	0.036
Hauntings/Poltergeists	0.200	0.614	0.077
Mediumship	0.020	0.614	0.008
Veridical Anomalous Experiences	0.260	0.614	0.100
Reincarnation	0.002	0.614	0.001

— Our techniques followed tested principles and approaches in inferential statistics.

— The Drake equation scheme and the underlying data used in our analysis have both been subjected to peer review.

— The outcomes produced estimated error rates.

— The standards used in the creation of the model adhere to the laws and practices of probability and inferential statistics; deviations from those rules were purposefully used for the maximum conservative estimate of the survival argument.

— The data and analytical procedures that produced our conclusion are generally accepted by researchers in anomalistic psychology and consciousness studies.

Given the available empirical evidence of alternative or skeptical explanations of survival-related experiences or observations, our Drake-S Equation empirically demonstrates that known confounds are insufficient to explain approximately 39% of the entire body of survival-related phenomena reported in the literature. In other words, while skeptical explanations have strong merit, they unquestionably fail to discredit all favorable evidence at the population level. Despite the hundreds of empirical, peer-reviewed studies that point toward the maximum viability of skeptical explanations, we conclude that *it is less likely than not* that skeptical explanations can account for parapsychological- or survival-related evidence.

Furthermore, based on the same mathematical calculations, and combined with established empirical research attesting to the neurobiological, psychological, environmental, and psychosocial contributions to human perception, any witnesses who are sufficiently vetted and thereby excepted from the various skeptical explanations described in this essay represent testimony that is *more likely than not* to support a ‘purified’ *prima facie* case of postmortem survival. Alternative explanations for such witnesses’ presumed veridical experience are, therefore, lacking. While the paranormal experiences of these particular witnesses undoubtedly constitute very rare or “black swan” events, their testimony is nonetheless valid and arguably meets the legal definition and standard of ‘beyond a reasonable doubt.’

DISCUSSION

Our essay confronted the pointed question, “*What is the best available evidence for survival?*” The answer was, perhaps, hidden in plain sight. Much intriguing literature has addressed lone categories of evidence for and against life after death, but never was it empirically meshed into a holistic and compelling picture. Now, a fresh synthesis

of representative information reveals a high probability of postmortem survival. Of course, a complete and intellectually honest statement about our exercise, or any related endeavor, is that “no evidence to date scientifically proves the ontological reality of survival.” Indeed, we have only faithfully calculated but not definitively solved the *Drake-S Equation*. Like the many experiments and meta-analyses published in support of putative psi, our evaluation has produced a tantalizing empirical anomaly, namely that 39% of survival-related phenomena are in need of a comprehensive explanation beyond the obvious and often hackneyed assortment of known confounds.

We are shocked by this high percentage left unaccounted for by skeptical explanations—and contend that the results have strong probative value for a legal argument favoring postmortem survival. On one hand, and consistent with Martin and Augustine (2015), our findings clearly suggest that current scientific models can explain most survival-related reports. On the other hand, the alternative explanations we reviewed—despite their blanket application by skeptics (e.g., Cabbolet, 2014; Hansen, 1992; Martin, 1998; Truzzi, 1987)—simply cannot resolve the *Drake-S Equation’s* potential implications for survival. A sizable amount of witness testimony remains not only legitimately anomalous but in direct contradiction to conventional scientific wisdom. We thus reject any attempt to dismiss the outcome of our exercise as merely being a synonym for ‘unexplained’ (Houran et al., 2017, 2018), because we have identified an empirical effect that frankly should *not* exist if biological death marks the end of human consciousness, i.e., personal identity, perception, sentience, and cognition. This outcome might represent a type of ‘proof by contradiction.’ Our collaboration as friendly adversaries further points the way, we humbly suggest, toward further initiatives that draw together skeptics and believers in a joint pursuit of greater clarity on this essential question.

As with Drake’s (1961) original equation, ours is an initial approximation based on selective variables and data. Future iterations of our proposed solution using ever-improving datasets will, no doubt, refine the estimates to yield a more precise probability that also reflects ongoing research and indicates new research directions. To this point, our estimates highlight “haunt/poltergeist episodes” and “veridical anomalous experiences” (e.g., ADCs) as having the most promise for obtaining witness testimony that can withstand counter-arguments and cross-examination. Additionally, while we confined ourselves to peer-reviewed studies in order to expressly meet the Daubert standard, doctoral dissertations might offer broader literature reviews. Examples that we could have leveraged include Streit-Horn’s (2011) systematic review of ADCs or

Sapkota's (2017) in-depth study of psychological contagion. Also, areas we deemed suitable to cluster the findings may seem to other researchers to deserve their own section within the formula for independent error calculation. Last and most importantly, some parts of our equation that are viable contributors to perceptual error (e.g., environmental effects) desperately require additional studies and replications to gather a reliable set of empirical data to improve our estimates. This is probably the case for every area considered in our analysis.

Limitations and Future Refinements of the *Drake-S* Equation

As repeatedly noted, we used extremely conservative methods that skewed to skepticism. This introduced limitations or caveats that future refinements of our equation should remedy. Most notably, many of the error factors that we discussed here are likely to co-vary, which our current formulation willfully ignores. Measurement error would have been more accurately applied by nesting it within each of the other five error terms and deducting the appropriate variance to represent the amount of measurement error inherent in the calculation of the individual error factors themselves. Additionally, variables linked to mental boundaries, such as transliminality and sensory-processing sensitivity, surely also relate to expectancy effects—and co-vary to an extent with mental illness. Environmental effects could also co-vary with expectancy effects, although this is only hypothesized, as controlled studies with strong external or ecological validity have not, to our knowledge, been conducted.

Moreover, when aggregating error components, we clearly indicated assumptions that are highly unlikely (e.g., a correlation between two variables as '1'), and/or are contrary to the data (e.g., paranormal belief and experience neither correlate perfectly nor should this be expected; see e.g., Laythe et al., 2018). Given sufficient time and effort, partial correlations can be calculated to obtain more precise aggregated estimates by controlling for partial interrelations between and within our error clusters. It should be noted, however, that use of this process would strongly decrease the conservative percentage estimate of the alternate explanations presented.

We also note that our current formula is suitable for a posterior calculation of probability in a Bayesian calculation, which, given our conservative mathematics, arrives at previously a priori philosophical estimates of the posterior probability for survival at 50% (Sudduth, 2016). From a legal perspective, a conservative estimate in favor of skepticism clears an even higher bar when 'survival' witnesses meet a higher standard after vetting than is actually

needed. Thus, our current estimate likely provides a good general basis for vetting cases of putative survival in a legal context. Due to its conservative slant, it ought to be resistant to last-minute attempts at invoking other sources of explanation.

Where Do We Go from Here?

Researchers should certainly search for other empirical factors that could contribute to alternative explanations for survival-related phenomena. By the same token, there will come a point where the model we used to calculate our estimate (i.e., the loose assumption of independence between error factors) will have to be addressed in order for the formula to remain meaningful (i.e., sum to less than '1' as a necessary function of a probability equation). First and foremost, ignoring covariation both between error terms and within error terms still only provides a combined potential effect of approximately 61% for skeptical explanations, which is markedly less than the claims of debunkers who generally rely on materialism to explain paranormal experiences.

We can confidently assert two things about our *Drake-S* Equation and future modifications. First, considering the fact that covariation is ignored in the current model, additional research and in-depth analyses are needed to compute accurate covariation estimates between these factors. Once accomplished, we expect that our conservative (i.e., favorable) estimate of error factors will be reduced by 15–20% due to the recognized intercorrelations noted earlier. Second, the variables considered in this exercise are reasonably comprehensive and sympathetic to the materialist perspective. As such, we humbly posit that skeptical critiques will need to find new and robust alternative explanations with powerful effect sizes to fill the remaining percentage of witness testimony or study outcomes that is probabilistically free of known confounds. At the moment, we are uncertain of what other factors should be addressed to make the *Drake-S* Equation a more rigorous guide to vet survival-related phenomena with evidentiary value.

Our Closing Argument

Human consciousness is a fantastically complex phenomenon, and our exercise provides sound statistical reasoning to think that biological death does not extinguish it. Even so, a 39% chance of postmortem survival might seem modest or below the threshold of 'beyond a reasonable doubt.' But potential jurors should ask themselves what decisions they would make based on this same probability.

To illustrate, would you hold an outdoor wedding with a 39% chance of thunderstorms . . . or gamble your entire

life savings on an investment that has a 39% chance of going bust . . . or skydive with a 39% chance of the parachute malfunctioning? Practical questions like these quickly contextualize the impact of odds well surpassing one-third. In fact, our estimated probability far exceeds the likelihood of many established but rare events (Sepulveda, 2021), including (a) finding a four-leaf clover (.0001%), (b) bearing twins in natural pregnancy (.004%), (c) being audited by the IRS (.005%), (d) having your car stolen (3% chance), (e) becoming a millionaire (6%–22%), (f) dying in a plane crash (1 in 11 million), or (g) your even being born (1 in 5.5 trillion).

The parachute and plane scenarios above are admittedly macabre, but death eventually comes to everyone. Thus, it offers some hope and comfort to the skeptic in this adversarial collaboration that the prospect of survival is not relegated to philosophical or religious rhetoric but can be tethered to expert testimony using scientific evidence.

IMPLICATIONS AND APPLICATIONS

Drawing on published precedents (e.g., Cowan et al., 2020; Honorton & Hyman, 1986; Lange, Greyson, & Houran, 2004), our study underscores the feasibility of adversarial collaborations for normalizing and advancing research on controversial topics. The Drake-esque approach of empirically calculating a net probability for a hypothesized occurrence or event by adding the cumulative weight of conducive conditions or putative evidence and then deducting the maximally established influence of known confounds contributing to Type 1-related errors can likewise help to (a) structure and contextualize the study of many issues in edge science given that proposed explanations are limited by their effects sizes and probabilistic strength, (b) better understand the role of perceptual and cognitive processes within meaning-making of anomalous experiences, and (c) identify and prioritize areas of investigation with perhaps the strongest evidential value for provocative hypotheses.

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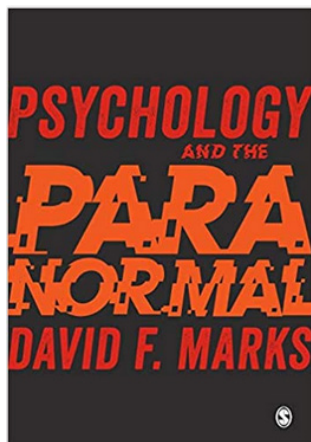


BOOK REVIEW

Psychology and the Paranormal: Exploring Anomalous Experience by David F. Marks

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David Marks's previous book about the paranormal (Marks, 2000) and other earlier writings established his reputation as a firm skeptic. He wrote the current book in order to learn about new developments in paranormal research during the past 20 years.

As described in this book, Marks's attitude toward the paranormal has changed significantly in recent years. These changes are apparently due largely to his personal anomalous experiences. This book is not a simple rehash and extension of his previous writings.

Chapter one introduces the types of paranormal phenomena and presents survey data about beliefs in paranormal phenomena. Chapter two discusses childhood abuse and dissociation as having a role in some, but probably not all, subjective paranormal experiences. Chapter three describes psychological factors that may be involved in paranormal experiences, including worldview, cognitive factors, confirmation bias, subjective validation, and the Barnum Effect (statements that most people consider true about themselves).

In chapter four, Marks describes and evaluates a personal experience of synchronicity that had layers of meaning for him. He rates the probability as 75% that the experience had a paranormal component. Marks now believes that spontaneous paranormal phenomena may occur.

Marks reviews several lines of laboratory experiments in chapters five through eight and concludes that the probability that psi manifests reliably in these experiments is extremely small, but not zero or disproven. Most of the discussion focuses on methodological problems and failures to replicate. He invited certain proponents of psi to respond to his writing and included their comments. These are the usual debates between proponents and skeptics, with little new information or insight. Those commenting were Harold Puthoff, Rupert Sheldrake, Daryl Bem, Adrian Parker, Stanley Krippner, and Dean Radin. The book also has comments by Susan Blackmore about the possible fraud of Carl Sargent.

Remote viewing and psychic staring are discussed in chapter five. For both lines of research, Marks concludes that studies with poor methodology have produced significant results and studies with good methodology have nonsignificant outcomes. He also notes that highly profitable applications of remote viewing would be well-established and convincing if the claims for remote viewing were true.

In chapter six, Marks discusses ganzfeld research and the methodological debates about the associated retrospective meta-analyses. He points out that with retrospective meta-analyses methodological decisions are made after knowing the outcome of the studies, which is the opposite of good research methodology. He notes that the methodological debates about the retrospective meta-analyses in parapsychology remain unresolved and discusses the value of study preregistration (or registration) and prospective meta-analysis. He ends the section by describing Caroline Watt's ongoing prospective meta-analysis of preregistered ganzfeld studies as a watershed moment and asks "Will it or won't it find support for ESP?" (p. 137).



In chapter seven, Marks discusses Daryl Bem's 2011 paper that forced psychologists to recognize the pervasive unacceptable practices in psychological research. The paper described nine precognition studies that used standard methods for psychological research. Skeptical psychologists were faced with the choice between recognizing evidence for psi versus recognizing that their usual research methods were deficient. Dream ESP is also discussed in chapter seven. Marks notes that the effects in these studies have been steadily declining. He also discusses the methodological debates about the retrospective meta-analyses for dream ESP.

Chapter eight on psychokinesis focuses on the 2006 retrospective meta-analysis by Bösch, Steinkamp, and Boller of experiments using electronic random number generators. Marks describes the methodological debate about the retrospective meta-analysis and accepts the conclusion of Bösch et al. that the results are consistent with publication bias.

Chapter nine covers hypnosis. Chapter ten covers out-of-body and near-death experiences, including a noetic experience that Marks had when he once thought he was about to drown. Chapter eleven presents Marks's theory that the underlying motivation for humans is homeostasis—striving to achieve safety, security, equilibrium, and control. He believes that paranormal experiences are part of the "spectrum of consciousness" associated with homeostasis.

The final chapter is twelve and has the title "Take-Home Message: Psi is a Spontaneous Process that Cannot be Summoned at Will in a Laboratory Experiment." This chapter has a message for skeptics that the lack of evidence for psi in laboratory experiments does not mean that psi does not occur in spontaneous reports. It also has a message for proponents of psi that they should accept that "*psi is not a process that is available at will*" (p. 309, emphasis in the original).

Marks believes that paranormal research should focus on anomalistic psychology that investigates "the human mind, the conscious brain and the world of anomalous experience" (p. 313). He argues that ceasing research on laboratory psi will clear the way for scientific progress in understanding anomalous experiences. He offers various suggestions for expanded and innovative non-laboratory research.

STRENGTHS AND WEAKNESSES

One purpose of this book was to provide a summary and stimulus for students—in effect, "passing the baton to a new generation of explorers" (p. 313). The book summarizes past controversies about experimental research reasonably well and offers ideas for future research.

Precedents

Marks mentions only one reference about the elusive, unsustainable nature of psi, and does not discuss the development and extent of those ideas, or investigators who have preceded him with similar conclusions. Notably, the book does not mention Rhea White, who was a pioneer in abandoning experimental research as making inadequate progress, after nearly 40 years of personal involvement. She started a line of scientific investigation of what she called *exceptional human experiences* (White, 1997a, 1997b; Brown, 2000). She focused on understanding how the experiences actually affected a person. Understanding the effects or apparent purposes of psi is a prerequisite for understanding how psi works and the sources of psi. Rhea White appears to have already gone down the path that Marks has just discovered.

The field of parapsychology has to a great extent become divided into two camps, with one believing that progress is being made with experimental research (represented by most writers in Cardeña et al. [2015]), and the other believing that some property of psi prevents reliable control of the phenomena. The latter includes ideas such as that psi is intrinsically unrepeatable (Eisenbud, 1992/1963), is actively evasive (Beloff, 1994), is radically elusive (Batchelder, 1994), manifests as a trickster (Hansen, 2001), is constrained to be unrepeatable and useless (Lucadou, 2001; Millar, 2015; Walach et al. 2021; Walach et al., 2014), and is unsustainable (Kennedy, 2003, 2016a). These are not naïve newcomers to parapsychology or outsiders. Like Rhea White, most actively pursued experimental control of psi, often for more than a decade, before adopting these ideas.

