

THE SKEPTICAL **INTELLIGENCER.**

VOL 3 ISSUE N° 3 July 1999

The Magazine of ASKE

ASSOCIATION for SKEPTICAL ENQUIRY

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- *Electronic material*: Driscoe, E. Another look at Uri Geller. <http://www.etc.org>. Accessed 21 April 1997.

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ARTICLES

The Anthropic Coincidences: A Natural Explanation

By Victor J. Stenger

Victor J. Stenger is professor of physics and astronomy at the University of Hawaii. He was a coauthor of the recent report of neutrino mass. He has written three books: Not By Design: The Origin of the Universe, Physics and Psychics: The Search for a World Beyond the Senses, and The Unconscious Quantum: Metaphysics in Modern Physics and Cosmology (all published by Prometheus Books).

Recently the media has reported that scientists have discovered supernatural purpose to the universe. The so-called anthropic coincidences, in which the constants of nature seem to be extraordinarily fine-tuned for the production of life, are cited, in these reports, as evidence. However, no such interpretation can be found in scientific literature. Based on all we currently know about fundamental physics and cosmology, the most logically consistent and parsimonious picture of the universe as we know it is a natural one, with no sign of design or purposeful creation provided by scientific observations.

Poking Out of The Noise

At least two-and-a-half millennia have passed since a few thinkers, such as Thales and Heraclitus in ancient Greece, had the idea that the world around us might be understood wholly in terms of familiar substances and forces such as water and fire. They were the first to grasp the possibility that mysterious, undetectable agents need not be invoked in the explanation of phenomena. It was a revolutionary notion - and the world was far from ready to embrace it. At this stage, humanity still clutched the superstitions carried out of cave and forest. And so, with a few exceptions, *naturalism* lay largely dormant for two millennia while human cultures continued to be dominated by supernatural thinking.

In Christian Europe during the Middle Ages, the study of empirical phenomena did not necessarily exclude the supernatural. Indeed, most if not all of the scientists, or "natural philosophers," of the period were clerics or otherwise connected with the Church. Nevertheless, serious conflict between the fledgling science and religion broke out in the sixteenth century when the Church condemned Galileo for maintaining

that Copernicus' proposition that the earth circled the sun represented a *physical* and not just *mathematical* description of the solar system. However, religion and science soon reconciled. Newton interpreted his great mechanical discoveries, which were based on the earlier work of Descartes, Galileo, and others, as uncovering God's design for the physical universe. The success of Newtonian science was rapid and dramatic. People began to speak of the need to read two books authored by God - Scripture and the Book of Nature..

Science offers natural explanations for phenomena previously attributed to supernatural agency. Static electricity, not Thor's spear, produces a lightning flash. Natural selection, not divine intervention, impels the development of life. The neural network of the brain, not some disembodied spirit, enables mental processes. Scientific explanations are frequently unpopular; witness Darwinism. It seems that they occupy a privileged place for the simple reason that they work so well, not because people find them appealing. Technological progress, fed by scientific discovery, testifies to the power of natural explanations for events. This has given science enormous stature and credibility. People listen to what science has to say, even if they do not always like what they hear, in particular, that they are not the center of the universe.

With the exception of the minority who insist on literal interpretation of scripture, religious scholars have largely deferred to science on those matters where the scientific consensus has spoken. Theologians are quite adept at reinterpreting the teachings of their faiths in the light of new knowledge. There is nothing wrong with this. Most scientists and theologians agree that both groups are in the business of learning, not preaching. Theologians argue, with some merit, that religion still has a role to play in moral

matters and in the search to find the place of humanity in the scheme of things. Most scientists regard questions about the purpose of the universe to be beyond the scope of science. Nevertheless, when they read the press reports about science and religion converging, some religious believers take heart that, when everything is said and done, the purpose they desire will stick its head up out of the scientific background noise.

The Supposed Signal of Purpose

For about a decade now, an ever-increasing number of scientists and theologians have been asserting, in popular articles and books, that they can detect a signal of cosmic purpose poking its head out of the noisy data of physics and cosmology. This claim has been widely reported in the media (see, for example, Begley 1998, Easterbrook 1998), perhaps misleading lay people into thinking that some kind of new scientific consensus is developing in support of supernatural beliefs. In fact, none of this reported evidence can be found in the pages of scientific journals, which continue to successfully operate within an assumed framework in which all physical phenomena are natural.

The purported signal of cosmic purpose cannot be demonstrated from the data alone. Such observations require considerable interpretation to arrive at that conclusion. Those not very familiar with recent deliberations in the philosophy of science might be inclined to scoff and say that the observations speak for themselves, with no interpretation necessary. Facts are facts, they might argue, and neither God nor purpose are scientific facts.

However, scientists and philosophers of science have been unable to define a clear demarcation between observation and theory. Most now agree that all scientific observations are "theory-laden." That is, empirical results cannot be cleanly separated from the theoretical framework used to classify and interpret them. This new development in the philosophy of science has opened the door for theologians and believing scientists to reinterpret scientific data in terms of their preferred model of intelligent design and divine purpose to the universe. Some claim the data fit this model better than alternatives. Most say it is at least as good.

The data whose interpretation is being debated in the religion-science dialogue are not scraps

of fading documents, nor the uncertain translations of ancient fables that over time have evolved into sacred texts. Rather, they consist of measurements made by sophisticated research teams using advanced scientific instruments. The new theistic argument is based on the fact that earthly life is so sensitive to the values of the fundamental physical constants and properties of its environment that even the tiniest changes to any of these would mean that life as we see it around us would not exist. This is said to reveal a universe in which the fundamental physical constants of nature are exquisitely fine-tuned and delicately balanced for the production of life. As the argument goes, the chance that any initially random set of constants would correspond to the set of values they happen to have in our universe is very small; thus this precise balancing act is exceedingly unlikely to be the result of mindless chance. Rather, an intelligent, purposeful, and indeed personal Creator probably made things the way they are. The argument is well captured by a cartoon in mathematician Roger Penrose's book *The Emperor's New Mind* which shows a cartoon of the Creator pointing a finger toward an "absurdly tiny volume in the phase space of possible universes" to produce the universe in which we live (Penrose 1989, 343).

Most who make the fine-tuning argument are content to say that intelligent, purposeful, supernatural design has become an equally viable alternative to a random, purposeless, natural evolution of the universe and humankind suggested by conventional science. However, a few theists have gone much farther to insist that God is now *required* by the data. Moreover, this God must be the God of the Christian Bible. No way, this group says, can the universe be the product of purely natural, impersonal processes. Typical of this view is *The Creator and the Cosmos: How the Greatest Scientific Discoveries of the Century Reveal God*, a book by physicist and astronomer Hugh Ross. Ross cannot imagine fine-tuning happening any other way than by a "personal Entity...at least a hundred trillion times more 'capable' than are we human beings with all our resources". He concludes that "the Entity who brought the universe into existence must be a Personal Being, for only a person can design with anywhere near this degree of precision" (Ross 1995: 118).

The delicate connections among certain physical constants, and between those constants and life, are collectively called the *anthropic coincidences*.

Before examining the merits of the interpretation of these coincidences as evidence for intelligent design, I will review how the notion first came about. For a detailed history and a wide-ranging discussion of all the issues, see *The Anthropic Cosmological Principle* by John D. Barrow and Frank J. Tipler (Barrow 1986). I also refer the reader there for the original references. But be forewarned that this exhaustive tome has many errors, especially in equations, some of which remain uncorrected in later editions.

The Anthropic Coincidences

In 1919, Hermann Weyl expressed his puzzlement that the ratio of the electromagnetic force to the gravitational force between two electrons is such a huge number, $N_1 = 10^{39}$ (Weyl 1919). This means that the strength of the electromagnetic force is greater than the strength of the gravitational force by 39 orders of magnitude. Weyl wondered why this should be the case, expressing his intuition that "pure" numbers (i.e. numbers, like pi, that do not depend any system of units) occurring in the description of physical properties should most naturally occur within a few orders of magnitude of unity (i.e. zero). Unity, or zero, you can expect "naturally". But why 10^{39} ? Why not 10^{57} or 10^{123} ? Some principle must select out 10^{39} .

In 1923, Arthur Eddington commented: "It is difficult to account for the occurrence of a pure number (of order greatly different from unity) in the scheme of things; but this difficulty would be removed if we could connect it to the number of particles in the world - a number presumably decided by accident (Eddington 1923: 167). He estimated that number, now called the "Eddington number," to be $N = 10^{79}$. Well, N is not too far from the square of N_1 . This was the first of the anthropic coincidences: that N approximately equals the square of N_1 .

These musings may bring to mind the measurements made on the Great Pyramid of Egypt in 1864 by Scotland's Astronomer-Royal, Piazzi Smyth. He found accurate estimates of pi and the distance from the earth to the sun, and other strange "coincidences" buried in his measurements (Smyth 1978). However, we now know that these were simply the result of Smyth's selective toying with the numbers (Steibing 1994: 108-110; De Jager, 1992). Still, even today some people believe that the pyramids hold secrets about the universe. Ideas like this never seem

to die, no matter how deep in the sand they may be buried.

Look around at enough numbers and you are bound to find some that appear connected. Most physicists, therefore, did not regard the large numbers puzzle seriously until one of their most brilliant members, Paul Dirac, took an interest. Few physicists ignored anything Dirac had to say.

Dirac discovered that N_1 is the same order of magnitude as another pure number N_2 that gives the ratio of a typical stellar lifetime to the time for light to traverse the radius of a proton. That is, he found two seemingly unconnected large numbers to be of the same order of magnitude (Dirac 1937). If one number being large is unlikely, how much more unlikely is another to come along with about the same value ?

In 1961, Robert Dicke pointed out that N_2 is necessarily large in order that the lifetime of typical stars be sufficient to generate heavy chemical elements such as carbon. Furthermore, he showed that N_1 must be of the same order of N_2 in any universe with heavy elements (Dicke 1961).

The heavy elements did not get fabricated straightforwardly. According to the big bang theory (despite what you may hear, the consensus of cosmologists now regard the big bang as very well established), only hydrogen, deuterium (the isotope of hydrogen consisting of one proton and one neutron), helium, and lithium were formed in the early universe. Carbon, nitrogen, oxygen, iron, and the other elements of the chemical periodic table were not produced until billions of years later. These billions of years were needed for stars to assemble these heavier elements out of neutrons and protons. When the more massive stars expended their hydrogen fuel, they exploded as supernovae, spraying the manufactured elements into space. Once in space, these elements cooled and accumulated into planets.

Billions of additional years were needed for our home star, the sun, to provide a stable output of energy so that at least one of its planets could develop life. But if the gravitational attraction between protons in stars had not been many orders of magnitude weaker than the electric repulsion, as represented by the very large value of N_1 , stars would have collapsed and burned out long before nuclear processes could build up the periodic table from the original hydrogen and deuterium. The formation of chemical complexity is only possible in a universe of great age - or at least this

so in a universe with other parameters close to the values they have in this one.

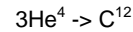
Great age is not all. The element-synthesizing processes in stars depend sensitively on the properties and abundances of deuterium and helium produced in the early universe. Deuterium would not exist if the difference between the masses of a neutron and a proton were just slightly displaced from its actual value: the relative abundances of hydrogen and helium also depend strongly on this parameter. The relative abundances of hydrogen and helium also require a delicate balance of the relative strengths of gravity and the weak interaction, the interaction responsible for nuclear beta decay. Had the weak force been slightly weaker, the universe would be 100 percent hydrogen. In that case, all the neutrons in the early universe would have decayed leaving none around to be saved in deuterium nuclei for later use in the element-building processes in stars. A slightly weaker weak force and few neutrons would have decayed, leaving about the same numbers of protons and neutrons. In that case, all the protons and neutrons would have been bound up in helium nuclei, with two protons and two neutrons in each. This would have led to a universe that was 100 percent helium, with no hydrogen to fuel the fusion processes in stars. Neither of these extremes would have allowed for the existence of stars and life as we know it based on carbon chemistry.

The electron also enters into the tightrope act needed to produce the heavier elements. Because the mass of the electron is less than the neutron-proton mass difference, a free neutron can decay into a proton, electron, and anti-neutrino. If this were not the case, the neutron would be stable and most of the protons and electrons in the early universe would have combined to form neutrons, leaving little hydrogen to act as the main component and fuel of stars. It is also essential that the neutron be heavier than the proton, but not so much heavier that neutrons cannot be bound in nuclei, where conservation of energy prevents the neutrons from decaying.

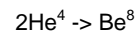
In 1952, astronomer Fred Hoyle used anthropic arguments to predict that an excited carbon nucleus has an excited energy level at around 7.7 MeV. I have already noted that a delicate balance of physical constants was necessary for carbon and other chemical elements beyond lithium in the periodic table to be cooked in stars. Hoyle looked closely at the

nuclear mechanisms involved and found that they appeared to be inadequate.

The basic mechanism for the manufacture of carbon is the fusion of three helium nuclei into a single carbon nucleus:



(The superscripts give the number of *nucleons*, i.e., protons and neutrons in each nucleus, which is indicated by its chemical symbol; the total number of nucleons is conserved, i.e., remains constant, in a nuclear reaction). However, the probability of three bodies coming together simultaneously is very low and some catalytic process in which only two bodies interact at a time must be assisting. An intermediate process had earlier been suggested in which two helium nuclei first fuse into a beryllium nucleus which then interacts with the third helium nucleus to give the desired carbon nucleus:



Hoyle showed that this still was not sufficient unless the carbon nucleus had an excited state at 7.7 MeV to provide for a high reaction probability. A laboratory experiment was undertaken, and sure enough a previously unknown excited state of carbon was found at 7.66 MeV (Barrow and Tipler, 1986: 252).

Nothing can gain you more respect in science than the successful prediction of a new phenomenon. Here, Hoyle used standard nuclear theory. But his reasoning contained another element whose significance is still hotly debated. Without the 7.7 MeV nuclear state of carbon, our form of life based on carbon would not have existed. Yet nothing in fundamental nuclear theory, as it is still known today, directly determines the existence of this state. It cannot be deduced from the axioms of the theory.

Like the other coincidences, this particular nuclear state seems hardly likely to be the result of chance. In 1974, Brandon Carter (Carter 1974) introduced the notion of the *anthropic principle* which hypothesized that the anthropic coincidences are not the result of chance but somehow built into the structure of the universe. Barrow and Tipler (21) have identified three different forms of the anthropic principle

and refer to Carter's version as the "strong" anthropic principle, defined as follows:

Strong Anthropic Principle (SAP): The Universe must have those properties which allow life to develop within it at some stage in its history.

This suggests that the coincidences are not accidental but the result of a law of nature. But it is a strange law indeed, unlike any other in physics. It suggests that life exists as some Aristotelian "final cause."

Barrow and Tipler (22) claim that this can have three interpretations:

(A) There exists one possible Universe 'designed' with the goal of generating and sustaining 'observers.

This is the interpretation adopted by most theistic believers.

(B) Observers are necessary to bring the Universe into being.

This is traditional solipsism, but also is a part of today's New Age mysticism.

(C) An ensemble of other different universes is necessary for the existence of our Universe.

This speculation is part of contemporary cosmological thinking, as I will discuss below. It represents the idea that the coincidences are accidental. We just happen to live in the particular universe that was suited for us.

The current dialogue focusses on the choice between (A) and (C), with (B) not taken seriously in the scientific community. However, before discussing the relative merits of the three choices, let me complete the story on the various forms of the anthropic principle discussed by Barrow and Tipler. They identify two other versions:

Weak Anthropic Principle (WAP): The observed values of all physical and cosmological quantities are not equally probable but take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirement that the Universe be old enough for it to have already done so.

The WAP has not impressed too many people. All it seems to say is that if the universe was not the way it is, we would not be here talking about it. If the fine structure constant were not $1/137$, people would look different. If I did not live at 508 Pepeekeo Place, I would live someplace else.

Final Anthropic Principle (FAP): Intelligent, information-processing must come into evidence in the Universe, and, once it comes into existence, it will never die out.

This is sometimes also referred to as the *Completely Ridiculous Anthropic Principle*.

Predictions of the FAP

In *The Anthropic Cosmological Principle*, Barrow and Tipler speculated only briefly about the implications of the FAP. Tipler later propounded its consequences in a controversial book with the provocative title: *The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead*. Here Tipler carries the implications of the FAP about as far as one can imagine they could go (Tipler 1994).

Tipler argues that the robots that will evolve from our current computer technology will ultimately spread themselves throughout the universe, each new generation of robot producing ever superior versions of itself. After the passage of a billion billion years or so, the universe will become uniformly populated with an extremely advanced life form. Humanity, of course, will be long gone.

At that point, Tipler assumes the universe will begin to contract toward what is called the "big crunch," the reverse of the big bang. The collapse of the universe does not happen in any old way, however. It is very carefully controlled in order to maintain causal contact across the universe and provide sufficient energy for what life must then accomplish in order to avoid extinction.

The advanced life form that has evolved from our twenty-first century robots should be able manage this, according to Tipler. Who can deny the possibility of anything a billion billion years in the future? The universe then converges on what the French Jesuit Pierre Teilhard de Chardin called the *Omega Point*. Tipler associates the Omega Point, as did Teilhard, with God.

Being the ultimate form of power and knowledge, the Omega Point would also be the ultimate in Love. Loving us, it would proceed to resurrect all humans who ever lived (along with their favorite pets and popular endangered species). This is accomplished by means of a perfect computer simulation, what Tipler calls an *emulation*.

Since each of us is defined by our DNA, the Omega Point simply emulates all possible humans that could ever live, which of course includes you and me in every variation. Our memories have long since dissolved into entropy, but Omega has us relive our lives in an instant, along with all the other possible lives we could have lived. Those that Omega-God deems deserving will get to live even better lives, including lots of sex with the most desirable partners we can imagine.

All this, Tipler claims, is a predictable consequence of the FAP. Fortunately, we do not have to wait a billion billion years to test the theory. One prediction is that the universe is "closed." That is, someday in the distant future it will stop expanding and begin contracting. This depends on the average density of matter and energy in the universe, a quantity which can be estimated from a wide range of observations that are improving every year.

When Tipler wrote his book, a closed universe was not supported by the data, but the uncertainties were still large enough that the possibility could not be strongly ruled out. Since then, observations have made it even more unlikely that the universe is closed. An open, "flat" universe that is poised just on the border between expansion and contraction is predicted by the inflationary big-bang theory. Right now, the FAP prediction of a closed universe does not look as if it will be fulfilled.

You might ask if an ever-expanding universe can be made consistent with the FAP. No doubt it can, but then it makes no testable predictions and so it becomes little more than speculation. Tipler's theory at least had the virtue of being falsifiable. It now seems to be heading for falsification.

Interpreting the Coincidences: (A) They Are Designed

Let us now review the first of the three possible explanations for the anthropic coincidences listed by Barrow and Tipler: (A) *There exists one*

possible Universe 'designed' with the goal of generating and sustaining 'observers'."

Many theists see the anthropic coincidences as evidence for purposeful design to the universe. They ask: how can the universe possibly have obtained the unique set of physical constants it has, so exquisitely fine-tuned for life as they are, except by purposeful design - design with life and perhaps humanity in mind? (See, for example, Swinburne 1990, Ellis 1993, Ross 1995).

Let us examine the implicit assumptions here. First and foremost, and fatal to the design argument all by itself, we have the wholly unwarranted assumption that only *one type of life is possible* - the particular form of carbon-based life we have here on earth.

Carbon would seem to be the chemical element best suited to act as the building block for the type of complex molecular systems that develop lifelike qualities. Even today, new materials assembled from carbon atoms exhibit remarkable, unexpected properties, from superconductivity to ferromagnetism. However, to assume that only carbon life is possible is simply "carbocentrism" that results from the fact that you and I are structured on carbon.

Given the known laws of physics and chemistry, we can easily imagine life based on silicon (computers, the Internet?) or other elements chemically similar to carbon. However, these still require cooking in stars and thus a universe old enough for star evolution. The $N_1 = N_2$ coincidence would still hold in this case, although the anthropic principle would have to be renamed the "cyberthropic" principle, or some such, with computer rather than humans and cockroaches the purpose of existence. Indeed, Tipler would probably agree with this.

Only hydrogen, helium, and lithium were synthesized in the early big bang. They are probably chemically too simple to be assembled into diverse structures. So, it seems that any life based on chemistry would require an old universe, with long-lived stars producing the needed materials.

Still, it seems like "chemicentrism" to rule out other forms of matter than molecules in the universe as building blocks of complex systems. While atomic nuclei, for example, do not exhibit the diversity and complexity seen in the way atoms assemble into molecular structures, perhaps they might be able to do so in a universe with different properties.

Sufficient complexity and long life may be the only ingredients needed for a universe to have *some* form of life. Those who argue that life is highly improbable need to open their minds to the fact that life might be likely with many different configurations of laws and constants of physics. Furthermore, nothing in anthropic reasoning indicates any special preference for human life, or indeed intelligent or sentient life of any sort. As Earmon has expressed this: "Imagine, if you will, the wonderment of a species of mud worms who discover that if the constant of thermometric conductivity of mud were different by a small percentage they would not be able to survive." (Earmon 1987, 314).

The development of intelligent life does not seem to have proceeded smoothly and elegantly from the fundamental constants in the way that the phrase "fine-tuning" may be thought to imply. Several billion years elapsed before the conditions of intelligent life came together, while the process of fashioning these conditions seems to have been accompanied by a staggering degree of waste (all that space, dust and seemingly dead cosmic bodies). By human standards, it seems remarkably inefficient. Also, in the case of human life, it appears that (amongst other things) Earth would have suffered frequent catastrophic collisions with comets had it not been for the gravitational effect of Jupiter. This hardly seems consistent with divine creation. Setting in motion a myriad of threatening comets and then positioning a huge planet as a protection against the danger you have just created yourself seems more like the work of a cosmic jerry-builder. (For more about the contingency of life on Earth, see Taylor, 1998).

Even before we examine the other possibilities in detail, we can see another fatal fallacy in the fine-tuning argument. It is a probability argument that rests on a misconception of the concept of probability. Suppose we were to begin with an ensemble of universes in which the physical constants for each vary over a wide range of possible values. Then the probability that one universe selected randomly from that set would be our universe is admittedly very small. The fine-tuning argument then concludes that our specific universe was deliberately selected from the set by some external agent, namely God.

However, a simple example shows that this conclusion does not logically follow. Suppose that a lottery is conducted in which each entrant is assigned a

number from one to one million. Each has kicked in a dollar and the winner gets the whole pot of \$1 million. The number is selected and you are the lucky winner! Now it is possible that the whole thing was fixed and your mother chose the winning number. But absent any evidence for this, no one has the right to make that accusation. Yet that's what the fine-tuning argument amounts to. Without any evidence, God is accused of fixing the lottery.

Somebody had to win the lottery, and you lucked out. Similarly, if a universe was going to happen, some set of physical constants was going to be selected. The physical constants, randomly selected, could have been the ones we have. And they led to the form of life we have.

In another example, estimate the probability that the particular sperm and egg that formed you would unite - that your parents, grandparents and all your ancestors down to the primeval stew that formed the first living things would come together in the right combination. Would that infinitesimally small number be the probability that you exist? Of course not. You exist with 100% probability. (For further discussion of probability and the fine-tuning argument, see Le Podgevin 1996 and Parsons 1998).

Ikeda and Jefferys (1997) have done a formal probability theory analysis that demonstrates these logical flaws and others in the fine tuning argument. They have also noted an amusing inconsistency that shows how promoters of design often use mutually contradictory logic.

On the one hand you have the creationists and god-of-the-gaps evolutionists who argue that nature is too *uncongenial* for life to have developed totally naturally, and so therefore supernatural input must have occurred. Then you have the fine-tuners (often the same people) arguing that the constants and laws of nature are exquisitely *congenial* to life, and so therefore they must have been supernaturally created. They can't have it both ways.

The fine-tuning argument rests on the assumption that *any* form of life is possible only for a very narrow, improbable range of physical parameters. We can safely conclude that this assumption is completely unjustified. None of this rules out option (A) as the source of the anthropic coincidences. But it does show that the arguments that are used to support that option are very weak and certainly insufficient to rule out of hand all alternatives. If all those alternatives

are to fall, making (A) the choice by default, then they will have to fall of their own weight.

