

Myths persist in
modern culture
because of the
brain's biological
need to impose
order on the world

Likely Story

By
Klaus
Manhart

What is the best way to seduce a virgin so that neither she—nor your wife—notices? The Greek god Zeus devised a crafty plan after he observed the lovely Princess Europa gathering flowers by the sea and was immediately overcome by desire. Zeus took the form of a bull and walked gently over to Europa and let her pet him. ⚡ The bull seemed so peaceful to Europa that she trustingly climbed on his back—whereupon the animal plunged into the sea, absconding with the lady. After arriving at a far-off shore, Zeus transformed himself into a young man and appeared to Europa, promising to protect her forever in this new land, which he named in her honor. The ruse worked, and the couple had three sons together. ⚡ It seems the Greek gods could not do without a little heartache and intrigue now and then. Cloud-shrouded Mount Olympus was a sort



ZEUS
Supreme God

Rewarder of good and punisher of evil, Zeus ruled from Mount Olympus with law and the power of thunderbolts.



DEMETER
Goddess of
Fertility

Sister and mistress of Zeus, Demeter brought fertility to women and bountiful harvests to land.

GINA GORNY

of soap opera world. Its deified inhabitants set all kinds of traps for one another. They showed weakness, particularly for the beauty of the opposite sex. They also formed ad hoc alliances and fought and even killed in pursuit of their own interests. The gods were anything but perfect. Their human qualities go a long way toward explaining why myths from ancient Greece and elsewhere satisfy us to this day: if gods had hu-

90,000 years ago—whereas others have argued that Neandertals also may have developed a system of myths and religious beliefs.

Of course, the mythical systems of different human cultures vary greatly. But they all contain answers to the same fundamental questions. This was the conclusion reached by American myth researcher Joseph Campbell before his death in 1987. For decades, Campbell looked for common

Myths of different cultures all probe similar enigmas: life and death, creation and destruction.

manlike failings, then we humans can convince ourselves that we are capable of being godlike.

But there must be more to our attraction. Why is it so easy for us to buy into such mythology? In part, because certain functions of our brain insist on imposing order and purpose on our otherwise puzzling surroundings. No matter how rational and enlightened we attempt to be, our brains cannot resist the urge to embrace metaphysical relations.

Explain the Unexplainable

Myths are much more than soap operas. The earliest cultures used these fabulous stories to try to explain the mysterious natural phenomena that determined their existence. Ancient Egyptians conjured up hundreds of divinities who controlled the destiny of the Nile River and its peoples. The river's water, and its annual floods, embodied their ideas about creation, death and rebirth. According to beliefs of that era, the primeval ocean Nun filled the entire universe when life began. Just as the gods created life from Nun's waters, the flooding of the Nile left behind fertile wetlands that wondrous plants and animals colonized.

Initial forms of spiritual and religious practice trace back at least 40,000 years to a period many scholars associate with the emergence of modern human behavior [see "The Morning of the Modern Mind," by Kate Wong; *SCIENTIFIC AMERICAN*, June]. Numerous cave paintings and carvings from this period suggest that these people believed in powerful, supernatural forces, which they hoped to influence in their favor. Based on findings at archaeological sites such as Qafzeh in Israel, some researchers suggest that anatomically modern humans were taking part in burials and other rites even earlier—more than

motifs among a wide array of legends and religions from both ancient and modern societies, including Greek, Roman, Egyptian, Asian and Nordic.

Three qualities emerged: First, a myth involves an existential question about death, birth or the creation of the world. Second, a myth contains human conundrums raised by unbridgeable contradictions—creation versus destruction, life versus death, gods versus humans. Third, a myth attempts to reconcile these opposite poles, to allay our fears.

Brain Needs a Story

Over time, mythical stories become anchored in beliefs and religions, and today they continue to influence how people live and understand the world. The lore becomes a fundamental part of our cultural makeup, which is one reason why it persists, even in progressive and highly technological societies.

But perhaps there is more to the tale. In the late 1990s radiologist and religion researcher Andrew Newberg and psychiatrist Eugene G. d'Aquili, both then at the University of Pennsylvania, set out to find the wellspring of religious feelings in the brain. In 2001 Newberg published their groundbreaking results (d'Aquili had since passed away), based on monitoring the brain activity of meditating Buddhists and praying Franciscan nuns. As soon as their test subjects were in a deep state of religious contemplation, the researchers recorded drastically reduced activity in a particular part of the parietal lobe. This region

(The Author)

KLAUS MANHART is a sociologist, philosopher of science and freelance writer in Munich.

is responsible for spatial orientation and one's sense of body; it makes us conscious of where our own body ends and the rest of the world begins, so that we can clearly distinguish between ourselves and everything else.

