

## MIND AND MIRACLES

by Ilkka Pyysiäinen

*Abstract.* Miracles are real or imagined events that contradict our intuitive expectations of how entities normally behave. Miracles in the weak sense are unexplained counterintuitive events. Miracles in the strong sense are counterintuitive events we explain by referring to the counterintuitive agents and forces of various religious traditions. Such explanations result from the fact that our minds treat half-understood information by carrying out searches in the memory, trying to connect new information with something already known. This is cognitively the most economical way of dealing with new information: we obtain the maximum of relevance at minimal processing cost.

*Keywords:* cognitive science; counterintuitiveness; domain specificity; evolutionary psychology; intuitive ontology; miracles.

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Whether miracles in fact occur is a question of perennial fascination. Debates over the issue, however, have usually not led to any agreement, partly because it has not been made clear what exactly is meant by a *miracle*. In this paper, I put forward a theory of miracles that I hope will clarify what is at issue. I am not proposing a new definition of the concept but rather am trying to construct a theory that explains why we have this concept and what kinds of events are considered miraculous. I do not focus on theological, philosophical, or parapsychological aspects of the possibility of miracles, although I touch briefly upon the question of why people believe in them. My focus is on how the concept of a miracle has found its way into the cognitive architecture of the human mind, on why we have this

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[*Zygon*, vol. 37, no. 3 (September 2002).]

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persistent inclination to consider some things miraculous. In other words, I am not trying to explain how it is possible for a miracle to happen in external reality; what I am concerned with is how the human mind is capable of representing certain events and phenomena as miraculous.

#### INTUITIVE KNOWLEDGE

It is often thought that miracles are events that take place against the laws of nature, with "laws of nature" here understood in a scientific sense. In other words, something happens that according to the (known) laws of nature absolutely should not happen. This is problematic, however, as people with no knowledge of science yet can believe in miracles. This in turn requires that they be able to form the concept of a miracle and also to recognize an event as being miraculous. Thus, it cannot be a defining characteristic of miracles that they happen against the laws of nature.

Discarding the definition of miracles as events that are impossible and inconceivable from the scientific point of view leaves us with an alternative idea: miracles are events that contradict our everyday intuitive expectations of how people, living things, and physical objects usually behave. This, however, sounds suspicious, because anthropologists have convinced us that no such universal intuitions exist. All knowledge is culture-specific and socially constructed. What is regarded as miraculous in one culture may thus seem perfectly natural in another.

Such relativism, however, is no longer a viable option. Recent findings in evolutionary psychology, cognitive science, and developmental psychology strongly suggest that (1) totally unguided learning, with no built-in bias, is impossible; (2) certain aspects of culture are not at all transmitted but are simply inferred by subjects from certain outputs; and (3) culture can well be conceived of as the "precipitate of cognition and communication in a human population," that is, as an abstract summary of what many individuals have in mind. Besides mental representations, there are also such public representations as works of art, or texts. These are expressions of mental representations, which in turn are interpretations of public representations. Knowledge acquisition is essentially inferential: we do not merely mechanically encode and decode messages, but we provide material tokens (words, for example) of our intentions, while others try to infer our intentions from these tokens (Sperber and Wilson 1988; Tooby and Cosmides 1995; Boyer 1994b; 1998; 2000; 2001b; Sperber 1996; Elman et al. 1998; Atran 1998.)

This suggests that all human beings share, from very early age, some intuitive, noncultural knowledge of visible reality and of themselves. It is intuitive in the sense of being tacit knowledge, which is used spontaneously in practical reasoning without our necessarily being aware of it. We have this knowledge because the material environment we live in is to

some extent everywhere the same; this in turn has shaped our brains and cognitive “machinery” so that they are to some extent similar. This is not to say that the material environment has primacy over our brains or to suggest that the reverse is the case. It is rather that our brains and the external reality have coevolved and thus have shaped one another in a process of interaction (Varela, Rosch, and Thompson 1996; Elman et al. [1996] 1998).

This intuitive knowledge is structured as genetically specified and innate, specialized cognitive modules that process information in a domain-specific manner (see Atran 1998; Sperber 1994), or as folk theories that are also in some sense innately triggered (Carey [1995] 1996; 1996; Gopnik and Wellman 1996; Gopnik and Meltzoff 1997). Things can be innate in (at least) three ways. First, on the level of representations, knowledge may be innate in the form of patterns of synaptic connectivity at the cortical level; this, however, is a relatively rare phenomenon. Second, the specific architecture of the brain may be innate at the level of the individual neuron, the local cortical architecture, or the global architecture of the brain. Third, there may be innate constraints in the developmental schedule, in the sense that a given solution may not be encoded from the start but is guaranteed to appear at some point as an inevitable result of brain development (Elman et al. 1998, 22–35, 360–61).