Both camps have the same data. Proponents of experimental parapsychology conclude that the existing studies provide convincing evidence for reliable psi effects. Those who believe that reliable psi effects are not possible conclude that these same studies support their position due to the inconsistent, weak effects, and lack of progress in obtaining more reliable, stronger effects after 90 years of experimental work.

Past Methodology

Marks notes certain key methodological practices that have been recognized in recent years as needed for good research, but those practices were not fully implemented in writing this book. Rather, most sections in the book appear to have been written with the methodological standards that were widely used 40 years in the past. At that time it was mistakenly thought that studies with exploratory methodology could provide convincing evidence for a controversial phenomenon like psi.

The studies typically were unregistered, severely underpowered, and had methodological flexibility or researcher degrees of freedom to adapt the analyses and hypotheses to fit the data. Also, results that were not significant were sometimes not reported. These practices are appropriate for initial exploratory research, but not for confirmatory research. Virtually no formal confirmatory research was done in psychology or parapsychology. Additional studies using similar exploratory methodology were considered adequate confirmation.

A series of articles that spearheaded the need for formal, preregistered, well-powered confirmatory research was published in November, 2012, in *Perspectives on Psychological Science* (see in particular Bakker et al., 2012; Pashler & Wagenmakers, 2012; Wagenmakers et al., 2012).

Subsequent preregistered, high-powered confirmatory studies of many published findings in psychology verified that inflated effects were common for unregistered initial studies (Klein et al., 2018; Open Science Collaboration, 2015) and for retrospective meta-analyses (Kvarven et al., 2019). The need for formal confirmatory research with preregistration of studies and adequate sample sizes has become widely recognized and implemented. Exploratory research is the creative step in scientific research and is essential, but also intrinsically has questionable validity. Confirmatory research makes scientific research valid and self-correcting. For comparison, in medical research, in 2005 many journals made public preregistration a requirement for publishing confirmatory (phase 3) studies (International Committee of Medical Journal Editors, 2005).

Ferguson and Heene (2012) pointed out that retrospective meta-analyses have not been effective at resolving scientific debates in psychology and “may be used in such debates to essentially confound the process of replication and falsification” (p. 558). These points are consistent with the experience in parapsychology. As noted above, retrospective meta-analysis is a type of post hoc analysis that offers additional opportunities to introduce bias. A meta-analysis involves many methodological decisions. Critics of a retrospective meta-analysis usually can find plausible alternative decisions that significantly change the results. Ultimately, relying on post hoc analyses is not an effective strategy for resolving controversial scientific questions.

If researchers have a useful understanding of a real effect, 90% or more of properly designed confirmatory studies should produce significant results. That is basically replication on demand and should efficiently end a scientific debate without the need for a retrospective meta-analysis to establish that the effect exists. If properly designed confirmatory research has not yet been conducted or does not have a high degree of success, the research can be consid-

ered to remain at the exploratory or unconfirmed stage, with questionable validity.

Essentially all of the findings currently considered as established in experimental parapsychology (reviewed in Cardeña et al., 2015) are based on retrospective meta-analyses of unregistered, usually underpowered studies. Preregistered, well-powered, formal confirmatory research has not yet been conducted for most lines of research in parapsychology. The arguments that reliable psi effects have or have not been found in experiments are based on speculations about research with questionable validity.

Marks appears to believe that conclusions can and should be drawn from studies that were unregistered and conducted with methodology that was more exploratory than confirmatory. Virtually all of the studies discussed in his book were in that category. He has a “belief barometer” at the end of most sections, where he registers his personal belief and asks readers to register their belief. Also, the comments by proponents of psi and Marks’s responses appear to be based on the outdated assumption that such debates about methodology can make unregistered, small studies provide convincing evidence. As was common 40 years ago, Marks gives little attention to the distinction between exploratory and confirmatory research.

An alternative approach more in line with the new era of methodological standards would be to end each section by noting that the existing studies cannot provide reasonable conclusions. Preregistered, well-powered, formal confirmatory research is needed before reasonable conclusions can be made.

With this new era of methodology, the first question when reviewing a line of research is: Have any preregistered, well-powered, confirmatory studies been conducted? Searching study registries is a fundamental, initial step for a review. In the previous methodological era the first question was: Have any meta-analyses been conducted (with the meta-analyses being retrospective and typically based on small studies)? Study registries did not exist in psychology and were not considered. Marks appears to have focused on the question from the previous era when writing most sections of this book.

Three Confirmatory Studies

The book does not discuss the three large preregistered confirmatory studies conducted by Schlitz, Delorme, and Bem for Bem’s 2011 retroactive (precognitive) priming studies (Schlitz et al., 2021; Schlitz & Delorme, 2021). Marks may have left these out because the studies were published in a peer-reviewed journal after his book was published. However, the results had been presented at conventions of the Parapsychological Association, and

the preregistrations (in 2013, 2015, and 2019) were publicly available on a study registry, similar to the ganzfeld prospective meta-analysis that was discussed in the book.

These three studies were the type of confirmatory research that is needed. They were multi-center and had planned sample sizes of 512, 640, and 384 (compared to 100 in the two initial studies by Bem). The detailed preregistrations ensured that the confirmatory analyses evaluated whether the data fit the hypothesis, rather than the exploratory practice of adapting the analyses and/or hypotheses to fit the data. These studies should provide significant results if the findings of Bem's initial studies and the subsequent retrospective meta-analysis are valid.

All three studies obtained nonsignificant results for the preregistered confirmatory analyses. This disparity between unregistered initial research and preregistered confirmatory research is not surprising to those who have experience with formal confirmatory research (medical research in my case, also see Kvarven et al., 2019; Open Science Collaboration, 2015). These findings demonstrate the need for caution and humility when drawing conclusions from exploratory research, or any research without proper preregistration.

The dramatic methodological changes in the past 10 years indicate that psychological researchers have historically not had the methodological skills needed to resolve a scientific controversy. Even with the recent methodological advances, psychological researchers still generally do not have the needed methodological skills. Experimenter fraud is a conspicuous example.

Experimenter Fraud

Marks has much discussion of Susan Blackmore's observations about possible fraud by Carl Sargent. I found both Blackmore's claims and Sargent's responses to be unconvincing. Sargent's subsequent refusal to cooperate with investigators and quitting parapsychological research are of more concern. Whether the errors in managing the targets were intentional as suspected by Blackmore or unintentional as claimed by Sargent, this unfortunate case demonstrates the need for routine quality control measures to prevent both fraud and unintentional errors in confirmatory research.

Marks, like most other psychological researchers, offers no guidelines or suggestions for preventing experimenter fraud. This leaves fraud as an endlessly unresolved confounding factor that is not addressed with preregistration or prospective meta-analysis.

It is well-established that peer review and replication are not effective at detecting or deterring experimenter fraud (Broad & Wade, 1982; Strobe et al., 2012). Fraud

would be easy and tempting in most psychological and parapsychological experiments, with very little chance of getting caught. When previously successful experimenters fail to obtain evidence for psi, as happened with Schlitz, Delorme, and Bem, experimenter fraud does not come up. However, if evidence for psi is found, then experimenter fraud will need to be addressed.

Effective quality control measures usually can be easily implemented that prevent undetected fraud by one person acting alone, as well as prevent unintentional errors. This would eliminate almost all cases of experimenter fraud and unintentional errors. For example, in a precognitive dreaming study by Watt (2013), an experimenter used an online random source to randomly select the target pool and the target. A second experimenter observed this process and the recording of the results to verify that no unintentional or intentional errors occurred. Given that humans are not perfect, such double-checking is a needed quality control for convincing confirmatory research.

Measures to prevent software programming fraud can be integrated with software validation, but most psychologists currently do not recognize formal software validation or programming fraud as significant methodological issues (Kennedy, 2016b). This is another example of the lack of needed methodological skills.

RECOMMENDATIONS

Marks's book will be useful to students and others seeking an introduction to parapsychological research that focuses on controversies in the past 20 years. For those who have a working knowledge of paranormal research, the book may be of most interest as a case study of one psychologist's changes in attitude about the paranormal. The book is also a case study of the continuing difficulty psychological researchers have in implementing the new era of methodology in their thinking and work.

DISCLOSURES

I have previously come to conclusions similar to Marks's beliefs that psi may occur spontaneously, but is not subject to reliable human control in laboratory experiments (Kennedy, 2013; 2016a). Therefore, I am sympathetic with the main conclusions in this book. One difference is that based on my personal experiences, I am 100% certain that paranormal phenomena beyond current scientific understanding sometimes occur. My skepticism about claims for reliable control of psi is based more on the inability to develop sustained practical applications of psi rather than on methodological weaknesses. If psi had the properties that are assumed for experiments and for meta-analyses,

reliable practical applications would have been developed long ago. The lack of sustainable practical applications indicates that some fundamental principles that make psi uncontrollable and unpredictable are not understood and can no longer be ignored.

My standards for research methodology are based on working in regulated medical research for about 15 years. These standards are very different than past and present psychological and parapsychological research (Kennedy, 2016b). To my knowledge, the Transparent Psi Project (2017) is the only study design in the history of parapsychology that applies methodological practices that are comparable to the routine practices in my experience in regulated medical research. These include measures to prevent experimenter fraud, formal software validation, and appropriate development of operating characteristics (power analysis) for confirmatory Bayesian hypothesis tests.

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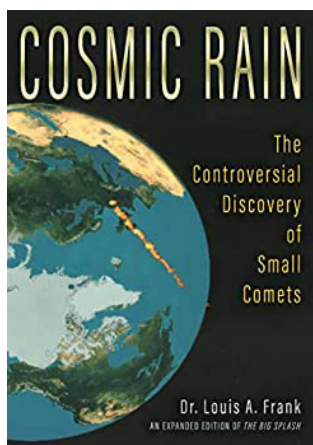
ESSAY
BOOK REVIEW

Startling Discoveries and Contrarian Anomalies: Small Comets and Other Heresies

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Cosmic Rain: The Controversial Discovery of Small Comets by Louis A. Frank



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This book should be required reading for all scholars and students of Science and Technology Studies (STS), which encompasses the history and sociology of science and the interaction of science with society as a whole.¹ Anomalists will find the discovery narrative engrossing and the whole book rewarding, well worth coping with the occasional technicalities. Lay readers should likewise appreciate Part 1 and will miss little of importance to them by scanning Part 2 more rapidly.

CONTENT OVERVIEW

Cosmic Rain is really several books in one. Most directly, it is a fascinating scientific detective story. At the same time, as Frank recognized (p. 4), it is an important case study in the history of science, illuminating most particularly the circumstances of scientific breakthroughs that are surprising and unforeseen. Frank's experiences illustrate several general points about the manner in which science receives—or rather, resists—startling novelty.

Furthermore, this book is a very detailed first-hand description of scientific activity, warts and all, that should enable non-scientists to begin to recognize that scientific activity is very much like other human activities: influenced by human behavior and human psychology, not only by the objective technical considerations.

Louis Frank was a distinguished physicist at the University of Iowa whose specialty was plasma physics. In the early 1980s, he was puzzled by persistent dark spots in ultraviolet (UV) images of the outer reaches of the Earth taken from a satellite, the Dynamics Explorer, which carried several instruments that were Frank's responsibility.

Frank and his associates made strenuous efforts trying, unsuccessfully, to identify flaws in the instruments that could be responsible for those dark spots. Eventually they concluded that the cause had to be some actual physical phenomenon capable of absorbing UV at such discrete points. The culprit seemed to be water, since its molecules and components absorb UV of the pertinent wavelengths. But at the relevant altitude above the Earth's surface, that water could not have originated at the Earth's surface, it must have arrived from outer space. Frank deduced that it originated in the so-called "Oort disc," a vast reservoir of comets feeding the more well-known "Oort cloud" that



had long been regarded as the source of such major comets as the iconic Halley's, which periodically becomes visible from the Earth.

But comets of Halley's size would be far too large to account for those little dark spots, so apparently the Earth was being impacted by quite small water-containing comets—"small" relative only to the commonly visible ones like Halley's, namely in the range of a few tons of mass and producing, on contact with the Earth's outermost reaches, clouds of water vapor some tens of miles in size.

Frank's conclusion was not immediately palatable to large swaths of the scientific community. It was the very first time that the existence of such comets had been suggested, let alone how many of them were needed to account for the observed UV-dark spots: something like *ten million* per year. Why had they not been seen by other means?

Frank's small, water-carrying comets infringed on long-standing presumptions about quite a range of issues: the material composition and the mechanisms of formation of stars and planets and moons, of the universe as a whole, and specifically of our own solar system. Wherefrom came all the water on Earth and the other planets and moons? How? When?

So Frank experienced the typical reactions: denial, resistance, difficulty getting the work published. Grants continued to be awarded for his plasma work but not for studying small comets. Peer review relating to the small-comet hypothesis was biased and incompetent. Vigorous opposition was marked by behavior of which the perpetrators might well be thoroughly ashamed: hypocrisy, dishonesty to varying degrees, and in a variety of circumstances "intrigue, back-biting, and small-mindedness" (p. 3). *Cosmic Rain* is replete with examples of such behavior, to the extent that I frequently penned the marginal note "ugh."

That Frank's small comets have such wide-ranging implications serves to explain in some part how lengthy and nasty was the opposition to his discovery. That lengthy resistance also illustrates that Frank's own personality is a crucial element in the story: He needed to have the self-confidence and moral strength to push his evidence strongly and persistently; and thereby he behaved *inevitably* in ways that could easily be described as arrogant, inflexible, unreasonable, self-promoting, like a crank or a crackpot. As I. J. ("Jack") Good, the leading 20th-century proponent of Bayesian statistics, liked to say (Good, 1998): Geniuses are cranks who happen to be right, and cranks are geniuses who happen to be wrong.² And George Bernard Shaw pointed out long ago that progress depends on the actions of unreasonable individuals.³

Such individuals (cf. Peter Duesberg, below, re HIV/

AIDS) have no easy time of it. Louis Frank had been highly respected (for work primarily in plasma physics), but he became *persona non grata* when he proposed the small-comets hypothesis. Frank himself cited (p. 22) the similar experiences of Alfred Wegener (continental drift) and Hannes Alfvén (theories in plasma physics). In the most recent years, another instance is that of Thomas Gold, highly respected for his work in astrophysics but ignored and derided when he made a suggestion about the mechanism of hearing (Gold, 1989)—a suggestion that much later turned out to have been well-founded; and again ignored and even laughed at for his suggestions about the origin of oil and the presence of primordial life at great depths in the Earth.⁴

Frank's confidence about being right, and thus appearing arrogant, is illustrated by the grandiose subtitle of his original book (Frank, with Huyghe, 1990), and by his remarks on page 1: "The textbooks in a dozen sciences will have to be rewritten . . . lakes, rivers, and oceans were not formed . . . early in Earth's history . . . the substances necessary for the origin of life on this planet may well have arrived from space." If, as it seems, all of the present water on Earth represents the cumulative arrival of small water-bearing comets over the course of some 4 billion years, it might make us more aware of the possibility that terrestrial events are influenced or coerced by comets, meteors, asteroids, cosmic radiation. The notion that life on Earth might have been seeded from space has not been widely welcomed, even as evidence for it may be mounting (Wickramasinghe, 2022).

The first part of *Cosmic Rain*, chapters 1–27, is the gripping detective story of discovering that the little dark spots in UV images of the top of the atmosphere are caused by "small" water-bearing comets. It is essentially a reprint of the original edition of Frank's (1990, with Huyghe) book, and describes in fascinating detail how Frank was *forced* by the range and nature of the evidence to conclude that small comets are the only conceivable explanation for the spotty absorption of UV that had first puzzled him. Chapter 6 shows that the composition and history of the oceans fit with the idea that the water originated from cometary sources. Chapter 7 reveals how Frank arrived at plausible conclusions about what, besides water, those small comets contain—and, again, these plausible speculations will have aroused mainstream resistance because of their pertinence to the origin of life on Earth. Common objections to Frank's small comets included that they ought to be observed directly by radars that are continually active as safeguards against hostile missiles, so chapter 9 discusses the flaws in that objection. Chapter 10 indicates how, where, and when small comets can best be actually seen. Some reports of "flying saucers," as UFOs

were first called, might be explainable by small comets, as well as such other controversial reports as the falling from the heavens of large blocks of ice (chapter 11). Later chapters fill in details about whether there should be visible signs of small comets hitting the moon; attempts to gather data about the small comets by means of various man-made Earth satellites; and, unfortunately, quite a lot about the unethical and often hypocritical behavior of the determined activists of mainstream resistance. Chapter 27, “The Turning Point,” sums it up: “The search was over. The existence of small comets had been confirmed. But few believed it. We had won after nine innings, but the others insisted that the game go on.”