Interpreting the Coincidences: (B) They Are All in the Head

Let us look next at the second of the explanations for the anthropic coincidences listed by Barrow and Tipler: (B) *Observers are necessary to bring the Universe into being.*

As the philosophers Berkeley and Hume realized, the possibility that reality is all in the mind cannot be disproved. However, any philosophy based on this notion is wrought with problems, not the least of which is why then is the universe not the way each of us wants it to be? Furthermore, whose mind is the one that is doing the imagining? Berkeley decided it had to be the mind of God, which makes this interpretation of the anthropic coincidences indistinguishable from the previous one. However, another possibility that is more in tune with Eastern religion than Western is that we are all part of a single cosmic mind.

This idea has become very popular in the new age movement. Triggered by the publication of *The Tao of Physics* by physicist Fritjof Capra (1975), a whole industry has developed in which the so-called mysteries and paradoxes of quantum mechanics are used to justify the notion that our thoughts control reality. The most successful practitioner of this philosophy is Dr. Deepak Chopra, who has done very well promoting what he calls "quantum healing" (Chopra 1989, 1993).

Option (B) is certainly not taken seriously in the current science-religion dialogues. However, let me include a brief discussion for the sake of completeness (see Stenger 1995 for more details).

Basically, the new ideas on cosmic mind and the quantum begin with the confusing interpretive language used by some of the founders of quantum mechanics, most particularly Niels Bohr. In what is termed the *Copenhagen interpretation*, a physical body does not obtain a property, such as position in space, until it is observed. Although quantum mechanics has continued to agree with all measurements to very high precision, the Copenhagen interpretation has been further interpreted to mean that reality is all in our heads.

Moreover, according to the idea of "quantum consciousness," our minds are all tuned in holistically to all the minds of the universe, with each individual

forming part of the cosmic mind of God. As applied to the anthropic coincidences, the constants of physics are what they are because the cosmic mind wills them so.

Today few quantum physicists take the notion of a cosmic quantum mind seriously. The success of quantum mechanics does not depend in any way on the Copenhagen interpretation or its more mystical spinoffs. Other interpretations exist, like Bohm's hidden variables (Bohm and Hiley, 1993), the many worlds interpretation (Deutsch 1997), and the consistent histories interpretation (Omnès 1994). Unfortunately, no consensus interpretation of quantum mechanics exists among physicists and philosophers. Suffice it to say that the admittedly "strange" behavior of the quantum world is mysterious only because it is unfamiliar, and can be interpreted without the introduction of any mystical ideas, including cosmic mind.

Interpreting the Coincidences: (C) They Are Natural

Finally let me move to the possibility that we can understand the anthropic coincidences naturally. I have very carefully discussed the other options first in order to make it clear that, by themselves, they are highly flawed and provide us little reason to accept their premises. I might stop here and claim the natural explanation wins by default. This can be somewhat justified on the principle of parsimony. Since all scientific explanations until now have been natural, then it would seem that the best bet is a natural explanation for the anthropic coincidences. Such an explanation would probably require the fewest in the way of extraordinary hypotheses - such as the existence of a spirit world either inside or outside the physical universe.

The Laws of Nature

The standard model of elementary particles and fields has, for the first time in history, given us a theory that is consistent with all experiments. More than that, in developing the standard model physicists have gained significant new insights into the nature of the so-called laws of nature.

Prior to these recent developments, the physicist's conception of the laws of nature was pretty much that of most lay people: They were assumed to be rules for the behavior of matter and energy that are part of the very structure of the universe, laid out at the

creation. However, in the past several decades we have gradually come to understand that what we call "laws of physics" are basically our own descriptions of certain symmetries observed in nature and how these symmetries, in some cases, happen to be broken. And, as we will see, the particular laws we have found do not require an agent to bring them into being. In fact, they are exactly what would be expected in the absence of an agent.

The most powerful of all the laws of nature are the great conservation principles of energy, momentum, angular momentum, charge, and other quantities that are measured in fundamental interactions. These apply whenever a system of bodies is sufficiently isolated from its environment. Thus the total energy, momentum, angular momentum, charge, etc. of the molecules in a completely insulated chamber of fixed volume will remain constant as the molecules move about. Individual molecules can exchange these quantities when they interact with others. Thus a molecule can lose energy and momentum by colliding with another, while the struck molecule will gain the same amounts. A chemical reaction can occur in which the charges of the molecules also change, but the total charge remains constant.

The position of a body in space is usually represented in terms of coordinates, such as the latitude, longitude, and altitude of an aircraft in the sky. For over a century now, physicists have known that whenever their description of a body does not depend on a particular coordinate, say x , then the momentum that corresponds to that coordinate, p_x , is conserved. That is, this particular momentum component, called the "momentum conjugate to x ," does not change as the body moves.

For example, consider a space probe far from earth moving in a straight line at constant velocity v_x with respect to its home ship in which we are riding. Let the position of the probe with respect to some arbitrary marker, say asteroid Randi, be x . The motion of the probe will look the same whether viewed from our ship at $x=0$ or another vessel at $x=137,000$ kilometers. The probe's velocity v_x and momentum $p_x = mv_x$, where m is the mass of the probe, will be the same independent of x .

Similarly, our description of the probe's motion need not include the time at which it is being observed. As long as it keeps moving with constant velocity, in

magnitude and direction, its motion will look the same whether viewed at UT0645 or UT1720. This independence of the time "coordinate" is expressed as conservation of energy, where energy is "the momentum conjugate to t ." (In relativistic kinematics, energy is the "timelike coordinate" of a four dimensional momentum in which each component is conjugate to four dimensional spacetime).

The motion of the probe in this example is said to possess both *space-translation* and *time-translation* symmetries. This means that our description of its motion does not depend on any special position in space or moment in time. Under the same conditions, the probe would behave the same way on a planet in the Andromeda galaxy a million years in the future.

The probe also possesses *rotational symmetry*, behaving the same way when observed from other angles where its motion points in a different direction. Rotational symmetry implies angular momentum conservation.

Now consider the universe as a whole. Unless it is being acted on by some outside agent, it will behave the same regardless of where we place it in some imagined super spacetime or how we happen to orient it. That is, the universe is expected to possess all three symmetries described above. It follows that energy, momentum, angular momentum, and any other quantities of the type that are conjugate to these coordinates will be conserved *globally*, that is, as a whole and at each point in space and time.

In other words, the global conservation "laws" are exactly what one expects for an isolated universe with no outside agent acting. Only a *violation* of these laws would imply an outside agent. The data so far are consistent with the non-existence of such an agent.

Global conservation laws follow from what we call global symmetries, like space translation and time translation. As I said, this was pretty much known a hundred years ago but not much was made of it. In this century, with the development of quantum mechanics, the same connection between symmetries and conservation laws was shown to still exist and to be even more profound.

In more recent years, the importance of *broken symmetries* has come to be recognized. This has been put together with our understanding of unbroken global symmetries to produce a coherent

scheme in which everything we know seems broadly to fit.

Broken symmetry is actually very common at the everyday scale. Not all cars travel in straight lines at constant speed. They roll to a stop when the engine cuts off, as energy is lost to friction. Neither are the material structures we see around us fully symmetric. The earth is not a sphere but a flattened spheroid. A tree looks different from different angles. Our faces look different in a mirror. Mirror symmetry is broken when a system is not precisely left-right or mirror symmetric, like our faces. That is no surprise, and indeed we can view much of what we call material structure as a combination of broken and unbroken symmetries. Again, think of a snowflake. Structure and beauty seem to be combinations of both unbroken and broken symmetries, of both order and randomness.

The big revelation to physicists in the 1950s was that a few rare nuclear and fundamental particle interactions are not mirror symmetric. This discovery triggered an awakening to the possibilities of symmetry breaking at the fundamental scale in other situations. In many cases, this was merely a reexpression of old facts in a new language. For example, a symmetry such as momentum conservation can be broken *locally* without destroying the overall space-translation symmetry of the universe. When momentum conservation is locally broken, as with a falling body, we say we have a force acting. Indeed Newton's second law of motion specifies that force is equal to the time rate of change of momentum. In this case global momentum conservation is maintained, as interacting bodies in an isolated system have an equal and opposite reaction, as expressed by Newton's third law.

Thus gravity, and the other forces of nature, came to be recognized - and described theoretically - as broken local symmetries. The standard model was built on a framework of local broken symmetry.

Symmetry breaking can be likened to a pencil balanced vertically on its eraser end. This situation possesses rotational symmetry about the vertical axis, that is, it looks the same from any angle you view it as you walk around the pencil holding the pencil. However, the balance is precarious. With no help from the outside other than random breezes, the pencil will eventually fall over. The direction it points along is random - unpredictable, undesigned - but the

symmetry is broken and a new, special direction is then singled out.

In the Beginning

For almost two decades, the *inflationary big bang* has been the standard model of cosmology (Guth 1981, 1997; Linde 1987, 1990, 1994). We keep hearing, again from the unreliable popular media, that the big bang being is in trouble and the inflationary model is dead. In fact, no viable substitute has been proposed that has anything like its explanatory power.

The inflationary big bang offers a plausible, natural scenario for the uncaused origin and evolution of the universe, including the formation of order and structure - without the violation of any laws of physics. Indeed, as we saw above, these laws themselves are now understood far more deeply than before and we are beginning to grasp how they too could have come about naturally. This particular version of a natural scenario for the origin of the universe has not yet risen to the exalted status of a scientific theory. However, the fact that it is consistent with all current knowledge and cannot be ruled out at this time demonstrates that no rational basis exists for introducing the added hypothesis of supernatural creation. Such a hypothesis is simply not required by the data.

According to this scenario, by means of a random quantum fluctuation the universe "tunneled" from pure vacuum ("nothing") to what is called a *false vacuum*, a region of space that contains no matter or radiation but is not quite "nothing." The space inside this bubble of false vacuum was curved, or warped. A small amount of energy was contained in that curvature, somewhat like the energy stored in a strung bow. This ostensible violation of energy conservation is allowed by the Heisenberg uncertainty principle for sufficiently small time intervals.

The bubble then inflated exponentially and the universe grew by many orders of magnitude in a tiny fraction of a second. (For a not-too-technical discussion, see Stenger 1990). As the bubble expanded, its curvature energy was converted into matter and radiation, inflation stopped, and the more linear big bang expansion we now experience commenced. The universe cooled and its structure spontaneously froze out, as formless water vapor freezes into snowflakes whose unique patterns arise from a combination of symmetry and randomness.

In our universe, the first galaxies began to assemble after about a billion years, eventually evolving into stable systems where stars could live out their lives and populate the interstellar medium with the complex chemical elements such as carbon which are needed for the formation of life.

So how did our universe happen to be so "fine-tuned" as to produce these wonderful, self-important carbon structures? As I explained above, we have no reason to assume that ours is the only possible form of life and perhaps life of some sort would have happened whatever form the universe took - however the crystals on the arm of the snowflake happened to be arranged by chance.

At some point, according to this scenario, the symmetries of the initial nothingness began to be "spontaneously" broken. Those of the current standard model of elementary particles and forces were among the last broken, when the universe was about 10^{-12} second old and much "colder" than earlier. The distances and energies involved at this point have been probed in existing colliding beam accelerators, which represents about the deepest into big-bang physics we have so far been able to explore in detail. Higher energy colliders will be necessary to push farther, and we are far from directly probing the earliest time scales where the ultimate symmetry breakdown can be explored. Still, it may surprise to reader that the physical principles which have been in place since a trillionth of a second after the universe began are very well understood.

By about 10^{-6} second, the early universe had gone through all the symmetry breaking required to produce the fundamental laws and constants we still observe today, 13-15 billion years later. Nuclei and atoms still needed more time to get organized, but after 300,000 years the lighter atoms had assembled and ceased to interact with the photons that went off on their own to become the cosmic microwave background. The first galaxies began to assemble after about billion years, evolving eventually into stable systems where stars could live out their lives and populate the interstellar medium with the heavier elements like carbon needed for the formation of life.

Regardless of the fact that we cannot explore the origin of the universe by any direct means, the undoubted success of the theory of broken symmetry as manifested in the standard model of particle physics provides us with a mechanism that we can apply, at

least in broad terms, to provide a natural explanation for the development natural law within the universe, without a lawgiver being invoked to institute those laws from the outside.

We have seen that the conservation laws correspond to global symmetries that would automatically be present in the absence of any outside agent. The total chaos that was the state of the universe at the earliest definable time possessed space-translation, time-translation, rotational, and all the other symmetries that result when a system depends on none of the corresponding coordinates. Nothing is more symmetric than nothing. Nothing has more conservation laws than nothing. Expressing this in an information science context, total chaos and complete symmetry correspond to zero information. Any kind of action by an external agent would result in non-zero information and some broken symmetry. We have no evidence for this, again no need to introduce the uneconomical hypothesis of a creator.

The force laws as exist in the standard model are represented as spontaneously broken symmetries, that is, symmetries that are broken randomly and without cause or design. When the pencil fell over, the direction it pointed to broke the original symmetry and selected out a particular axis. In a more apt example, consider what happens when a ferromagnet cools below a certain critical temperature called the *Curie point*. The iron undergoes a change of phase and a magnetic field suddenly appears that points in a specific, though random, direction. This breaks the original symmetry in which no direction was singled out ahead of time (or at least no direction was predictable by any known theory).

The forces of nature are akin to the magnetic field of a ferromagnet. The "direction" they point to after symmetry breaking was not determined ahead of time. The nature of the forces themselves was not pre-specified. They just happened to freeze out the way they did. Just as no agent is implied by the global symmetries (indeed, quite the opposite), none is implied by the broken symmetries, which in fact look very much like the opposite.

Now theists may argue that I am simply assuming the absence of divine causation and not proving it. I am not claiming to prove that such causation does not exist. Rather I am simply demonstrating that, based on current scientific knowledge, none is necessary.

In natural scenario I have provided, the values of the constants of nature in question are not the only ones that can occur. A huge range of values are in fact possible, as are all the possible laws that can result from symmetry breaking. The constants and forces that we have were selected by accident - as the pencil fell - when the expanding universe cooled and the structure we see at the fundamental level froze out. Just as the force laws did not exist before symmetry breaking, so too the constants did not exist. They, after all, come along with the forces. In the current theoretical scheme, particles also appear, together with the forces, as the carriers of the quantities like mass and charge and indeed the forces themselves. They provided the means by which the broken symmetries materialize and manifest their structure.

What About Life?

Someday we may have the opportunity to study different forms of life that evolved on other planets. Given the vastness of the universe, and the common observation of supernovas in other galaxies, we have no reason to assume life only exists on earth. Although it seems hardly likely that the evolution of DNA and other details were exactly replicated elsewhere, carbon and the other elements of our life form are well distributed, as evidenced by the composition of cosmic rays and the spectral analysis of interstellar gas.

We also cannot assume that life would have been impossible in our universe had the symmetries broken differently. Certainly we cannot speak of such things in the normal scientific mode in which direct observations are described by theory. But, at the same time, it is not illegitimate, not unscientific, to examine the logical consequences of existing theories that are well-confirmed by data from our own universe.

The extrapolation of theories beyond their normal domains can turn out to be wildly wrong. But it can also turn out to be spectacularly correct. The fundamental physics learned in earthbound laboratories has proved to be valid at great distances from earth and at times long before the earth and solar system had been formed. Those who argue that science cannot talk about the early universe, or life on the early earth because no humans were there to witness these events, greatly underestimate the power of scientific theory.

I have made a modest attempt to obtain some feeling for what a universe with different constants would be like. It happens that the physical properties of matter, from the dimensions of atoms to the length of the day and year, can be estimated from the values of just four fundamental constants. Two of these constants are the strengths of the electromagnetic and strong nuclear interactions. The other two are the masses of the electron and proton (Press and Lightman 1983).

Of course, many more constants are needed to fill in the details of our universe. And our universe, as we have seen, might have had different physical laws. We have little idea what those laws might be; all we know is the laws we have. Still, varying the constants that go into our familiar equations will give many universes that do not look a bit like ours. The gross properties of our universe are determined by these four constants, and we can vary them to see what a universe might grossly look like with different values of these constants.

I have created a program, *MonkeyGod*, which can be executed on the World Wide Web at <http://www.phys.hawaii.edu/vjs/www/monkey.html>. Try your own hand at generating universes! Just choose different values of the four constants and see what happens. While these are really only 'toy' universes, the exercise illustrates that there could be many different universes possible even within the existing laws of physics.

As an example, I have analyzed 100 universes in which the values of the four parameters were generated randomly from a range five orders of magnitude above to five orders of magnitude below their values in our universe, that is, over a total range of ten orders of magnitude. Over this range of parameter variation, N_1 is at least 10^{33} and N_2 at least 10^{20} in all cases. That is, both are still very large numbers. Although many pairs do not have $N_1 = N_2$, an approximate coincidence between these two quantities is not very rare (for more details, see Stenger 1995).

The distribution of stellar lifetimes for these same 100 universes has also been examined. While a few are low, most are probably high enough to allow time for stellar evolution and heavy element nucleosynthesis. Over half the universes have stars that live at least a billion years. Long life is not the only requirement for life, but it certainly is not an unusual property of universes.

Recall Barrow and Tipler's option (C), which held that an ensemble of other, different universes is necessary in any natural explanation for the existence of our universe. Another myth that has appeared frequently in the literature (see, for example, Swinburne 1990) holds that only a multiple-universe scenario can explain the coincidences without a supernatural creator. No doubt this can do it, as we will see below. But even if there were only one universe, the likelihood of *some* form of life in that single universe is not necessarily small. If many universes beside our own exist, then the theistic argument from the anthropic coincidences is dead in the water.

An Infinity of Universes

Within the framework of established knowledge of physics and cosmology, our universe could be one of many in an infinite super universe or "multiverse" (Linde 1994). Each universe within the multiverse can have a different set of constants and physical laws. Some might have life of a different form than us, others might have no life at all or something even more complex or so different that we cannot even imagine it. Obviously we are in one of those universes with life.

Several commentators have argued that a multiverse cosmology violates Occam's razor (see, typically, Ellis 1993: 97). This is wrong. The entities that Occam's law of parsimony forbids us from "multiplying beyond necessity" are theoretical hypotheses, not universes. For example, although the atomic theory of matter multiplied the number of bodies we must consider in solving a thermodynamic problem by 10^{24} or so per gram, it did not violate Occam's razor. Instead, it provided for a simpler, more powerful, more economic exposition of the rules that were obeyed by thermodynamic systems.

As Max Tegmark (1998) has argued, a theory in which all possible universes exist is actually more parsimonious than one in which only one exists. Just as was the case for the breaking of the global conservation laws, a single universe requires more explanation - additional hypotheses.

Let me give a simple example that illustrates his point. Consider the two statements: (a) $y = x^2$ and (b) $4 = 2^2$. Which is simpler? the answer is (a), because it carries far more information with the same number of characters than the special case (b). Applied to multiple universes, a multiverse in which all

possible universes exist is analogous to (a), while a single universe is analogous to (b).

The existence of many universes is in fact consistent with all we know about physics and cosmology. No new hypotheses are needed to introduce them. It takes an added hypothesis to rule them out - a super law of nature that says only one universe can exist. That would be an uneconomical hypothesis! Another way to express this is with lines from T. H. White's *The Once and Future King*: "Everything not forbidden is compulsory".

An infinity of random universes is suggested by the modern *inflationary model* of the early universe (Linde 1987, 1990, 1994 ; Guth 1981, 1997; Smith 1990; Smolin 1992, 1997). As we have seen, a quantum fluctuation can produce a tiny, empty region of curved space that will exponentially expand, increasing its energy sufficiently in the process to produce energy equivalent to all the mass of a universe in a tiny fraction of second. Andre Linde proposed that a background spacetime "foam" empty of matter and radiation will experience local quantum fluctuations in curvature, forming many bubbles of false vacuum that individually inflate into mini-universes with random characteristics (Linde 1987, 1990, 1994; Guth 1997). In this view, our universe is one of those expanding bubbles, the product of a single monkey banging away at the keys of a single word processor.

The Descent of the Universe

Smith (1990) and Smolin (1992) have independently suggested a mechanism for the evolution of universes by natural selection. They propose a multi-universe scenario in which each universe is the residue of an exploding black hole that was previously formed in another universe.

An individual universe is born with a certain set of physical parameters - its "genes". As it expands, new black holes are formed within. When these black holes eventually collapse, the genes of the parent universe get slightly scrambled by fluctuations that are expected in the state of high entropy inside a black hole. So when the descendant black hole explodes, it produces a new universe with a different set of physical parameters - similar but not exactly the same as its parent universe. (To my knowledge, no one has yet developed a sexual model for universe reproduction.)

The black hole mechanism provides for both mutations and progeny. The rest is left to survival of the survivor. Universes with parameters near their "natural" values can easily be shown to produce a small number of black holes and so have few progeny to which to pass their genes. Many will not even inflate into material universes, but quickly collapse back on themselves. Others will continue to inflate, producing nothing. However, by chance some small fraction of universes will have parameters optimized for greater black hole production. These will quickly predominate as their genes get passed from generation to generation.

The evolution of universes by natural selection provides a mechanism for explaining the anthropic coincidences that may appear far out, but Smolin suggests several tests. In one, he predicts that the fluctuations in the cosmic microwave background should be near the value expected if the energy fluctuation responsible for inflation in the early universe is just below the critical value for inflation to occur.

It is no coincidence that the idea of the evolution of universes is akin to Darwin's theory of biological evolution. In both cases we are faced with explaining how unlikely, complex, non-equilibrium structures can form without invoking even less likely supernatural forces. Natural selection may offer a natural explanation.

Tegmark's Ensembles

Tegmark has recently proposed what he calls "the ultimate ensemble theory" in which all universes that mathematically exist also physically exist (Tegmark 1998). By "mathematical existence," Tegmark means "freedom from contradiction." So, universes cannot contain square circles, but anything that does not break a rule of logic exists in some universe.

Tegmark claims his theory is scientifically legitimate since it is falsifiable, makes testable predictions, and is economical in the sense that I have already mentioned above - a theory of many universes contains fewer hypotheses than a theory of one. He finds that many mathematically possible universes will not be suitable for the development of what he calls "self-aware structures," his euphemism for intelligent life. For example, he argues that only a universe with three spatial and one time dimension can contain self-aware structures because other combinations are too

simple, too unstable, or too unpredictable. Specifically, in order that the universe be predictable to its self-aware structures, only a single time dimension is deemed possible. In this case, one or two space dimensions is regarded as too simple, and four or more space dimensions is reckoned as too unstable. However, Tegmark admits that we may simply lack the imagination to consider universes radically different from our own.

Tegmark examines the types of universes that would occur for different values of key parameters and concludes, as have others, that many combinations will lead to unlivable universes. However, the region of the parameter space where ordered structures can form is not the infinitesimal point only reachable by a skilled artisan, as asserted by proponents of the designer universe.

Conclusion

The new convergence of science and religion that has been reported in the media is more between believing scientists and theologians than believers and nonbelievers. Theistic scientists who deeply wish to find evidence for design and purpose to the universe now think they have. Many say that they see strong hints of purpose in the way the physical constants of nature seem to be exquisitely fine-tuned for the evolution and maintenance of life. Although not so specific that they select out human life, these properties are called the "anthropic coincidences" and various forms of the "anthropic principle" have been suggested as the underlying rational.

Theists argue that the universe seems to have been specifically designed so that intelligent life would form. Some have gone so far as to claim that this is already "proved" by the existence of the anthropic coincidences. The theist claim translates into a modern version of the ancient argument from design for the existence of God. However, the new version is as deeply flawed as its predecessors, making many unjustified assumptions and being inconsistent with existing knowledge. One gross and fatal assumption is that only one kind of life, ours, is possible in every configuration of possible universes.

Another form of the anthropic principle holds that observers, by their very act of observation, bring the universe into being. This has become a popular notion in New Age philosophy and is supposedly justified by certain interpretations of quantum

mechanics. However, other interpretations of quantum mechanics are viable and the best evidence that we do not make our own universe is the fact that the universe is not what most of us want it to be.

We have examined possible natural explanations for the anthropic coincidences. A wide variation of constants of physics has been shown to lead to universes that are long-lived enough for life to evolve and exhibit "anthropic" coincidences, though human life would certainly not exist in such universes.