Being innate, intuitive knowledge forms the bias that makes it possible for us to acquire new knowledge from our environment (it is like the ROM that makes a computer function). This innate knowledge also allows us to infer knowledge that is not explicit. If for example I hear someone saying that the *knoffs* are tired and the *treesups* need to be repaired, I immediately assume that *knoffs* can also be hungry and that *treesups* may be made of steel but not the other way around, even if I have not explicitly been given any such information about *knoffs* and *treesups*. In like manner, if I am told in a foreign culture that some god, previously unknown to me, is keeping an eye on me, I will also presuppose that this god will not immediately forget what he or she sees (whether I believe in his or her existence or not), together with a host of other things. In other words, I will tacitly assign this god to the category of persons with some counterintuitive properties and will thus be able to infer many things concerning him or her, even if they are never explicitly reported to me. This is what is meant by knowledge that is never explicitly transmitted but that we nevertheless acquire. The idea of “exhaustive cultural transmission” is simply false: all knowledge is not acquired through explicit transmission (Boyer 1993; 1994b; 1996a; 2001b).

It is beyond reasonable doubt that all human beings share intuitive knowledge concerning at least physical objects, natural kinds (plants and animals), and persons. We know that certain physical explanations apply to physical objects, living kinds, and persons alike (for instance, one cannot

pass through them). We know that (folk-)biological explanations apply to living kinds and persons (e.g., they have nutritional needs). Finally, we know that intentional explanations apply to animals and persons (they act according to their beliefs and desires) (Boyer 1998; 2001a, b; Barrett 2000). With this in mind, we are now well equipped to tackle the question of miracles as contradicting universal human intuitive expectations.

#### MIRACLES AS COUNTERINTUITIVE PHENOMENA

Human beings are also capable of forming counterintuitive representations. Such fluidity of the human mind is sometimes celebrated as the foundation of our culture: We are not constrained by the here and now, the concrete and the tangible, but we can store images of bygone events, imagine distant futures, construct possible worlds by the power of imagination, lie, and use figurative language—all because we have the ability to transcend the boundaries of such cognitive domains as those of physical objects, natural kinds, and persons (see Mithen [1996] 1998).

This, however, should not be taken to mean that the human mind is now free from all kinds of constraints. The intuitive ontologies are still in place, despite the fact that under certain circumstances we are capable of forming representations that violate *some aspect* of these ontologies. There are two ways in which such counterintuitiveness can be produced. We can violate intuitive expectations either by denying to an entity some property it intuitively should have or by transferring to an entity a property it intuitively should not have. For example, ideas about ghosts violate assumptions about solid objects that appear in the first six months in the developing child; paintings or statues having psychological properties, such as the ability to hear prayers, go against preschoolers' expectation that artifacts are not agents; and various kinds of miraculous metamorphoses violate essentialist principles tacitly used by preschoolers. In such counterintuitive representations all other characteristics of the entity in question remain intact. A person without a body is still a person, with the properties of a person, for example. This person is merely invisible and intangible because he or she does not have a body (Boyer 1994b, 91–124; 1996a; 2000; Boyer and Walker 2000, 144).

From the cultural point of view, it is important that optimally counterintuitive representations seem to be culturally the most successful. “Optimally” here means that a representation involves only a single violation or transference, with its other aspects remaining intuitive. “Cultural success” means that such representations are highly likely to become widespread because they are attention grabbing and memorable. Because they are effectively recalled, they are also more likely to be reported to others. That they are thus memorable and tend to survive in transmission has been shown by empirical experiments carried out by Justin L. Barrett and Melanie

A. Nyhof (2001) and Pascal Boyer and Charles Ramble (2001) in different cultural contexts. Their counterintuitiveness makes such representations interesting and thus easy to remember, while their intuitive aspects make them easy to represent and apply in reasoning. It would be much too difficult to represent, let alone remember and apply in on-line reasoning, the idea of a “cat that can never die, has wings, is made of steel, experiences time backwards, lives underwater, and speaks Russian” (Barrett 1998, 611).