Newberg and d'Aquili postulated that religious feeling must have a neurological basis, because the lack of neuronal firing in this parietal region seemed to be associated with a sense of spiritual ecstasy. They concluded that religious impulse—an urge for metaphysical experience—was engraved in the brain.

Other researchers have found that myths seem to have another biological foundation. In contrast

brain regions become involved. Together the eight operators regulate the work of the human mind. Though still being debated, this scheme is gaining more acceptance.

The causal operator interprets reality as a chain of causes and effects. If the doorbell is ringing, someone is probably at the door. If it is raining, the street will be wet. The causal operator drives our curiosity and motivates us to decipher the mysteries around us. It enables us to develop empirical explanations for natural processes but also tries to create a cause-and-effect relation for metaphysical riddles such as death and the creation of the universe. People with certain types of

(The brain's parietal lobe insists on conjuring up a cause and effect for metaphysical riddles.)

to animals, humans have a capacity for abstraction, which allows us to imagine threats in advance. Physiological fear responses can be triggered simply by picturing a danger, which prepares the body for "fight or flight." This same ability enables us to make sense of suffering and even of death. For example, we can rationalize that the pain of an immunization shot is worthwhile for the greater good of never catching measles.

Bringing such observations together, d'Aquili coined the term "cognitive imperative" to describe this sense-making function of the brain. We have a biologically conditioned desire for order and sense. We simply cannot encounter situations and processes without ascribing purpose to them. Psychologists Michael E. McCullough of the University of Miami and the late David B. Larson, then at the National Institute for Healthcare Research, extended this concept to what they call ontological yearning—the need to understand the fundamental nature of our world rather than simply accepting it as is. According to this hypothesis, the cognitive imperative forces our brain to think unceasingly—and so we cannot help but make up stories and myths to account for the mysteries around us.

Cosmic Cause and Effect

The ability to conjure explanations for phenomena is a capacity that Newberg terms the causal operator. It is one of eight general, analytical functions of the brain, which Newberg and d'Aquili termed cognitive operators. When an operator is active, several, often widely separated

brain damage cannot trace even the simplest events to their causes.

The other seven cognitive operators give a context for how and why the causal operator can emerge from our brain. The holistic operator allows us to see the world as a whole. With its help, we immediately and effortlessly understand a configuration of leaves, branches and twigs to be a tree. The holistic operator is based on activity in the right parietal lobe. The reductionist operator works in reverse; it makes it possible for us to break a whole into its component parts and is mainly based in the more analytical left hemisphere. The abstractive operator derives general concepts from individual facts. For example, it enables us to classify dachshunds, collies and cocker spaniels under a single rubric: dogs. Recent imaging studies indicate this function is based in the left parietal lobe.

The existential operator gives us the feeling that data coming from our senses and processed by the brain have a basis in reality. This function is most likely based in the limbic system. The emotional operator lies there, too. It links perceptions to feelings and underlies our ability to think and judge rationally.

The quantitative operator estimates size, quantity, time and distance and calculates mathematically. The binary operator helps us invoke order among the most varied phenomena in our environment. To perform this function, it meters space and time in terms of opposites: up and down, left and right, inside and outside, before and after. The binary operator is located in the



ARES
God of War

Son of Zeus and Hera, Ares took pleasure in bloodshed. Soldiers dedicated their weapons to him before each campaign.

lower parietal lobe; patients with damage to this area can no longer identify the opposites of words or objects.

For Newberg and d'Aquili, the binary operator plays a crucial role in forming and perpetuating myths. It helps us reduce complex situations. It supplies us with a quick and simple heuristic for orienting ourselves, by constructing the central elements of myth: good and evil, birth and death, heaven and earth, isolation and integration.

Expanding the connection between cognitive operators and belief systems, Newberg and other researchers maintain that certain areas of the brain play a crucial role in religious experience.

Although this view continues to be controversial, it does seem clear that the ability to think in terms of cause and effect would not be possible without a particular functional structuring of the parietal lobe. In all probability, human beings seek explanations for the mysteries of the world simply because the brain has that capacity. **M**

(Further Reading)

- ◆ **The Power of Myth.** Joseph Campbell, with Bill Moyers. Anchor, 1991.
- ◆ **Cerebral Blood Flow during Meditative Prayer: Preliminary Findings and Methodological Issues.** Andrew Newberg et al. in *Perceptual and Motor Skills*, Vol. 97, No. 2, pages 625-630; 2003.