Part 2 of *Cosmic Rain*, “Vindication,” has been edited after Frank’s death by Patrick Huyghe, who explains in Appendix 2 how this came about. It details how various sectors of the scientific community accepted, eventually and piecemeal, the existence and import of the water-bearing comets. Many casual readers may find Part 2 less gripping than Part 1, but it is nevertheless a vital part of this case study, illustrating how some adherents of the overturned “consensus” persisted with unwarranted and unethical opposition to the facts long after the case had been objectively proved. Many pages in Part 2 carry my marginal “ugh” note, including about the supposedly most authoritative journals, *Nature* and *Science* (pp. 165–166).⁵

Frank’s (1990) book did not get reviewed by prominent scientific journals; but popular media (and also Arthur C. Clarke) described it as interesting, including about how science treats such novelties. That seems quite typical, to be ignored by the mainstream experts but not by the general public. Contrarian books about HIV/AIDS, global warming, and cholesterol, below, met similar fates. In economics, Milton Friedman’s *Capitalism and Freedom* (1962, University of Chicago Press) was not reviewed in any major national publication yet sold 400,000 copies (Brooks, 1998).

This ignoring or evading or denigrating of a mass of substantive evidence offered by fully qualified people is illustrated on a number of other topics of great public importance (below), for instance HIV/AIDS, global warming, the toxicity of common aluminum compounds, and the theory that “bad” cholesterol as the cause of cardiovascular disease (CVD).

CONTEXT

Several of the general points brought out in the immediately following section are cogently illustrated in the book under review, adding further examples on those points and underscoring the lessons waiting to be learned.

How Science Reacts to Novelty

Anomalists, members of the Society for Scientific Exploration—scientific *explorers*—know full well that their endeavors are not appreciated by “science,” indeed that they tend to be ignored, or dismissed out of hand, or denigrated, or positively maligned. And, rather naturally, we may regard that as unwarranted and resent it. But researchers working entirely within the scientific mainstream encounter the same positive resistance (Barber, 1961), lack of appreciation, and even career-damaging persecution if they happen to come up with evidence or interpretations that are not consonant with the prevailing “scientific consensus.”

The popular view, the conventional wisdom shared by many scientists and would-be scientists, imagines that “science” is always on the lookout for new things, new facts, and new theories. But that is simply not the case nowadays (Bauer, 2017). Contemporary science welcomes novelty only if it fits nicely with what it currently believes; things that don’t fit are treated in the same way as are the striking anomalies in which Scientific Explorers are interested.

The mistaken popular view is based on a superficial acquaintance with the early days of modern science, the heyday of natural philosophy, when it seemed as though almost everything about natural phenomena remained to be properly understood, and the small elite community of natural philosophers indeed welcomed and was excited about genuine novelties. But those were times before anyone was called a scientist,⁶ and long before there existed such specialist disciplines as physics and chemistry and geology and biology and so on.

“Disciplines” is highly appropriate here: Modern sciences are indeed *disciplined*. They have developed approaches, methodologies, bodies of knowledge, and theories in which scientists are trained and which they are expected to follow. Every specialty has its own *paradigm*⁷ (Kuhn, 1970) of how research should be done. That model has become effectively a demand, a dogma that governs research: Getting jobs and grants and other resources is guided by “peer review,” which enforces the accepted ways, in practice hegemonic because they constitute the standards, the guidelines; and getting one’s work output published, at the mercy of peer review.

If research happens to come up with data or ideas that do not fit the established paradigm, but without directly or positively contradicting it, then that research comes to survive in a sort of limbo, as what Gunther Stent (1972) called “premature discoveries,” his iconic example being Avery’s discovery of DNA as the chemical carrier of hereditary information.

But if a discovery or interpretation positively *contradicts*

the “scientific consensus” in the particular specialty, then even well-established, lauded, accomplished scientists may lose the respect of their peers, their access to grant funds, their invitations to conferences and seminars; and thereby also their standing and credibility in the eyes of the media and the general public.

Scholars of STS, historians of science, and sociologists of science are among a small minority of people who have long known and understood that the most striking advances in science are routinely and usually vigorously opposed by the scientific majority, the mainstream “consensus” (Barber, 1961), what Frank calls “the current wisdom.”⁸ For an authentic understanding of scientific activity, it is essential to recognize that this sort of behavior is not a matter of “a few bad apples” within the scientific community, it is an inevitable consequence of human nature when long-held and strongly held beliefs are challenged: “As men in society, scientists are sometimes the agents, sometimes the objects” of resistance to unorthodoxies (Barber, 1961). One quite general factor is Groupthink (Janis 1972/1982), the tendency for members of any group to suppress individual doubts and reservations and to go along with the prevailing group “consensus.”⁹ So the most startling discoveries routinely encounter resistance, including behavior that in other circumstances would be widely condemned as unscrupulous and unethical; as illustrated by innumerable episodes in global history, perfectly ordinary human beings can behave monstrously when they are part of a mob.

Increasingly since about the middle of the 20th century (Bauer, 2017, p. 17 ff.), researchers have worked in an hyper-competitive environment in which career advancement and even career survival has demanded constantly successful grant-getting and prolific publishing—as well as not rocking any boats, be they norms of the specialist technical community or of one’s vocational environment that may have no obvious relevance to technical expertise: In many places, for example, at the very least lip service is expected nowadays to the values of “equity, diversity, inclusion” (Krylov, 2021).

Altogether, the resistance to claims that do not seem to fit the contemporary paradigm can be even more vigorous now than in the past, and it is often *ad hominem*.

How Are Novel Discoveries Made?

The *reception* of novelty has just been discussed; but how does novelty arise in the first place?

The importance of how novelty is received is that something cannot realistically be said to have been discovered until it is recognized by “science”; that is the dilemma for anomalists.

With discoveries in the mainstream, those that fit become accredited, as earlier noted. Those that do not fit are treated just like the matters promoted by anomalists. They are noticed in the first place only by chance, serendipitously, since they are contrary to the scientific consensus and therefore no funds are available to find or study them. As Stephan and Levin (1992) point out, it is a matter of being in the right place at the right time. Sometimes the right place is in a neighboring specialty, or even in a quite different field: The most remarkably novel discoveries often come from outsiders (Harman & Dietrich, 2013), albeit not always (Gieryn & Hirsh, 1983).

This ignoring or evading or denigrating of a mass of substantive evidence offered by fully qualified people is illustrated on a number of other topics of great public importance, for instance HIV/AIDS; global warming; the theory that “bad” cholesterol is the cause of cardiovascular disease (CVD); the toxicity of aluminum compounds.

SOME SIMILAR CASES

HIV/AIDS and Peter Duesberg

Peter Duesberg, molecular biologist and cancer researcher at the University of California Berkeley, had been highly acclaimed as discoverer of the first oncogene (Duesberg, 1987). He was elected to the National Academy at a rather unusually early age and awarded a rare 7-year Outstanding Investigator Award by the National Institutes of Health.

I had all the students I wanted. I got all the grants awarded. . . . I became California Scientist of the Year. All my papers were published. I could do no wrong, almost, professionally . . . until I started questioning the claim . . . or the hypothesis that HIV is the cause of AIDS. Then everything changed. (Scovill, 2004)

After Duesberg pointed out that HIV, since it was supposedly a retrovirus, could not be the cause of AIDS, he was promptly excommunicated: no more research grants, and even ejected from his home department at Berkeley into space in a different building, and no longer given access to graduate students. To ensure that Duesberg received no more invitations to conferences or seminars, the “HIV” celebrity scientists Anthony Fauci and Robert Gallo made known that they would not attend if Duesberg were invited (Bauer, 2007, p. 229).

Duesberg’s (1989) main contrarian publication in the *Proceedings of the National Academy* has an editorial footnote promising a response from a proponent of the HIV-AIDS theory, but that promised response never

eventuated. Despite a general understanding that members of the Academy have a right to publish in its *Proceedings*, Duesberg's intended follow-up article was rejected (the only other Academy member to experience such a rejection had been Linus Pauling, Nobelist for both Chemistry and Peace). Journalists were warned (Bauer, 2007, p. 175) that they could lose their access to official sources if they paid attention to such mavericks as Duesberg. When President Mbeki of South Africa convened an advisory committee composed of both proponents and adversaries of HIV-AIDS theory, it recommended several of Duesberg's suggestions for critical studies that could settle the matter; but those projects were never carried out for lack of funding.

When polemicists cannot summon convincing evidence or arguments, they resort to ad hominem. A professor at McGill University called Duesberg "probably the closest thing we have . . . to a scientific psychopath" (Bauer, 2007, p. 212). Robert Gallo derided Duesberg's credentials for never having personally worked with AIDS patients or HIV (Bauer, 2007, p. 234), he "is not an epidemiologist, a physician, or a public health official" (Bauer, 2007, p. 235). One might bear in mind that Gallo himself is an MD, which carries no training for scientific research, whereas Duesberg is a fully-fledged molecular biologist with degrees in *science*. Gallo also derided Duesberg's work on cancer (Bauer, 2007, pp. 234, 237), which others have widely acknowledged as significant, so much so as to warrant an article in *Scientific American* (Duesberg, 2007)—albeit, the editors in effect apologized for daring to publish something by Duesberg, emphasizing that they were not endorsing his views about AIDS!

When Duesberg (1996) wrote a comprehensive book, the publisher was one that specializes in conservative, politically right-leaning matters, illustrating how topics in science have become enmeshed with political ideologies; not only over HIV/AIDS but also about global warming (Bauer, 2012a).

On so prominent a public matter, a book by such a prominent dissenter would surely warrant substantive review, even if only unfavorable, in leading scientific and medical journals, but Duesberg's gained only one, in *Perspectives in Biology and Medicine* (Friedmann, 1997), and it is not substantive at all, describing the book as "conspiracy-laden innuendo, selective truths, and high-handed language." There was an equally outraged review in *The New York Times* (Osborn, 1996) by an MD who described herself explicitly as a scientist [!] and made plainly false statements, for instance that "many major biomedical research journals have arranged for formal, published debates between Mr. Duesberg and other distinguished scientists," whereas in fact there had not even been the promised response in the *Proceedings of the National Academy*.

By contrast to those belittling reviews by professional specialists, both *Booklist* and *Kirkus Review* described the book as presenting a quite plausible and soundly argued case; and readers at amazon.com rated the book very positively, 4.7/5.

Like Frank's, Duesberg's case is typical in several ways: ad hominem rather than substantive attacks; boycotted or largely ignored by disciplinary publications and venues; book not reviewed by appropriate disciplinary journals but significantly appreciated by general readers; accused of lacking supposedly needed credentials.

Global Warming and Climate Change

In common parlance, "global warming" and "climate change" are presumed to mean "caused by human activities, primarily release of carbon dioxide." Innumerable references in the media are framed in such apocalyptic terms as "existential threat" (Bauer, 2012b, p. 18f.), even as a great number of qualified experts disagree strongly enough to publish petitions.¹⁰ Nevertheless, human-caused climate change is the experts' current wisdom, duly enshrined in the media's and the public's conventional wisdom. Those who openly disagree are ignored or maligned ("denialists").

Physicist Steven Koonin is as qualified as anyone to discuss climate change, having pioneered in computer-modeling and having worked on sustainable-energy projects both in industry and in government. In *Unsettled* (Koonin, 2021) he cites copiously from the published reports of the International Panel on Climate Change (IPCC) to demonstrate that many of the shibboleths continually parroted by climate-change alarmists are simply contrary to the actual facts in the official reports themselves, for instance about an alleged (but not data-supported) increased frequency of such "extreme weather events" as hurricanes.

It is worth noting that Koonin strives mightily not to appear critical of the dogmatic insistence of the doomsayers. He uses moderate language and everywhere cites the official data. But he does suggest that dialogue between believers and skeptics would be good, citing so-called "Blue Team / Red Team exercises" to safeguard against injudicious policies and actions: Once the Blue Team has come to a conclusion, they ask an independent set of specialists—the Red Team—to examine the Blue Team's evidence and arguments and conclusions, to act as Devil's Advocate looking for mistakes and inadequacies. The two teams then discuss and argue further, with the intention of making ensuing publications and recommendations as sound and close to objective as possible. The concept of such "adversarial collaboration" has been discussed also by Cowan et al. (2020) and Clark et al. (2021), and the

proposal for a specifically Science Court has much the same rationale (Bauer, 2017, chapter 12).

Just as with Frank's and Duesberg's, Koonin's book has not received appropriate review in major journals. Indeed, some of the reviews (Boslough, 2021; Ward, 2021; Yohe, 2021) have been ad hominem¹¹ rather than substantive, at the same time as readers rate the book highly both at amazon.com (4.7/5) and at goodreads.com (4.4/5). My own review in this Journal is positive (Bauer, 2021a), and several online reviews¹²⁻¹⁴ agree that the book is sound and unbiased, as does Levine (2021).

How these topics of importance to everyone become politically polarized is again illustrated here by the fact that the only substantive, even-handed early review was in *The Wall Street Journal* (Mills, 2021).

The Cholesterol Hypothesis of Cardiovascular Disease

Some researchers and some practicing physicians have presented evidence for some three decades or more that "bad" cholesterol is not the cause of cardiovascular disease. But their claims have not been engaged with publicly or substantively by proponents of the accepted, official belief; the latter simply declare that the evidence supporting the cholesterol hypothesis is decisive, that "the science is settled."

That lack of substantive public engagement means that anyone who happens to wonder whether the cholesterol hypothesis really is true, the last word on the matter, needs to wade through and assess for themselves the details and technicalities offered by the dissenting experts. Few people have the interest, time, or technical facility to do that, which means that the mainstream "scientific consensus" remains effectively dominant—no matter how objectively, factually strong the dissenters' cases may be.

The literature of dissent from the cholesterol hypothesis is actually quite voluminous. A large part of it comes from well-informed and technically expert people—physicians who became convinced of the flaws in the mainstream belief through their own first-hand experience as well as from research and surveys of the pertinent literature.

Uffe Ravnskov, a Swedish physician and medical researcher, was among the first to argue publicly against the cholesterol hypothesis. His book, *The Cholesterol Myths* (Ravnskov, 2003), was published in Sweden in 1991 and in English translation a dozen years later. Many years on, *The Great Cholesterol Con* (Kendrick, 2008) was published by a Scottish physician and medical researcher.¹⁵ Between those years, a great number of articles and books aimed to debunk the cholesterol hypothesis as well as describing

seriously harmful "side" effects of the cholesterol-lowering statin drugs, for example, *Lipitor: Thief of Memory* (Graveline, 2006) by an astronaut-physician.¹⁶

This contrarian literature argues that the official view is not supported by the evidence: Lowering cholesterol does not reduce the risk of cardiovascular disease, heart attacks, or strokes, and does not decrease all-cause mortality. These contrarian publications are replete with citations to the mainstream literature and with seemingly reasonable interpretations of it; a very detailed survey has been given by Kauffman (2006, Myth 3, pp. 78–104).

But the proponents of the mainstream consensus have not engaged directly or substantively with this critical literature. In view of how important the matter is to the general public and to medical authorities and policymakers, one might have expected to find reviews of the books by Ravnskov, Kendrick, Graveline, and others in such publications as the *British Medical Journal*, the *Journal of the American Medical Association (JAMA)*, the *New England Journal of Medicine*, and in *Science* and *Nature*, the scientific periodicals whose mission is to report on all really important topics in science and medicine. So I searched for such reviews in the online *Book Review Digest Plus and Retrospective*¹⁷ and in *PubMed*¹⁸ and with Google; but the only reviews I found were on websites and in newsletters of proponents of alternative medicine and other contrarians. Dr. Kendrick confirmed to me¹⁹ that none of his books have been reviewed in those prominent mainstream periodicals.²⁰ Yet considerable interest on this matter is displayed by the general public. On amazon.com, Kendrick's *The Great Cholesterol Con* has a 4.6/5 rating and on goodreads.com it rates 4.2/5. Graveline's and Ravnskov's books also are rated highly by readers.

Toxicity of Aluminum Compounds

Christopher Exley has studied the toxicity of aluminum compounds for several decades, publishing a couple of hundred articles²¹ and a book (Exley, 2020; Bauer, 2021c) that summarizes his findings.