Boyer argues that optimally counterintuitive representations constitute the category of “religious ideas” and that a concept that confirms only intuitive ontologies is ipso facto nonreligious, although counterintuitiveness as such is not a sufficient criterion for religion (Boyer 1994a, 408; 1994b, 122, 124). Yet there is no domain specialization in religious thinking, in the sense that there is no distinct domain of “religious cognition” (Boyer 1996b; 1999, 68; Boyer and Walker 2000, 151–53). Thus, religion is typified by counterintuitive representations, although it is not possible to draw hard and fast lines between religious, fictional, magical, and other kinds of counterintuitiveness. Another option is to argue that a counterintuitive representation is religious when it is the object of serious belief, is shared by a group of people, and is used in life management both individually and socially (Pyysiäinen 2001; 2002; Boyer and Walker 2000). Furthermore, religions seem to favor in particular counterintuitive representations of *agents* rather than mere mechanical counterintuitiveness (Lawson 2001). Whether such agents actually exist and work miracles is a question it is not necessary to resolve in the context of the present theory. It may, however, be important to realize that, although for a believer it is often intuitively natural that some counterintuitive agent(s) exist(s), it still is against his or her intuition that a person, for example, not have a body: persons *in general* have bodies. Thus, although gods and other counterintuitive agents are exceptions to what is intuitively expected, beliefs concerning them may nevertheless become totally routinized (Boyer 1996a, 93; 2001b, 65; Boyer and Walker 2000, 134).

As should by now be clear, my argument is precisely that miracles are counterintuitive phenomena. An event or a phenomenon is miraculous to the extent that it violates our intuitive ontological expectations. However, even quite ordinary events and phenomena may be considered miracles, in the sense that they may be interpreted as brought about by some counterintuitive agent, such as God. In that case the supposed cause is counterintuitive although the effect is not, and the event or phenomenon in question may appear miraculous only to those who share the belief in the counterintuitive cause (see Pyysiäinen 1999; Boyer 2001b, 12–13). This may even be quite an important aspect of miraculousness as it is understood in modern theologies. In folk religion it is more typically the effect (some event or phenomenon) that is counterintuitive, attention grabbing, and memorable, and therefore comes to be classified as a miracle. Following

Barrett (2000), we could construct a catalogue of the possible types of miracles by cross-tabulating the basic ontological categories and the possible violations that produce miraculousness. Table 1 is a much-simplified adaptation of Barrett's chart.

Ontological category	Psychological violation	Biological violation	Physical violation
Person	An omniscient person	A monk who needs no food	A guru who can go through walls
Living kind	A donkey that talks	A flying kangaroo	An invisible cow
Solid object	A statue that hears prayers	A painting that grows	A rock that can be in two places at once

**Table 1.** A catalogue of the counterintuitive.

It is important to realize that miraculous events and phenomena can be either real or imagined, although it is not always possible to decide to which category a given miracle belongs. Many events and phenomena may appear miraculous to us because we have not developed intuitions about the mechanisms that produce them. Celestial phenomena, such as eclipses, are one good example. Another is provided by phenomena that science has only recently revealed to us, such as quantum-physical phenomena. Yet these are usually considered real and not just imagined events.

Imagined miracles could in principle be of any kind; actually, however, they seem to repeat certain common patterns, just as the bizarre elements in our dreams have certain constraints and thus are not completely arbitrary (Revonsuo 1995, 147–59; Revonsuo 2001; Boyer 2001b, 61–68). As Boyer (2000) emphasizes, the human mind is after all not that fluid, and our attention is selectively drawn to such phenomena as seem to be the most relevant for us. Relevant information is such that we are able to perceive some connection with it and the knowledge we already possess. We can combine it with our existing knowledge and thus be able to form new premises, which allow for new inferences (Sperber and Wilson 1988, 46–50, 118–71). Thus not all counterintuitive phenomena have equal inferential potential. We can draw far more inferences from the representation of a person without a body than, for instance, from the representation of a rock that is invisible on Wednesdays. Such inferential potential can be theoretically expected to enhance the cultural success of a represen-

tation. Another factor is the ease with which we can form and maintain a representation; ideas too difficult to represent may not become widespread. I therefore hypothesize that miracles such as Barrett's winged cat that speaks Russian are virtually nonexistent in folk narratives.