The most powerful "laws of physics," the conservation laws, were shown to be evidence against design rather than for it. They are directly related to the "symmetries of nothing" that would exist in the absence of design. Furthermore, the observed forces, particles, and other structure in our universe are consistent with the accidental, or spontaneous, breaking of symmetries at local points in spacetime. This also mitigates against design or creation.

Although not needed to negate the fine-tuning argument, which falls of its own weight, from all that we know of fundamental physics and cosmology other universes besides are own are not ruled out. The theory of a multiverse composed of many universes with different laws and physical properties is actually more parsimonious, more consistent with Occam's razor, than a single universe. We would need to hypothesize a new principle to rule out all but a single universe. If, indeed, there exist multiple universes, then we are simply in that particular universe of all the logically consistent possibilities that had the properties needed to produce us.

Acknowledgments

I have greatly benefitted from discussions with Ricardo Aler Mur, Samantha Atkins, John Chalmers, Scott Dalton, Keith Douglas, Ron Ebert, Simon Ewins, Jim Humphreys, Bill Jeffreys, Kenneth Porter, Wayne Spencer, and Ed Weinmann.

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On the Psychology of Belief in the Paranormal

by Michael A. Thalbourne

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The beginnings

As one who accepted the evidence for the paranormal, I did both my Honours thesis (at the University of Adelaide, 1976) and my doctoral dissertation (at the University of Edinburgh, 1981b) on

essentially parapsychological topics In brief, I had a sender in a secluded location look at a line-drawing of some object randomly chosen from a dictionary, while a distant receiver-person would have blank paper and a pen and attempt to guess and draw the sender's

picture. This process was repeated ten times over a period of half an hour. The degree of resemblance between target-picture and response-picture can be objectively ascertained using ranking procedures with "blind" judges (Thalbourne, 1979, 1988). "Blind" judges are those who are not aware of the correct target-response matchings. Using these procedures, the 10 responses in my tests were ranked from 1 (response most closely resembling the target) to 10 (response least closely resembling the target), and these ranks were called the "ESP scores". In my Honours thesis, hypothesising that closeness of relationship affected ESP, I compared 18 emotionally close and 13 non-close pairs, but found no difference in ESP scores. However, I had given to all participants a battery of psychological tests. When the ESP scores¹ were correlated with the results from the psychological tests there turned out to be some slight significant evidence that those with higher ESP scores were more extraverted, and a very strong pattern of evidence that persons who scored high on an attitude-to-ESP questionnaire — that is, who more strongly believed in, and claimed more experience of, the paranormal — also tended to obtain higher ESP scores: the "sheep", to use Gertrude Schmeidler's (1943) memorable terminology for believers in ESP, tended to show more target-response resemblance than did the "goats", those who reject the possibility of ESP. (These terms are taken from a New Testament simile [Matthew 25: 31-33]: "When the Son of man comes in his glory, and all the angels with him, then he will sit on his glorious throne. Before him will be gathered all the nations, and he will separate them one from another as a shepherd separates the sheep from the goats...". However, no religious connotation was intended by Schmeidler.)

I spent my Ph.D. years following up on this finding of a correlation between higher ESP scores and higher scores on an attitude to ESP questionnaire. In further experiments I obtained additional evidence of such a correlation. As it turned out, I found that the correlation was stronger for the senders than for the receivers. Thus, if the sender was a sheep (as determined by a sheep-goat attitude scale: see Thalbourne & Delin [1993] for the evolution of this scale), the target-picture tended to show up (in form or in theme) in the receiver's drawing; whereas if the sender was a goat, the receiver's drawing tended to show an *avoidance* of the form or theme of the target-picture. This effect tended to occur only when the

sender and receiver were essentially unacquainted with each other.

Since that time I have completed only one drawing experiment (Thalbourne & Shafer, 1983). This experiment was made controversial by the fact that the two participants turned out to be conjurors planted by James Randi in our laboratory to try, amongst other goals, to vitiate experiments (Thalbourne, 1995c), though the two claim not to have been able to cheat in this particular study. I have done a study with identical and fraternal twins, never completed because of the closure of the laboratory in which I was working. But because of the time-consuming nature of the judging-process, and the necessity (I now believe) of having a "blind" (and paid) judging-supervisor (the lack of which is a potential methodological shortcoming in my earlier studies because it compromises the "blindness" of the judges²). I have been deterred from conducting other picture-guessing experiments, and have limited myself to forced-choice studies, where the participant makes a choice from one of a limited range (such as one in four), with, it must be admitted, somewhat limited success (e.g., Thalbourne, Beloff & Delanoy, 1982; Thalbourne, 1986; Thalbourne, Delin, Barlow & Steen, 1992-1993). I no longer consider myself to be an experimenter outstandingly conducive to obtaining evidence of the paranormal, but rather one who gets sporadic statistical significance here and there, in a way that is open to various interpretations such as the significance being due to an excessive number of analyses without correction for that number, and thereby leading to the conclusion that the "significance" was due to mere chance. If the case for the paranormal rested on the evidence I have obtained, it would be a slight case indeed.

Extraverted sheep and introverted goats

But there is another theme that was going on in parallel with my parapsychological research. In the course of my postgraduate career, I found that people who had an extremely close and reciprocated relationship with someone tended to believe in, and claim experience of, the paranormal to a significantly greater extent than subjects who had never had an extremely close and reciprocated relationship with anyone. This "non-close-relater effect" replicated on all the occasions that I looked for it (Thalbourne, unpublished data). One possible explanation for this result lies in the different degrees of intimate contact

with others the two groups have. Being in a relationship might produce instances of coincidences between the thoughts or deeds of the partners which subjectively appear to be ESP communication. This may foster belief in ESP. On the other hand, people who have never been in close relationships may be loners who rarely have the opportunity to experience such coincidences.

In the summer of 1978 Erlendur Haraldsson invited me to the University of Iceland in Reykjavík to act as his research assistant, and it is to him that I owe my lasting interest in the psychology of belief in the paranormal. One of the tasks he had me do was compare two samples (pilot-confirmation) of sheep and goats on an Icelandic version of Cattell's Sixteen Personality Factor test, which purports to measure 16 different facets of personality, such as warmth, emotional stability, etc. Back home in Edinburgh I did the same for two samples of data that were available to me. Essentially we found that sheep showed a small tendency to be more extraverted than goats. In 1980 we published a paper on this finding (Thalbourne & Haraldsson, 1980), and in the following year I replicated it (Thalbourne, 1981a). Since sheep and extraverts are each separately thought by parapsychologists to tend to obtain ESP-scores above chance, while goats and introverts are thought to score below chance, this research naturally led to a parapsychological experiment in which extraverted sheep were compared for guessing performance with introverted goats (introverted sheep and extraverted goats being excluded from the analysis). In our first experiment, introverted goats obtained ESP-scores significantly below chance, and more extremely so than introverts or goats alone, and in our second experiment there was evidence of a sheep-goat effect (Thalbourne, Beloff & Delanoy, 1982); but thereafter, in six further experiments, statistically significant results were very hard to come by (Thalbourne, Beloff, Delanoy & Jungkuntz, 1983; Thalbourne & Jungkuntz, 1983), except that sheep continued to be more extraverted than goats!

Sometime in 1984, when I was working at Washington University in St. Louis, I took a different tack with my psychological research. There appeared in the magazine *Psychology Today* a short article entitled "How magical are you?" — a (poor) attempt to discuss the work of Loren Chapman and his associates at the University of Wisconsin on the attribute of

magical thinkingⁱ and its relationship to proneness to psychosis (Eckblad & Chapman, 1983). Many of the beliefs and experiences described as "magical" seemed identical with parapsychological notions, such as "Some people can make me aware of them just by thinking about me" and "I have wondered whether the spirits of the dead can influence the living." It therefore seemed likely to me that scores on the 30-item Magical Ideation Scale would correlate (that is, be statistically associated) with scores on what by this time we were now calling Sheep-Goat Scales. A pilot sample of 12 students showed no such association, but a larger sample of 99, gathered from the university's student dormitories by my student Lon Eskin, showed this relationship very strongly, even when the blatantly parapsychological items were removed from the Magical Ideation Scale (Thalbourne, 1985). This finding has been replicated many times (e.g., Thalbourne, 1994a) and extended to such characteristics as grossly schizophrenic-like distortions in the perception of one's own body, and other perceptual distortions (as measured by the Perceptual Aberration Scale, devised by L.J. Chapman, J.P. Chapman and Raulin, 1978). So, then, if sheep are more prone to magical thinking, are they then more prone to psychosis? As we shall see, this question is still open, but for the time being we can say that there is indeed a tendency for sheep to score higher on psychopathological scales. We shall get to some relevant evidence shortly.

One of my colleagues while at the McDonnell Laboratory for Psychical Research at Washington University was Michael McBeath, now at Kent State University. Of wide-ranging interests, he was keen on researching the relationship between the paranormal and sexuality in all its manifestations. One of the hypotheses which he formulated was that the incidence of homosexuality among experiencers of paranormal phenomena was higher than would be expected by chance (McBeath, 1985). I collected data over the next few years that bore upon this hypothesis. I administered an expanded Sheep-Goat Scale to 50 heterosexual and 50 homosexual men, expecting to find the incidence of belief and experience to be higher in the latter. But the gay men scored about the same as the straight men on the Sheep-Goat Scale — suggesting that McBeath might be wrong in his hypothesis (Thalbourne, 1997a). I also gave my participants two paranormal tasks. The first was an

ESP task. In this, the subject had to guess the gender of an attractive person depicted in a concealed picture (50 pictures were used for each subject). If McBeath's hypothesis was correct, the homosexual men might be more likely to be correct in their identifications when the person in the picture was male. Unfortunately, the statistics of the evaluation have proven to be beyond my capacities to analyse, so the outcome of that portion of the study remains unclear. The second task was of ostensible psychokinesis, and involved trying to will six plain silver ball bearings and six ball-bearings blackened by holding them over a flame. The 12 ball-bearings were poured from an opaque rubber bulb into a narrow glass tube — to emerge in a linear pattern where (it was hoped) the two colours either alternated or formed separate blocks (Knowles, 1967). After some years of collecting data it transpired that the apparatus was faulty, inasmuch as the blackening of the ball bearings significantly retarded their egress into the glass tube (Thalbourne, 1996c). So that experiment was a fizzer. Perhaps others will have more success with sexual orientation and other variables connected with sexuality.

Another of McBeath's hypotheses was that those who were vehemently skeptical of paranormal claims were more likely to exhibit signs of the so-called Type A Behaviour Pattern. Type A behavior is associated with elevated risk of heart attack, and is comprised of a number of components. These include competitiveness, excessively hurried actions, a compulsive sense of time-urgency, hostility (Friedman & Rosenman, 1974), mistrust, and even, perhaps, cynicism (Williams, 1984). Perhaps we should have gone to such vehement skeptics for our data, but instead we chose the easier option of approaching students and members of the general population. We administered the Sheep-Goat Scale and scales measuring speed and impatience (the Jenkins Activity Survey: Krantz, Glass, & Snyder, 1974) and suspiciousness (Factor L of the Sixteen Personality Factor Questionnaire: Cattell, Eber, & Tatsuoka, 1970) but found no difference between sheep and goats on any of these variables (McBeath & Thalbourne, 1993). Another dead end.

The psychology of belief in life after death

Our lab closed for lack of funding in the summer of 1985, and it was 1987 before I was in an academic position again and able to pursue research,

by this time back in my home town of Adelaide. It was then that I received the opportunity to continue pursuing one of my pet interests in the psychology of belief in the paranormal, which is the psychology of belief in life after death. This seems to be a very under-researched area, there being only one or two other workers in the world who are active on this topic.

Box 1

General believers in life after death tend to be:

- female
- older
- more religious
- more conservative, socially and politically
- more believing in ESP and PK
- more likely to allege experience of the paranormal

Anyway, I found in my review of the literature (Thalbourne, 1989) that belief in an afterlife varies widely from country to country — from as low as 18% in Japan to as high as 70% in India and the U.S.A.; it is slightly more prevalent among women than among men and in older people rather than the young; that, with the exception of Jewish people, who are rather skeptical, afterlife-belief is stronger in those who currently have a religious affiliation and in those exhibiting a range of religious attitudes, behaviours, and experiences; that it is higher among those who are socially and politically conservative (cf. Thalbourne, 1994b); and that it is higher among those who accept the notion that mind can behave paranormally, and probably higher among those who report ostensible *experience* of mind behaving in this way.

To delve further into exactly what sort of life after death was envisaged, I presented seven (or in some cases eight) scenarios to a number of groups of people, both students and members of the general population. I subjected the data to a statistical technique known as factor analysis, and found that instead of eight different afterlife scenarios we really had just two — reincarnation, and immortality — which could occur independently or in combination. We thus had (1) extinctionists (non-survivalists), who did not believe in any life after death; (2) reincarnationists; (3) immortalists, who denied reincarnation and might also believe in the Resurrection of the Dead; (4) eclectics, who believed in a combination of immortality and reincarnation; (5) "other" believers, who believed in life

after death but not one of the reincarnationist or immortalist variety; and (6) agnostics, who are unsure about whether there is a life after death.

The results of five studies (Thalbourne, 1996b) showed quite a large number of distinct differences, demographic and psychological, between these six groups.

Box 2

Extinctionists tend to be

- male
- of no religious affiliation and not religious
- low belief in, and alleged experience of, this-worldly paranormal events
- less prone to psychosis
- more liberal, socially and politically
- less anti-hedonistic
- average on militarism-punitivism
- more realistic
- less likely to interpret dreams
- less hypnotisable
- less guilty about sex
- in greater agreement with the right to suicide

Compared to the other groups, extinctionists tended to be men, though not necessarily younger. They also tended not to have a religion, either at the time of the survey or during their upbringing. Extinctionists tended to score lowest on the variables measured: they had lesser belief in and alleged experience of this-worldly paranormal events (a very consistent finding), and had lower scores on various measures relevant to magical ideation and to schizophrenia (the Schizophrenia Scale: Hathaway & McKinley, 1983) or other psychoses; they also tended *not* to be religious (as measured by Haraldsson's Religiosity Scale: Haraldsson, 1981), to be socially and politically liberal (conservatism-liberalism and its components being measured by the Wilson-Patterson Attitude Inventory: Wilson, 1975), not antihedonistic, average on militarism-punitivism, realistic rather than following a philosophy of life, not to engage in dream-interpretation, and to be low in both hypnotisability and sex-guilt; finally, extinctionists tended to agree with the right to suicide but to disagree (naturally) with the statements that there is a Hell and a Heaven and that we are reunited with loved ones when we die; they were no different in belief in a just world (as measured

by the Just World Scale of Rubin & Peplau, 1975), in belief in extraordinary life-forms, belief that one reaps what one sows, and in the mercy-killing of infants.

Extinctionists constituted about 18% of these samples (and agnostics the same percent). Thus, the majority of persons surveyed, regardless of whether they were American or Australian, appeared to believe that death does not spell the end for human consciousness.

In three of the five studies there were measures of belief in, and alleged experience of, the paranormal (Thalbourne, 1981a; Thalbourne, 1985; Tobacyk & Milford, 1983). The results were quite consistent. The highest scores on these scales were obtained by the reincarnationists and eclectics, the lowest by extinctionists and agnostics, with immortalists falling somewhere between. Clearly, the higher the belief in and the more experience of the paranormal, the greater the tendency to believe in an afterlife, particularly one involving reincarnation.

In two of the studies there were questionnaire measures of religiosity (Haraldsson, 1981; Tobacyk & Milford, 1983). Extinctionists and agnostics again scored the lowest, but in this case the highest scores were obtained by the immortalists and it was the reincarnationists and eclectics who fell somewhere in between. Obviously, the greater the degree of religiosity, the greater the tendency to believe in an afterlife, but most especially one of the immortalist variety. Similarly, afterlife believers, particularly of the immortalist kind, were the most likely to have had a religious upbringing and to be currently affiliated with a religious group.

Several measures were administered in one study only, and it must be emphasised that the conclusions drawn should be considered tentative until they are replicated. However, the data suggest the following profiles of the different types of believer:

extinctionists and agnostics tend to show few signs of schizophrenia-relevant personality, to be more liberal, less antihedonistic, more realistic, less inclined to interpret their dreams, less hypnotisable, and less guilty about sex. Immortalists tend to show an average number of signs of schizophrenia-relevant personality, are more conservative, more antihedonistic, more idealistic, moderately hypnotisable, and highly guilty about sex. Finally, the reincarnationists and eclectics scored high on schizophrenia-relevant variables, were more liberal, frequently engage in dream-interpretation,

were more hypnotisable, and less guilty about sex. The three groups of subjects therefore differ from each other in distinctive ways, and indeed the two groups of afterlife-believers, while showing some similarities, show some striking differences also. The finding that afterlife believers do not represent a psychologically homogeneous group would appear to justify the attempt made to differentiate between types of believers.

Box 3

Extinctionists and agnostics tend to be

- less likely to show signs of schizophrenia-relevant personality
- more liberal
- less antihedonistic
- more realistic
- less inclined to interpret their dreams
- less hypnotisable
- less guilty about sex

Immortalists tend to be

- average in signs of schizophrenia-relevant personality
- more conservative
- more antihedonistic
- more idealistic
- moderately hypnotisable
- highly guilty about sex

Reincarnationists and eclectics tend to be

- high on schizophrenia-prone variables
- more liberal
- more likely to engage in dream-interpretation
- more hypnotisable
- less guilty about sex

Thus, the general question, “Do you believe in life after death?,” by indiscriminantly combining different sorts of believer, or by restricting believers to one variety, is now seen to give potentially misleading results. Greeley (1988) reported that belief in an afterlife was associated with opinions opposing greater concern about: the environment, homosexual rights, gun control and arms reduction. All of these opinions could be said to be conservative attitudes, and this characterisation gains credence from the fact that such opposition tended to be greater amongst those who

interpreted the Bible as literally God’s word. These findings may well have stemmed from a preponderance of Christian immortalists in Greeley’s sample. This could also be the explanation for Kalish’s (1963) findings that (general) afterlife-believers disapproved of birth control and abortion and approved of capital punishment. Groups where reincarnation is the dominant form of afterlife-belief might, I suggest, give quite different results. Wuthnow and Glock (1974) found that readers of *Psychology Today* who were “experimenting with Eastern religion” showed a high level of belief in reincarnation and were also rather radical, socially and politically. Indeed, research comparing Western countries with those of Asia might be most illuminating, as it may be that when reincarnation is the majority belief it is the conservatives who believe it, not those who are more liberal.

Although these studies do not throw much light on *how* afterlife beliefs are acquired, I offer the following speculation as a plausible account. Belief in an afterlife appears to originate in at least two different ways in the West. If a person believes in the immortalist eschatology, he or she has probably come to it by way of a Christian upbringing and a current association with Christian activities and attitudes. This process may be enhanced if the person is politically and socially conservative (though the Church may also bring these characteristics about, as, for example, it almost certainly brings about greater sex-guilt, which is strongly associated with conservatism).

If, on the other hand, persons look favourably upon reincarnationist ideas, the route to their belief seems to be quite different. Rather than being involved in the established Church, such persons, although having some interest in religion, may have gone their own way ecclesiastically, and be more influenced by a metaphysical system that emphasises paranormal belief and experience and altered states of consciousness. They may also be prone to certain unusual experiences that they interpret as revealing the existence of afterlife realities and entities beyond the veil of the ordinary senses. Immortalists may tend to believe in an afterlife mainly on authority, without having experienced much evidence of it. Reincarnationists, on the other hand, are likely to base their belief — rightly or wrongly — on their own experience or the experience of others.

We are left with a picture of a number of different metaphysical viewpoints. These viewpoints can be grouped into two separate but partially overlapping camps. The extinctionists and the agnostics are in one of the camps; the immortalists, eclectics, reincarnationists, and “other” believers are in the other.

Since this research I have published a further paper (Thalbourne, 1996a) in which I used a new typological questionnaire for classifying people into the six afterlife-belief categories mentioned above. The subjects were 85 psychology undergraduates. General belief in life after death was found to be high, and believers tended to *desire* there to be an afterlife, to adhere to a dualistic (mind/body) philosophy (according to the Dualism Scale, devised by Stanovich [1989]), and to have less anxiety about death (as measured by Templer's [1970] Death Anxiety Scale). Subdivision of subjects into the six different forms of afterlife beliefs showed that reincarnationists exhibited the strongest adherence to a dualistic philosophy and the highest level of belief in, and alleged experience of, ESP and psychokinesis — replicating the previous study. Extinctionists were the lowest on these two dimensions.

I have done a more recent experiment of this kind, using, amongst others, certain psychopathological variables, but I will leave that until my next paper.

More on sheep and goats

During the late 1980s I conducted more research into the psychology of belief in ESP and psychokinesis. Three papers emerged from this research. As I fervently believe in the value of replication in psychology as well as parapsychology, in the first paper (Thalbourne, 1995a) I replicated (to a greater or lesser extent) results that suggested sheep were more likely to be religious, hypnotisable, to have had a vivid spiritual experience, to read more often about Eastern religions or theosophy, to recall their dreams and engage in dream-interpretation, and to have less sex-guilt than goats. As expected, believers were no more conservative overall than disbelievers, nor were they more likely to read the Bible or to have been religiously affiliated during their upbringing. Contrary to prediction, however, believers were no more likely than disbelievers to have a religious affiliation at the time of this 1988 survey.

Box 4

Sheep tend to be

- more religious
- more hypnotisable
- more likely to have vivid spiritual experience
- more likely to read about Eastern religions
- better able to recall dreams
- less guilty about sex

The second paper was a collaborative effort based on the Diploma thesis of student Kelly Dunbar (Thalbourne, Dunbar, & Delin, 1995). In this study, 169 students taking introductory psychology at the University of Adelaide in 1987 completed my own Sheep-Goat Scale and another widely used measure of belief in the paranormal, the Tobacyk-Milford Paranormal Belief Scale (Tobacyk & Milford, 1983), which give similar but not identical results to each other. Participants were also administered a battery of tests measuring three demographic and 10 cognitive/personality/psychopathological dimensions. In summary, the overall pattern confirmed that there are associations between belief in the paranormal and certain personality, cognitive, and psychopathological variables. This holds regardless of whether the term *paranormal* is applied to the purely parapsychological or to other scientific anomalies, as in Tobacyk's scale. The relationships are strongest and most consistent for magical ideation. The association is less strong but still present in the case of the correlations between belief in the paranormal and (1) having a so-called “external” personal efficacy locus of control³ and (2) neuroticism (Eysenck, 1958).

In this study, relationships with other research variables are rather fewer in number and depend on the particular dimension of paranormal belief being examined. For example, believers in certain types of the paranormal were in certain cases found to be more dogmatic (using the dogmatism scale of Troidahl and Powell, 1965) than disbelievers. Only the interpersonal and sociopolitical locus of control scales failed to yield any statistically significant associations with any aspect of paranormal belief. The overall suggestion from these data is that sheep may be more inclined to be maladjusted.

The study also examined belief in life after death. In summary, belonging to a religious group seems to be associated, not surprisingly, with general belief in an afterlife, whereas in the case of belief in

reincarnation such an affiliation is less relevant and gender appears to have an influence. The variable of magical ideation appears to be associated with belief in an afterlife, especially reincarnation, and neuroticism also consistently appears to be correlated. These results suggest that afterlife believers may be somewhat less well adjusted than disbelievers.

In the third paper (Thalbourne, 1995b), 247 students taking psychology at the University of Adelaide in 1989 were administered an expanded version of the Australian Sheep-Goat Scale and an exploratory Conceivability Scale. The aim of constructing this new scale was to produce a measure of something like a person's ability to imagine (in the sense of intellectually conceive of) a certain object or scenario. To this end, the scales lists 20 unusual (but not necessarily paranormal) scenarios (such as "Travel back in time", "Spontaneous combustion of a human body", "An animal with natural wheels", "Travel faster than the speed of light", and "A creature which carries its young in its stomach and gives birth through its mouth"), and subjects were given the following instructions:

Listed below are a number of unusual notions. These notions may be quite unlikely or perhaps even impossible. Your task is not to say whether they are possible or impossible, likely or unlikely. You simply have to say how easily you, personally, can imagine them being true.