Exley's work has brought antagonism because many manufacturers of a variety of products do not like to see evidence of possible toxicity, especially toxicity that appears to target the brain—unusually high amounts of aluminum are found in brains of deceased autism and Alzheimer's victims, for example. And aluminum compounds occur in baby food and other processed foods, many ointments and skin lotions, in antacid preparations, and, perhaps most disturbingly, as adjuvants in vaccine. So Big Pharma as well as the aluminum industry would have preferred that Exley not do his research.

The funding for it came from as variety of individuals

and institutions outside Exley's place of work, the University of Keele in Staffordshire, England. The university maintained an online portal through which donations could be made to the work of any given faculty member, and Exley's research received donations in that way for several years, but then the administration imposed increasing difficulties; that seemed contemporaneous with changes in the university's top administration and university funding from the Gates Foundation and a pharmaceutical company. Eventually Exley was unable to continue his research, and he has described the sad story in a detailed online "Leaving Statement."²²

MORALS AND LESSONS

Frank's story and case study, and the similar cases just described, illustrate a number of points of general import:

— **Startling discoveries come serendipitously.**

Frank was researching plasmas, not comets.

Serendipity is more likely the less certain is the pre-existing knowledge or, much the same thing, the more complicated is the system involved—as for instance, in environmental matters or in medical matters. Thus in medicine, substances envisaged as potentially useful against one condition may turn up unforeseen benefits: Something tried for ameliorating cardiovascular disease becomes Viagra, the magic blue pill to treat erectile dysfunction. Drug companies quite often ask the Food and Drug Administration to approve existing drugs for new applications, "repositioning" them.

— **Really novel discoveries likely follow after innovations in technique, in this case observations possible only from satellites above the Earth.**

It behooves anomalists to be vigilant for possibly useful new techniques; for example, "environmental DNA" was studied some years ago at Loch Ness as potentially providing information about the rumored "monsters" (Green, 2020), and it should obviously be employed whenever looking for evidence of the existence of species thought mythical or extinct (for example, the Eastern cougar in USA, the thylacine in Australia).

— **Contrarian discoveries often come from disciplinary outsiders, as earlier noted.**

But personality also can guard against succumbing to Groupthink: Frank had been from childhood something of a loner and outsider (p. 19).

— **The general importance of personality in science.**

Many people observing such small, indistinct, and unexpected spots in images acquired for quite other purposes might well have dismissed them as likely artefacts of instrumental flaws and not inquired further;

but by Frank's self-description, he was pedantically, obsessively meticulous, *everything* had to be just right and fully understood.

More generally, scientific activity has nowadays become so intensely competitive as to be dysfunctional in several respects. Finding the best interpretation, theory, or understanding is helped—from an objective standpoint—if differing claims and evidence engage directly and openly, as in the resort to Devils' Advocates or Blue-Team/Red-Team exercises (above; Koonin, 2021) or through "adversarial collaborations" (Cowan et al., 2020; Clark et al., 2021). But that sort of procedure calls for more patient consideration, less rush to publish, than is now commonplace; personalities that were ideal for doing science before, say, the middle of the 20th century (Bauer, 2017, p. 17 ff.), would probably not find modern-day science a congenial vocation.

— **Resistance to scientific discovery is routine (Barber, 1961); facts do not win out immediately (Bauer, 2021b); revolutionary paradigm shifts come only eventually (Kuhn, 1970).**

Here again personality plays a part. That believers in the old ways have to die off (Planck, 1949) is illustrated in Frank's story by the continuing opposition to the bitter end of some prominent individuals, for instance the journal editor Alex Dessler, who is mentioned three dozen times in the book, far more often than anyone else.

— **It may have helped in the eventual overcoming of mainstream denial that the small comets do not directly disprove long and strongly held beliefs, only presumptions, not based directly on strong evidence, about how the planets and moons formed from available material.**

The intense specialization of modern science conspires to make it difficult to connect actually related matters: The water-bearing small comets have implications for research in what might not seem obviously related topics, say, the search for Earth-like planets as well as the origin of water on, say, the moons of Saturn or Jupiter.

Still, even presumptions are not abandoned until a better explanation is forthcoming; and Frank's comets solved some conundrums in planetary science. That will have helped the acceptance of the small-comets theory, piecemeal among various separate, not routinely interacting scientific specialties.

— **Mainstream science—including mainstream media coverage of science—nowadays does not serve society in a reliable, trustworthy way.**

Perhaps the most obvious problem is that implications of science affect so many societal sectors and interests that political partisanship can drown out substantive truth-seeking: Thus, left- and right-leaning groups and

media favor opposite sides regarding whether HIV causes AIDS and whether carbon dioxide is the prime mover in global warming and most recently over how to deal with COVID-19.

Startling but soundly based discoveries are prematurely and dogmatically dismissed if they do not fit the prevailing paradigm or the experts' current wisdom.

Lay audiences may be better-informed by popular sources than by the expert wisdom: Reviews in popular media, amazon.com, and goodreads.com were more appropriate regarding Frank's comets, Koonin's climate-change book, and several cholesterol critiques.

So too with anomalistic topics. When, more than 50 years ago, I became interested in the possible reality of Loch Ness "monsters," I was dismayed to find absolutely nothing about that in the scientific literature, and mere dismissive paragraphs in encyclopedias. While the online *Britannica*²³ now has more information, it is wrong on several points, for instance that the iconic photo has been proven a hoax (Shuker, 1995, 86–88). Wikipedia is as unreliable as usual, in this case allowing the *Skeptic's Dictionary* to speak for "the scientific community."²⁴

CAN MAINSTREAM DISCOVERERS AND ANOMALISTS LESSEN THE ROUTINE RESISTANCE THEY ENCOUNTER?

The problem hinges on the difference between Kuhn's (1970) normal science and revolutionary science (see for instance McClenon [1984] re parapsychology) or between the avocational, amateur pursuit of anomalistics and the professional, living-earning pursuit of mainstream science (Bauer, 1986, pp. 77–79).

No matter how certain one is about being right, it makes a much better impression to appear to be making suggestions that oneself finds hard to accept: Present a conundrum, a mystery, not an attempted *fait accompli*.

If possible, present the claim as not directly contradicting hegemonic doctrine even if it doesn't exactly fit it either. One might seek advice in private from open-minded mainstream experts, sounding them out by offering the best evidence, in effect trying to engage in a personal "Red-Team / Blue-Team" exercise. But actual cases suggest that Groupthink is an enormous barrier. Jeffrey Meldrum and Grover Krantz were experts in anatomy but failed to arouse interest among their peers about the quest for the alleged Bigfoot (or Sasquatch) creatures. In the search at Loch Ness, Robert Rines engaged the famous inventor of strobe photography, Harold Edgerton, as well as sonar expert Marty Klein and photographic expert Charles Wyckoff, without making the quest respectable in mainstream quarters.

The issue of lessening resistance is social and political more than intellectual. Moreover, the experts' current wisdom and the society's conventional wisdom are interrelated, and general acceptance requires that the two be in harmony. So gaining peer recognition may be important and even necessary, but so too is acceptance by the popular media; being trusted by journalists and science writers can be very useful, and relations with such people should be cultivated.

NOTES

¹ "Science & Technology Studies" has become the standard name for this scholarly field; Earlier names included "Science Studies" and "Science, Technology, & Society." A good overview is by Sismondo (2004).

² The difference might be illustrated by two people who were similar in a great many ways: Albert Szent-Györgyi, awarded a Nobel Prize, and Wilhelm Reich, widely dismissed as a crackpot (Bauer, 2017, p. 108).

³ "The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man".

This is often cited as from George Bernard Shaw, *Man and Superman*. The latter is one of Shaw's plays, but the quote is not from the script of the play. Published versions of Shaw's plays include a preface and other additional material. This particular quote is from one of the appendixes, "Maxims for revolutionaries", under "Reason", p. 282 in the 1946 Penguin edition. The original publication was in 1903.

⁴ Gold also illustrates Barber's generalization that anyone may be sometimes the agent, sometimes the object of resistance: Gold the maverick did not care for maverick Frank's small comets (p. 24).

⁵ Paul Lauterbur, Nobel Prize 2003, pioneered medical applications of magnetic resonance imaging (MRI). He pointed out (cited by Michael Goodspeed, "Science and the coming dark age" at rense.com) that "you could write the entire history of science in the last 50 years in terms of papers rejected by *Science* or *Nature*"—as indeed his had been, describing the very work that later brought him a Nobel Prize.

⁶ The label was coined by William Whewell about 1834.

⁷ Kuhn defines a scientific paradigm as: "universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners."

⁸ Economist Kenneth Galbraith coined the frequently used phrase, "the conventional wisdom" to describe beliefs hegemonic in society as a whole. I think "current wisdom"

is better for what is hegemonic within the supposedly expert community.

- ⁹ Abba Eban is credited with the insight that a consensus means that everyone agrees to say collectively what no one believes individually: a clear corollary of Groupthink.
- ¹⁰ For example, the Leipzig Declaration on Global Climate Change. http://henryhbauer.homestead.com/Leipzig_DeclarationPontius2005.pdf
- ¹¹ Hit piece against Koonin's book *Unsettled* lacks substance. <https://clintel.org/hit-piece-against-koonins-book-unsettled-lacks-substance>
- ¹² Book Review: *Unsettled* by Steven Koonin. <https://www.hefner.energy/articles/book-review-unsettled-by-steven-koonin>
- ¹³ Ian Hore-Lacy. <https://iscast.org/reviews/review-of-unsettled-what-climate-science-tells-us-what-it-doesn-t-and-why-it-matters-by-steven-e-koonin/>
- ¹⁴ <https://www.independent.org/publications/tir/article.asp?id=1669>
- ¹⁵ <https://drmalcolmkendrick.org>
- ¹⁶ <https://spacedoc.com>
- ¹⁷ *Book Review Digest Plus and Retrospective* from EBSCO: "Book Review Digest indexes reviews of current fiction and non-fiction, and provides review excerpts and over 100,000 full-text reviews. 1905–present."
- ¹⁸ PubMed does list *articles* by Graveline, Kendrick, and Ravnskov.
- ¹⁹ Personal communication, email of December 19, 2021.
- ²⁰ *The Great Cholesterol Con* did get a favorable review in 2007 in the *British Journal of General Practice*, 57, 336.
- ²¹ <https://www.researchgate.net/scientific-contributions/Christopher-Exley-39683428>
- ²² <https://www.aluminiumresearchgroup.com/history>
- ²³ <https://www.britannica.com/topic/Loch-Ness-monster-legendary-creature>
- ²⁴ https://en.wikipedia.org/wiki/Loch_Ness_Monster#cite_ref-3

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**ESSAY
BOOK REVIEW**

On Subtle Bodies, Out-of-Body Experiences, and Apparitions of the Living: A Review of Ernesto Bozzano's Study of "Bilocation"

Reviewed by

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La Bilocazione: Sdoppiamenti, Viaggi Astrali, Esperienze Extracorporee by Ernesto Bozzano

Due to untimely death of Carlos S. Alvarado, this review has been revised by Massimo Biondi, who tried to express, to the best of his knowledge, the thought of the author. It is for this reason that it was decided to maintain the author's voice in first person, as it was originally. Also, thanks are due to Nancy L. Zingrone, who has not only greatly improved the text, but has helpfully supervised the revision of this review.



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For many years there have been phenomena such as apparitions of the living, photographs of the living at a distance, near-death experiences, emanations from the dying of light, fog, or incorporeal "doubles," which have suggested the existence of a spirit, or "subtle body," able to separate itself from the physical body, sometimes bringing consciousness with it. This idea also underpins the projection model for Out-of-Body Experience (OBE) cases, which has an interesting history (Alvarado, 2009, 2011, 2019). Here I briefly review that concept through the analysis of a work written by the Italian student of psychic phenomena Ernesto Bozzano, published for the first time in 1934 and recently re-edited in the original language by Golem Libri, a young publishing house specializing in "psychic" topics.

In discussing this book my approach is mainly historical. I hope both to help modern readers to get more acquainted with Bozzano's work, and to highlight those passages that deepen our understanding of specific aspects of the topic, especially with reference to the ideas on OBEs published before the 1930s. I am convinced that while the issues discussed by Bozzano have a limited value today, they can stimulate further discussions.

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ON SUBTLE BODIES AND DEATH

Bozzano's work is part of an ancient tradition of beliefs in "subtle bodies," i.e., non-material bodies, housed within the physical ones (Mead, 1919; Poortman, 1954/1978). The literature on the "double"—a term used by some during the 19th century to designate that principle, as well as to refer to apparitions of the living (Shirley, n.d., circa 1938)—grew in many occult circles,¹ and was particularly rich among spiritualists, as shown by the writings of Emma Hardinge Britten (1875), Gabriel Delanne (1899/1904), William Stainton Moses (1876–1877), and Ernesto Volpi (1890).

In his book *Posthumous Humanity*, French linguist Adolphe D'Assier (1883/1887) presented detailed remarks about the nature of the subtle body. Similar ideas were provided



by Charles Lancelin (1925) and Sylvan J. Muldoon (Muldoon & Carrington, 1929), both of whom experienced recurrent OBEs. For some, such as theosophist Annie Besant (1896), the issue was that of the nature of the alleged many subtle bodies, which led psychic researcher Hereward Carrington to state: “Theosophists distinguish between . . . various bodies; psychic students strive, for the most part, only to prove the objective existence of any one of them” (Carrington, 1915, p. 40).

In a little-known multipart article, William Stainton Moses (1876–1877) discussed many cases of apparitions of the living and OBEs, which he explained by referring to the “trans-corporeal action of the spirit.” Moses, like many others from antiquity (Long, 2019), and like Bozzano, saw death as related to the permanent projection of the spirit from the physical body. While apparitions of the living were but temporary excursions (Figure 1), Moses (1876–1877) wrote, the location of consciousness outside the body could become permanent:

Every experiment, every observation, goes to confirm the grand truth round which all the theories of Spiritualism centre. “*Man is a spirit: and the change called death only transfers him to another sphere of existence.*” While on earth he can at times act independently of his body: he can communicate with those who are akin to him, but in higher stages of progression he can vindicate his birth right, and rise superior to what in his present state is possible for him. (Moses, 1876–1877, p. 441)

Traditionally, spiritualists have regarded death as a permanent separation of the spirit from the body, a process “equivalent to spiritual birth” (Peebles, 1869, p. 335).²



Figure 1. Artistic conception of spirit leaving the body at death (from C. Reiter, *Mortilogus*, 1508).

Clairvoyant Andrew Jackson Davis (1850, p. 162) stated the following: “The butterfly escapes its gross and rudimental body, and wings its way to the sunny bower, and is sensible of its new existence.”

Some, such as the German philosopher Carl du Prel (1899/1907), have held that the characteristics of the spirit, or double, extend to the production of physical effects.³ Similarly, Alexander Aksakof stated that “extracorporeal activity can go as far as the doubling of the organism, presenting a simulacrum of oneself, which acts for a certain time, independently of its prototype, and presents incontestable attributes of corporeality” (Aksakof, 1890/1895, p. 523). Many others believed that the physical nature of what leaves the body had been experimentally proven by Albert de Rochas (1895) with tests of perception of the double by hypnotized persons, and by Hector Durville (1909) (Figure 2), who hypnotized volunteers and required their externalized ghosts to induce physical effects, obtain



Figure 2. French Magnetizer Hector Durville.

information, and perform different tests. Durville believed that the exteriorized double was a composite capable of further divisions: While it is close to the physical body, it is an etheric body, but when “it is far away for some time, it abandons its etheric form and leaves with the astral one” (Durville, 1922, p. 5).

Most researchers, such as those of the Society for Psychical Research (e.g., Gurney et al., 1886; Myers, 1903), were not very fond of the idea of subtle bodies, and this prompted Hereward Carrington to write (as quoted by Bozzano):

It may be asserted . . . with considerable confidence, that the evidence for the existence of some sort of an “astral body” has been constantly accumulating as the result of our psychical investigations, and that this evidence is

now very strong. It need hardly be pointed out that, if this were once definitely accepted, it would enable us to account for a large number of otherwise baffling phenomena very readily—haunted houses, apparitions seen by several persons at the same time, psychic photographs, clairvoyance, etc.; and (assuming that such a body might occasionally move or affect matter) raps, telekinesis, “poltergeists,” and other physical phenomena. In fact, once the objective existence of an astral body be postulated, a flood of light would be thrown upon psychic manifestations, both physical and mental. (Muldoon & Carrington, 1929, p. xx)

ERNESTO BOZZANO

Ernesto Bozzano (1862–1943) (Figure 3) was a prolific student of psychic phenomena, today often forgotten especially because most of his works have been published in Italian, French, and Spanish, and have not had a wide circulation in English-speaking countries. During his life he published many books and articles on a wide variety of psychic phenomena, such as apparitions, clairvoyance, haunted houses and poltergeists, physical and mental mediumship, phenomena of psychokinesis at the time of a distant death, premonitions, etc. His studies, consisting of analyses of representative cases of the considered phenomenon, were above all aimed at promoting the concepts of non-physicality and survival of consciousness at bodily death, and with the same goal Bozzano included numerous discussions in which he defended the spiritist positions and attacked the positivist ones of science and psychological research.