What is needed to confirm these hypotheses is empirical research in folk traditions as well as psychological experiments on the way we actually process counterintuitive information. The third volume of Stith Thompson's (1955–58) motif index of folk tales, classifying marvels, provides a good starting point for folkloristic research, and Barrett and Nyhof's (2001) and Boyer and Ramble's (2001) experiments provide apt models for empirical research.

#### WEAK AND STRONG SENSE OF *MIRACLE*

It is evident that many things happen that run counter to our intuitive expectations. When we cannot connect information concerning them with anything we know and thus cannot imagine any possible source of explanation, we take them to be in some sense miraculous. They just happen, and we do not know how. This I call miraculousness in a weak sense.

As Dan Sperber and Deirdre Wilson (1988, 48) note, when a piece of information is entirely unconnected with anything in an individual's representation of reality, it can only be added to this representation in isolated bits and pieces; this usually means too much processing cost for too little benefit. Therefore we either discard such information altogether or process it symbolically (Sperber 1995), trying to find a relevant place for it in memory, to connect it in a random fashion with something already known. A cognitively economical way of doing this is to connect together all representations that are counterintuitive and difficult to understand. Such items are saved in the same file in memory, as it were, because they share the same crucial feature of being difficult to understand. A typical example of such cognitive processing is the pervasive idea that there must be some profound connection between quantum mechanics, the puzzle of consciousness, and "mysticism" (Capra 1975; Zohar 1990; *Journal of Consciousness Studies* 1994).

This presupposes the existence of a special metarepresentational mechanism of the mind, the input of which consists of the conceptual output of other modules; it processes concepts of concepts, not unmediated perceptions. Any belief thus processed is metarepresented in the validating context of some other beliefs. I can, for example, believe that "Peter believes that 'grandma's recovery from cancer was a miracle,'" where "Peter believes" is the validating context, and "grandma's recovery from cancer was a miracle" is a metarepresented belief, which I am not necessarily capable of fully understanding (Sperber 1994; 1997; 2000.)

In this perspective it is very understandable that “weakly” miraculous events and processes are often connected to those counterintuitive representations that we already possess. I call miraculous in the strong sense those weakly miraculous events and phenomena that are given an explanation or interpretation employing the counterintuitive representations present in one’s database (other than scientific ones). Such explanations are powerful in the sense that they are impossible to refute with reference to empirical observations. Beliefs such as “God loves the world” can be made compatible with any state of affairs we can imagine (Flew 1972) and yet are not necessarily meaningless (see Hare 1963). (Note that the counterintuitive representations used can be either religious or nonreligious. However, I do not further discuss this distinction.) The idea of miracles in the strong sense thus is the product of our way of processing half-understood information in as economical a way as possible. Whether this idea also correctly describes reality is a separate question that usually is not of any immediate relevance for everyday thinking.

#### BELIEF IN MIRACLES

When counterintuitive forces or agents are presented as folk-theoretical explanations of miracles, it is always the case that believers cannot specify those mechanisms whereby counterintuitive forces or agents bring miracles about. If they could, the miraculous events and phenomena would seem much less miraculous. In fact, we would then be dealing with a situation similar to the case of science: a given mechanism can be specified but is difficult to understand. And, if it were easy to understand, there would be no miracle at all.

It is for this reason that scientists argue that the reality of miracles in this strong sense has not been established, because it is not clear what exactly (that is, what kind of mechanism) is supposed to be established. All a scientist can say is that things may happen that we currently cannot explain. Scientists also can study the possibility of miracles in the weak sense; in such cases the scholar is trying to explicate the causes and mechanisms that produce exceptional phenomena that seem to contradict our present scientific knowledge.

The possibility of miracles in the strong sense, on the other hand, is a theological question: how do various counterintuitive beings bring miracles about? (See Swinburne 1996; Brown 1984.) Naturally, scientists also may believe in miracles in the strong sense, because even scientists have to confront the practicalities of everyday life. As human individuals they necessarily hold various un- and nonscientific beliefs. As Martin Hollis (1983, 72) puts it, “Mankind could hardly survive without beliefs which are incoherent, unlikely, disconnected, and daft.” An argument is not scientific simply because it is presented by a scientist.