Sheep tended to get higher scores on the Conceivability Scale, suggesting that goats may be goats in part through a lack of imaginativeness.

A subsample of the students were also administered the Tobacyk-Milford Paranormal Belief Scale, along with the Just World Scale and eight ethical or religio-philosophical items. The results from both paranormal belief scales indicated that high scorers tended to be more likely to believe in a Heaven and in union with loved ones at death. On the other hand, believers were no more likely to have been affiliated with a religious faith during their upbringing nor to be so affiliated at the time of the survey; nor did they endorse opinions to the effect that justice ultimately prevails, that honesty is the best policy, that we reap what we sow, that they had suffered a grave miscarriage of justice, that suicide is permissible, and that mercy-killing of infants is acceptable.

I once read — where I cannot now locate — that as the psychology of belief in the paranormal progresses flattering and unflattering adjectives will accrue to both believers and disbelievers alike. In the 1990s I was responsible for accumulating what I regard as some unflattering adjectives for believers, who turned out to have more positive attitudes to horoscopes (Thalbourne, 1992), to astrology and UFOs (Thalbourne & French, 1997), to extraordinary life-forms such as the abominable snowman and the Loch Ness monster (Thalbourne, Dunbar & Delin, 1995; Thalbourne, 1995b), and to be slightly more superstitious than disbelievers (Thalbourne, 1997b), though this particular situation is not always found, and there appears to be no association between paranormal belief and intelligence (Thalbourne & Nofi, 1997). Belief in the paranormal (i.e., ESP, psychokinesis, and life after death) thus seems often to go along with belief in what I would call non-parapsychological anomalies. (Sheep also tend to believe in such divinatory practices as the *I Ching* and the Tarot [Murphy & Lester, 1976; Thalbourne *et al.* 1992-1993], but this fact seems to me unremarkable given that these practices may be thought of as involving an element of ESP or psychokinesis.) I might also mention at this point that paranormal belief appears to be higher among psychiatric patients (persons with schizophrenia or manic-depression) than among members of the general population (Thalbourne, 1998) a finding which I shall try to accommodate in my next paper.

A turning point

It may seem to the reader that research on the psychology of belief in the paranormal was rather unsystematic and not clearly guided by any theoretical notions (other than the notion that the believer was deficient in some way!), and the results were not easily integrated into an overall pattern, even if they had been replicated on more than one occasion. In contrast, the 1990s have seen the growth and testing of various models, such as the childhood trauma models of Irwin (1993) and of Lawrence, Edwards, Barraclough, Church and Hetherington (1995), and the model of Lange and Houran (in press) postulated to explain reports of poltergeists and hauntings. One model is my own: the conceptual framework for which I am responsible I call "transliminality". I will have much

more to say on this topic in a paper to be published in the *Skeptical Intelligencer* in due course.

Acknowledgements

This paper benefitted greatly from the extensive and incisive comments provided by the Editor and the editorial board. Address correspondence to Dr. Michael A. Thalbourne, Department of Psychology, University of Adelaide, Australia 5005, or e-mail to: psym-tha@complex.psych.adelaide.edu.au.

Notes

1 The same ESP-score was applied to both sender and receiver of a given pair.

2 The problem with my earlier studies concerns the possibility of sensory cueing between the judges on the one hand and me in my role as experimenter/judging supervisor on the other. When I laid out the ten responses from the subject in front of the judge I occasionally knew the correct target-response match (especially if it was rather striking). Although I did my best not to give anything away, some cue from me might inadvertently have been given out. If that cue had then been picked up by a judge, it might have biased his or her target-response rankings. It should be stressed, however, that this sensory cueing problem does not affect the evidence for the sheep-goat effect, because I was blind as to the sheep-goat status of the percipients whose responses were being judged. Had I not been blind, the sheep-goat effect could have come about by my selectively encouraging the judges to give high ranks to the correct target-response match when the percipient was known to be a sheep, and low ranks where I knew the percipient to be a goat.

3 Locus of control has to do with where the location of forces controlling a person's life is placed — either within one's self, or in the external environment: see Paulhus, 1983.

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The Creation Of Satanic Ritual Abuse

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This article was first published in the Journal of Social and Clinical Psychology (1997); 16(2): 112-132. It is reprinted with the kind permission of Guildford Publications Inc, who retain the copyright..

Fears about satanic ritual child abuse swept the nation in the 1980s and 1990s, but were probably largely unfounded. In this article, we explore sociocultural, individual, and therapy-related factors that together may be responsible for the creation of ritual abuse allegations. We conclude that there are serious problems with embracing false ritual abuse claims and call for more responsible journalistic coverage of issues relating to child abuse, more research to identify factors that contribute to false allegations, and better therapeutic practices to aid people seeking psychological help.

In the mid-1980s a new form of child abuse allegation surfaced in the United States, and eventually, worldwide. At first called satanic abuse, then satanic ritualistic abuse, and then simply ritual abuse, this form of child abuse was said by clinicians and a few researchers to be especially damaging to its victims because of its extraordinarily violent and bizarre nature (e.g., Kelley, 1989, 1996; Young, Sachs, Braun, & Watkins, 1991). Ritual abuse was said to involve large numbers of victims and perpetrators- of both genders, to be so cloaked in secrecy and involve such precise concealment of evidence that almost no one knew about it and to involve the most horribly painful and degrading practices imaginable including sacrificing human infants to Satan, gang-raping young children during satanic worship, eating human flesh and feces, and forcing children to spend time in graves or pits containing dead animals or snakes (Bottoms, Shaver, & Goodman, 1996). Being characterized by the most extreme violations of normal human standards of morality and dignity, it lived up to its "satanic" label.

Reports of ritual abuse initially came from a few "adult survivors," adults who claimed to have been satanically abused during their childhoods. The first was probably Michelle Smith, who supposedly regained satanic abuse memories during therapy with Dr. Lawrence Pazder (whom she later married), then told her story in the influential 1980 book *Michelle Remembers* (Smith & Pazder, 1980). But fairly quickly, similar reports emerged in the context of complicated child abuse cases at daycare centers such as McMartin Day Care in California (Waterman, Kelly, Oliveri, & McCord, 1993). The seeming cross-

corroboration of children's and adult survivors' claims at first led many open-minded professionals, including clinicians and journalists, to believe that abusive satanic cults actually existed and were a serious threat to society.

More recently, however, these beliefs have been effectively attacked by skeptics, and ritual abuse is now viewed by many professionals to be part of a more general tendency of certain individuals, especially clients of certain psychotherapists, to manufacture memories of abuse that never occurred (Lindsay & Read, 1995; Loftus, 1993; Pendergrast, 1995). If satanic ritual abuse does not really occur, what could possibly explain hundreds of people earnestly claiming to be survivors of it? In this article, we provide an integrative overview of many factors that together contributed to the creation of false ritual abuse allegations. Up front, we want to state clearly what should be, needless to say: Questioning the existence of highly networked, intergenerational, international, child-abusing satanic cults, and asking why their existence was widely accepted, in no way amounts to questioning the existence and prevalence of actual child abuse. The evidence for child abuse-medical, forensic, and historical evidence is overwhelming and is just as troubling now as ever (e.g., Browne & Finkelhor, 1986; Finkelhor, 1986). But family members are the main perpetrators of child abuse (U.S. Department of Health and Human Services, 1996), and they do not seem to need the help of satanists to inflict serious damage. Furthermore, we do not mean to imply that there has never been a case of child abuse involving satanic elements. Paedophiles are not rare; neither are people who practice satanic religions. Occasional overlap of the two groups should not be surprising. It would be surprising, however, if they overlapped with any great frequency, or if the overlap resulted in the formation of large clandestine organizations.

Evidence against satanic ritual abuse

What led us to believe that satanic ritual abuse is rare? Our primary source of evidence is data collected in the early 1990s during large-scale survey research conducted by the first author in collaboration with Gail S Goodman and Phillip R. Shaver. Our

surveys were designed to answer many questions about the nature of ritual abuse allegations in the United States. Briefly stated, we targeted nearly 40,000 professionals and agencies with our surveys: psychologists, psychiatrists, social workers, and legal and social service agencies. In the present article, we draw conclusions mainly from the results of our survey of clinical psychologists who were all members of the American Psychological Association. (The responses of different professionals were similar in important ways; see Goodman, Qin, Bottoms, & Shaver, 1994.) The research was conducted in three phases: (a) a postcard survey to identify clinicians who had encountered relevant cases (total targeted $N = 6,000$), (b) a detailed survey to obtain more complete information about specific cases reported by those clinicians (targeted $N = 803$), and (c) a final detailed survey to gather information about the beliefs and practices of both clinicians who had and clinicians who had not encountered cases of ritual abuse; also, to gather information about therapists' general experiences with cases involving claims of repressed memories of any kind (targeted $N = 760$). Response rates at each stage ranged from 42% to 47%. (For more detailed information about these surveys, see Bottoms et al., 1996; Bottoms, Diviak, Goodman, & Shaver, 1996; Bottoms, Diviak, Goodman, Tyda, & Shaver, 1995; Bottoms, Shaver, Goodman, & Qin, 1995.)

Our results convinced us that the threat of satanic conspiracies was greatly exaggerated. First, relatively few therapists ever directly encountered a single case of alleged satanic abuse. Approximately 11% had seen a case reported by an adult survivor, 13% had seen a case reported by a child. An even smaller number of clinicians accounted for the vast majority of ritual abuse cases reported; for example, 2% of our sample claimed to have encountered hundreds of cases each. Second, as we detail later, therapists who reported cases were especially likely to have attended special workshops dealing with ways to identify and treat ritual abuse, to believe in the reality of satanic ritual abuse and repressed memories, to use suggestive "memory recovery" techniques such as hypnotic age regression which can produce false memories and iatrogenic symptoms in clients, and to diagnose their clients as suffering from controversial maladies such as multiple personality disorder (MPD, now known as dissociative identity disorder). Third,

nearly all therapists believed their clients' claims about satanic practices even though there was little or no corroborative evidence for them. Finally, nearly all of the claims about satanic abuse arose in the context of psychotherapy. In general, it seems that only after the phenomenon was well known (after seminal public accounts such as Michelle Remembers) did many individuals outside of therapy decide that they too suffered from it.

What we learned from our surveys is largely supported by the research of others interested in ritual abuse and in the larger controversy over the reality of recovered, formerly repressed memories of childhood abuse (e.g., Lindsay & Read, 1995; Poole, Lindsay, Memon, & Bull, 1995). (Many claims of childhood ritual abuse initially emerged as adult survivors' recovered memories; see Qin, Goodman, Bottoms, & Shaver, in press.) Combining these converging findings with the fact that police and FBI agents have never been able to find evidence of child-abusing satanic cults (Lanning, 1992), and adding in the fact that many alleged victims of such cults have now been discredited (Corwin, 1996) or have recanted their stories (Passantino, Passantino, & Tron, 1990), one has to conclude that there probably never were any highly organized, intergenerational, child-abusing satanic cults.

Overview

We now attempt to explain how thousands of cases of satanic ritual abuse were honestly reported when perhaps no abusive satanic cults existed. We focus on adult survivor cases, because our research indicates that they were the most extreme and bizarre in various ways, and historical evidence suggests that they influenced the well-publicized child cases.¹

We will show that understanding adults' fake reports of satanic ritual abuse requires examining a complex web of social and psychological forces. For clarity, we divide our discussion of those forces into three sections: Sociocultural Factors, Individual Factors, and Therapist and Therapy Factors. We draw support where possible from our own data, but also from others' research aimed at concerns about false claims of childhood sexual abuse, and from basic social, clinical, and cognitive psychological literatures.

Sociocultural factors

A number of complex sociocultural factors collectively set the stage for the rise of satanic fears in America, and in turn, the emergence of ritual abuse Claims in the offices of psychotherapists. As sociologists and others have pointed out (Pendergrast 1995), Americans have recently faced rapid social change, exposure to diverse and threatening lifestyles, economic insecurity, and family instability. People often seek simplistic explanations for their troubling experiences, leading to the kind of conspiratorial thinking and scapegoating that was the basis for satanic scares during the past decade (Richardson, Best, & Bromley, 1991; Victor, 1993). What better scapegoat or object of fear than satanic cults? Folklorists (e.g., Victor, 1993) have produced case studies of satanic rumors in economically depressed rural areas to support their contentions that panics about Satan are most likely to surface in areas hit hard by cultural change and economic downturns. In our research, however, we found no evidence that reports of ritual abuse are more a rural than an urban phenomenon, leading us to conclude that sociocultural precursors to ritual abuse beliefs are widespread in our society. Similar factors instigate other types of fearful thinking, such as the paranoia about government that characterizes American "militia groups."

Another important factor is the public's increasing reliance on the media in struggles to understand personal experiences and difficulties. This has supported the growing popularity of psychology in our culture, which has brought about widespread exposure to and belief in unscientific "psychobabble." Bookstores are filled with popular self-help books that sell the public on concepts such as codependency, inner child, memory recovery, alter personalities, and the value of embracing a victim persona. Increasing numbers of people seek therapy that is supportive of the beliefs they have been exposed to through these sources. Not surprisingly, this has been paralleled by an explosion in the number of people calling themselves therapists without receiving adequate training, supervision, or continuing education. As noted recently in *Newsweek*, therapy has become "as accessible as your friendly talk-show shrink" (Solomon, 1996, p.22).

The media is at no loss for material dealing specifically with Satanism and ritual abuse. A recent visit to a popular urban bookstore turned up a dozen

books detailing the supposed horrors of ritual abuse and how to treat its survivors (e.g., Feldman, 1993; Lockwood, 1993; Ross, 1995; Ryder, 1992; Sakiteim & Devine, 1992; Sinason, 1994; Smith, 1993), and more dealing with Satanism Popular television dramas such as *The X Files* regularly include supernatural story lines (Carter, 1993), soap operas feature characters suffering from demonic possession, and talk shows showcase families ravaged by satanic ritual abuse. In fact, Geraldo Rivera can probably be credited with educating the largest section of the public at one time about ritual abuse with his 1988 show on the topic. It was the most widely watched show of its kind. (One of our survey respondents noted that a client made ritual allegations after being questioned by a relative who had watched Rivera's show. Coons [1994] has also noted the direct relation between media accounts and clients' allegations.) Thus, against the background of the media's message that nearly anything evil is possible, ritual abuse became plausible to America.

Ironically, the long overdue recognition of child abuse as a major societal concern also probably nurtured the unchecked rise of ritual allegations. In the 1970s, documentation of child abuse brought about publicity and mandatory reporting laws that, thankfully, have protected thousands of children from horrible abuse (e.g., FinkeThor, 1986). But the hard-fought baffle to gain recognition for real child abuse left child advocates sensitive to the historical denial and betrayal of child abuse (Lindsay & Read, 1995), and in turn, perhaps more accepting of ritual abuse claims and intolerant of skeptics who would question any form of child abuse. Unfortunately, skepticism about ritual claims incorrectly became equated with denial of child abuse generally (and even with a pro-child abuse stance). This raised emotions and politicized the issues in ways that have hampered the scientific study of ritual abuse and false memory.²

Because of its efforts to end the historical denial of child abuse, feminism has also been blamed for the rise of false allegations of child abuse (Tavris, 1993; Wakefield & Underwager, 1994). The women's movement swept the abuse of women and children into the public eye, enabling real victims to gain deserved public belief and recognition (Herman, 1981; Rush, 1980). At the same time, it may have paved the way for belief in ritual abuse as well, although the centrality of its role is difficult to specify. As Lindsay and Read (1995) point out in an insightful article about recovered

memory therapy, "In our view, the controversy regarding memory work does not reduce to a debate between feminists and nonfeminists" (p.849).! our view, widespread belief in ritual abuse does not reduce to feminist beliefs and practices either; however, feminist support of a culture in which questioning adult survivors' stories is anathema must be placed on the list of factors contributing to the spread of belief in ritual abuse.

Finally, organized religion, particularly fundamentalism, has been an important catalyst for panic about ritual abuse. After all, religion created Satan in the first place, and in general, religious groups have missed no opportunities to ascribe every hint of societal breakdown to Satan - threats to lifestyles, loss of parental control of children, divorce, disease, etc. It fits with religion's prime objectives to find a satanic explanation for child abuse as well. The first voices bringing stories of ritual abuse to the religious community, such as Lauren Stratford (1988), stirred religious listeners with tales of satanic terrors requiring supernatural deliverance (e.g., Michelle Smith wrote that the Virgin Mary literally descended from heaven and rescued her from her satanic persecutors). Even though such stories were eventually exposed as fiction (Passantino *et al.*, 1990), ritual abuse claims were still embraced by the church. In religious discourse laced with psychobabble, pastors, lay leaders, and religious counselors spread the word about the powers of Satan and his danger to children. The church provided adolescents with information about satanic practices and actively encouraged disclosure of ritual abuse (Weir & Wheatcroft, 1995). Perhaps the best illustration of the role religion can play in creating a false ritual claim is the infamous ritual abuse case involving Washington State Sheriff Paul Ingram. Ritual allegations that were almost certainly false were first made against Ingram by his daughter, who supposedly recovered ritual abuse memories during a feverish, revival-style religious camp meeting (Wright, 1994). After vehemently denying the allegations, Ingram finally confessed to the satanic deeds after long sessions of trance-like prayer with his pastor (he later also confessed to details confabulated by a skeptical social scientist; see Ofshe, 1992).

Individual factors

Individual variables must also be counted as contributors to false ritual abuse claims, but research

has yet to reveal exactly how. General life stressors may leave people predisposed to adopt a false history of abuse, or may at least push them into closer contact with cultural or clinical suggestions of abuse. Job loss or uncertainty, geographical moves, divorce, and other stressors may bring about any number of common forms of malaise: depression, anxiety, family problems, feelings of powerlessness, low self-esteem. People suffering from any of these problems can turn to a variety of sources for help, including the readily-available psychobabble previously mentioned or survivors' groups that foster acceptance of one's identity as a "healing survivor." Such groups can become alternative families, creating a powerful social setting that can dramatically influence behavior and beliefs. And, as discussed below, troubled people may enter therapy with a clinician who focuses insistently on child sexual abuse, recovery of repressed memories of abuse belief in satanic cults, and so on-all of which may promote satanic revelations.

Psychological disturbance resulting from a history of real, but non-satanic childhood abuse may also leave some persons vulnerable to the belief that they were satanically victimized. For example, beliefs about ritual abuse maybe built from fragmented memories of actual abuse that are distorted by exposure to suggestive media or therapy (Ganaway, 1989; Spence, 1994). In addition, dissociative disorders such as MPD or posttraumatic stress disorder (PTSD), which are thought to result from childhood abuse (Kluft, 1985), may leave some people particularly vulnerable to false memories. Canaway (1989) has suggested that the heightened suggestibility of clients with dissociative disorders makes them particularly prone to incorporate stories of ritual abuse into their own life histories¹ just as they sometimes embrace equally unlikely stories of UFO abduction (for discussion, see Newman, this issue; Newman & Baumeister, 1996). In fact, full)? half of the adult survivors encountered by clinicians in our surveys were diagnosed as suffering from MPD, and a quarter from PTSD. This might be taken as evidence that childhood satanic ritual abuse leads to dissociation; but in right of converging evidence that ritual abuse is exaggerated, we think it is more likely that individuals with dissociative disorders (which may originate from real, non-satanic abuse) are highly susceptible to suggestions of any kind of sensational abuse, whether it be perpetrated by Satan or space aliens. Or, perhaps

the same exceptionally suggestible people can be led to believe both that they have been satanically abused and that they have multiple personalities (Ofshe & Watters, 1994). Thus, inherent suggestibility, hypnotizability, and proneness to dissociation all of which are highly interconnected (e.g., Spiegel, 1993), may make the creation of satanic abuse memories possible.

Gender has begun to emerge as another individual difference factor of importance. Across our surveys, the vast majority of self-designated survivors of ritual abuse were women, as were clients who allegedly recovered formerly repressed memories of any kind. Media and other accounts of the adult-survivor phenomenon concur; for example, 90% of the child sexual abuse claims reported by accused parents to the False Memory Syndrome Foundation are made by females (Wakefield & Underwager, 1992). Compared to men, women are more likely to be victimized and probably more likely to report victimization (e.g., Finkelhor, 1986), and more likely to seek therapy - but not as much as nine times more likely. More research is needed to fully explain this intriguing gender difference.

Finally, personal religious beliefs may be one factor among many that can predispose a person to adopt a false history of ritual abuse. Individuals who share culturally sanctioned beliefs in supernatural religious forces may find it plausible that satanic groups focus their evil efforts on destroying children and perhaps that they themselves were abused by satanists.

Therapist and therapy factors

How does an individual move from general vulnerability to the specific belief that he or she was satanically abused? Some people may come to this conclusion after extensive exposure to suggestive media influences or support groups. But others may recover their history of satanic abuse after extended periods of therapy (Dawes, 1994). In 95% of ritual abuse cases reported to us, the allegations were first disclosed in therapy; further, therapy was the most often reported trigger of the recovery of supposedly repressed memories of all kinds. Some clinical professionals argue that a supportive therapeutic environment is necessary to foster the recovery of real traumatic memories (Herman, 1992; Terr, 1994). But in the case of ritual abuse, we think it is more likely that

therapy facilitates the recovery of false memories. Thus, some kinds of therapy, and some therapists-but not all or even most-have helped to create the phenomenon of imagined satanic ritual abuse. How?

Therapy is a unique social situation in which normal social psychological processes become intensified in ways that may lead to clients' and therapists' co-creation of false beliefs. Whether or not false memories of ritual abuse are created depends to a large extent on therapists' pre-existing beliefs and their actions during the therapy process. For example, assumptions about the long-term effects of child sexual abuse are central. Now that the media are saturated with material that gives lay people reasons to suspect that they have been abused even if they cannot remember it, some clients may enter therapy with a belief that they were abused and a desire to seek memories of the abuse (or some may enter therapy with already hilly sculpted false memories). Others, however, may first seek therapy with no notion that they were previously abused, then be told by a therapist that their troubles are symptomatic of unresolved childhood abuse and that they must search for relevant memories. Unfortunately, the symptoms believed by therapists to indicate a history of sexual abuse are nearly as varied as the reasons people seek therapy. In Poole *et al.*'s (1995) survey, there was little agreement among therapists about long-term effects of sexual abuse, but frequently chosen symptoms included sexual dysfunction, poor relationships, and low self-esteem. Other symptoms noted in the literature include depression and motivational problems (Bass & Davis, 1988), perfectionism (Blume, 1990), emotionality and distress (Courtois, 1992), and "body memories" or somatic symptoms (Courtois, 1992). Even a client's initial denial of childhood abuse is sometimes considered to be evidence of past abuse (Bass & Davis, 1988; Blume, 1990). Obviously, many people who seek therapy (and many people who do not) experience such symptoms, and the possible causes range beyond sexual abuse. Even so some therapists may wrongly take any number of such symptoms as hints that forgotten childhood abuse lurks in a client's history, and begin a long saga of probing that may itself create the memories (Loftus, 1993).

Beliefs about the way human memory works are also important in shaping therapists' approaches to clients and therapy. Even though modern cognitive models of memory do not support a Freudian

repression mechanism (Holmes, 1990), many therapists believe that repression is a special defense mechanism for blocking out memories of emotionally stressful past events (Freud, 1915/1957). For example¹ in Yapko's survey of therapists (1994b), 43% agreed "If one does not remember much about his or her childhood, it is most likely because it was somehow traumatic" (p.53). In 87% of repressed memory cases (of all kinds) reported to us, respondents indicated that psychological pain caused clients to forget or repress traumatic memories. Further, our sample generally believed in repressed memory and memory recovery, as measured by a specially constructed multi-item "Belief in Repressed Memory?? scale. Many clinicians also believe that amnesia for child sexual abuse in particular is common (Claridge, 1992; Fredrickson, 1992). For example, Wume (1990) suggests that as many as half of all incest survivors do not remember their childhood abuse. Finally, even though there are many studies illustrating the malleable nature of memory (e.g., Hyman, Husband, & Billings, 1995; Loftus, 1993; Nelson & Roediger, 1996), about a third of Yapko's (1994b) respondents agreed that "The mind is like a computer, accurately recording events as they occur" (p.51). Therapists endorsing such beliefs are likely to suspect that many clients have histories of abuse that they do not remember and to accept as accurate nearly all memories clients "recover" during therapy. Further, they may believe in the largely untested psychoanalytic notion that troubling symptoms can be resolved only after recovery and abreaction of repressed traumas, and that recovery and abreaction necessitate lengthy therapy during which clients get much worse before getting better.