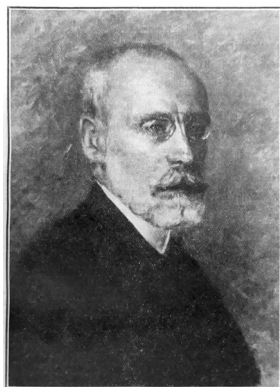


Figure 3. Ernesto Bozzano.

Bozzano was also known for his classifications of phenomena, which included the gradual modes of their manifestation. In his works, mostly monographs on one phenomenon at a time, he organized and presented many cases mainly drawn from spiritualistic and psychical publications. His systematic compilation of these cases made his work useful to those who wished to work through a poorly indexed literature. Bozzano cast his net widely, though, and the low level of proof supplied by some of his chosen examples diminished the value of his efforts.⁴

Bozzano was firmly convinced that the living and the

dead possessed the same powers, of a non-physical nature and independent from the material body, so the supernatural phenomena of whatever kind, both caused by the living and by disembodied agents, were, from his perspective, the source of clear and converging evidence of survival. As he (Bozzano, n.d. circa 1938) wrote:

Both are indispensable for the purpose and cannot be separated, since both are the effects of a single cause; and this cause is the human spirit, which, when it manifests in transient flashes during “incarnate” existence, determines animistic [by the living] phenomena, and when it manifests in a “discarnate” condition in the living world, determines spiritistic phenomena. (Bozzano, n.d. circa 1938, pp. viii–ix)

BOZZANO’S LA BILOCAZIONE

Bozzano originally published his analysis of the topic of bilocation in the Italian journal *Luce e Ombra* in a long multipart article entitled “Considerazioni ed Ipotesi sui Fenomeni di Bilocazione” (Considerations and Hypotheses about the Phenomena of Bilocation) (Bozzano, 1911b), which came out in the same year in English and French translations (Bozzano, 1911a, 1911c) (Figure 4). More than twenty years later he published *Dei Fenomeni di “Bilocazione”* (Bozzano, 1934), a longer monograph with more cases, which also appeared in French (Bozzano (1937, 1934), and is now in print in Portuguese (Bozzano, 2020/1934). Subsequently, he reviewed the topic in other works (e.g., Bozzano, n.d. circa 1938; see also Alvarado, 2005). The book that is being commented on here is a reprint of the 1934 Italian edition which includes a useful introduction by Cecilia Magnanensi, former secretary of the Biblioteca Bozzano-de Boni in Italy, as well as new footnotes with biographical information on individuals mentioned in the text.

At the beginning of the book Bozzano states that the word “bilocation” was a “term used by theologians, which summarizes the multifiform manifestations called ‘fluid splitting’; a name which in turn corresponds to ‘etheric body’, ‘astral body’, ‘perispirit’ . . .” (page 17).⁵ It is important to underscore,

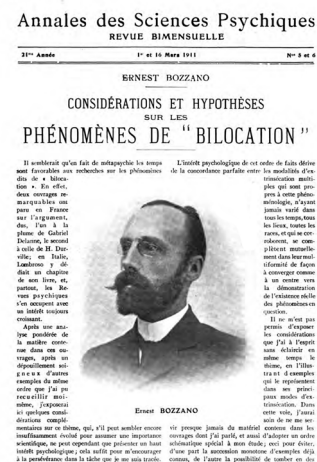


Figure 4. First page of article about bilocation in the *Annales des sciences psychiques* (1911).



however, that a similar characterization of the phenomenon came from Bozzano and did not necessarily reflect the thinking of theologians. Although some might also agree with him, most Catholic theologians used the term to solely designate the appearance of a saint in two places at once and did not dwell on speculations on etheric or astral bodies (see, for example, the classical writings of Fathers Ribet [1879, chap. 13] and Séraphin [1873, pp. 413–449]).

From a spiritualistic point of view, bilocation includes all forms of an individual's presence in two places at once: In one place with a physical, material body, and in another place—near or far from the previous one—with a non-material “double,” either subtle or etheric, i.e., made of an impalpable substance analogous to the ether which, it was believed, pervades space.

Bozzano specified his thesis in the first paragraph of his introduction:

The phenomena of “bilocation” are of decisive importance for the experimental demonstration of the existence and survival of the human spirit, because they show that within the “material body” there is an “etheric body,” which during earthly life in rare circumstances of decreased vitality (physiological sleep, hypnotic sleep, mediumistic trance, ecstasy, fainting, narcosis, coma) can temporarily leave the “material body.” Hence it follows that, if the “etheric” body is able to separate itself from the “material” one, often bringing with it consciousness, all memory and some peculiar sensory faculties, then it must be admitted that, when it will definitively separate from it at death, the spirit will continue to exist in appropriate environmental conditions. This is similar to admitting that the existence within the “material body” of an “etheric body,” and consequently of an “etheric brain,” demonstrates that the true seat of consciousness and intelligence is the “etheric body,” which is the subtle and immaterial envelope of the disembodied spirit. (p. 15)

The book consists of analyses of relevant cases, selected from various sources, and is intended to support the existence of an etheric body and survival of bodily death. To accomplish this, Bozzano classified the excerpts, according to their features, into four different groups that he believed illustrated the same basic process.

The first group consisted of feelings of completeness in amputees (the phantom limb phenomenon),⁶ and of doubling in some of those suffering from hemiplegia. Boz-

zano criticized the physiological and scientific hypotheses proposed at the time to explain these phenomena but offered little more than a theoretical preference for the idea of an etheric body. However, in his opinion, the vague perception of having an immaterial body that did not coincide with the material one may indicate the occurrence of an “initial degree” of bilocation.

The first class is then followed by cases of autoscapy, that is, instances in which a person sees an apparition of him-/herself. This section contains five cases, one of which (p. 32) I excerpted from the original source cited by the author:

I saw . . . a figure approaching me, which, on coming near, I discovered was the double of myself, except that the figure, which wore a white dress, had a charming smile. I also wore a white dress; the figure had black on its hands, whether gloves or mittens I do not know. I had neither. It was out of doors, coming down a garden walk. On holding out my hand to it, the figure vanished. [I was] 24 years old, in robust health, and not in anxiety or grief at the time. (Sidgwick et al., 1894, p. 74)

Bozzano admitted that many autoscopic cases are pathological, but he called attention to the contemporary physical sensations, such as feeling cold or tired, to discriminate the true doublings. He attributed such sensations to the process of projecting the double and thus causing a loss of “substance.” In these experiences the consciousness is retained in the material body, but sometimes the opposite occurs. Indeed, in a case included in this group there was dual consciousness, i.e., the sensation of being in two different positions at the same time: both in the physical and in the externalized body. Experiences of this type, apparently quite rare, made him think that autoscapy is

an initial phase of the phenomena of “bilocation,” in which the consciousness is no longer bipartite, but is completely transferred, together with the intelligence and the supernormal sensory faculties, into the external “etheric body,” while the material body lies in deep sleep, or in catalepsy. (p. 37)

This brings us to the next group of 20 cases, in which consciousness was completely exteriorized, as it is reported in OBEs.⁷ One such case, here cited from the original, was reported by physician George Wyld (1903) (Figure 5):

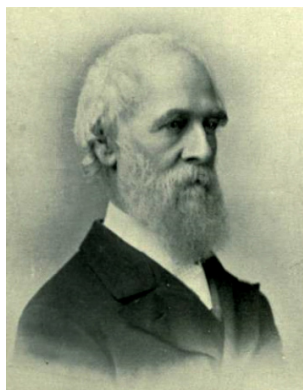


Figure 5. George Wyld.

One day in the year 1874, as I took chloroform to relieve the intense agony I was suffering from the passage of a renal calculus, I suddenly lost all pain, and as suddenly saw my 'soul-form' standing and contemplating my body as it lay motionless on the bed, about six or seven feet from where my 'spirit-form' stood. (Wyld, 1903, p. 34)⁸

Another case took place during the war, in a trench while the experiencer was extremely tired and in great physical discomfort:

I became conscious, acutely conscious, that I was outside myself; that the real "me"—the ego, spirit or what you like—was entirely separate and outside my fleshly body. I was looking in a wholly detached and impersonal way, upon the discomforts of a khaki-clad body, which whilst I realised that it was my own, might easily have belonged to somebody else for all the direct connection I seemed to have with it. I knew that my body must be feeling acutely cold and miserable but I, my spirit part, felt nothing . . .

In the morning H. [his companion in the trench] remarked to me upon my behaviour during the night. For a long time I had been grimly silent and then suddenly changed. My wit and humour under such trying circumstances had amazed him. I had chatted away as unconcernedly as if we had been warm and comfortable before a roaring fire—"as if there was no War on" were his exact words I remember. [The last four sentences were not cited by Bozzano.] (Two hallucinatory bilocations of the self, 1929, pp. 127-128)

Bozzano notes that the phenomenon rarely manifests under normal conditions and that, if it is so, the projections take place in "circumstances of absolute rest of the body" (p. 41). Of the 20 cases making up this group, five had occurred while the experiencer was under the effect of anesthetics, and two each while the person was hypnotized or ill. The other instances had involved either people asleep, or asphyxiated, in a coma, depressed, exhausted,

falling, injured, giving birth, smoking, doing automatic writing, or falling asleep.

Also noteworthy was the detail that when "the doubled phantom moves at a distance, truthful perceptions of distant things or situations almost always occur . . . which sometimes happens even in cases where the doubled phantom does not move away from its body" (p. 41). All of this was a strong proof in support of the objective nature of the experience.

Finally, in the last group Bozzano collected experiences in which subtle doubles of living people were seen, often without the sensation of an externalized consciousness. The following is a case (cited on pp. 94-95) concerning an apparition prior to the death of the body:

I was in my bedroom being undressed by my maid . . . when I saw, just behind her about two feet off, her exact resemblance. She was then in perfect health . . . On the following Sunday, she was only poorly. I went for a doctor at once, who said she was a little out of sorts. On Wednesday evening she suddenly died. (Myers, 1895, p. 448)

Here it is a second-hand case of an apparent long-distance visit involving a woman who would not live long (pp. 103-104):

One Sunday afternoon she expressed to her sister her great regret at never having heard her fiancé, the pastor several leagues from there, preach. She fell into catalepsy, and lay for two hours as one dead. When she awakened she told of having seen her fiancé, and of having heard him preach in such and such a way. She died the next day. After the burial, Madame Turban [the informant] asked the fiancé if on Sunday afternoon he had preached on such and such a subject. Struck by her question, and very much surprised, he asked, "How do you know that?"—"Your fiancée told me."—"It's very strange," he answered. "Just imagine—in the middle of my sermon I thought I saw a white form enter the church, which resembled my fiancée; she sat down in an empty seat in the midst of the assembly, and disappeared toward the end of the service." (Flammarion, 1921/1922, p. 123)⁹

Other cases, among the most interesting ones in the book, consisted of visions of lights and shapes near the bodies of dying people. According to Bozzano, these are objective findings, especially when perceived by several

witnesses, which have great theoretical value as

they represent the initial phase of the “deathbed bilocation,” in which subtle substance escapes from the “material body” and, after repeated ups and downs caused by temporary reabsorptions into the organism (related to the ups and downs of the vitality of the dying person), ends up organizing into an “etheric body.” (p. 110)¹⁰

Mists were sometimes perceived, as in two instances that Bozzano took from Sophia de Morgan’s (1863) *From Matter to Spirit* (pp. 111–112), while other ones involved lights and subtle bodies. *La Bilocazione* also includes a fascinating case observed by members of one family. The experience took place around their mother’s deathbed (pp. 117–118). The following paragraphs are a few extracts from the original report of this case.

During the afternoon we saw bright blue lights, sometimes near her and sometimes about the room. We could only see them for a second or two, and usually only one or two of us at a time . . . At dusk that afternoon, as she lay perfectly quiet, I and three sisters all at once noticed a pale blue mauve haze all over her as she lay. We watched it and very gradually it deepened in colour until it became a deep purple, so thick that it almost blotted out her features from view, and spread all in the folds of the bed-clothes like a purple fog. Once or twice she feebly moved her arms and the colour travelled with them. We thought it very wonderful, so called the two remaining sisters to see if they could see it too, and they could. At this time our sister saw a grey smoke-like object pass between two chairs; it was about three feet high and just glided away from the bed. I was sitting there, but did not see it. As we watched, very gradually patches of bright yellow light, like sunlight, appeared on the pillow; one at the left side of her head was particularly bright sometimes, and then would slowly dim and once more become bright again. Mother’s old friend was also in the room during this time, but she neither saw the purple mist around mother nor the blue lights, and said that our eyes were tired with watching and that we were over-wrought. We drew her attention to this very bright patch on the pillow and she saw it, but said it was the reflection of the fire or gaslight; we screened both, and she then went round the room and moved pictures

and photograph frames and tilted the mirror, but without making any difference to the light. At last she came and put her hands directly over it, but without shading it in any degree; after that she sat down without saying a word. Early in the evening I saw my eldest sister, and the other sister who saw the grey object before, both turn and look at the same time to the place where it had appeared, and they saw it once more; again I did not see it but they both did, and both agreed as to the description. The sister who first saw it about this time also saw a large blue globe-like light resting on mother’s head, but none of the rest of us could see it. She claimed that the inside appeared all moving and gradually it turned to deep purple and faded out.

About seven o’clock that evening mother’s lips parted and from that time we gradually saw a thick white mist collect above her head and spread across the head of the bed. It came from the top of her head, but collected more thickly to the opposite side of the bed in which she was lying. It hung like a cloud of white steam, sometimes so thick we could scarcely see the bed rails, but continually it was varying although it moved so slowly as to be scarcely perceptible. I and my five sisters were still with her, and all saw it distinctly, also my brother and one brother-in-law. The blue lights continued about the room, also in flashes of yellow, like sparks, appeared sometimes. All this time mother’s lower jaw gradually fell a little. For some hours we saw little difference except that a halo of pale yellow light rays came round her head; there were about seven in number; they varied in length from twelve to twenty inches at different times. By midnight everything had cleared off, but she did not die until 7.17 on the morning of January 2nd. (Monk, 1922)

Bozzano argued that the preceding case was beyond critique because it had occurred recently and been reported by the percipients soon after, and “all those present at the deathbed saw in an identical manner the unfolding of the phenomenon in every phase” (p. 118). These considerations led him to state that the hallucinatory hypothesis could be excluded with certainty, and that “the objective existence of the phenomenon [was] scientifically proven” (p. 119). However, he was not completely correct, as in reporting the case he omitted the first paragraph above, and therefore did not take into account that some of the relatives had feelings and perceptions that were not reported

by other relatives. The story included somewhat subjective elements and did not conclusively support the presence of an objective subtle body as Bozzano believed.¹¹

Then, commenting on the different perceptions—vision and touch on the shoulder—experienced by two witnesses near a dying woman (p. 129), he pointed out that to induce those sensations a “fluidic form” of the woman must have appeared physically in the environment in which she was seen. A similar point was made later in the book (p. 131), when Bozzano discussed an apparition included in the *Phantasms of the Living*, in which the “presence” had been perceived by three witnesses but through differing sensory modalities. Such cases may tell us something about how the experiences depend on the sensitivities and psychological styles of the percipients, but for Bozzano “these complex and interesting manifestations suggest[ed] the presence in the place of a spiritual agency capable of recognizing specific perceptive styles of people, and of adjusting itself to signal its presence through supernormal impressions” (p. 131).

Lastly, he relates a few cases of whole-body apparitions seen around dying people (pp. 133–139). Three of those experiences had been reported by nurse Joy Snell (1918), who was said to have frequent perceptions of similar phenomena near her dying patients.