In everyday thought a mere lack of scientific explanation is often regarded as evidence for the reality of miracles in the strong sense, however. Ordinary thinking and scientific thinking clearly operate on different principles. Ordinary, everyday thinking proceeds from the immediate experience of individuals; it aims at short-term, practical efficacy, not at creating general theories; it seeks evidence and not counterevidence; it makes use of individual cases as evidence and personalizes values and ideals; it makes use of abductive inference; and its argumentation often takes narrative form. Experiential everyday theories of reality, like scientific theories, serve the purposes of organizing the data of experience and guiding behavior. Whereas the subject matter of scientific theories consists of data that are theoretically organized, however, the subject matter of experiential theories emerges from the experiences of everyday life. Whereas the scientist pursues understanding and theoretical explanation, experiential theories are applied by people trying to go about their daily lives in an emotionally satisfying way (Epstein 1990; Oatley 1996).

But why, then, is the reality of miracles taken for granted in everyday contexts? One answer is that stories about miracles attract attention and therefore are culturally successful. They are memorable and interesting, and we like to spread them. And, because we thus use them, they come to be regarded as true. They are also such that if they were true, they would have rather dramatic consequences for us. Who would not be fascinated by the ideas of true miraculous cures or the miraculous accumulation of wealth? In everyday thinking we do not treat the question of the truth of miracles as a metaphysical problem in need of a rational solution. Rather, we adopt a more practical stance and think about what would follow if miracles were possible. Surely the world would be a much more interesting place. So why not believe? What do we have to lose? Why should a layperson believe the scientist rather than the priest or the guru, if the latter's arguments are easier to process and more useful in everyday life management? The question of belief in everyday contexts cannot be separated from the question of use (see Boyer 2001b, 29–31, 297–330). We apply the concept of miracle as a premise in practical reasoning, without considering that we are thus employing an epistemic attitude that can be generalized to include all similar cases.

It is also possible to use beliefs about miracles to support various ego-centered and denominational goals. Believing that one has been the object of a divine miracle makes one feel important and special; claiming that in this particular religion, sect, or denomination miracles are possible makes the faith in question an attractive choice and bolsters the authority of its leaders.

## CONCLUSION

The concept of miracle is based on the way our cognition works in relation to external reality. Every now and then we encounter events and phenomena, and hear stories of such events and phenomena, that contradict our intuitions. When such events and phenomena are not simply left unexplained but instead are connected to our already existing beliefs about counterintuitive agents and forces, the result is the idea of a miracle in the strong sense of the term. I hypothesize that such cognitive processing occurs even in cultures in which no *explicit* concept of miracle exists, because miracles are exceptions to panhuman intuitions.

In addition to the cognitive universals discussed, mainstream Western attitudes toward miracles have two other sources. First of all, the Roman Catholic Church especially has been interested in distinguishing between genuine miracles of God and other types of counterintuitive phenomena (such as hallucinations and psychotic episodes). A genuine miracle must stand the test of critical examination. Thus, the distinction between genuine and false miracles has been made widely known. Second, the development of science, and its subsequent tremendous success story, has made educated Westerners highly sensitive to the question of the possibility or impossibility of miracles. Whether we accept or reject the possibility of true miracles, we seldom question the principal authority of science in this matter. Scientific or quasi-scientific arguments have been used both to defend and to refute the possibility of miracles in the strong sense (there is no debate about miracles in the weak sense). Given that scientific concepts and theories also often contradict our intuitive expectations (see McCauley 2000), it is easy to take the authority of science with regard to the truth of miracles as one more instance of the principle that we have an inclination to connect miracles in the weak sense with the counterintuitive representations we entertain, even when we cannot fully understand what this connection actually consists of.

We hold the concept of miracle in the strong sense for the following combined reasons: (1) because some real events contradict our intuitive expectations; (2) because we are able to form counterintuitive representations and store in mind half-understood and metarepresented information; (3) because such representations fascinate us, evoke emotions, and therefore are culturally successful; and (4) because our minds are equipped with a symbolic mechanism that treats half-understood information by carrying out searches in the memory, trying to find old representations that fit with the acquired and partly incomprehensible new representations. This in itself is not to say anything about the possibility of miracles in the strong sense—that is, about the question of whether some counterintuitive forces and agents, not presently recognized by science, in fact do manipulate known reality in miraculous ways. Such questions cannot be

decided by any purely scientific arguments because of the very nature of the problem. Yet science can contribute to the problem of miracles by providing explanations not only with regard to the behavior of external reality but especially with regard to our ability to represent and understand reality. It is from this latter point of view that I have here approached the concept of miracle.

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