To uncover hidden memories and bring about client healing, clinicians may use suggestive "memory work" and special memory recovery techniques. At worst such controversial techniques include hypnotic age regression; past lives regression; sodium amytal interviews; guided imagery exercises; or bibliotherapy, in which clients are encouraged to read books on memory recovery and ritual abuse (for a full discussion see, e.g., Lindsay & Read, 1994, 1995; Poole *et al.*, 1995).³

In our latest detailed survey of clinicians, we found that among respondents who believe that ritual abuse can be accurately diagnosed, popular techniques for diagnosis include journal/diary therapy, the use of dubious published ritual abuse symptom

checklists (Gould, 1987), dream interpretation, hypnotic inquiry, and hypnotic age regression. Hypnotherapy in particular is something many critics of recovered memory are quite concerned about because it is known to contribute to misinformation effects in recall and generally heightened suggestibility (e.g., Bowers & Hilgard, 1988; Spanos, Burgess, & Burgess, 1994), but is widely regarded as a useful recovered memory tool (Yapko, 1994a, 1994b; Poole *et al.*, 1995). Empirical studies of the effectiveness of memory recovery techniques are badly needed. In their absence, we can speculate that their use has contributed to the creation of false memories of satanic ritual abuse. Once a therapist suspects that a client has been ritually abused and feels it necessary to search for relevant memories, common social psychological processes may increase the likelihood that therapists' suspicions lead to firm beliefs-on the parts of both therapist and client. For example, initial suspicions of child abuse will be tested by the therapist, and research suggests that this testing may be biased. Specifically, the therapist may be more likely to seek and obtain information that fits with his or her suspicions than information that does not-a process known as confirmatory hypothesis testing (e.g., Snyder & Swann, 1978; Zuckerman, Knee, Hodgins, & Miyake, 1995). In laboratory settings, although therapists can and sometimes do use unbiased strategies (Dallas & Baron, 1985; Strolirner & Chiodo, 1984; Strolirner & Newman, 1983), they also fall prey to confirmatory strategies (Dallas & Baron, 1985; Haverkamp, 1993; Strotuner, Shivy, & Chiodo, 1990). Confirmatory strategies are probably quite likely to be used when therapists pursue suspicions of abuse. Therapists may be invested in their diagnosis of past abuse for all of the reasons discussed earlier. Further, because clinicians are prone to accept a wide range of symptoms as indicators of abuse, it is easy for them to gain what they consider to be independent confirmation of their suspicions. Finally, in laboratory settings, there are obvious alternate hypotheses for the subject/clinician to pursue; but in actual therapy settings, alternate hypotheses such as "the client's memory is false" or "the client was not abused" may not be considered therapeutically appropriate. Why? For one thing, our research reveals that nearly all clinicians believe their clients, even though their claims involve unspeakable horrors for which there is virtually no evidence. They base their belief on clients' intense

displays of emotion, psychological symptoms, and detailed stories - the same evidence used to argue for the reality of UFO abductions. But it is really not surprising that these are perceived to be markers of veracity: Appropriate knowledge and affect, perceptual detail (Johnson & Suengas, 1989), and confidence (Perrod & Cutler, 1995) are indicators of truth for all of us in everyday life. We are prone to believe what others tell us (Gilbert 1991), and in the case of ritual abuse, it is hard to comprehend why someone would fabricate such a horrendous story if it were not true (Loftus & Ketcham, 1994). Unfortunately, none of these markers is necessarily indicative of truth. Thus, the alternative null hypothesis ("client is mistaken") is not as convincing as the hypothesis that the client has been abused.

There is another important reason why therapists may not pursue an alternative hypothesis, even if they doubt the historical truth of clients' claims: They may believe that the truth doesn't matter in therapy, that objective reality doesn't matter¹ that what matters is empathizing with and validating client's experiences. This reasoning is surprisingly widespread: In our research, although most clinicians attached some importance to verifying clients' claims before personally believing them, 22% believed that "It is important to accept clients' reports as true regardless of verification," and three-quarters of our sample agreed that "the literal truth of clients' reports should not be of primary concern; clients should be treated for what they believe they have suffered." Similarly, Nash (1994) has argued that historical truth is not always clinically useful and Waterman et al. (1993) encouraged therapists and parents of suspected child victims to seek out emerging memories, but "not to get sidetracked by the need to uncover the absolute truthfulness of these events" (p.253). Thus, testing alternative hypotheses is believed to be therapeutically contraindicated. Such suspension of disbelief illustrates a conceptual divide between legal and clinical standards of proof, a chasm that should perhaps be narrowed. As we have argued before (Bottoms *et al.*, 1996), the historical truth of clients' claims definitely does matter, because clinical encouragement of false beliefs is potentially quite harmful. Clients may live the rest of their lives with a false, painful belief, a belief they may act on, making specific accusations of sexual abuse against innocent people.

Several other therapist factors deserve mention. For example, therapists who believe in satanic conspiracies and the reality of ritual abuse are probably more likely than others to encourage and/or accept clients' disclosures of ritual abuse. There was little skepticism about satanic ritual abuse among the clinicians we surveyed. In fact, some were exceptionally concerned about satanic cult activity; for example, one lamented the fact that "so many people in high places like doctors and lawyers" were satanists, and another told us he was convinced that our results would be used by cult members. One of many people who telephoned us while we were collecting our data warned us that the entire public school system had been infiltrated by satanists and that one of our consultants from the FBI was a high priest in a satanic cult. Equally unlikely sentiments are expressed in ritual abuse seminars, books, and papers; for example, satanic cults are conceived of as more sophisticated than the mafia or CIA, and skeptics are suspected of being cult members (see Pendergrast, 1995, for discussion). These kinds of beliefs are nothing short of paranoid and would seem to be dangerous guides for professional therapy.

Belief in ritual abuse may be intensified by therapists' personal religious convictions. As discussed earlier, mixing of religious beliefs with therapy has almost certainly helped to create some ritual abuse claims. In fact, Christian psychologists are more likely than non-Christians to diagnose ritual abuse among their clients (McMinn & Wade, 1995). The influence of clinicians' religious beliefs on the therapy they practice may be subtle, or not: We have encountered the writings of some who even use exorcism and religious healing rituals in therapy and believe that clients' alter personalities are really demons (Friesen, 1991, 1992). Such extreme beliefs may not be so rare among religious counselors. In our latest survey, 7% of our APA-member respondents thought exorcism might be helpful in treating ritual abuse survivors - arguably 7% too many.

Research on therapists' beliefs and practices indicates that gender may also be a relevant therapist factor. Although Poole et al. (1995) found no differences between men and women therapists' use of suggestive memory recovery techniques, our research reveals that women therapists are somewhat more likely than men to believe in repressed memory and in the reality of ritualistic abuse, and to have more faith in

controversial diagnoses such as MPD. This is consistent with research findings that men and women have different ideas about a variety of issues related to child sexual abuse. For example, compared to men, women are generally more likely to believe children and to react more negatively toward child sexual abuse (Bottoms, 1993), and to vote guilty in the context of mock trials involving adult or child sexual assault (Borgida & Brekke, 1985; Bottoms & Goodman, 1994; Duggan et al., 1989; Gabora, Spanos, & Joab, 1993). Determinants of these differences are not yet clearly understood, but factors responsible surely include differences in gender-role socialization, contact with children, rates of persons' victimization, and perhaps even differences in personal fears of being falsely accused (Bottoms, 1993).

Finally, and importantly, our research reveals that many of the therapist factors we have reviewed are all part of the same large constellation of controversial attitudes and therapeutic practices. For example, we found a striking tendency for practitioners who believe in the reality of repressed memories also to believe that ritualistic abuse exists and is not a product of suggestion from therapists or media. Further, compared to others, therapists who believe in satanic ritual abuse have encountered more ritual cases in their practices and are more likely to (a) think that therapeutic practices such as hypnotic age regression are useful in identifying ritual abuse, b) fail to realize that hypnosis can lead to client suggestibility, (c) believe in the existence of other controversial phenomena such as multiple personality disorder, (d) suspend disbelief when encountering ritual allegations, and (e) fail to seek corroboration for clients' claims before believing them. Research is needed to identify the common underlying construct. The search may lead to individual differences in critical thinking and appreciation for science.

What results from a combination of all the factors we have outlined? What effect does lengthy therapy involving confirmatory search strategies have on a vulnerable client? In experimental settings, participants have been found to behaviorally confirm interviewers' hypotheses (e.g., Dallas & Baron, 1985; Snyder & Swann, 1978, Experiment 3; Zuckerman et al., 1995). In much the same way that innocent suspects in a crime make false confessions after repeated questioning by investigators convinced of their guilt (e.g., Gudjonsson, 1992; Kassin &

Wrightsmann, 1985), vulnerable clients undergoing subtly persuasive therapy may come to doubt their own memories and accept suggestions of ritual abuse. If people can come to accept a belief that is quite undesirable (that they committed a crime), they certainly must be capable of accepting the belief that they have been abused when there are powerful "rewards" for the belief. Specifically, the ritual abuse "confession" is a co-creation of a mutually flattering and exciting story according to which the client has endured horrible torture but is now achieving catharsis, heroically confronting evil oppressors, being accepted unconditionally by a sympathetic therapist and a loving community of fellow survivors, and in some cases even reuniting with God. At the same time, the therapist, unable to see his or her contribution to the creation of the story, is able to view him or herself as a great therapist, a liberator of the oppressed, a spiritual guide, and a clever detective.

Problems and prospects

There are a number of serious problems with the outcome of people believing they have been victims of satanic ritual abuse. In many cases, troubled individuals get worse than they were before seeking explanations for their symptoms (Ganaway, 1989). Many are hospitalized. Some who enter therapy with jobs that supported the cost of therapy later "decompensate," lose their jobs, and have to rely on disability and workers' compensation (Pendergrast, 1995). Social support networks are sometimes permanently destroyed, especially if legal action is taken against family members presumed to be abusive cult members. Although the courts are an appropriate place for securing justice in real child abuse cases, many misguided lawsuits have been brought against uncomprehending parents (Nathan & Snedeker, 1995; Spiegel & Scheffin, 1994). In at least a few cases, parents were jailed for horrendous crimes they surely did not commit (Wright 1994). Even when former therapy clients recant and reunite with parents, sometimes suing former therapists (Bowman & Mertz, 1996), trust in family relationships is difficult to re-establish (Pendergrast 1995).

The legal system has reacted to ritual abuse claims in ways that will only encourage the public's unnecessary worries about satanic cults, worries that eventually help foster the growth of new false allegations. Several state legislatures have passed

special laws that make child abuse a more serious offense if it is committed in the name of Satan (e.g., Illinois Public Act #87-1167). Many have changed statutes of limitation on child abuse to accommodate criminal charges of abuse based on memories recovered years after the events (Bowman & Mertz, 1996). Loftus (1993) has argued that such laws allow for charges that are impossible to defend against after so many years.

Within psychology, controversy over false allegations of childhood abuse has contributed in large part to the growing void between empirical and applied contingents. Emotional, ad hominem insults are hurled between believers and skeptics at conferences, over the internet, and in the media. Writings from both sides of the controversy suffer from bias and exaggeration. This very public debate is eroding lay confidence in our discipline, and even driving researchers from empirically examining the issues for fear of personal reprisals.

Perhaps worst of all, publicity surrounding false satanic ritual abuse claims has undermined the believability of actual victims of child abuse and created a backlash against the prosecution of legitimate child abuse claims. The journalistic, legal, and empirical pendulum has swung away from child advocacy and toward skepticism about virtually all claims child sexual abuse (Bowman & Mertz, 1996). This is unwarranted and, in the long run, dangerous.

What can be done to improve this situation? The solutions are perhaps as diverse and complicated as the causes. Some answers lie outside the realm of psychology; for example, the media should recognize its role in creating unsubstantiated panics and take care not to sensationalize (and in turn help to create) questionable phenomena. But many of the answers must come from within psychology. We need to find better ways to help genuinely troubled clients improve, without discrediting real victims or embracing false claims and encouraging injustice in the process. Of course, to the extent that wider cultural and socioeconomic forces brought us to the present juncture, it may be difficult to change our ways. Even so, we should work on our own views and practices rather than viewing ourselves-researchers and therapists-as helpless victims of history.

One thing we can do is increase the rigor of therapist training and continuing education. But this will not be as easy as ferreting out bad programs and

instituting new standards. Our latest survey of clinical psychologists found no relation between the prestige of clinical doctoral programs and their graduates' beliefs about and experiences with repressed memory, satanic ritual abuse, and suggestive therapeutic practices. Even programs considered to be among the best are capable of producing unscientific practitioners. This is perhaps because good programs often contract out their students' supervision to less trained people in applied settings. Further, once trained, therapists seek continuing education from sources that vary dramatically in quality and kind. Over half (60%) of our respondents who had encountered satanic abuse cases had attended one or more professional development workshops dealing with ritual abuse. The more they had attended, the more ritual abuse cases they had seen in their practices, and the more likely they were to believe in the reality of satanic abuse. Mulhern (1991) argues that once therapists learn about ritual abuse in these settings, they are more likely to believe in, search for, and inadvertently create, memories of satanic abuse in their clients.

We can conduct more and better research on therapeutic practices and client disorders. Our surveys identified clinicians who claim to have treated scores or even hundreds of ritual abuse cases. Granting agencies should fund studies of such therapists' treatment sessions. Thus far, the scientific community and the general public have had to rely on hidden cameras smuggled into therapy sessions by a handful of disguised journalists as well as reports of a few disgruntled clients, to learn what happens in recovered memory therapy. Given the centrality of psychotherapy to present-day American society, psychological researchers should know more than they currently do about how therapy is actually being practiced-and so should the American public. Is it true that clients need to recover lost memories in order to get better? Do clients need to get worse before they can improve? Is it always valuable to believe, or appear to believe, whatever a client says? We also need more research on client factors that contribute to the overall problem. What factors increase hypnotizability, dissociative tendencies, acceptance of misleading media reports, and therapeutic suggestibility? Given that the same general issues were on the table during Freud's era, it is frustrating that we still do not have much insight into them, especially when we have the research techniques and technology to do better.

Finally, perhaps we need a new and clearer conception of the goals of therapy, a conception that stresses enhanced personal strength, interpersonal competence, coherence of mind, reality orientation, critical thinking, resilience, humor, and affection rather than memory recovery (or memory creation), multiplicity of personalities, being a perpetual inner child or victim, and so on. In conclusion, there is no one simple way to fix the many conditions that led to the unfounded panic over satanic ritual abuse. Although we have focused somewhat on troubling therapeutic practices, many factors have contributed to the problem. It is our hope that the sociopolitical climate within our discipline will become more supportive of aggressive empirical pursuit of them all.

Acknowledgements and notes

Grants to Gail S. Goodman from the National Center on Child Abuse and Neglect and to Bete L. Bottoms from the University of Illinois Campus Research Board funded the collection of data from which many of our conclusions are drawn. That research was conducted in partnership with Gail S. Goodman and Phillip R. Shaver, and with the help of Kathleen Diviak, Jian Jian Qin, and Alexis Thompson. It would have been impossible without the dedicated work of numerous research assistants at the State University of New York at Buffalo and the University of Illinois at Chicago. We thank them all. Finally, we especially thank the American Psychological Association members who responded to our surveys.

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Notes

1. That is, suggestive questioning during forensic interviews and therapy with alleged child victims was probably shaped by investigators' knowledge of adult survivors' stories of satanic abuse.
2. Child advocates are not completely unreasonable in connecting skepticism about ritual abuse and repressed memory with denial of child sexual abuse: Some skeptics have indeed minimized the well-evidenced negative effects of child sexual abuse, even characterizing the anti-child sexual abuse movement as "a pervasive and pernicious antisexuality" (e.g., Wakefield & Underwager, 1994, p. 47). There is unscientific bias on both sides of this controversy.
3. Highly suggestive tools and techniques are also used in therapy with children to encourage disclosure of ritual abuse. For example, *Don't make me go back, Mommy: A*

child's book about satanic ritual abuse is a bedtime storybook about a little girl who was satanically abused at a daycare center (Sanford, 1990). Northwest Psychological Publishers (no date) markets a series of "Projective Storytelling Cards" that depict graphic scenes of ritual abuse, such as hooded figures sacrificing an infant over a fire in a graveyard. To their credit, when nonabused 3- to 10-year-old children are asked to tell a story about these cards in a laboratory situation, they do not make up stories of ritual abuse (Goodman et al., in press). This is not to say the cards will not stimulate false accusations when used in conjunction with coercive, repeated questioning.

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TALKS

Traditional and fringe archaeological paradigms: a dichotomy of approach.

By Jennie Hawcroft

Jennie Hawcroft is in the final stages of a Ph.D. in Neanderthal archaeology and evolution at the University of Sheffield. Her published work has included studies of the history of ideas and knowledge in her field, as well the nature of humanness and "otherness" in human evolution. She has extensive wider interests in archaeology, including the public perception of the discipline and concepts of the past. The current article is based on a paper given at the ASKE Cult Archaeology - Sensational but Questionable Claims about the Past event at the University of Sheffield, 19 march 1999.

This paper will begin by outlining what is meant by fringe, or cult, and traditional archaeologies, and describing some of the points of differences between the two approaches. I will go on to describe how some of the accusations levelled at traditional archaeologist by cult practitioners are unfounded. I will also criticise some aspects of traditional archaeology, particularly its attitude to fringe studies. I will illustrate these points using two examples from fringe archaeology. I will conclude by describing some of the benefits which discourse between fringe and traditional archaeology could achieve, if allowed to proceed in an atmosphere of mutual respect.

I should start by being explicit about my own perspective and agenda. I am an academic, an archaeologist of the traditional type, and I am currently based in the Archaeology Research School at Sheffield University. My own research concerns human evolution, especially the Neanderthal period, although my overall training includes many other areas of archaeology. As such, I shall declare from the start that I am here to defend traditional archaeology when the need arises. However, I have had some experience with fringe archaeology and its research, and am sympathetic with some of its questions. Most importantly, though, I am here to advocate the defence of enlightened scientific debate, and to encourage a fair hearing for both sides, in the hope that this will result in a positive outcome for both camps.

So what do I mean by 'traditional' and 'fringe' archaeologies? In preparation for this paper, I had a look at some websites from the fringe camp. I found

what I had expected to find - discussions of archaeological sites and theories which are not usually admitted into the annals of professional academic archaeology, and editorials denouncing the arrogance of traditionalists and accusing the establishment of scientific cover-ups. It is this sort of archaeology - and of other types of science - which sees itself as renegade, on the edge, challenging, radical, and oppressed by traditionalist conspiracies. Its wealthiest proponents are able to publish books and television documentaries supporting their beliefs, and the sensationalism of their challenges to the establishment result in impressive book sales and viewing figures.

Traditional archaeology, on the other hand, is that produced by universities, field excavators and museums - generally, although not always, people with degrees in archaeology, which sometimes leads to the accusation that we are all brainwashed by being put through the same establishment training. Traditional archaeology is very slow in production, with digging and museum funding being low, and publication hampered by painstaking processing of research. Traditional archaeology publications are generally in the form of very boring books, or articles written in obscure journals circulated only to those already in the establishment club. Consequently, public knowledge of traditional archaeology is generally restricted to what remains after it is filtered through a commercialising element such as *Time Team*, or a museum presentation such as the Jorvik Viking Centre. Both of those examples have, incidentally, attracted fierce criticism from academic purists on the grounds of over simplification.

Probably the most vital feature, though, of professional archaeology is its caution: that it admits it does not have all the final answers about the past. No academic archaeologist worth his or her training should ever make statements about the past which indicate that we know The Truth, or The Reality. In recent years, archaeologists have spent a lot of time discussing how we know what we know, and why we can never hope to know about certain aspects of life in the past. We have got very good at admitting our own limits and biases. We know all too well that none of us were actually there, so that when we're describing the past, we are working with our interpretation of remaining evidence, not recounting histories which we know first-hand to be true. Knowledge about the past is formed from interpretations of the available evidence, not from direct witness. It is this well-known lack of a party line on any aspect of the past that makes traditional archaeologists defensive when fringe workers suggest any sort of high-powered, over-arching scientific conspiracy.

When I was asked to give this paper, I wondered how I would choose what particular examples of fringe archaeology to talk about. In the event, I was prompted by a recent re-run of a documentary on bog bodies - rare examples, such as Lindow Man from Cheshire and Tollund Man from Denmark, of ancient corpses preserved by having been deposited in acidic peaty environments. This documentary featured several so-called experts, one of them a woman who talked about 'the Celts', and, moreover, what Celtic religion was like, what the Celts thought and how they reacted to certain events in their lives. I was fuming with indignation.

What do we mean when we refer to the Celts? I hope I will not be bursting anyone's bubble by revealing to you tonight that, archaeologically speaking, there is no such thing as the Celts. There is no group of people whom we can identify as the Celts. The Celts are a myth, started by the Romans, compounded during the Renaissance and sealed by the Victorians. The myth of the noble warrior, the flame-haired heroes, the proud possessors of the secrets of earth-based spirituality - none of it has any archaeological support.

This is not to say that there are not legitimate uses of the word 'Celtic'. In the discipline of linguistics, northern European languages are grouped together under the label 'Celtic', and the woven knotwork style

of art is a style usually referred to as 'Celtic' without doing any harm. However, these are both words used in other areas of study, studies which do not necessarily care whether there is historical accuracy to their labels. It is, then, entirely accurate to speak of Celtic languages or Celtic design. It is not correct, though, to imagine them to be linked with a specific, identifiable ethnic group of the Iron Age.

The notion of Celtic identity, despite being archaeologically unsupported, is one often used by fringe archaeologists, writers and television producers, as something romantic and mysterious about the past. The subject of the Celts holds a special fascination, and a trip into any bookshop or gift shop, or even tattoo parlour, will prove this. What is it that has such commercial power? I would suggest it is the element of spirituality, of absolute confidence in the power of the mysterious, and of symbiosis with the natural world, which appeals to modern readers and viewers. This should not be surprising, as the myth of the Celts was consolidated, into the form we witness it today, during the colonial period. British and French explorers were discovering and claiming far-away lands from the time of Elizabeth I onwards, and they came back with tales of people living such different lives, with such incomprehensible customs and values, that they inspired reconstructions of even more impressive states of noble savagery for our own past. Later, in the eighteenth and nineteenth centuries in Britain, national identity was undergoing a severe strain. The Scots in particular suffered a return to the oppressive rule of the English. It was during this time that the clan tartans, which are commonly supposed to date back thousands of years - and some suggestions of tartan can be seen in the more glamorous modern reconstruction of Celtic life - were first thought of. It is not surprising that Scotland and Wales, which have consistently been neglected areas of our island, have retaliated in their folklore by adopting a romantic and proud ethnic identity in the form of the Celts.

However, the modern notion of the Celts is more than an investigation of whether Iron Age people wore tartan or not. If one asks a non-archaeologist what he or she thinks is meant by the term Celtic, one will get a variety of responses. The word conjures up images of traditions validated by ancient genetic designation, of swirling mists, wistful longhaired maidens and handsome warriors, and magical legends. And, if gift shops and non-archaeological

writers want to make money out of this myth, and people like it, I do not have an objection. What I do object to is any pretence that such commercial enterprises are engaging in actual archaeological research or education, that they are presenting a true picture of the past.

This brings me to the second point raised by the documentary in question which made me so mad. Even if we were discussing a better-established group of people in the past, such as the Vikings or the Goths, it is important to maintain a level of reserve when discussing certain aspects of their lives. Information such as what a group's religion was about, who their gods were, what their ceremonies consisted of, and how they thought about various issues, are extremely dangerous ground for the archaeologist, and should be for anyone dealing with the past. None of the groups I have mentioned, mythical or otherwise, have left written records for us to interpret. All so-called religious or ceremonial sites are identified as such because they represent activity which the archaeologist cannot ascribe to practical use, such as food processing or shelter. Stories told about what people in the past thought, why they buried their dead rather than cremated them, why they lived in round houses rather than square, and what their social and physical surroundings meant to them, are always our interpretations based on the evidence, and also on what our own biases and expectations. We cannot get inside the heads of people who's lives were so removed from our own. We have enough trouble understanding other cultures in the modern world, whose members are alive and well and able to tell us about it. We could not even answer some of these questions about our own culture. How can we know things about the past which are so amorphous?