Noting that bilocation phenomena clearly imply the existence of a double, Bozzano argued that they were “the necessary complement, or better the *sine qua non* condition of the existence of a great part of metapsychic phenomena, starting with some spontaneous forms of post-mortem apparitions, and ending with the experimental phenomena of ‘materialization’” (p. 146). However, despite the relevance of the works of such authors as Albert de Rochas (1895), Hector Durville (1909), Baraduc (1908), and Moses (1875), he had to admit that science still did not accept the existence of the subtle body. But according to Bozzano it was only a matter of time, because in the end scientists would realize that materialistic explanations could not explain the phenomena; and this, consequently, would have many philosophical, social, and religious implications. He believed both the “convergence of proof” (p. 155) provided by the cases of different nature included in his classification, and the “ascending gradation of analogous phenomena, that prove to be intimately connected to each other, completing, validating, integrating, and reinforcing each other” (p. 156) would become very useful, given that they contributed to the strength of experimental evidence.

EVALUATION OF THE BOOK

La Bilocazione, first published in book form in 1934, was to some extent a synthesis of previous ideas about

subtle bodies. Even if the case classification was an original contribution by the Italian scholar, the work also took up ideas of other authors (e.g., Mattiesen, 1931; Muldoon & Carrington, 1929; Volpi, 1890).

For current readers, the book still has a lot to offer. First, the emphasis on the witnesses’ experiences and their narratives point to the importance of paying attention to individual cases, and not only—as is preferred today—to collections made up of many examples. The individual cases and especially the collections allow quantitative, statistical, and demographic analyses. But detailed and deep attention to the unique stories the witnesses provide allows us to consider the features and structure of the experiences, to extract new details that are important, suggest new research avenues, and allow a gradation in the scales of specific dynamics or features. Because of Bozzano’s method, he—and those who have come after him—have been able to see that, among other things, the acquisition of information during journeys out of the body, or the cord-like connections between the physical and etheric bodies are found in some, but not all, of the experiences he considered. In addition, Bozzano brings to our attention such phenomena as apparitions of the living that have been neglected in recent times. The same can be said of the deathbed cases he included, in which individuals around the dying person see mists, lights, and subtle bodies that represent the dying person, and sometimes other spirits (Alvarado, 2006; Moody, with Perry, 2010). By bringing Bozzano’s work back to the attention of modern researcher, I hope that future investigations of new cases in which the features of the experiences also are considered will be conducted.

Another line of research that might be inspired by this new look at Bozzano’s cases and his methods is the focus on the psychological traits of those who experience and report the phenomena he covered (on the importance of these issues, see Alvarado, 2006). Furthermore, as already mentioned, this book, as happens for many of Bozzano’s publications, can be used as an index to interesting but otherwise forgotten cases, lost to today’s researcher because of the failings or outright lack of indexes available for the original documentation.

However, it should be noted that the volume has some problems. One of these is the varying level of evidence in the included cases. Bozzano extracted texts from sources with less-than-optimal reliability and, although he took some of them from the SPR, he did not comment on the methods by which corroborating evidence were gathered, if at all. In the treatment of the Monk case, for example, Bozzano did not seem interested in the detailed testimony of all the individuals involved in collective cases. That he seemed to take summaries of one person’s experiences as

told by another person at face value was certainly as problematic then as it is now.

The evidential status of the experience narratives is also relevant for the explanations Bozzano proposes. There is no doubt that there are similarities between the cases, and that some of them, such as OBEs and deathbed experiences, suggest that something is leaving the body. But the evidence does not seem so strong or persuasive to be as sure as Bozzano was that the phenomena proved an etheric body produced the phenomena. The reader's discomfort with Bozzano's conclusions increases when it becomes clear that while Bozzano expressed his ideas in very definitive terms, he also dismissed or ignored criticisms or counterarguments from other scholars.

Finally, I find it strange that Bozzano did not deal with other issues relevant to his argument. He mentioned some characteristics of the OBEs, but he could have said much more on topics such as the places visited by the experiencers, the descriptions of their OB bodies, and the varieties of their sensory experiences. The book also lacks discussions on the possible differences between occasional and recurrent OBEs (e.g., Muldoon & Carrington, 1929; Turvey, n.d. circa 1911), and on the disparate doctrines of the subtle body and the etheric brain by other authors (e.g., respectively, Besant, 1896; Leadbeater, 1895). Bozzano overlooked intentionally produced apparitions and so-called "arrival apparitions" (Vardøger cases), in which a person is seen or heard in a place where the individual has not, in fact, arrived.¹² My impression is that because he was concerned primarily with proving the existence of the etheric body, he showed little interest in highlighting varieties and commonalities of the phenomena.

Today the issue of subtle and etheric bodies is unpopular in scientific circles (for one exception see Tressoldi et al., 2015) and among members of the parapsychological community, some of whom simply state that "jury remains out . . . on the *physical* reality of subtle bodies" (Kelly, 2015, p. 509), that those phenomena may have hyperspatial dimensions (Carr, 2015), or that they are veridical hallucinations (Braude, 2003). However, Bozzano's book underscores that it is possible that a continuum exists between such phenomena as apparitions of living, OBEs, and deathbed observations, as others have commented (Nahm, 2011). His study also reminds us that the current tendency to define such experiences as hallucinatory by emphasizing psychological and neurological explanations does not clarify everything that occurs in nature. It is my belief that *La Bilocazione* is undoubtedly worthy of being read and that the useful points that Bozzano has raised should be taken into consideration.

NOTES

¹ An important example are the writings of theosophists (e.g., Besant, 1896; see also Deveney's 1997 study). A theosophist referred to various vehicles, or bodies, of which the physical body was one:

It might be said that there exist around us a series of worlds one within the other (by interpenetration), and that man possesses a body for each of these worlds by means of which he may observe it and live in it. (Leadbeater, 1902, p. 35)

Others, such as French occultist Charles Lancelin (1925), believed in the existence of various bodies as well.

² One author referred to a "double . . . which can separate from . . . and act as the natural or material body, united however by an electrical cord, the sundering of which would produce the death of the physical body" (Watson, 1876, p. 187). English psychical researcher Frederic W. H. Myers (1903) wrote that "self-projection . . . is the one definite act which it seems as though a man might perform equally well before and after bodily death" (Vol. 1, p. 297). Many later writers also related OBEs to survival of death (e.g., Mattiesen, 1931; Muldoon & Carrington, 1951). In addition, various authors presented observations of emanations (mist, lights, subtle bodies) from dying persons (e.g., Davis, 1850; De Morgan, 1863; Monk, 1922), a topic discussed by Bozzano in his book.

³ Referring to this principle, one writer wrote about "the existence of a special state of dynamism outside the human organism" (Volpi, 1890, p. 318). Some speculated that medium's doubles were the basis of some séance materializations (e.g., Coleman, 1865, p. 127). Regarding the famous spirit materialization Katie King, it was stated that she was "not an independent spirit, but the spirit, or 'double' of the medium . . ." (Spirit forms, 1873, p. 452). The topic continued to be discussed in later years (e.g., Fodor, 1934).

⁴ For references and details about Bozzano's life and work, see Alvarado (2016), Gasperini (2012), Iannuzzo (1983), and Ravalchini (1993). Some works that well represent Bozzano's approach and beliefs are his essays about death-related phenomena, his critique of a book by René Sudre, and his general discussion of issues related to survival of death (see, respectively, Bozzano, 1923, 1926, n.d. circa 1938).

⁵ Some early comments about the perispirit were published by Kardec (1860, pp. XV, 38–39, 59). Summarizing communications received from mediums, this author stated that the perispirit provided a link between the spirit and the physical body. Its force "is drawn from the

surrounding environment, from the universal fluid; it holds at the same time electricity, magnetic fluid, and, up to a certain point, inert matter" (p. 119). It would also be involved with organic processes, and with psychic phenomena, but it would not carry consciousness with it. Later discussions, also informed from spirit communications, related the concept to the unconscious, to memories, and to human morphology (Delanne, 1897).

⁶ On discussions about phantom limbs consistent with Bozzano's, see D'Assier (1883/1887, pp. 103–104) and Bouvery (1897, pp. 44–47). Justinus Kerner (1829/1845) stated that when Friederike Hauffe, the famous Seeress of Prevoist, "saw people who had lost a limb, she still saw the limb attached to the body; that is, she saw the nerve-projected-form of the limb . . ." (p. 77).

⁷ He was only presenting a few examples of published cases. Many others can be found in the literature, such as a complex case reported by the medium D. D. Home (1864, pp. 44–47), the reports of recurrent experiences (e.g., Muldoon & Carrington, 1929; Turvey, n.d. circa 1911), and various other cases (e.g., Dubet, 1894; London Dialectical Society, 1871, pp. 162–163; Wiltse, 1889).

⁸ Wyld (1895) wrote to the British medical journal *Lancet*, mentioning his experience and arguing that because anesthetics were widely used there should be many cases like his experience. He had already commented on the use of anesthetics to prove the existence of the soul, and cited experiences of others that supported his ideas (Wyld, 1880, Chapter 7).

⁹ Another even more interesting case cited in the book (pp. 104–109) was one reported by William T. Stead (1896) of a Mrs. A, seen by Stead and others in a church service while she was ill at home. In his explanation for the fact that the lady was wearing garments appropriate to the occasion rather than what she would have been wearing in her sick room, Bozzano asserted that "thought is a plasticizing and organizing force" (p. 109) and assumed that the lady thought of herself as wearing proper attire for the environment in which she was seen. Later in the book the author commented (p. 145) on Wiltse's (1889) classic experience of leaving his body, pointing out that when he realized he was out of his body naked and in front of ladies, he felt embarrassed and soon after found himself clothed. Bozzano (1926–1927) also discussed the power of thought in a different study.

¹⁰ This is consistent with the idea that the perispirit separates from the physical body at death gradually, "and as long as the disturbance lasts, it retains a certain affinity with the body" (Le lien de l'esprit et du corps, 1859, p. 128). See also Lancelin (n.d., pp. 15–16).

¹¹ Gurney et al. (1886, Vol. 2, pp. 221–223, 237–238, 619–

622) have discussed selective percipience (see also Alvarado, 2006, pp. 146–147). For another selective deathbed case, see 'Hallucinations experienced in connection with dying persons' (1908, pp. 309–310).

¹² Interestingly, most of the reports of these cases, as well as of apparitions of the living happening during crises, do not include descriptions of the experience of being out of the body.

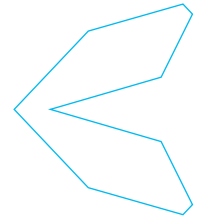
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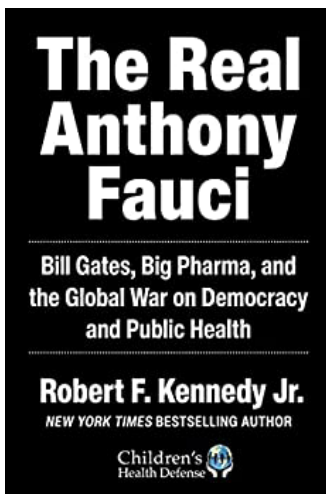
BOOK REVIEW

***The Real Anthony Fauci. Bill Gates, Big Pharma, and the Global War on Democracy and Public Health* by Robert F. Kennedy, Jr.**

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DISCLOSURES

I have done some background research and reading on mercury toxicity (Mutter et al., 2010; Mutter et al., 2005), from thimerosal (ethylmercury, a preservative that used to be in vaccines until about 10 years ago) to amalgams. This is an area where Robert F. Kennedy has been politically quite active with his Children's Health Defence foundation. I am therefore favorably inclined to Kennedy's activities, although I am certainly not an antivaxxer. I have also done primary research on Covid-19 right from the beginning (Walach & Hockertz, 2020a, 2020b)—modeling (Klement & Walach, 2021), conducting surveys (Walach et al., 2022; Walach et al., 2021c), looking at data, blogging in Germany—conducting two highly visible and highly controversial studies (Walach et al., 2021a; Walach et al., 2021d), which have both been retracted within a week, one of them republished (Walach et al., 2021b), the other still under a new review. I was critical of the official Covid-19 narrative as soon as I discovered huge discrepancies between original data and reports in the media, as well as analyses of media-prone scientists who were ostensibly wrong; we have succeeded in publishing a critique of one such dangerously wrong analysis (Dehning et al., 2020) about 2 years after the original one was out, following two rejections and long rounds of reviewing (Kuhbandner et al., 2022). So, I have learned a lot of lessons there. I initially thought, we are dealing with a mistake. The more I saw, the more I lost that stance of innocence and thought that perhaps there was an initial accident or problem, but surely very soon some people used it to ride their own hobbyhorses. Collateral utility, as I call it. That is the reason I embarked on my own social-science study: interviews with activists in Germany and elsewhere, who wrote articles, blogged, were visible in the public. I have conducted 13 interviews so far, and the tacit and express knowledge from those interviews is of course also feeding my viewpoint.

So, I approached this book with eagerness, hoping to find some enlightenment for all the puzzles I had encountered: the hostility of peers who did not agree with my findings, for instance. I have published controversial stuff previously. But never before did I feel such vitriolic hatred, even from very good colleagues who happened to see things differently. Never before was my sincerity and honesty, even though I might be mistaken, challenged. And never before was my university position cancelled because of an inconvenient analysis that some saw as wrong, as happened to me in summer 2021. Never before was I the object of a shitstorm hashtag on Twitter.

Readers of the journal and members of the SSE will be familiar with these experiences. They happen whenever a core of a fortified mainstream narrative is challenged either by data, analytical reasoning, or both.

All these personal experiences convinced me, reluctantly, I must say, that whatever was at the base of this worldwide Corona virus crisis was much more sinister than just a grand mistake. That was the point in time when I happened to come across the title of



this book, was electrified, and bought it. It is a long time since I have been as thrilled by a book that related facts, not a novel.

It is an important book because it poses a fundamental challenge to the integrity of medical science in the United States, and indeed worldwide, and especially regarding COVID-19 science. With all of its own bias—see below—it is still a very important contribution that should be read and discussed widely.

CONTENT OVERVIEW

This is an extremely well-researched piece that tries to unravel the network of conflicts of interest that might have contributed to, or triggered, the Corona virus crisis. It is the background research for a coroner's inquest for a charge of high treason. The author is of course not so stupid as to say so, but this is what I read between and behind the lines. It incriminates Anthony Fauci, the head of the National Institutes of Allergy and Infectious Diseases (NAID) with having instigated, funded, and overseen the research in the virology lab in Wuhan, which was the trigger for the pandemic, and with having covered up these origins. It also charges him with having built up an immensely dense web of researchers, who, out of comradery, but also because they depend on his funding, do his bidding. They are in such powerful positions as journal editors, reviewers on panels that judge license applications for drugs or grant proposals to steer the scientific and public opinion. Ten years ago, Bill Gates entered the picture with his foundation, making friends with Fauci and offering him collaboration for their mutual benefit, and, allegedly, that of mankind. The latter is of course the public image both of Fauci and Gates and his foundation. But in reality, so the narrative in the book goes, they are only interested in propelling their influence, power, and wealth. Fauci, by holding a job that is the best remunerated position of all public offices, including the president of the United States, and by owning wagonloads of patents (Martin, 2021) and shares in pharmaceutical companies, such as Gilead pharmaceutical or Moderna, that produce the very products Fauci and his cronies invent and patent. Gates, by investing in those companies through his personal shareholder company and his foundation, thus increasing his return on investment massively, and being part of the big international game of restructuring not only the health of the human population but also the political arena.

This is the reason why Kennedy calls this whole thing a "coup d'état." This is the most decisive word in this book, I feel. It is very cleverly placed. It shows up only on page 389 of 450 pages, when Kennedy discusses the infamous role of Robert Kadlec, a bioweapons expert for the US Army.