Although there is no explicit conspiracy to deny fringe claims, there is, then, a suspicion of suggestions which are romantic but not substantiated, and which cannot stand up to testing by traditional archaeological means. These methods emphasise considering all the evidence, that which is common as well as unusual, and choosing minimalist interpretations. As a result, archaeological accounts which come from traditional, professional sources are invariably cautious, full of disclaimers, and wouldn't be offered for publication unless the author was sure she or he had amassed plenty of evidence which cannot be contradicted by existing knowledge in the subject. The

slightest assertion of a positive fact in the professional press results in immediate challenge, so sensationalist claims are widely avoided. Like I said, this makes it all a bit boring. Traditional archaeological presentations do not draw the sort of viewing figures or book sales that Graeme Hancock or Erik von Daniken do. It may well be that the commercial success of fringe archaeology makes the traditionalists a bit jealous, and we comfort ourselves with academic snobbery - we might be poor and boring, but we are intellectually pure, we have not sold out. Or so we like to think.

It is partly this academic snobbery on the part of some traditional archaeologists which prevents the establishment from spending its time answering the claims of the fringe with proper respect and seriousness. Fringe claims are seen as so ridiculous that they need not be dignified with a thorough answer - although this is the sort of snobbery which is being discouraged in professional archaeology today, and an attitude which I would never condone. Besides, although there are general boundaries between fringe and traditional archaeologists, these cannot be securely defined. Lots of earth mysteries people have backgrounds in conventional archaeology, and lots of conventional archaeologists came to the discipline through an initial interest in leylines or sacred stones.

However, the difference of approach involved in the two camps does make it difficult for them to engage in debate on the same level. Unlike conventional archaeology, fringe archaeology delights in making positive assertions, constructing tangential associations, bringing in evidence which is anomalous with equal weighting as that which is typical, and challenging established patterns for the sake of it. Fringe archaeologies persist in making claims about the past which traditional archaeology cannot dispute. This is not because the fringe archaeologies are 'right', but rather because they cleverly pick on claims which, by their very nature, could never be proven either way. I once heard a Radio 4 programme where a science writer interested in Neanderthals asked an establishment expert whether she could disprove that Neanderthals had descended from extra-terrestrial aliens. The expert was still groping for where to begin when the programme's presenter cut her off.

This is a good example of a difference of approach. If an expert was to deny that possibility that Neanderthals descended from outer space, he or she would have to engage in a whole debate about

physics, philosophy and inter-planetary biology quite outside of the limits of what we know about Neanderthals. It's a completely unfair demand. Traditional archaeologists are trained to rely only what we have and what we can establish beyond reasonable doubt (although never absolutely). It is inevitable that, when faced with outlandish fringe claims which cannot be proven or disproven, traditional archaeologists will either get very annoyed, or burst into tears.

A classic example of this, although not quite as outlandish, is the Aquatic Ape theory of human evolution. This theory was published by Elaine Morgan, who is a professional science writer with an Oxbridge degree in English, and no archaeological or anthropological training to my knowledge. Her theory suggests that there are lots of traits in humans which indicate that we have an aquatic, or water-dwelling, ancestry. Examples of these traits include a subcutaneous fat layer, the ability of newborn babies to swim, forward facing faces and the pattern of body hair distribution. When you read her book, it is extremely well argued, hangs together well and makes sense. She argues that humans are naturally the aquatic member of the primate order and that back in human evolution, early hominids were water-dwelling creatures. So what's the problem with that?

Many fringe enthusiasts would suggest that the main problem is that Elaine Morgan isn't a member of the club, and that she has been sneered at because her ideas are so different from what is currently agreed on, and that she is some sort of oppressed genius suffering from the effects of cronyism and exclusivity. While some of these points may be valid, being oppressed does not make one right. However, let us consider one of those points: what she is suggesting is a long way off from what is currently agreed upon by some clever people who have spent their lives researching this topic. Nowhere does Morgan talk about the fossil record of early hominids or the timing of human evolution. The plain fact is that we have good reason to believe that humans split off from other ape ancestors as recently as six million years ago, and we have fossils of those hominid ancestors that cover a large part of that intervening period. These fossils are consistent in two aspects - one, they appear to have inhabited extremely arid environments, i.e. nowhere as lush as Britain, never mind actually in water, and two, they appear to have been bipedal - i.e., standing on

two upright legs like we do - and having half one's body weight and half one's height (or length) made up by striding great long legs is not a feature consistent with aquatic mammals such as the whale, hippo, otter or seal. Morgan's scenario is a long way from this well-founded image of bipedal hominids walking across an arid landscape. If she is right, she must be referring to a time in hominid history long before the dates of the fossils we have, in order to allow sufficient time for evolution to adapt hominids from the wet to the dry environment without trauma. And there just isn't time. We can chart human anatomy from the split with the apes to the modern state, and there isn't the space for Morgan's interpretation anywhere.

This is a good example of why academics sometimes get snobby about contributions from non-specialists: if Morgan was inside the establishment she would be required to address the existing problems of the fossil record and of time. She doesn't do this, her views are not a contribution, but an opposition, to the current state of knowledge, and this is why there is conflict rather than dialogue.

Morgan's Aquatic Ape theory is a perfect example of an "alternative" explanation offered which cannot be accepted by the conventional thinkers on the subject. However, it would be unprofessional, unscientific and discourteous of conventional archaeology to insist that such contributions were dismissed out of hand. Debate and challenge is the meat and drink of scientific enquiry, and many researchers in archaeology today are actively discouraging the snobby, exclusive attitudes of the past. After all, it is not so very long since archaeology itself was considered a crank pursuit, and one of the exciting things about the study of the past is that currently accepted facts can be turned on their heads by one new discovery at any time. However, as a member of the current establishment, I must also argue that alternative or fringe researchers be equally considerate, and address existing knowledge about the past when constructing their alternative explanations. Only when both camps understand where the other is coming from can we hope for useful discourse between them.

Despite the opposed characterisations I have offered, I hope I have also made a case for the notion that something beneficial could come from the interface between the two camps. A great deal of self-congratulatory fuss has been made in academia

recently over inter-disciplinary approaches to advancing knowledge - the idea that when two disciplines come together, the debate between them generates questions, answers and knowledge that could never have arisen from one discipline alone. A good example from my own work is the collaboration between human evolution studies and cognitive science. Is it too much to hope that we could extend the beneficial processes of interdisciplinary study to include profitable debate between two opposed camps within the same subject? It is my feeling that prevailing attitudes on both sides currently make this unlikely, but that an increase in open-minded debate and meetings like this could make it a possibility for the future.

Further reading

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Don't Believe Everything You Feel: The Need for Critical Thinking and Proper Testing in Complementary Medicine

By Wayne Spencer

Wayne Spencer is a civil servant and a member of ASKE. Prior to the publication of the current issue, he was the editor of the Skeptical Intelligencer. This article is a slightly revised version of a text presented in London on 11 March 1999 as part of the Skeptics in the Pub series of talks.

For the purposes of this talk I shall adopt Charles Vincent and Adrian Furnham's definition of "complementary medicine". According to Vincent and Furnham (1997: 7):

The term 'complementary medicine' embraces a wide range of therapeutic practices and diagnostic systems that stand separate from, or in some cases opposed to, conventional scientifically based medicine.

As examples of complementary medicines, I would mention homoeopathy, acupuncture and, at least to some degree, chiropractic. However, as Vincent and Furnham's definition stresses, the term complementary medicine embraces a wide range of practices, and the degree of distance between scientific medicine and individual complementary techniques and systems can vary considerably. In addition, different complementary medicine systems may have quite different theoretical

conceptions and practical approaches. For these reasons, one should view with caution general pronouncements about complementary medicine. What holds for one therapy may not apply to another; and findings about complementary medicine practices, patients, or practitioners as a whole may conceal important distinctions between individual therapies.

Notwithstanding these cautions, it does seem possible to identify some broad similarities between at least the major complementary medicine systems. Four such commonalities have been suggested by Vincent and Furnham (1997: 20-1). The first is a vitalistic philosophy, or "the doctrine that an invisible, intangible, unique form of energy is responsible for all the activities of a living organism" (Raso, 1998); the second is the view that "the body is self-healing, and the task of the practitioner is to assist the healing process" (Vincent and Furnham, 1997: 21); the third is the possession of a single all-encompassing theory of disease; and the fourth is made up of the belief that

there is an ideal state of mental and physical health and the associated emphasis on active preventative measures designed to maintain that state.

Complementary medicine is widely used in Europe and America. For instance, a 1997 nationally representative household telephone survey in the United States found that 42.1% of respondents had used at least one of a rather broad set of complementary therapies (Eisenberg et al. 1998). Extrapolating their data to the US population as a whole, the authors suggested that the annual number of visits to complementary medicine practitioners now totals some 629 million. This means that more visits are made to complementary medicine practitioners than to primary care physicians. Total out-of-pocket expenditure on complementary medicine was estimated to be \$27 billion.

The American study is broadly in line with an Australian study, which found that 48.5% of respondents had used complementary medicines in the previous month, and which estimated total expenditure on complementary medicine by the Australian population at Aus\$612 million (MacLennan, Wilson and Taylor, 1996).

As for the United Kingdom, the precise extent to which the public uses both self-administered complementary medicines and complementary medicine practitioners appears to be not entirely clear. In *Which* surveys conducted in 1991 and 1995 around a quarter of respondents said they had used a complementary medicine practitioner in the preceding 12 months (see Fisher and Ward, 1994; Dickinson, 1994). An earlier study published in 1985 suggested that around 2.5% of the population, or 1.5 million people, were treated by complementary medicine practitioners in any year (Fulder and Munro, 1985). A further UK study conducted in 1987-8 concluded that there were an estimated 1909 practitioners of acupuncture, homoeopathy, naturopathy and osteopathy registered with national professional associations (Thomas et al, 1994). These practitioners were estimated to see 70,600 patients a week, of which 10% of were new patients. Two-thirds of the new patients had not used complementary medicine before. A 1996 market research study estimated that the market for homoeopathic remedies, licensed herbal treatments and aromatherapy products had increased by 36% since 1991, and was now worth £72 million (Mintec International Group Limited, 1997). The report

states that only 24% of respondents to a consumer attitudes survey would not consider using alternative medicine for any illness or condition because they do not believe it works.

In the case of mainland Europe, complementary medicine is also popular, although the exact levels of use found by surveys appears to vary considerably. According to one recent discussion of the literature, "Recent surveys on usage in Europe have varied from 8% to 80%" (Monckton et al, 1998; but see also Fisher and Ward, 1994). The inconsistent definitions of complementary or alternative medicine used by researchers have evidently not helped.

Looking at the demographic characteristics of users of complementary medicine, surveys fairly consistently find that such persons tend to come from higher social groups, to be relatively better educated, to be neither very young nor very old, and to be women (see, for example, Fulder and Munro 1985; Schouten, 1997; Astin, 1998). With regard to the latter, however, it should be noted that women are also greater users of orthodox medicine than men (Schouten, 1997).

So, it appears that the use of complementary medicine is very widespread. But why do people use it? What leads to a decision to try a complementary medicine?

Studies suggest that the main ailments for which complementary medicines are used include musculo-skeletal problems, such as back troubles and arthritis; headaches and migraine; psychological problems; chronic pain; and allergies (see, for example, Fulder and Munro, 1985; Thomas et al, 1991; Sharma, 1992; Vincent and Furnham, 1996; Bullock et al, 1997; Schouten, 1997; Kelner and Wellman, 1997; Astin, 1998; Burgh, Hatch and Neims, 1998). Thus, in general, complementary medicine is used for relatively minor conditions. However, it does not follow that these are the only conditions for which it is used. In fact, complementary medicine is also employed by significant numbers of sufferers from serious conditions such as cancer (see, for example, Ernst and Cassileth, 1998 and Vincent and Furnham, 1997: 58-62)

Studies suggest that the reasons why people turn to or persist with complementary medicine are complex and vary between the users of different complementary systems (see, for example, Furnham, 1996). Some of the reasons behind the use of complementary medicine are basically pragmatic.

Many complementary medicine users have had the complaints for which they are seeking assistance for many years (Schouten, 1997; Furnham, Vincent and Wood, 1995). They have generally been to orthodox doctors for those conditions, and remain on good terms with their general practitioners; but they have found the relief available for their particular condition from that source to be inadequate (see, for example, Moore et al, 1985). This specific sense of the failure of orthodox medicine may be extended in some to a dissatisfaction with other aspects of their orthodox health care, such as the communication between themselves and their GPs; the degree to which their GPs can provide an explanation of their condition that is satisfactory to them; or the side-effects of orthodox treatments (Finnigan, 1991; Furnham and Kirkcaldy, 1996; Vincent and Furnham, 1996). Complementary medicine users may also have more positive reasons for using complementary medicine. For example, they may be philosophically committed to a particular system of complementary medicine or perhaps be inclined to its use by holistic views on the inter-relationship of mind, body and spirit expression (Finnigan, 1991; Astin, 1998). One large American study (Astin, 1998) found that being a "cultural creative" was also correlated with complementary medicine use. Cultural creatives, we are told:

... take in a lot of information from a variety of sources [and] are good at synthesizing it into a 'big picture.' Their style is to scan an information source efficiently, seize upon something they are interested in, and explore that topic in depth [...] Cultural Creatives [...] tend to reject hedonism, materialism, and cynicism [...] are disdainful of modern media, consumer, and business culture. They also reject world views based on scarcity or fear, as well as the non-ecological orientation of ultra-conservatives and intolerance of the Religious Right [...] The positive values of the Creatives [...] are: Ecological Sustainability [...] Globalism [...] Women's Issues [...] Altruism [...] Self-Actualization, and Spirituality [...] Social Conscience and Optimism. (Ray, 1997)

Although a patient may *first* visit a complementary practitioner for one reason, he or she may *continue* to use the treatment for others. For example, a person may initially contact a complementary practitioner for purely pragmatic reasons, but later be impressed by the superior communication skills and bedside manner

of the practitioner (Ernst, Resch and Hill, 1997), the very much longer time which studies show complementary practitioners spend with their patients (Hewer, 1983; Fulder and Munro, 1985; Schouten, 1997), or other aspects of the philosophy or apparent results of the treatment.

Overall then, complementary medicine users can perhaps be thought of as occupying a continuum. At one end there are those who have turned to complementary medicine purely as a last resort. At the other end are those who are philosophically, socially or religiously committed to the ideology of a complementary system. In between, people mix specific and general dissatisfaction with orthodox medicine and a positive appreciation of features of complementary medicine to a greater or lesser extent. In any event, the proportion of the population who rely solely on complementary medicine for their health care is extremely small (perhaps 5% or much less: Thomas et al, 1991; Astin, 1998). Complementary patients may regard orthodox medicine as less effective than do the patients of general practitioners in general; and they may regard complementary medicine as more effective than orthodox medicine for certain conditions (Vincent, Furnham and Willsmore, 1995). Nonetheless, in the main, they seem to remain on fairly good terms with their general practitioners (Moore et al, 1985), and they recognise that orthodox medicine possesses the most effective treatments for other conditions, such as cancer (Vincent, Furnham and Willsmore, 1995). They remain prepared to consult general practitioners in appropriate circumstances.

All of this diversity notwithstanding, clearly the view that complementary medicine is to some degree effective is widespread. Where do such beliefs come from? Several studies indicate that the sources of people's information about complementary medicine include: friends and family, doctors, and the media (Budd et al, 1990; Sharma, 1992; Vincent and Furnham, 1994; Bullock et al, 1997). In the cases of friends and family and the media, it seems likely that personal experiences of complementary medicine are the ultimate basis of the information. As for doctors, it may come as a surprise to some that a doctor would refer or otherwise point a patient to complementary medicine. However, surveys reveal that a substantial number of general practitioners do indeed practice complementary medicine themselves or refer patients to both medically-qualified and medically-unqualified

complementary practitioners (Reilly, 1983; Wharton and Lewith, 1986; Perkin, Percy and Fraser, 1994; White, Resch and Ernst, 1997). It appears that doctors do not necessarily obtain good, or indeed any, information about complementary medicine as part of their medical training or practice (see, for example, Ramples et al, 1997; Wetzel, Eisenberg and Kaptchuk, 1998), and one study found that doctors' impressions of the effectiveness of complementary medicines were based mainly on observed benefits to patients; personal or family experience of benefit; or the media (Wharton and Lewith, 1986). Once again, therefore, personal experiences of improvements and cures by individuals who have used complementary medicines seem to be important. But can such personal experiences be relied upon? I think not.

Diseases and their symptoms do not stay constant over time; rather, they tend to increase and decrease in severity as time passes (see Buckman and Sabbagh, 1993). As anyone who has been ill will perhaps remember, on some days or even weeks, you feel better, and on others you feel worse. This is so even in the case of chronic or fatal illnesses. The overall trend may be down, but within that there are ups and downs of greater or lesser length. In most cases of relatively minor diseases, the ailment is self-limiting; that is, it will come to an end even if nothing is done about it. In more severe illnesses, there can also be instances of so-called spontaneous remission, where the disease either goes into abeyance for an extended period of time or vanishes altogether (see, for example, Sander, 1993 on epilepsy).

One of the difficulties with personal experiences is that they cannot convincingly take the natural course of the illness into account. Before we can be at all sure that a treatment itself was effective, we need to know what would have happened had the treatment not been used. How can we know whether the improvement reported in a single case study wasn't just a natural upturn, particularly as the patient may have taken the complementary medicine when she was feeling at her very worst and thus was probably at the bottom of a temporary trough in the up and down progress of their illness? I am afraid that we cannot. But then again, I would point out that we also cannot necessarily conclude that a remedy is ineffective merely because it failed to produce any obvious improvement in one person. Perhaps the person would

have felt an awful lot worse had he or she not taken the course of treatment. We just cannot tell.

We also need to consider the placebo effect. The phrase placebo effect refers to the therapeutic effects that arise not from the action of the treatment itself but rather from some other component of the process of treatment, such as "the expectations of the patient (and the doctor), the power and prestige of the physician, the credibility of the treatment and so on." (Vincent and Furnham, 1997: 134). Evidence from a range of studies indicates that procedures or agents that are quite ineffective *in themselves* can nonetheless produce improvements. Indeed, it seems reasonable to conclude that even effective courses of treatment produce a mixture of specific effects and placebo effects. The precise mechanisms of these placebo effects are matters of some discussion and dispute in the scientific literature (see Harrington, 1998; Shapiro and Shapiro, 1998; and Tausk, 1998 for recent discussions); but, whatever the mechanisms may be, before we can decide that a treatment is something more than a placebo, we need to be able to decide which part of the observed consequences of a treatment is the placebo effect and which is the direct result of the specific action of the treatment. Someone who has taken a treatment himself and then observed what then happened cannot do this. The benefits he experiences may be entirely placebo effects and much the same benefits would have been seen if he had, say, taken an inert sugar pill instead of the homoeopathic preparation he did. The mere fact that the person got better does not tell us anything about whether the treatment itself contributed anything to the improvement.

There are a number of other problems with testimonies about personal experiences of medical treatments. Some of these come into sharp focus when we are confronted with claims about pretty much miraculous healings. Consider a person who tells us that she went to a spiritual healer with a cancer that her doctors had said was incurable. After the treatment, we are told, the cancer is found to have gone. In a case like this, several questions properly arise. How do we know that she was actually suffering from cancer? Did the person misunderstand the diagnosis or the prognosis given by the doctor or has he misremembered it? You might think that information about such life and death matters are things that a person would most certainly not forget. Yet, consider a

recent study that looked at how well patients awaiting an operation recalled the information they had been given about the risk of stroke associated with having and not having the operation. The results showed that "patients consistently failed to recall their risk of stroke" (Lloyd et al, 1999). In addition to this, there is a large body of data that indicates that human memory can be profoundly faulty (see Schacter, 1996). Also, what about the correctness of the diagnosis? All procedures all fallible. How do we know that there was not an equipment or processing failure; or an error in matching the results to the patient; or in interpreting the data? And, what about the cure itself? Has the disease really gone? What is the basis of the claim that it has and how secure is it? Could it be, for example, that the progress of the disease is merely slower than the average? Or, is the claimant's opinion on her state of health based merely on the absence of any symptoms? A number of studies of the patients of faith healers have found that although they reported improved health there was no *objective* change in their physical conditions (see Beit-Hallahmi and Argyle, 1997: 59), while a study spiritual healing patients found that they 'redefined' their symptoms and conditions in such a way that the problems for which they had been treated could be regarded as healed (Click, 1990). All in all, subjective impressions and symptoms are not always a good guide to the underlying physical disease (Schouten, 1997). And what about the effects of any orthodox treatment the claimant may have had before or at the same time as the complementary treatment? Could that be responsible for any change in the claimant's condition? Could it even be that the process of diagnosis has affected the patient's condition, for example by removing the whole of a tumour during the course of a biopsy (for this and other points raised above, see Lammes, 1988)? I am afraid that the stories we are given by acquaintances and in the media do not generally address these issues in any convincing way.

For me, the shortcomings of testimonials of personal experience are poignantly expressed by an early American Medical Association poster (Hines, 1988: figure 17). This shows a series of testimonials for tuberculosis cures given in good faith by customers of the cures. Each of the persons shown on the poster later died of tuberculosis.

In order to overcome the deficiencies of personal experience, proper testing is required. Over

the last century or so, medical science has slowly developed a type of test that is sometimes called the randomised, double-blind, placebo-controlled clinical trial (or RCT. See Shapiro and Shapiro, 1998 for historical details and Vickers et al, 1997 on RCTs and complementary therapies). This type of trial contains a number of features that are designed to eliminate or control some of the aspects of personal experience that can give rise to false impressions of the efficacy or lack of efficacy of a treatment. I shall briefly run through some of these. But before doing so, I would caution against the view that all orthodox treatments have been properly evaluated by means of state-of-the-art RCTs. There is now a huge movement within medicine towards what is known as "evidence-based medicine". However, not all orthodox treatments have yet been satisfactorily tested.

First, the RCT includes a placebo group. That is, instead of simply providing a treatment to a single group of patients and seeing what happens, you have at least two groups. In a basic RCT, one group of patients receives the treatment that you wish to test, while a second group receives an inert substance or procedure that is indistinguishable from the treatment under investigation, or at least as equally credible to the patients. The idea here is that any placebo benefits that might arise from aspects of the treatment process other than the substance or procedure that you are interested in will be equally experienced by both the treatment and the placebo groups. By comparing the results the for two groups, therefore, you can gain some idea as to whether the treatment under investigation has any *extra* benefits over any placebo effects, effects of the passage of time etc.

But if you have two groups of patients, is it not possible that the groups may be different in some important respects, and that these differences may affect the final results? The RCT has several features designed to ensure that when the final comparison is made between the outcomes in the treatment group on the one hand and the placebo group on the other, you are comparing like with like. If you know in advance that a particular factor may upset the results, you can make adjustments to take this into account. For example, right from the outset you could exclude from the trial certain groups of people, such as those who are already taking some other type of treatment. Additionally, it is possible in some instances to check the make up of the treatment and placebo groups to

see that there are not skewed one way or the other. This is often done in the case of such variables as age, sex, and severity of illness. Another important safeguard here is randomisation. The idea is a simple one. You start with a single pool of patients. Then you allocate them to either the treatment group or the placebo group *at random*. The idea here is that any factors that may affect the results, including unknown ones, will also be randomly distributed between the two groups.

Randomisation also plays a role in the process of *blinding*. RCTs are *double-blind*. This means that neither the patients nor the people conducting the experiment should know whether a given patient is in the placebo group or the treatment group. There are several reasons for requiring blinding. If the experimenters knew who was in which group, they may consciously or unconsciously treat the patients differently, and this could affect the results. Similarly, if the people who are deciding what the outcome has been for a patient know whether that patient received the treatment or a placebo, then, to the extent that the measure of the outcome has a subjective component, this could bias their decisions. As far as patients are concerned, one benefit of keeping them unaware of whether they are receiving a placebo or the treatment under investigation is that you do not eliminate any psychological placebo effects that may be present. It would be difficult for faith, expectation or other such factors to operate if the patient knows from the start that they have merely received a sugar pill.