He was President Trump's Covid-19 crisis manager. But he had long-time connections, it seems, with various CIA activities that Kennedy describes in this last part of the book. He shows how the CIA was involved with various vaccine operations across the world, and, of course, various coup d'états:

The pervasive CIA involvement in the global vaccine putsch should give us pause . . . The CIA has been involved in at least seventy-two attempted and successful coups d'état between 1947 and 1989, involving about a third of the world's governments. . . . The CIA does not do public health. It doesn't do democracy. The CIA does coups d'états. (p. 389)

There you have it. This is the place where the vocabulary changes to a clear treason-suggestive narrative. Then follow various descriptions of exercises—biowarfare threat simulation, preparedness exercises, modeling exercises—in most of which some military and CIA input can be detected through people organizing these exercises. The book culminates in the stark statement, toward the end:

After twenty years of modeling exercises, the CIA—working with medical technocrats like Anthony Fauci and billionaire Internet tycoons—had pulled off the ultimate coup d'état: Some 250 years after America's historic revolt against entrenched oligarchy and authoritarian rule, the American experiment with self-government was over. The oligarchy was restored, and these gentlemen and their spymasters had equipped the rising technocracy with new tools of control unimaginable to King George or to any other tyrant in history. (p. 433)

This is a clear conspiracy narrative. Well, having read Talbot (2015), I can understand Kennedy. There, a conspiracy against JFK and his father Robert Kennedy, Sr., is alleged, at whose core the CIA is surmised to be. Thus, here comes the challenge to duel. Not with saber or pistol, but with words and the judiciary system. After all, Kennedy is a lawyer and knows his business. If a coroner picks this book up, he would be obliged, in my lay version of judicial understanding, to charge Fauci, and perhaps Gates, with high treason. That is, after all, what planning a coup d'état is.

Now, let's be clear: Nowhere is this allegation directly mentioned. This is my reading between and behind the lines. But the whole architecture of this book works toward this conclusion. And the words carrying the uttermost weight in the proceedings are not Kennedy's own words. Rather he lets others speak: Many of the direst passages are quotations from other people's books, papers,

interviews, as if a lawyer were letting witnesses speak.

A man of Kennedy's stature, who has made a lot of enemies already, would not survive a day without being sued for billions, if anything of what he says and alleges in this book were not either pretty well documented and proven, or the opinion of someone else who—freedom of speech—anyone can quote. And so this basic argument is craftily built up from the beginning. Everything that is factual is extremely well supported by references. If I counted correctly—the notes are at the end of the chapters—then we are talking about roughly 2,200 references. Many of them lead to newspaper and magazine publications, Youtube videos and interviews, but quite a few are also original scientific references, monographs, and journal publications.

Thus, the end makes the subtitle clear. The book is about a conspiracy narrative. At its core is Anthony Fauci. His co-conspirator is Bill Gates in Kennedy's story, who both together used, if not crafted, that SARS-CoV-2 pandemic to press through with a medical agenda, bringing those novel vaccines into the world's population, and using the resulting chaos to install a somewhat more autocratic way of handling the world, abolishing a lot of what used to be all too self-evident: liberties of movement, freedom of speech, let alone sufficient income and security, as well as a psychological sense of safety.

Is this conspiracy narrative plausible? Yes, if you accept that conspiracies are not always, but sometimes, behind what we see, and if you accept that while some details might be wrong the large picture remains untouched. Is it politically viable? We shall see. It will be viable if the larger politics follow the route laid out so far, and my guess is that this is exactly what the author wants to prevent. I myself have become a conspiracy convert, mainly through the book shedding light on my own experiences. Had I not been involved with this whole business, I might have put the book down; oh no, not another conspiracy theory. But having been activated and having found myself in the limbo between hard-to-swallow policies on the one hand, mask mandates, lockdown, restriction of freedom, and a reality that did not at all warrant those activities, I was in need of an explanation. For a long time, my explanation was a Talmudic saying: "There are two things in the universe that are infinite: God's mercy and human stupidity."

Human stupidity, when confronted with a novel challenge, together with media activists who act like headless chickens and are largely innumerate, go a long way to explain irrational reactions, unsound policy decisions, and unscientific pronouncements. But as one commentator in Germany observed: After about half a year it had become clear that none of the fear-mongering scenarios had borne out. In Germany, as was even officially pronounced in 2020, the year of the pandemic, our hospitals had fewer beds

occupied than in 2019, the intensive care units were less challenged and had fewer places filled than in 2019, and the number of respiratory diseases in hospitals were fewer than in 2019 (Frank, 2021). Never was there a shortage of ICU beds (Lausen & van Rossum, 2021). And there was no surplus mortality out of the ordinary. That might have been different in other countries. All that was obvious in the middle of 2020, and still our politicians drummed up fear of the virus and the collapse of the health system, and said: Only if we have a vaccination, will we be able to return to normal. And many thought that this behavior was in need of explanation. Would stupidity be sufficient? Are our leading politicians indeed so stupid? I thought: could be, who knows. We know that humans are very bad at judging random events as random, and they are very good in detecting patterns where there are none. Better detect one tiger too many than one too few. Your survival depended on it in olden times. So, we see "invisible hands" where there are none, and we are prone to detect mischievous plans where there is only incompetence. That, really, is the alternative explanation for the fiasco that we are in the midst of experiencing.

Kennedy now puts diverse threads together and weaves a net as dense as Fauci's net of cronies and dependents. Whoever wants to understand this should read this book. Even if one does not buy into the grand narrative of conspiracy developed here, it is a fountainhead of detailed knowledge and surprising insights. I am presenting some that were important for me.

The NIAID, the sub-branch of the National Institutes of Health (NIH) Fauci runs, was a minor agency under threat of dissolution, together with the CDC in the 1950s and early 1960s. This was because infectious diseases, a major public health threat in the war years, were ever more receding. Good nutrition and sanitation were the most important drivers of this development. So NIAID director Richard M. Krause developed "The return of the microbes" strategy (p. 130). This was what Fauci took over from his boss, when Krause stumbled over a pharma scandal and vacated his seat for Fauci in 1984. Today, NAID is the single largest agency within NIH with an annual budget of 6 billion USD.

Enter HIV/AIDS in the 1980s. This is a fascinating story. Kennedy devotes some 120 pages to it, as this is the template: Via the hyping of a pandemic that never was and that was contained among subpopulations, Fauci succeeded not only to up his budget considerably, he also pulled the research—and the power—from the National Cancer Institute to his agency, together with the budget. He or some of his researchers developed some patents and the antiretrovirals took off: extremely potent, toxic, and expensive. This laid the ground for his power: a king's budget to distribute

to loyal barons, a dense network of researchers and reviewers, inroads into all kinds of political and media circles.

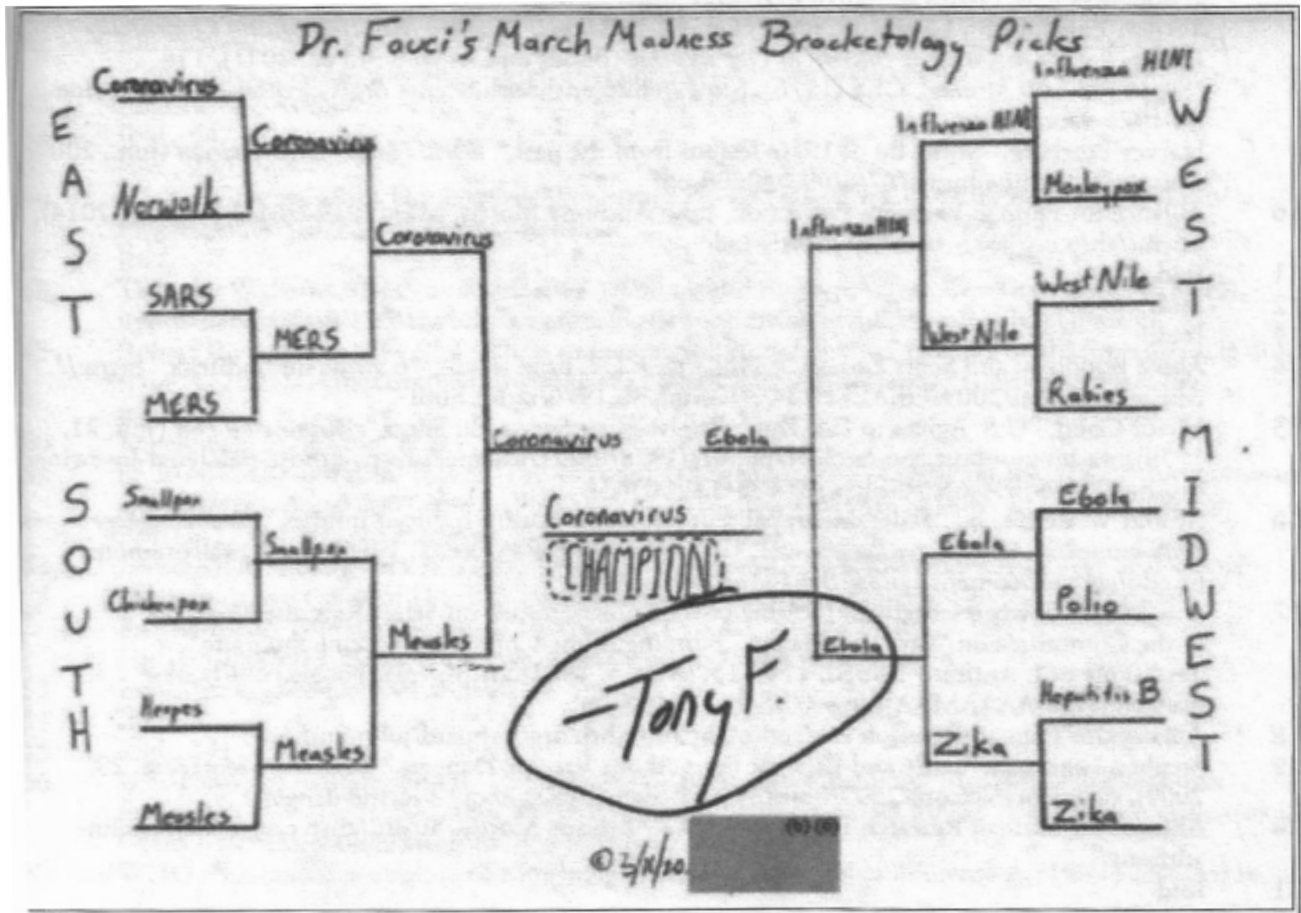
From then on Fauci had developed a simple strategy: When one scare vanishes, cook up a new one—bird flu, swine flu, Ebola, SARS, MERS, now SARS-CoV2—and always with a lot of noise. Each was a huge scare, with a dutiful entourage of scientists that supported his predictions, modelers that generated the scary figures, which never turned out to be true but which always provided him with an ever-growing budget and influence such that no one dared cross him for fear of personal consequences. That is the story Kennedy describes. An email dump of Fauci’s revealed by a Freedom of Information Act request and discussed in the *New York Post* on June 5, 2021, signed by Fauci himself on March 11, 2020, shows this tournament of scares graphically. The winner is: Coronavirus (Figure 1).

The final act: Due to the bioweapons convention, active research in bioweapons was largely disbanded in the US, Obama restricted research on gain-of-function of viruses, except “patriotic use,” i.e., some research on vaccines and potential threat scenarios as defensive research. And Fauci

and his cronies, Daszak, Baric, and others had to relocate their research into other countries. The newly built Wuhan lab was one of the prime funding recipients that received money from NIH, DARPA, and other agencies, often channeled through Daszak’s Eco Health Alliance, says Kennedy. And this is where the story begins:

Email material from Fauci, opened up via a Freedom of Information Act inquiry, shows that Fauci knew of the potential lab origin of the virus and had a problem, because the research was funded by him. Andersen of the Scripps Institute, who was the first to publicly call those who said otherwise conspiracy theorists (Andersen et al., 2020), alerted Fauci to a potential lab accident with Fauci’s “fingerprints on it.” An emergency phone call was arranged with all the top names in the field who later signed the infamous letter declaring the pandemic a zoonosis (Calisher et al., 2020), including Germany’s virus chieftain Christian Drosten, who alarmed the German public in weekly podcasts and frequent TV airings.

Might Fauci have made clever use of that accident? Kennedy suggests that. The vaccination platforms had



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Figure 1. Scan of email-dump by Anthony Fauci published June 5, 2021, by the *New York Post* (Kennedy 2021, p. 371, reference note 142 on p. 377).



been developed many years ago, against other diseases such as HIV/AIDS, with no positive effect but with some disastrous consequences, which Kennedy details over many pages. Fauci, and Gates, had their stakes there—patents, shares in the companies, etc. Did they also actively promote this? It seems so, as they started investing in the respective companies early on, earlier than the pandemic was known. Kennedy is meticulous in his notes.

Let me give you one example: Medical doctors in the US and elsewhere had alerted the public to the benefit of early treatment of Covid-19 with antivirals, mainly cheap generic ones like hydroxychloroquine or ivermectin, together with anti-inflammatories zinc and later on aspirin for preventing clotting, if the early interventions were insufficient (McCullough et al., 2021). Altogether this proved useful and cheap, as the substances were all available; it would simply have been some off-label use, as hydroxychloroquine and ivermectin were antiparasitic medications, which, however, also are antivirally active. These cheap regimens were aborted, mainly by Fauci in cooperation with some WHO and researcher input from conflicted researchers. Why? Because Fauci had his own horse running, remdesivir, an antiviral agent that used the very same pharmacological principle as ivermectin, only it was patented and by many orders of magnitude more expensive, and much more laden with side effects. Fauci held a patent and it is produced by Gilead Pharmaceutical, a company Fauci appears to hold shares in. Kennedy cites some interesting cases where the usage of ivermectin contributed to a drastic fall in Covid-19 morbidity and mortality in India, some countries in Africa, and apparently also in China which seems to have adopted the McCullough protocol or something similar.

The turning point in the narrative is a 2010 meeting between Fauci and Gates in which Gates seems to have proposed cooperation to mutual benefit which Fauci obviously accepted. What happened next will have to await a new bestseller, I guess. But it is clear from the material presented that they teamed up in developing new patents, investing into research that benefited their mutual or individual interests. It is known that Gates has high stakes in the international vaccination campaigns. He donates via his foundation to NGOs like the international vaccination alliance GAVI, which he supports, or the WHO, where he is one of the five most important sponsors. He buys shares in the respective companies that produce the vaccines. And even though WHO and other organizations buy the vaccines at reduced costs and distribute them around the world, the profit goes back to Gates via his personal shareholder company that pockets the profits. Capitalist philanthropy: You invest one dollar via a charitable donation which multiplies by the activities you support and flows

back into your pockets tenfold or more. And it is known that Kennedy has a high stake in countering this.

So it is not surprising that Gates is the villain in that narrative, trying to kill off half the population with vaccines that are designed to make girls barren in Africa under the guise of philanthropy, gruesome but well-documented, and supporting another one of his pet projects, reducing net-carbon output to zero (Gates, 2021). A chapter is devoted to the eugenic leanings of the Gates family and the Rockefeller Foundation associated with the Gates. A series of chapters is devoted to some very dubious experiments in Africa to test useless HIV-vaccines with much collateral damage. Kennedy evokes his uncle Ted Kennedy, who as a U.S. Senator made the Tuskegee experiments on prison inmates public and stopped them, where syphilis was inflicted and went untreated to study its natural course (Rockwell et al., 1964). He puts some of the Fauci–Gates vaccination experiments on the same line. I am not knowledgeable enough to judge whether that is correct. But the documentation seems to support the claim. And on and on it goes. Its 450 densely printed pages are the story of a monstrous, heinous greed and preposterous arrogance of being the world's savior. If only 10% of what Kennedy says is true, it would be bad enough. And from what I know, I have discovered very few, quite minor mistakes.

PROS, CONS, AND CONTRIBUTION TO THE LITERATURE

There are weaknesses: The book meanders sometimes; some chapters are less well-written, possibly due to some assistants taking over. There are detours, like attacks on all kinds of vaccinations, reentries, and redundant information. Some references would have benefitted from going to the sources instead of giving secondary references. But overall it is diligently done and captivating writing. No measured academic pros and cons, but with careful crafting of words. It is a book on the way to the bestseller shelves. But there are not many books on those shelves that are its equal. The book marks a new era—the era where revolutions do not happen by force, but by nudging, media presence, and brainwashing. Or should we say brain mask mandates?

There is an old saying: The opposite of good is not bad, but well-intended. Now, this is what we see here: apparently well-intended, and perhaps even believed to be, acts of philanthropy, and sometimes greed and power-mongering badly clothed as philanthropy. Even if Kennedy is wrong, this dense network of grant recipients of the Bill and Melinda Gates Foundation—some 30,000 or so institutions worldwide—is of course a network of people grateful, dependent, and likely eager to return a favor. Whoever

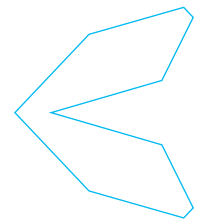
is a recipient of a grant will be nobly inclined toward the benefactor and turn a blind eye to a benefactor's shrewd actions. Our German weekly *Der Spiegel*, once a critical magazine, has received grants by the Gates foundation and since has lost most of its teeth regarding medicine and vaccination. That's just one example.

So, the consequence of Kennedy's analysis, even if his conspiracy theory turns out to be wrong, is lucid: If we allow big money to buy its influence everywhere and to promulgate the opinions and standpoints of those who own and distribute it, then we are actually already living in a plutocracy, in a regime of the rich, that also happens to turn out a sani-fascism, a fascism preoccupied with health and sanitation. It forgets a fundamental truth: We have by one order of magnitude more bacteria and viruses in and on us than we have cells, 1 kg of mass, and without them we would be unable to live. And it also shows that those who have the money and the power do not always have the knowledge and the wisdom needed to guide the world to a place of greater freedom and comfort.

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**COMMENTARY ON
BOOK REVIEW**

Counterpoint to Walach's Review of *The Real Anthony Fauci, Bill Gates, Big Pharma, and the Global War on Democracy and Public Health* by Robert F. Kennedy, Jr.

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At age 77, I can remember polio. I was terrified of it. Everybody was. A child in perfectly good health suddenly got a fever and the next morning was paralyzed for life. Everyone knew someone who had it. Then a vaccine came out, and this was a Wonderful Thing. Parents eagerly lined up their children to receive it (or a placebo in the earliest phases of its development), and nobody questioned this, as polio was obviously worse than the vaccine could ever be. Republican or Democrat, you did not want to get polio: There were no politics involved. There was also no Facebook.

Enter COVID. Suddenly 450 beds of my 650-bed hospital contained COVID patients, all of them good and sick. Corpses accumulated faster than they could be disposed of. Local nursing homes saw a majority of their residents die. People were terrified. The country shut down. When a vaccine finally arrived, you would think everyone would rush to get it, and many did. But then a strange and probably unprecedented thing happened: Politics supervened. Why not wanting to die should be informed by your political affiliation is still beyond me. By September 2021, 56% of Republicans were fully or partially vaccinated, as opposed to 92% of Democrats (Saad, 2021). During October/November 2021, an unvaccinated person was 58 times more likely to die of COVID than a fully vaccinated one (CDC, 2022a).

There have been nine deaths attributable to COVID vaccine (CDC, 2022b)—all from the Johnson & Johnson product, and at the time of this writing, 900,000 deaths from COVID in the United States. Polio vaccine, when the live virus, oral product (Sabin vaccine) was used for the convenience of not having to give a shot, caused five to ten cases of polio/year. For many years this was considered acceptable, compared to the millions of disease cases prevented. But as American society became more risk-averse, the original Salk vaccine, which did not use live virus but had to be injected, was brought back. Politics, by the way, was not involved in this change. The point is, sometimes vaccines have adverse effects, but are worth it. A child paralyzed by polio, a grandparent dying of COVID—who would not avoid this if they could?

Against this backdrop, this Journal's Editor-in-Chief asked me to examine the review by Harald Walach of the book *The Real Anthony Fauci, Bill Gates, Big Pharma, and the Global War on Democracy and Public Health* by Robert F. Kennedy, Jr. I am a conventionally practicing, university-based family physician. I've dabbled in alternative medicine but generally haven't found it effective. I've a side interest in paranormal phenomena as described in medicine and wrote a book about it (Bobrow, 2006), which is how I came to the Society for Scientific Exploration. I think mask mandates have been overdone—particularly outdoors where packed Black Lives Matter protests did not result in more COVID cases, and I am aware that some states that remained "open" (e.g., Florida) often didn't fare worse than those that closed (KFF, 2022). But in a risk-averse society you can expect some degree of overprotection. Disclosure-wise, I tilt Democratic but hold a number of conservative beliefs, and I got myself vaccinated against COVID as soon as I bloody well could. I say



this because Robert F. Kennedy, Jr., is a staunch and vocal ‘anti-vaxxer’ and his book, which I admittedly have only skimmed, appears to be his Manifesto.

Dr. Walach’s review is well-written and includes a short summary and a good sense of what the book is about. Some weaknesses also are addressed. As such, it is a good book review and Walach, to his credit, makes it clear that he’s “certainly not an anti-vaxxer.” However, he seems willing to take Kennedy seriously on most other key issues dealt with in the book, to wit:

Anthony Fauci is Evil
Bill Gates is Evil
Big Pharma is Evil
The CIA is Evil

(And they’re all in cahoots.)

Let’s take these assertions one by one.

Anthony Fauci’s job is as difficult as it is thankless. He has to tell people what they don’t want to hear, issue dire warnings against threats that will never come, and change his positions frequently, as new data arrives. Within the medical profession he is held in the highest esteem, and I’ve not seen an unkind word about him in any major medical journals. Unfortunately, his recent “I Am Science” stance has put people off unnecessarily. But someone has to do what he does: Be our country’s first defense against plagues. He may not be perfect, but it’s hard to imagine anyone else doing it better. Kennedy’s book, as interpreted by Walach, charges Fauci with “having instigated, funded and overseen the research in the virology lab in Wuhan which was the trigger for the pandemic”¹ (and accuses Fauci of “owning wagonloads of patents and shares in pharmaceutical companies, such as Gilead pharmaceutical or Moderna, that produce the very products Fauci or his cronies invent and patent.” This is patently absurd, and I would put it on the same level as Hillary Clinton abusing children in the basement of a Washington, D.C., pizzeria (“Pizzagate”) (Robb, 2017). A number of fact-checking sites have examined, and debunked, these allegations against Fauci (Schaedel, 2020; Reuters, 2021; Dent, 2020; Brown, 2020; Fauzia, 2020).

Bill Gates. I have no particular qualifications to weigh in on this, but I’ve had no reason to think he’s gone over to the dark side.

Big Pharma. Well, there is something here, at the very least some abuses of capitalism. Charging what the traffic will bear. Rebranding and repurposing drugs when their patents expire to sell them more expensively. Colluding to keep prices at a certain level, even generics (e.g., of ten different steroid inhalers for asthma, including generics, none is cheaper than \$179 wholesale) (Drugs for asthma,

2020). Worse, medical practice guidelines are drawn up by physician groups whose majority memberships receive significant sums of money from the drug companies and advise accordingly (Choudry et al., 2020). On the other hand, it must be noted that Big Pharma developed HIV drugs which, albeit quite expensive, transformed AIDS from a death sentence into an inconvenience, and they developed vaccines for COVID that saved many lives (see Note 2). Capitalism works both ways.

While we’re on the subject of pharmaceuticals, Dr. Walach makes mention of Kennedy’s example: “Medical doctors in the US and elsewhere had alerted the public to the benefit of early treatment of COVID-19 with antivirals, mainly cheap generic ones like hydroxychloroquine or ivermectin, together with anti-inflammatories, zinc, and later on aspirin” and continues: “These cheap regimens were aborted, mainly by Fauci . . .”. We used hydroxychloroquine and zinc in our hospital at the start of the pandemic in 2020, mainly in desperation as people were dying in bunches and we had nothing else. A single, small, French study had tabbed hydroxychloroquine as possibly useful. We stopped using it when it clearly didn’t work. I don’t know where ivermectin came from but by then we had better agents (Remdesivir [Gottlieb et al., 2022; Beigel et al, 2020] and monoclonal antibody therapy) and didn’t need to “try anything.” And ivermectin had mixed reviews in the medical literature (Bryant et al., 2021; Lawrence et al., 2021).

Here’s what fascinates me: There is a cheap, safe antidepressant known as fluvoxamine (brand name Luvox) which actually has been shown, in real studies, to be useful in COVID (Reis et al, 2021; Finley, 2021; Lenze et al., 2020). How did the information pipeline that brought us hydroxychloroquine and ivermectin miss this one? Perhaps this is what happens when you get your medical advice from social media. We didn’t use fluvoxamine as by then, as noted above, we had better drugs. Another study had shown that the measles, mumps, rubella (MMR) vaccine (the one Kennedy claims causes autism) conferred “strong protection from COVID-19” (Wesson Ashford et al., 2021) Where was social media on this one? Again, if you don’t want to get COVID, get vaccinated. If you do have the misfortune to be hospitalized, remdesivir and monoclonals are your best bets, even if Big Pharma profits.

The CIA. Well, here I must admit . . .

And they’re all in cahoots. This is too preposterous even for me, and I believe in the paranormal.

Dr. Walach, a European national, writes “Fauci was new to me. I knew of him, of course.” As an American practicing physician, I had been familiar with Fauci for decades and didn’t have to learn about him from Kennedy. Dr. Walach has a great respect for Kennedy (“a man of Kennedy’s

stature”) and takes him more seriously than do members of his own family (Kennedy Townsend et al., 2019). Robert F. Kennedy, Jr., has distinguished himself over the years as an environmental lawyer who has won some significant cases against polluters and is well-respected for these efforts. How he drifted over into grand conspiracy theories and the demonization of vaccines, Anthony Fauci, and Bill Gates I can’t say, but I hope our SSE membership can distinguish between the merely paranormal and that which is paranoid, delusional, and self-destructive. I do not disagree with Walach’s final point in his analysis of the book: “Those who have the money and the power, do not always have the knowledge and the wisdom needed to guide the world to a place of greater freedom and comfort.”

Kennedy’s book currently sits third on *The New York Times* nonfiction bestseller list. It is heavily referenced and as such, convincing. But the evildoers’ “Coup d’Etat” that he claims is occurring isn’t obvious to me. What I do see is no more patients younger than I am dying miserably of AIDS, and COVID under control except for the misled, misinformed unvaccinated, who make up almost all the current mortality from the disease. And no polio.

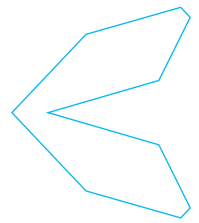
NOTE

¹ Our government did fund some research in the Wuhan virology lab but the implications in the statement are incorrect. <https://reporter.nih.gov/search/bvPCvB7zkyvb1AjAgW5Yg/project-details/8674931>

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REPLY TO
COMMENTARY

Some Reflections on Bobrow's Counterpoint to Walach's Review

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I am grateful for Robert S. Bobrow's "Counterpoint." Discourse and controversy are essential elements both of science and of finding political consensus. Both have suffered immensely over the last two years. And in my view, this has to do with the subtle mechanisms of installed censorship. Dissenting voices are silenced in the media and in academia. Political opinion is no longer a free, consensus-seeking debate. All is put under the umbrella of "unity for fighting the pandemic."

I think the way one can read Kennedy's book, my review of it, and Bobrow's comments hinges on two central questions. I am not going to answer them, but I wish to raise them for discussion. I will give a few bits of my opinion and my reasons for it.

The first question is: Is it true that we were faced with a "pandemic," i.e., a worldwide, devastating infectious disease problem? The second question is: Can we really trust our institutions, i.e., the political executive (in the United States the president and his administration, in Germany our chancellor and the executive ministry), our media, our parliamentary democracy?

Depending on your own answer to these questions, you will find both my review and Kennedy's book annoying or helpful. Bobrow obviously answers both questions in the positive.

I would agree with him: Vaccinations have done a lot of good, especially in the case of polio. But, following some studies and reports relayed by Kennedy, the recent polio vaccination campaigns in India and Africa have led to more unwanted effects than benefits and were stopped by the governments for that reason. That might have been completely different in the 1960s, when polio was a real threat. But one fact, easily overlooked, likely not so relevant for polio, but for other diseases is: All infectious diseases were on a steep decline many years before vaccines became available. That vaccines might have accelerated the decline is likely. Had we not found any vaccines, we might have seen the same decline, only a bit slower. This argument is old and was made, to my knowledge, first by McKeown (1976). But the point is, Covid-19 vaccines are not vaccines. But let me get back to that argument later.

Back to our central questions: I was, by and large, of the opinion that our institutions function well. Until I started to read a bit more widely in political texts, media literature, and critical social analysis. For instance, reading well-researched books such as those by Sands (2020), Sutton (1976), and Talbot (2015) gives you some taste of underground politics where background forces are at work that steer the seemingly benevolent forces of visible political actors toward the agenda of powerful elites and their benefit. It is a bit like losing your virginity: You are different, once you realize this. And with that kind of knowledge, you are more willing to be critical regarding publicly presented narratives. Therefore, I am at least willing to entertain the proposition that our political leadership is not necessarily benevolent and that powerful forces backstage try to get their will.

Now, if you look at the pandemic and its history, well-documented by Kennedy, you



see how a couple of mechanisms jump into place. My stance, initially, was open and curious. It was when I saw the divergence between publicly communicated figures and the facts that I saw in the scientific literature that I became first critical, then skeptical, and then outright convinced that something was utterly wrong. This started me on a journey of my own, an interview study, which I am since conducting. And the more I talk to experts of various kinds, the more my skeptical stance grows.

For instance, once you realize that the COVID-19 Infection Fatality Rates (IFR) are comparable to, in some countries lower than, influenza (Ioannidis, 2021), would you then still call the whole thing a pandemic? Once you realize that the pandemic definition was changed by the WHO in 2018, I believe, to get rid of the hitherto essential criterion that a pandemic had to have a high IFR, would you still think it is pandemic? Had we not had the various dashboards counting cases and fatalities, would we still have seen an emergency (Everts, 2020)? Had we not made a test that was never developed for overall screening and which is moreover quite non-specific—the CDC admitted on its website mid-2021 that it could not distinguish between flu and SARS-CoV2—the arbiter of diagnosis, would we have seen the same pandemic? For instance, only below roughly 22 cycles of amplification does the PCR test find viral material that might be indicative of infectivity (Jefferson et al., 2020). In Germany and probably elsewhere the standard cycle thresholds are about 37 to 45. Is this a solid diagnostic? I submit: We are dealing with a novel pathogen, but likely not with one that would have qualified for all the measures incurred. Had we not called for a worldwide pandemic and had we not tested, we would have seen some unusually severe “flu-like” peaks. Very likely a lot of later problems were actually induced by all kinds of measures, but we will never know, because no one cared to know.

I am not convinced that Kennedy is correct on all points. But I am convinced that he has a very important point to make and that people should listen. Having been the subject of various “fact checkers” myself, I can only say: The true name for this fact checking is counter-propaganda. My own study, which I know was well-conducted, was retracted for political reasons (Walach et al., 2021a, 2021b). It was “fact checked” for German TV by a person whose credentials were those of a horse-sports reporter. More questions? Another study, which was admittedly controversial and provocative in its wording, was also illicitly retracted, and then republished after a renewed and complex review process (Walach et al., 2021c, 2021d). We are in the process of publishing a letter pointing out that our analysis still stands (Walach et al., 2022 in press).

This is where the “vaccines” come in. They are not vaccines, but genetic preventive interventions, and as such

it is not even possible, let alone intellectually correct, to compare them with other vaccines. These interventions are associated with a number of deaths in the Vaccine Adverse Reaction (VAERs) database that is about by a factor 100 times higher than that of all other vaccines together (Seneff et al., 2022). It is precisely the taboo to discuss this that made me extremely skeptical of the whole mainstream narrative. They do not prevent transmission (Franco-Paredes, 2022). They have been around for a long time. One of my interview partners, who worked with the technology for 15 years said to me that they have abandoned the technology, because it is not controllable, how much of an end-product is produced, and the cationic lipid nanoparticles which are used for packaging the mRNA are toxic in themselves and do not have a regulatory approval because of that. Nowhere in the world. It is only possible through emergency approval that they could be marketed. And should such a technology be both safe and applicable without discussion and without criticism allowed? We are not talking about vaccines. We are talking about a completely novel pharmaceutical technology never used in humans before that has been admitted to market through emergency approval. This emergency approval was legally only possible because a point was made that there is no treatment available. As McCullough has made amply clear, this statement is false (McCullough et al., 2021).

So: What would you say, when you sit in front of that heap of information? There is a pandemic, which is hyped. There is a doctored situation, where “no treatment” is stipulated, which is clearly wrong. There is a novel technique magically jumping out of the hat, the mRNA-vaccine technology, that has been abandoned by many because of its unclear and potentially dangerous nature. This novel technique is suddenly without alternatives. And any criticism is banned. Well, I tell you what I did: I started to think and to read and to be very skeptical. And in such a situation Kennedy’s book is an eye-opener. It might not be correct in every respect. It might contain a lot of overstatement. It might even contain some false accusations (although I think a man in his position will be careful not to open himself up to libel suits by making careless statements). But by and large, it is a useful source of information.

It does rob you of your virginity, and likely in a less lustful way than the original act, but perhaps it is necessary. Unless, of course, you want to keep your trust in the system and your belief in the innocence and correctness of the mainstream narrative. I have shed both.

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