In order for the blinding to be effective, clearly the process of randomisation must be conducted in such a way that no-one connected with the experiment knows or can influence the results. Amongst other things, this means that the results must be kept concealed throughout the whole length of the trial. Evidence shows that where the results of randomisation do become known during a trial, this can lead to inflated estimates of how effective treatments are (Schulz et al, 1995).

Another feature of a good RCT that is not always seen in trials is that the measurements which are going to be used to determine the outcome of the trial are determined in advance. Deciding exactly what is going to count as success or failure after the results are in is a little like drawing the target around the arrow after it has landed. This can be a real problem with

clinical trials. Such trials tend to generate a huge amount of data. It may be all too easy to sift through this data and find some chance upwards fluctuation or other. If this fluctuation is then designated as the outcome measure and statistical analyses are carried out *as if the outcome measure had been specified in advance*, the result could be that a chance blip is converted into a seemingly non-chance effect.

There are many other requirements for good clinical trials (see Resch and Ernst, 1996 and Shapiro and Shapiro, 1998 for discussions). I do not have time to discuss all of these today. Moreover, it should be said that it is easier said than done to design a high-quality trial. In practice, it may be very difficult to, for example, ensure double-blinding or to devise a satisfactory placebo control (this problem has been the subject of much discussion in connection with acupuncture). A particular problem is so-called confounding factors. You will find that there is a statistical correlation between having yellow fingers and suffering from lung cancer (example from Resch and Ernst, 1996). But that does not mean that the one caused the other. In fact it is a third factor (smoking cigarettes) that is responsible for both. Such confounding can lead to mistaken conclusions about causal relations and may be far from easy to eliminate.

Not every proponent of complementary medicine would agree that rigorous testing of complementary therapies is required or that the RCT is the best vehicle for conducting such tests (see, for example, Vickers, 1996). However, it would be unwise to conclude that hostility to testing is universal amongst practitioners and users of alternative medicine. One survey found that the attitude of acupuncture patients towards scientific methodology was less favourable than that held by patients of general practitioners (Furnham, Vincent and Wood, 1995). However, in that same survey the attitudes of homoeopathy and osteopathy patients towards scientific assessment was indistinguishable from that of the general practitioner patients. Moreover, surveys of acupuncture practitioners and complementary medicine patients in Switzerland all found large majorities in favour of testing (Vincent and Mole, 1986; Kristof et al, 1998). It would also be unwise to think that complementary medicines are completely untested. In fact, there have been at least 8,000 randomised controlled trials of complementary medicine (Vickers, 1998). The next time someone asserts to you that a complementary

therapy has not been tested, I would recommend that you establish just where he or she has looked for such trials.

In view of the vast number of trials in the literature, I cannot even attempt a comprehensive analysis of the status of complementary medicine as a whole. However, to illustrate some of the principles I have mentioned, and to introduce some additional considerations, I shall briefly discuss a single family of claims. The one I have chosen is acupuncture.

In my discussion, I shall largely restrict myself to recent systematic reviews and meta-analyses. A systematic review has been defined as "an overview of primary studies which contains an explicit statement of objectives, materials, and methods and has been conducted according to explicit and reproducible methodology" (Greenhalgh, 1997). A meta-analysis is a type of systematic review. In the context of clinical trials, it has been defined as "a statistical analysis that combines or integrates the results of several independent clinical trials considered by the analyst to be 'combinable'" (Huque 1988).

Acupuncture is a traditional Chinese medical system that extends back some 3,000 years. Suffice it for present purposes to say that traditional acupuncture is based on the notion that a body energy called Qi flows through bodily channels called meridians. Illness is conceptualised as an imbalance in the flow of Qi. To restore the lost balance, needles are inserted, or pressure heat applied, at points where meridians are thought to flow close to the surface of the skin (see Ceniceros and Brown, 1998 and Ulett, Han and Han, 1998 for further details of the philosophy and practice of acupuncture).

As you may have heard, in the United States a panel from the National Institutes of Health (NIH) recently considered acupuncture. Their report states that "The data in support of acupuncture are as strong as those for many accepted medical therapies" (National Institutes of Health Consensus Development Panel on Acupuncture, 1998). More specifically, they stated:

There is clear evidence that needle acupuncture is efficacious for adult post-operative and chemotherapy nausea and vomiting and probably for the nausea of pregnancy...There is evidence of efficacy for postoperative dental pain. There are reasonable studies (although sometimes only single studies) showing relief of pain with acupuncture on

diverse pain conditions such as menstrual cramps, tennis elbow, and fibromyalgia. This suggests that acupuncture may have a more general effect on pain. However, there are also studies that do not find efficacy for acupuncture in pain...There is evidence that acupuncture does not demonstrate efficacy for cessation of smoking and may not be efficacious for some other conditions.

So, it is said that there is clear evidence of an effect of acupuncture on nausea. Fairly recently, Andrew Vickers conducted a systematic review of acupuncture antiemesis trials (Vickers, 1996). Vickers analysis found that a very large majority of the studies conducted on the antiemesis effect of the stimulation of acupuncture point P6 was positive, and this remained the case when he restricted his analysis to what his examination suggested were the better quality studies. However, Vickers did not actually offer any conclusions in his review, leaving it instead to the reader to reach a decision for herself. Vickers also pointed out that "None of the studies included in this review is methodologically perfect and the reader may instead decide that the P6 research does not constitute acceptable proof that acupuncture has specific effects on health". I would add myself that although the review considered whether patients and the researchers assessing the outcomes were blind to whether the patient had received acupuncture proper or a placebo, no consideration was given to whether the acupuncturist was so blinded. This may be because it is difficult to arrange things so that a person delivering acupuncture does not know whether he is giving acupuncture or a placebo. Nonetheless, empirical evidence already shows that trials that are not double-blinded give exaggerated results (Schulz et al, 1995). The possibility that the biases that cause such distortions in single-blind studies are also at work in the acupuncture studies remains, it seems, a plausible alternative explanation for the results Vickers found.

The other strong claim made by the National Institutes of Health Panel is that there is evidence of the efficacy of acupuncture for postoperative dental pain. Two recent systematic reviews have assessed the evidence on this matter (Ernst and Pittler, 1998 and Rosted, 1998). Both reviews suggested that acupuncture has some effect on dental pain. I am afraid that I remain unconvinced. One concern I have is about the quality of the studies reviewed. In the case of the first review, by Ernst and Pittler (1998), one

commentator has pointed out that only 3 of the 16 trials considered were randomised and double-blind, and this commentator argued that "not one of these studies would get into a review with the standards of experimentation that we expect for a new analgesic" (Anon, 1998). As for the second review, by Rosted (1998), only one study was adjudged to be of excellent quality. Moreover, only 1 of the trials not excluded as inadequate in quality was double-blinded. Whether in this trial the randomisation of the patients was adequately concealed for the duration of the trial is not obviously addressed. One other worry is that the author does not seem to have conducted a comprehensive search for unpublished trials. It is possible that negative trials are languishing unpublished in file-drawers somewhere, particularly in the Far Eastern countries (Vickers et al, 1998).

A number of other systematic reviews on acupuncture have been published recently. These have found little or no convincing evidence that acupuncture is effective. The reviews cover: smoking cessation (Law and Tang, 1995; Ashenden et al, 1997; White and Ramples, 1999); asthma (Davis et al, 1998; Linde, Jobst and Panton, 1999); back pain (Tulder, Koes and Bouter, 1997; Tulder et al, 1999); addiction (Moner, 1996); weight reduction (Ernst, 1997b); sickle cell pain (Elander and Midence, 1996); neuralgia (Volmink, et al, 1996); cancer pain (Sellick and Zaza, 1998); stroke recovery (Ernst and White, 1996; Hopwood, 1996); osteoarthritis (Ernst, 1997a) and depression (Ernst, Rand and Stevinson, 1998).

My assessment is that the benefits of traditional acupuncture remain unproven (see also the overview in Monckton et al, 1998 for another overview). Certainly, any pretensions acupuncture may have to being a *comprehensive* health system are very far from adequately supported by the available evidence.

As this fairly brief discussion may have revealed, the evaluation of the state of the evidence regarding complementary therapies can be a complex matter. In many cases, there are no quick answers; no easy know-down blows for the believer or the doubter. For this reason, I would urge you to be wary of sweeping and unsubstantiated statements about complementary medicine, whether pro or con. I fear that they usually betray a simple ignorance of the subject. In short, if you wish to be well-informed and properly critical about complementary medicine, there

is little alternative to equipping yourself with a reasonable understanding of the procedures of proper testing and then engaging in an examination of what is sometimes an extensive and challenging literature.

The subject of complementary medicine is an important one. Although the cost to the individual of complementary therapies may not always be great (see, for example, Fulder and Munrow, 1985), in total large sums of public and private money are involved. Remedies labelled as complementary medicine are not invariably safe, and several have been responsible for deaths and serious injuries amongst users (see Ernst, 1996). In addition, if the rather exaggerated and universal claims of efficacy made by some complementary therapies are taken seriously, there is a danger that sufferers from potentially serious or fatal illnesses will seek to rely on therapies that are less than optimally effective, or that diagnoses of such illnesses will be substantially inaccurate. And there is the question of the public understanding of science. I think that we should not treat lightly the conflict between our scientific background knowledge and the explanatory models offered by some complementary therapies. In my view, it is no trivial thing that dubious pseudo-science and mysticism are being promulgated to large numbers of people every day. The message does not seem to be taken very seriously by most, but it seems reasonable to conjecture that it hardly stimulates its listeners to embrace either the methods or the findings of science.

So, I would suggest that we should think more deeply and critically about complementary medicine and not trust everything we feel.

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Articles of Note

By Wayne Spencer

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Alternative Medicine

Astin, J. A. *et al.* A review of the incorporation of complementary and alternative medicine by mainstream physicians. *Archives of Internal Medicine*, 1998; 158(21): 2303-10. Overview of 19 studies into the practices and beliefs of orthodox physicians with regard to acupuncture, chiropractic, homeopathy, herbal medicine, and massage. The

results of the individual studies varied but referral to complementary practitioners, use of complementary medicine and belief in the efficacy of complementary medicine appear to be quite widespread amongst physicians. For example, 48% have been found to refer patients for acupuncture and 51% to believe in the effectiveness of acupuncture.

Breuner, C. C., P.J. Barry and K. J. Kemper. Alternative medicine use by homeless youth. *Archives of Pediatric and Adolescent Medicine*, 1998; 152: 1071-1075. The subjects in this study were 157 homeless youths 14-21 years who were receiving care at Seattle clinic's youth programme. 70.1% used complementary therapies. Complementary therapies were most often recommended by friends (52.7%), and the most common reason for using them was their perceived naturalness (43.9%). The majority of users of complementary therapies (87.3%) believed that they had been helped by them. In the event of illness, 51.7% would prefer to seek care from a physician if they had a choice and 36.9% from a complementary medicine provider. 11.4% would elect to treat themselves.

Cardini, F. and H. Weixin. Moxibustion for correction of breech presentation: a randomised controlled trial. *Journal of the American Medical Association*, 1998; 280: 1580-4. This randomised but open clinical trial compared two groups of pregnant patients with foetuses in the breech position. One group had an acupuncture point stimulated by moxibustion (the burning of herbs); the second merely received routine care. The outcomes for the acupuncture group were found to be significantly better than those for the control group.

Cherkin, D. C et al. A comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. *New England Journal of Medicine*, 1998; 339: 1021-1029. This randomised, single-blind trial of 321 adults found no *clinically* significant differences between subjects given physical therapy, chiropractic manipulation or an educational booklet. The cost of the physical and chiropractic treatments far exceeded those of the booklet treatment. The authors suggest that all patients with low back pain should not be referred for physical therapy or chiropractic manipulation.

Concar, D. Get your head round this... *New Scientist*, 1999; 162: 20-23. Discusses the claims that mobile phones are harmful to users. It suggests that the claims are not yet proven. The article is followed by an account of a test of shields said to protect mobile phone users from the microwave emissions from handsets (pp: 24-5).

Easthope, G., J. J. Beilby, G. F. Gill and B. K. Tranter. Acupuncture in Australian general practice: practitioner characteristics. *Medical Journal of Australia*, 1998; 169(4): 197-200. In this survey, around one in seven of Australian general practitioners were found to use acupuncture. Users of acupuncture tended to be male, aged 35-54 years, and have an overseas primary medical qualification.

Ernst, E. Complementary treatments for back pain - the facts. *Focus on Alternative and Complementary Therapies*, 1999; 4(1): 3-5. Concludes that conclusive judgements are not available: "Generally speaking, too few trials exist and the possibility of the preventative potential of complementary medicine has not been explored at all".

Ernst, E. Iridology: A systematic review. *Forsch Komplementarmed*, 1999; 6(1): 7-9. An extensive literature search located four studies of the diagnostic claims of iridology. The majority of these studies were negative. The article that iridology's claims are not supported by scientific evidence and that its use should be discouraged.

Ernst, E. Prevalence of complementary/alternative medicine for children: a systematic review. *European Journal of Pediatrics*, 1999; 158(1): 7-11. This examination of ten studies found that the degree to which complementary medicine is used by children varies but is generally high.

Goldstein, M. S. and D. Glik. Use of and satisfaction with homeopathy in a patient population. *Altern Ther Health Med*, 1998; 4(2): 60-5. Survey of 77 new of classical homoeopaths in the Los Angeles area. Patients tended to be highly educated and to have little prior knowledge of homoeopathy. The conditions they presented with were largely chronic conditions, with respiratory, gastrointestinal, and female reproductive problems being the most common. Around 80% had tried orthodox medicine for their condition beforehand. For months after treatment, only 29% reported no improvement. Regardless of whether there had been improvement, satisfaction with homoeopathy was high.

Greenfell, A., N. Patel and N. Robinson. Complementary therapy: general practitioner's referral and patients' use in an urban multi-ethnic area. *Comp Ther Med*, 1998; 6: 127-32. In this study, 68% of the 300 patients interviewed had used

complementary therapies in the previous year. The figures for black and Asian subjects was 78% and 77% respectively. The most common complementary therapy used by those two groups was herbal medicine (65% of blacks and 44% of Asians). 86% of GPs in the study referred patients for complementary therapies. Acupuncturists (58%), osteopaths (58%), homoeopaths (36%) and chiropractors (32%) were the main complementary practitioners to which the GPs referred their patients. 16% of GPs practices provided acupuncture to patients themselves.

Hope, T. Evidence-based patient choice. *Evidence-Based Medicine*, 1999; 4(2): 39-40. The author considers that "evidence-based medicine and patient-centred care are natural bed-fellows". He sets out the four steps that make up the process of evidence-based patient-choice.

Italian Study Group for the Di Bella Multitherapy Trials. Evaluation of an unconventional cancer treatment (the Di Bella multitherapy): results of phase II trials in Italy. *British Medical Journal*, 1999; 318: 224-228. Di Bella is a retired professor of physiology who has claimed to have developed a new and non-toxic cancer cure in the form of a mixture of melatonin, vitamins and other substances. This claim was widely publicised in the popular press, and was vigorously advocated by a group of his patients; moreover, at the end of 1997 a judge ordered, on the ground of "freedom of cure, that the Italian government must meet the costs of Di Bella's treatments. Trials of Di Bella's allegedly therapeutic preparation were rapidly convened, and this paper presents the interim results. No differences were found between the treatment and the control groups. An accompanying editorial stresses that the trials were not randomised and as a result the strength of the evidence derived from them is weakened (Marcus Müllner. Di Bella's therapy: the last word?[editorial] (pp. 208-209). This comment later gave rise to a number of letters on the place of randomisation in cancer trials (*British Medical Journal*, 1999; 1073-4). A study in another journal later examined the effects of the campaign promoting the Di Bella cancer therapy on a large sample of cancer patients (Passalacqua, R *et al.* Patients opinions, feelings, and attitudes after a campaign to promote the Di Bella therapy. *Lancet*, 1999; 353: 1310-14). This is accompanied by an editorial seeking to draw some lessons from the affair (Remuzzi, G. and A. Schieppati.

Lessons from the Di Bella affair [editorial]. *Lancet*, 1999; 353: 1289-90).

Isabelle, C. H., M. Jamieson and A. D. Ormerod. Randomized trial of aromatherapy: successful treatment for alopecia areata. *Archives of Dermatology*, 1998; 134: 1349-1352. Trial involving 86 patients diagnosed as having alopecia areata. Patients who had a mixture of essential oils and carrier oils massaged into their scalp daily had better outcomes than those who received such a massage carrier oils only.

Jacobs, J., E. H. Chapman and D. Crothers. Patient characteristics and practice patterns of physicians using homeopathy. *Archives of Family Medicine*, 1998; 7(6): 537-40. In this study data were collected from patient visits to 27 doctors of medicine or osteopathy using homeopathy in 1992 and then compared with the National Ambulatory Medical Care Survey of 1990. Homoeopathy patients were found to be generally younger, more affluent and more likely to have long-term complaints. Also, compared to physicians who practice conventional medicine, the doctors who used homeopathic medicine were found to spend more time with their patients, order fewer tests and prescribe fewer pharmaceutical treatments.

Keane, F. M. et al. Analysis of Chinese herbal creams prescribed for dermatological conditions. *British Medical Journal*, 1999; 318: 563-4. This analysis of 11 Chinese herbal creams found that they contained dexamethasone, a potent steroid. The steroid was not disclosed on the creams' packaging, and patients were inappropriately applying the cream to sensitive areas of skin.

Kitai E. et al. Use of complementary and alternative medicine among primary care patients. *Family Practice*, 1998; 15(5): 411-4. Survey of 480 patients in two primary care clinics in Israel. 18.7% were found to have consulted an alternative medicine therapist at least once, although younger (0-19 years) and older patients (65 and older) had lower rates of consultation. The most frequently used therapies were homeopathy (34.6%) and reflexology (18.7%), and musculo-skeletal (20.6%) and respiratory (15.9%) problems were the ailments for which treatment was most commonly sought. The treatment was considered to have been beneficial by almost half of the patients and partially beneficial by a further 34.6%.

Kranz, R and A. Rosemund. Motivation for use of alternative medicine. *Schweiz Med Wochenschr*, 1998; 126: 616-22. This study of 272 patients at three hospitals in Switzerland found that 43% had used complementary therapies. 72% of the users reported that they utilised such therapies because they considered them to be important additions to orthodox medicine. The authors conclude that complementary medicine users are not motivated by hostility to orthodox medicine.

Krastins, M., E. Ristinen, J. A. Cimino and R. Mamtani. Use of alternative therapies by a low income population. *Acupunct Electrother Res*, 1998; 23(2): 135-42. Survey of 199 mostly low-income patients in a family health center clinic. 29% percent of respondents said they used using at least one type of alternative therapy, usage being greater amongst patients over 29 years of age and those with more education and higher incomes. 90% of users of alternative therapies had more than one medical condition. By contrast, 70% of those not using alternative therapies suffered from only a single condition.

Ng, B-Y. Qigong-induced mental disorders: a review. *Australian and New Zealand Journal of Psychiatry*, 1999; 33: 197-206. Reviews the Chinese and English language literatures on the supposed benefits of Qigong practice (the evidence is found to be of poor quality) and Qigong-induced mental disorders (the evidence of a causal link between Qigong practices and psychosis is found to be less than compelling).

Potier, J. P. Bromate intoxication due to the ingestion of a dose prescribed by a homeopathist [letter]. *Nephrol Dial Transplant*, 1998; 13(11): 2978-9. Case report.

Pachter, L. M. et al. Home-based therapies for the common cold among European American and ethnic minority families: the interface between alternative/complementary and folk medicine. *Archives of Pediatric and Adolescent Medicine*. 1998; 152: 1083-1088. On the basis of interviews with mothers of children who attended clinics and physicians' offices, this study concludes that home-based remedies for childhood colds are commonly used. Many of the treatments were found to be complementary to biomedical treatment, and only a

very few were considered to be potentially hazardous. Mothers from ethnic minorities did not use home-based interventions to a greater extent than mothers from the majority culture.

Roberts, L., I. Ahmed, S. Hall S and Sargent C. et al. 1999. Intercessory prayer for the alleviation of ill health (Cochrane Review). In: *The Cochrane Library*, Issue 1, 1999. Oxford: Update Software. Despite a fairly extensive search through various electronic databases, the authors located only three studies they considered suitable and relevant. The evidence from these studies was mixed, and the authors concluded that their review neither confirmed nor disconfirmed the efficacy of intercessory prayer.

Sikand, A, and M. Laken. Pediatricians' experience with and attitudes toward complementary/alternative medicine. *Archives of Pediatric and Adolescent Medicine*. 1998; 152: 1059-1064. The subjects of this study were 348 Fellows of the Michigan chapter of the American Academy of Paediatrics. 55.2% said they would use complementary therapies personally, and 50.3% would refer patients for such therapies. The therapies to which they were prepared to refer were biofeedback (23.6%), self-help groups (23.3%), relaxation (14.9%), hypnosis (13.8%), and acupuncture or acupressure (10.9%). White paediatricians, U. S. medical school graduates and general paediatricians were most likely refer patients for complementary therapies. 54.1% of the paediatricians reported that they were interested in taking courses on complementary therapies. Women paediatricians were most likely to be interested in such education. The study also included material on paediatricians' discussion of complementary medicine with their patients.

Simpson, J. J., I. Donaldson, I and W. E. Davies. Use of homeopathy in the treatment of tinnitus. *British Journal of Audiology*, 1998; 32(4): 227-33. Small scale test. No objective differences found between homoeopathy and a matched placebo treatments.

Smolle, J., G. Prause, and H. Kerl. A Double-blind, Controlled Clinical Trial of Homeopathy and an Analysis of Lunar Phases and Postoperative Outcome. *Archives of Dermatology*, 1998; 134: 1368-1370. This double-blind, placebo-controlled trial found no benefit for treatment of warts by individually

selected homeopathic preparations. It also found no association between the outcomes of orthopaedic operations and the lunar phase at the time of operation.

Vainio, H. and M. Rautalahti. An international evaluation of the cancer preventive potential of vitamin A. *Cancer Epidemiol Biomarkers Prev*, 1999; 8(1): 107-9. A panel convened by the International Agency for Research on Cancer reviewed evidence from studies of cell and organ cultures, animal models, epidemiological studies, and human intervention studies. It concluded that there little evidence that taking vitamin A can prevent cancer.

Vickers, A. et al. How should we research unconventional therapies. A panel report from the Conference on Complementary and Alternative Research Methodology, National Institutes of Health. *International Journal of Technology Assessment in Health Care*, 1997; 13: 111-121. Discusses the questions: (1) What is a good question? (2) How can questions be matched with research designs? What is a strategic approach to research? (4) How can inappropriate interpretations of trials be avoided. Amongst other things, it argues that the randomised controlled trial is the appropriate means for discerning whether a given complementary treatment has a therapeutic effect.

Vickers A. J et al. Homeopathic Arnica 30x is ineffective for muscle soreness after long-distance running: a randomised, double-blind, placebo-controlled trial. *Clin J Pain*, 1998; 14(3): 227-31. This randomized, double-blind, controlled trial involving 519 long-distance runners found difference between Arnica 30X and a placebo.

Vickers, A., N. Goyal, R. Harland and R. Rees. Do certain countries produce only positive results? A systematic review of controlled trials. *Controlled Clinical Trials*, 1998; 19(2): 159-66. Acupuncture trials from China, Japan, Hong Kong, and Russia/USSR and Taiwan were found to be exclusively or overwhelmingly positive. The authors suggest that a bias towards the publication of positive trials may be present.

Vickers, A. J., R. W. Rees and A. Robin. Advice given by health food shops: is it clinically safe? *Journal of the Royal College of Physicians of London*, 1998; 32(5): 426-8. The advice given to a researcher who presented at health shops with symptoms

consistent with serious pathology was found to be inconsistent and inadequate.

Young, D. E. and S. K. H. Aung. An experimental test of psychic diagnoses of diseases. *Journal of Alternative and Complementary Medicine*, 1997; 3(1): 39-53. This test of three psychics found no impressive evidence that psychic diagnosis is a useful alternative medical tool. See also: Burk, L. Psychic/intuitive diagnosis: two case reports and commentary [letter]. *Journal of Alternative and Complementary Medicine*, 1997; 3(3): 209-210.

Astrology

Dean, G. Parallels between phrenology and astrology. *Correlation*, 1998; 17(1): 9-40. Extended discussion of the parallels between the experienced-based claims of nineteenth century phrenology and those of astrology. The two are found to have much in common.

Durant, J. and M. Bauer. British public perceptions of astrology: an approach from the sociology of knowledge. *Culture and Cosmos*, 1997; 1(1): 55-71. This analysis of 1988 public understanding of science data from 2009 considers the connections between astrological belief and such variables as age; gender; religious belief; religious integration; living alone or in partnership; the attributed scientific status of astrology; educational level; personal sense of control over the social world; and scientific understanding. It concludes that: "...belief in astrology is prevalent among particular social groups; groups which...may be experiencing difficulty in accommodating their religious feelings to life in an uncertain post-industrial culture".

Ertel, S. Astro-quiz: can astrologers pick politicians of painters? *Correlation*, 1998; 17(1): 3-8. Birth data for 20 politicians and 290 painters was given to 11 experienced astrologers. The astrologers were required to match the birth data to the person's occupation. Both individually and as a group they failed to do at better than chance levels.

Ertel, S. Scrutiny of Gunter Sachs' excursion into astrological research. *Correlation*, 1998; 17(1): 44-49. Critique of *Die Akte Astrologie*, a recent book by Gunter Sachs claiming to have found evidence in support of sun sign effects. See also Niehenke article below.

Hira, K. et al. Influence of superstition on the date of hospital discharge and medical cost in Japan: retrospective and descriptive study. *British Medical Journal*, 1998; 317: 1680-3. This study of the time spent in hospital by patients discharged over a three year period from a single Japanese hospital examines the influence of beliefs in Taian-Batsumetsu, "a superstition relating to the six-day lunar calendar". It suggests that Taian-Batsumetsu beliefs regarding lucky and unlucky days may be extending the time patients spend in hospital, and that this is costing the hospital an estimated £31,000 per year.

Lillqvist, O. and M. Lindeman. Belief in astrology as a strategy for self-verification and coping with negative life-events. *European Psychologist*, 1998; 3(3): 202-8. The subjects in this study were 50 students attending astrology, psychology or German-language courses in Helsinki. The results suggested that participation in an astrology course may serve to "verify participants' self-concept by increasing the certainty of self-control and perceived luck". Interest in astrology was also found to be associated with the number of past personal crises experienced but not with the number of past traumatic life-events.

Niehenke, P. The Astrology File: scientific proof of sun sign effects? *Correlation*, 1998; 17(1): 41-44. Critique of *Die Akte Astrologie*, a recent book by Gunter Sachs claiming to have found evidence in support of sun sign effects. See also Ertel's article above on the same subject.

Memes

Polichak, J. W. Memes - What are the good for? A critique of memetic approaches to information processing. *Skeptic* [U.S.A.], 1998; 6(3): 45-53. A critical examination of the claims of memetic theory. The author argues that key terms in memetics are poorly defined and that the theory's hypotheses are inconsistent with background knowledge in cognitive psychology.

Paranormal and extraordinary claims and experiences

Abstracts of presented papers from the Parapsychological Association 41st Annual Convention. *Journal of Parapsychology*, 1998; 62(2): 101-125. Extended summaries of 21 papers.

Alvarado, C. S. ESP and altered states of consciousness: an overview of conceptual and research trends. *Journal of Parapsychology*, 1998; 62(1): 27-63. Discusses the history of research into the relationship between altered states of consciousness and ESP from the nineteenth century, and the social contexts that have influenced such research. The author argues that in recent years this line of research has increasingly been abandoned.

Alvarado, C. S. and N. L. Zingrone. Out-of-the body experiences among readers of a Spanish New Age magazine. *Journal of the Society for Psychological Research*, 1999; 63: 65-85. Detailed examination of the features and psychological correlates of OBEs.

Bartowski, J. P. Claims-making and typifications of Voodoo. *Journal for the Scientific Study of Religion*, 1998; 37(4): 559-579. Sociological examination of three recent misrepresentations of voodoo religion.

Blackmore, S. J. and N. Rose. Reality and imagination: a psi-conductive confusion? *Journal of Parapsychology*, 1997; 61(4): 321-335. In this study involving 55 psychology students, subjects were required to distinguish between objects they had been shown and objects they had imagined. No correlation was found between false memories and levels of belief in the paranormal. However, in test for clairvoyance, more false memories were found for target objects than for non-target objects. The authors speculate as to whether this may show that confusing reality and imagination is "psi-conductive".

Carrazana, E. et al. Epilepsy and religious experiences: Voodoo possession. *Epilepsia*, 1999; 40(2): 239-41. This article discusses five cases where epileptic seizures were initially attributed to Voodoo spirit possession. (See also Jilek-Aall below).

Cohn, S. A questionnaire study on second sight. *Journal of the Society for Psychological Research*, 1999; 63: 129-158. Presents the results of a 65 item questionnaire completed by 208 respondents. The subjects had either contacted the Koestler Chair of Parapsychology at the University of Edinburgh or had

come to the researcher's notice through various contacts.

Don, N. S., B. E. McDonough and C. A. Warren. Event-related brain potential (ERP) indicators of unconscious psi: a replication using subjects unselected for psi. *Journal of Parapsychology*, 1998; 62(2): 127-145. Event-related brain potentials (ERPs) were recorded from 22 subjects during an ESP test. The results in the ESP test were at chance levels. Nonetheless, the ERP patterns discovered, which partly accord with those found in earlier studies, are interpreted as evidence of unconscious or preconscious psi.

Donovan, J. M. Reinterpreting telepathy as unusual experiences of empathy and charisma. *Perceptual and Motor Skills*, 1998; 87(1): 131-46. Argues that 'telepathy' requires nothing more than empathy and charisma. The results of two experiments supporting this hypothesis are presented.

Eagly, A. H., S. Chaiken, S. Chen and K. Shaw-Barnes. The impact of attitudes on memory: an affair to remember. *Psychological Bulletin*, 1999; 125(1): 64-89. Meta-analysis and detailed discussion of the literature on whether attitudes affect what people learn and remember. Suggests that attitudes exert a variety of effects on memory.

European Journal of Parapsychology, 1997; 13. Amongst other things, this issue contains 3 papers about factors conducing to success in 'ganzfield' ESP experiments and a special section made up of 7 papers about 'psi-conducive' experimenter practices and issues' (e.g. the hypothesis that the attitudes etc. of an experimenter can directly affect the outcomes of ESP experiments).

Fontana, D. Polidoro and Rinaldi: no match for Palladino and the Fielding Report. *Journal for the Society for Psychical Research*, 1998; 63: 12-25. Reply to a skeptical attempt to explain the phenomena reported in a favourable 1909 evaluation of the medium Eusapia Palladino as the product of fraud. Argues that this explanation is inconsistent with the evidence in the report and with the results of other investigations of the medium. See also the article by Martínez-Taboas below. A reply by Polidoro and Rinaldi is under preparation.

Gill, R., C. K. Hadaway and P. L. Marler. Is religious belief declining in Britain? *Journal for the Scientific Study of Religion*, 1998; 37(3): 507-516. This examination of opinion polls found very little change in the levels of belief in belief in reincarnation, horoscopes, foretelling future, lucky charms and black magic over the 1970s, 1980s and 1990s. Similarly, belief in messages with the dead appears to have stayed constant since the 1940/50s. However, belief in ghosts seems to have increased over time from 15% in the 1940/50s to 19% in the 1970s, 28% in the 1980s and 31% in the 1990s. The report also contains material on the changing levels of traditional Western religious beliefs.

Honorton, C., D. C. Ferrari and D. J. Bem. Extraversion and ESP performance: a meta-analysis and a new confirmation. *Journal of Parapsychology*, 1998; 62(3): 255-276. This analysis, which dates from 1990, examines 60 studies involving 2,963 subjects and 17 independent investigators. The results show a small but statistically significant positive correlation between ESP scores and extraversion measures in both free-response and forced-choice ESP tasks using individuals. No significant results were found for studies testing groups. The authors point out that evidence for a correlation between ESP and extraversion scores only appears in studies where the subjects completed the ESP task before the extraversion assessment, and they suggest that the positive result for forced-choice tests may be an artefact caused by subjects' knowledge of their ESP performance affecting their responses to the extraversion measure. This is disputed in a following article by J. Palmer and J. C. Carpenter ('Comments on the extraversion-ESP meta-analysis by Honorton, Ferrari, and Bem'; pp. 255-276).

Houran, J. and C. Williams. Relation of tolerance of ambiguity to global and specific paranormal experience. *Psychological Reports*, 1998; 83(3 Pt 1): 807-18. In this study: (1) global paranormal beliefs, abilities, experiences, and drug use were found to be positively associated with tolerance of ambiguity; and (2) fear of paranormal experience were found to be negatively related to tolerance of ambiguity. As it was also found that the specific types of anomalous experiences associated with tolerance of ambiguity tended to involve internal or physiological experience, the authors argue that their findings are consistent with

the hypothesis that what happens in some paranormal experiences is that subjective events are misattributed by the person experiencing them to external and supposedly paranormal sources. See also Lange and Houran below.

Hyman, I. E. and E. F. Loftus. Error in autobiographical memory. *Clinical Psychological Review*, 1998; 18(8): 933-947. Discusses the constructive nature of memory and a variety of the errors to which it is prone.

Irwin, H. J. An empirically derived typology of paranormal believers. *European Journal of Parapsychology*, 1997; 13: 1-14. Data from a mail survey of 228 Australian adults are here analysed using a statistical technique called hierarchical cluster analysis. The author concludes from this analysis that paranormal believers can be grouped into four clusters: Traditional Religious Believers, Tentative Believers, Skeptics and New Agers.

Jilek-Aall, L. Morbus sacer in Africa: some religious aspects of epilepsy in traditional cultures. *Epilepsia*, 1999; 40(3): 382-6. Drawing on his time working in various parts of Africa, the author describes how voodoo is conceived in traditional African thought as the product of supernatural forces or beings. He argues that health education when given in the context of organised treatment of epilepsy can change popular notions about epilepsy and improve the quality of life of epilepsy sufferers.

Kihlstrom, J. F. Hypnosis, memory and amnesia. *Philosophical Transactions of the Royal Society of London B*, 1997; 352: 1927-1732. Examines the evidence on the effects of hypnosis on memory. Concludes: "Because the risks of distortion vastly outweigh the chances of obtaining any useful information, forensic investigators and clinical practitioners should avoid hypnosis as a technique for enhancing recollection".

Lange, R. and J. Houran. The role of fear in delusions of the paranormal. *Journal of Nervous and Mental Disease*, 1999; 187(3): 159-66. Based on a cross-cultural sample of students who reported poltergeist experiences showing high fear of the paranormal, this study found positive effects of (1) belief in the paranormal on experience of the paranormal; and/or (2) fear on belief. Paranormal experience was also found to have a positive effect on

fear. The results are explained in terms of a 'self-reinforcing feedback loop' model of delusions of the paranormal based on psychological 'attribution theory'. See also Houran and Williams above.

Lindeman, M. Motivation, cognition and pseudoscience. *Scandinavian Journal of Psychology*, 1998; 39: 257-265. This article proposes that pseudoscientific beliefs can be understood as the result of the interplay between basic social motives (e.g. "to have a sense of control over outcomes, to belong, to find the world benevolent and to maintain one's self-esteem) and 'experiential thinking' ("the automatic and default way of interpreting, encoding and organizing everyday information...the realm of cognitive heuristics...and magical thinking"). Astrology, graphology and alternative health beliefs are used to illustrate the hypothesis.

Loftus, E. F. and D. Polage. Repressed memories. When are they real? How are they false? *Psychiatric Clinics of North America*, 1999; 22(1): 61-70.

Mansfield, V., Rhine-Feather, S. and J. Hall. The Rhine-Jung letters: distinguishing parapsychological from synchronistic events. *Journal of Parapsychology*, 1998; 62(1): 3-25. Compares and contrasts 'synchronistic' and parapsychological phenomena.

Martínez-Taboas, A. some critical comments on the thesis of 'Eusapia's sapient foot'. *Journal for the Society for Psychical Research*, 1998; 63: 26-33. See article by Fontana above. This is a further rejoinder to a skeptical evaluation of the medium Eusapia. The author argues that that evaluation is anecdotal and misleading. A reply is under preparation.

McDonald, S. W. The witch doctors of Scotland. *Scottish Medical Journal*, 1998; 43(4): 119-22. Examines ideas about healing in early modern Scotland by considering how magical cures appear in the records of 61 witchcraft trials.

McGillion, F. The influence of Wilhelm Fliess' cosmobiology on Sigmund Freud. *Culture and Cosmos*, 1998; 2(1): 33-48. Fliess was the original proponent of biorhythm theory. This article charts the impact his ideas had on the thinking of Freud.

Milton, J. Meta-analysis of free response ESP studies without altered states of consciousness. *Journal of Parapsychology*, 1997; 61(4): 279-319. The

author's statistical analysis yields above chance hit rates for the tests she combined. The author also finds no strong evidence that methodological shortcomings are responsible for these results. However, she concludes that because reports rarely stated whether the outcome measure was preplanned, and because of the widespread practice of multiple comparisons, caution is required.

Nelson, T. J. He made a way out of no way: religious experience in an African-American congregation. *Review of Religious Research*, 1997; 39(1): 5-26. Discusses the perceived action of supernatural beings in the everyday lives of the members of the African Methodist Episcopal Congregation and the factors shaping such experiences.

Opsasnick, M. The haunted boy of Cottage City: the cold hard fact behind the story that inspired *The Exorcist*. *Strange Magazine*, 1998; 20: 4-27. Detailed investigation of the story behind the film *The Exorcist*. The author suggests that the unfortunate story of a disturbed boy has been misrepresented and embellished to yield the story presented in the film and in various accounts of the 'facts' of the case.

Playfair, G. L. Telepathy and identical twins. *Journal for the Society for Psychical Research*, 1998; 63: 86-98. Discusses the anecdotal evidence about telepathic communications between identical twins and the research conducted into such communication. Calls for a resumption of research.

Roe, C. A. Critical thinking and belief in the paranormal: a re-evaluation. *British Journal of Psychology*, 1999; 90: 85-98. In this study psychological students were asked to rate the quality a short report of an ESP experiment. The subjects were randomly allocated a report with either pro-ESP results or anti-ESP results. No differences were detected between the assessments made by believers and disbelievers. However, weak evidence was found that subjects of either persuasion tended to mark tests that conflicted with their views as being of lower quality than those that supported their views. The authors question the hypothesis that paranormal beliefs are the product of critical thinking deficits.

Shouten, S. and I. Stevenson. Does the socio-psychological hypothesis explain cases of the reincarnation type? *Journal of Nervous and Mental*

Disease, 1998; 186(8): 505-506. This study compares the number and accuracy of statements made in Indian and Sri Lankan reincarnation cases in which either (A) written records were made *after* investigation of the reincarnation or (B) written record were made *before* investigation. The authors conclude that they did not find the differences between the two types of case that were to be expected if the non-paranormal socio-psychological hypothesis of reincarnation cases was true.

Sicher, F. A randomized double-blind study of the effect of distant healing in a population with advanced AIDS: report of a small scale study. *Western Journal of Medicine*, 1998; 169: 356-363. This study of paranormal healing is sometimes mentioned in discussions of the efficacy of prayer or distance healing. What is not so often mentioned is the editor's introduction to the paper. In part, this reads: "...The paper published below is meant to advance science and debate. It has been reviewed, revised, and re-reviewed by nationally known experts in biostatistics and in complementary medicine. It reports a 6-month blinded study of 40 patients with AIDS who knew they might receive distance healing treatments representing a variety of traditions. Patients who received treatment had a statistically significant more benign course than control subjects. Does the paper prove that prayer works? No. The authors call for more research, as do we and the reviewers, for a number of reasons. We note that the study was relatively short and analyzed rather few patients. No treatment-related mechanisms for the effects were posited. The statistical methods can be criticized. We have chosen to publish this provocative paper to stimulate other studies of distant healing and other complementary practices and agents. It is time for more light, less dark, less heat".

Simon, B. Undead science: making sense of cold fusion after the (arti)fact. *Social Studies of Science*, 1999; 29(1): 61-85. Although the cold fusion controversy faded after 1990 when the scientific community failed to accept the claims of cold fusion proponents, research into cold fusion continues to be undertaken by hundreds of scientists. However, this work is now shaped by the outcome of the earlier controversy, and cold fusion research is now carried out "in the context of a kind of shadow world of science" where it is unseen, unrecognised or unidentified as such, even by scientists working in the

same institutions. Cold fusion is thus both dead and alive in a manner analogous to that of a ghost.

Sivier, D. War amongst the angels. *Magonia*, 1999; 60: 3-7. Examines the part that class antagonism and class stereotypes play in the construction of contemporary Satanism scares.

Smith, M. D., C. L. Foster and G. Stovin. Intelligence and paranormal belief: examining the role of context. *Journal of Parapsychology*, 1998; 62(1): 65-77. Research into the relationship between intelligence and belief in the paranormal has yielded inconsistent results. One explanation offered for the disparities is that some researchers' public skepticism towards paranormal claims prompted subjects to conceal their belief in the paranormal when answering questionnaires. This study attempted to test the hypothesis of context effects. No evidence consistent with the hypothesis was found.

Snel, F. W., P. C. van der Sijde and B. Millar. Laying-on-of-hands and enzyme activity. *Journal for the Society for Psychical Research*, 1998; 63: 99-109. Test of the ability of psychic healers and ordinary subjects to affect enzyme activity. The results are somewhat mixed.

Steinkamp, F., J. Milton and R. L. Morris. A meta-analysis of forced-choice experiments comparing clairvoyance and precognition. *Journal of Parapsychology*, 1998; 62(3): 193-218. This study pools and analyses data from studies published in parapsychology journals from 1935-1997 that compared precognition and clairvoyance under relatively similar conditions. The results from tests of precognition and clairvoyance were both statistically significant, but no evidence was found to support the hypothesis that clairvoyance works better than precognition. No evidence in favour of various "psi conducive moderator variables" was also found.

Tamney, J. B. and S. D. Johnson. Christianity and public book banning. *Review of Religious Research*, 1997; 38(3): 263-271. This study found that support for the banning of books from public libraries is related to fundamentalism, an unease with modernity and a fear of moral decay.

Thalbourne, M. and R. O'Brien. Belief in the paranormal and religious variables. *Journal of the Society for Psychical Research*, 63: 110-122. Presents new data and reviews a number of other studies. Concludes that, overall, "the 'true' association between paranormal belief and each religious variable is probably positive but usually small, and thus that religiosity is only a minor correlate of belief in the paranormal".

Victor, J. S. Moral panics and the social construction of deviant behavior: a theory and application to the case of ritual child abuse. *Sociological Perspectives*, 1998; 41(3): 541-565. This article proposes (1) criteria for the identification of moral panics; (2) models of the social conditions that cause moral panics and the social construction of ideas of deviance; (3) hypotheses regarding the social mechanisms that transmit moral panics between different societies. Its theoretical arguments are illustrated by the case of contemporary allegations of ritual child abuse by Satanic cults.

Zola, S. M. Memory, amnesia, and the issue of recovered memory: neurobiological aspects. *Clinical Psychological Review*, 1998; 18(8): 915-932. Discusses the biological and behavioural findings relating to such questions as: how memory works; whether memories for traumatic events change over time; and whether false memories can be created? Amongst other things, argues that memory is subject to error and distortion, and that subjectively compelling memories can be false.

Further Reply to Dónal O'Mathúna

By Steuart Campbell

Steuart Campbell is a science writer and a member of ASKE.

May I respond to Dónal O'Mathúna's reply to me in the *Skeptical Intelligencer* Vol. 3(2)? He rebuts my claim that no religion permits its followers to question its teaching by referring me to *Deut.18:22*, where the Israelites were told (by whom?) that they should not listen to a prophet whose prophecies did not come true. Of course this is a separate matter from teaching; prophecies are not concerned with teaching. In fact, considering the vague nature of most Old Testament prophecies, it is extremely difficult to tell whether or not they have been fulfilled. Consequently the warning is practically valueless.

Dr O'Mathúna also refers me to *1 Cor.14:29*, as if this verse concerned the questioning of teaching. The word translated as 'judge' (*diakrinetosan*) means 'discern', 'distinguish' or 'discriminate'. Consequently Paul is telling his readers to distinguish between those who prophecy and not to let them all speak at once (see vv. 30/31). There is no suggestion of questioning teaching.

O'Mathúna's reference to *1 Cor.15:6* appears irrelevant to this debate. Whether or not 500 people saw the resurrected Jesus (itself unlikely and something which Paul cannot have known) has no bearing on the Church's teaching being questioned.

The only hint of any check on Paul's teaching occurs in *Acts 17:11*, where the Berean Jews searched their scriptures to see if what Paul told them was true, although this can only have been in the context of alleged Messianic references, themselves of dubious validity. There is no justification for claiming that Early Christianity tolerated or encouraged questioning of its teaching. Other religions are similarly intolerant.

If O'Mathúna is asking if I believe that adherence to religious faith indicates a lack of critical thinking, then the answer is certainly 'Yes'. No one who has not questioned the fundamental tenets of their religion can claim to be a critical thinker. Yet it is a *sine qua non* of religion that its tenets should be accepted without question. I am certain that no religion can withstand truly critical questioning. On the other hand, science, which I agree is no certain path to truth, can usually withstand a great deal of criticism. The tenets of science which have withstood such criticism are taken as the nearest approximation we have to truth. Without criticism, religion cannot claim to possess truth; with criticism, it collapses.

A new reply to O'Mathúna

By Gerald Huber

I have a short note on Dr. Dónal O'Mathúna's *Reply* in the *Skeptical Intelligencer* Vol 3(2)

Dr. O'Mathúna writes that the Israelites were told to test any prediction made by a prophet. For example, the prophet Jona predicted the destruction of Ninive, as the God had ordered him to do. However, after the people started to repent, God reversed his

decision and did not destroy Ninive. As one can see, the prediction made by Jona was not falsified by this, because the *real* prediction obviously was that Ninive would only be destroyed if God should not finally decide the other way - which he just happened to do.

Unfortunately Jona seemingly forget to relate the exact wording of this prediction to the people of

Ninive, just as God forget to relate it accurately to Jona.

Dr. O'Mathúna also thinks that under *1 Cor* 14:29 Christians should "pass judgement" on what they hear in church meetings. The biblical stipulation, however, refers to members of the meeting who are speaking in tongues or are making prophecies, and not to any dogma put forward by Paul. Of course, outside of the dogmas there are questions which are open to discussion in all known religions of the world.

Dr. O'Mathúna next points out that Paul insists that there were hundreds of eyewitnesses. Actually, however, Paul wrote that the Lord appeared to this number of people, and was not speaking about eyewitnesses in the way the word is understood today but about visions as well. Anyway, I fail to see the relevance of this aspect of the Bible. Just because a claim is made that eyewitnesses have existed, how does this show that one is invited to test that claim?

Finally, Dr. O'Mathúna puts forward Paul's assurance that the Christian faith would be in vain if Jesus had not really died and been raised from the

dead. However, I fail to see how he comes to the conclusion that Paul was proposing a test of the historical reliability of these occurrences. What Paul does here is just make it clear to his audience that the resurrection is a dogma of the Christian church. If it was not true, then the faith build on it would not be true. This is of course so simply by definition of what a dogma of a faith is. Saying "X is valid only if Y is valid" is obviously different from saying "Go out and test Y before you believe X". But even if we could properly assume that Paul wanted his listener to do a test of whether the resurrection really had occurred, I wonder how this could have been done. Allegedly Jesus had already ascended to heaven, which was after all quite common for the super-heros of those days such as Heracles or Appolonius. Presenting a text well within the bounds of the common mythology of his day, Paul's speech was probably as research-stimulating as today's sermons are to the church-attendees.

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