

WHILE many institutions collapsed during the Great Depression that began in 1929, one kind did rather well. During this leanest of times, the strictest, most authoritarian churches saw a surge in attendance.

This anomaly was documented in the early 1970s, but only now is science beginning to tell us why. It turns out that human beings have a natural inclination for religious belief, especially during hard times. Our brains effortlessly conjure up an imaginary world of spirits, gods and monsters, and the more insecure we feel, the harder it is to resist the pull of this supernatural world. It seems that our minds are finely tuned to believe in gods.

Religious ideas are common to all cultures: like language and music, they seem to be part of what it is to be human. Until recently, science has largely shied away from asking why. "It's not that religion is not important," says Paul Bloom, a psychologist at Yale University, "it's that the taboo nature of the topic has meant there has been little progress."

The origin of religious belief is something of a mystery, but in recent years scientists have started to make suggestions. One leading idea is that religion is an evolutionary adaptation that makes people more likely to survive and pass their genes onto the next generation. In this view, shared religious belief helped our ancestors form tightly knit groups that cooperated in hunting, foraging and childcare, enabling these groups to outcompete others. In this way, the theory goes, religion was selected for by evolution, and eventually permeated every human

society (*New Scientist*, 28 January 2006, p 30)

The religion-as-an-adaptation theory doesn't wash with everybody, however. As anthropologist Scott Atran of the University of Michigan in Ann Arbor points out, the benefits of holding such unfounded beliefs are questionable, in terms of evolutionary fitness. "I don't think the idea makes much sense, given the kinds of things you find in religion," he says. A belief in life after death, for example, is hardly compatible with surviving in the here-and-now and propagating your genes. Moreover, if there are adaptive advantages of religion, they do not explain its origin, but simply how it spread.

An alternative being put forward by Atran and others is that religion emerges as a natural by-product of the way the human mind works.

That's not to say that the human brain has a "god module" in the same way that it has a language module that evolved specifically for acquiring language. Rather, some of the unique cognitive capacities that have made us so successful as a species also work together to create a tendency for supernatural thinking. "There's now a lot of evidence that some of the foundations for our religious beliefs are hard-wired," says Bloom.

Much of that evidence comes from experiments carried out on children, who are seen as revealing a "default state" of the mind that persists, albeit in modified form, into adulthood. "Children the world over have a strong natural receptivity to believing in gods because of the way their minds work, and this early developing receptivity continues to anchor our intuitive thinking

throughout life," says anthropologist Justin Barrett of the University of Oxford.

So how does the brain conjure up gods? One of the key factors, says Bloom, is the fact that our brains have separate cognitive systems for dealing with living things – things with minds, or at least volition – and inanimate objects.

This separation happens very early in life. Bloom and colleagues have shown that babies as young as five months make a distinction between inanimate objects and people. Shown a box moving in a stop-start way, babies show surprise. But a person moving in the same way elicits no surprise. To babies, objects ought to obey the laws of physics and move in a predictable way. People, on the other hand, have their own intentions and goals, and move however they choose.

Mind and matter

Bloom says the two systems are autonomous, leaving us with two viewpoints on the world: one that deals with minds, and one that handles physical aspects of the world. He calls this innate assumption that mind and matter are distinct "common-sense dualism". The body is for physical processes, like eating and moving, while the mind carries our consciousness in a separate – and separable – package. "We very naturally accept you can leave your body in a dream, or in astral projection or some sort of magic," Bloom says. "These are universal views."

There is plenty of evidence that thinking about disembodied minds comes naturally. People readily form relationships with >

No wonder religion is part of human nature.
Our brains are primed for it, says Michael Brooks

Natural born
believers

GOD OF THE GULLIBILE

In *The God Delusion*, Richard Dawkins argues that religion is propagated through indoctrination, especially of children. Evolution predisposes children to swallow whatever their parents and tribal elders tell them, he argues, as trusting obedience is valuable for survival. This also leads to what Dawkins calls “slavish gullibility” in the face of religious claims.

If children have an innate belief in god, however, where does that leave the indoctrination hypothesis? “I am thoroughly happy with believing that children are predisposed to believe in invisible gods - I always was,” says Dawkins. “But I also find the indoctrination hypothesis plausible. The two influences could, and I suspect do, reinforce one another.” He suggests that evolved gullibility converts a child’s general predisposition to believe in god into a specific belief in the god (or gods) their parents worship.

non-existent others: roughly half of all 4-year-olds have had an imaginary friend, and adults often form and maintain relationships with dead relatives, fictional characters and fantasy partners. As Barrett points out, this is an evolutionarily useful skill. Without it we would be unable to maintain large social hierarchies and alliances or anticipate what an unseen enemy might be planning. “Requiring a body around to think about its mind would be a great liability,” he says.

Useful as it is, common-sense dualism also appears to prime the brain for supernatural concepts such as life after death. In 2004, Jesse Bering of Queen’s University Belfast, UK, put on a puppet show for a group of pre-school children. During the show, an alligator ate a mouse. The researchers then asked the children questions about the physical existence of the mouse, such as: “Can the mouse still be sick? Does it need to eat or drink?” The children said no. But when asked more “spiritual” questions, such as “does the mouse think and know things?”, the children answered yes.

Default to god

Based on these and other experiments, Bering considers a belief in some form of life apart from that experienced in the body to be the default setting of the human brain. Education and experience teach us to override it, but it never truly leaves us, he says. From there it is only a short step to conceptualising spirits, dead ancestors and, of course, gods, says Pascal Boyer, a psychologist at Washington University in St Louis, Missouri. Boyer points out that people expect their gods’ minds to work very much like human minds, suggesting they spring from the same brain

system that enables us to think about absent or non-existent people.

The ability to conceive of gods, however, is not sufficient to give rise to religion. The mind has another essential attribute: an overdeveloped sense of cause and effect which primes us to see purpose and design everywhere, even where there is none. “You see bushes rustle, you assume there’s somebody or something there,” Bloom says.

This over-attribution of cause and effect probably evolved for survival. If there are predators around, it is no good spotting them 9 times out of 10. Running away when you don’t have to is a small price to pay for avoiding danger when the threat is real.

Again, experiments on young children reveal this default state of the mind. Children as young as three readily attribute design and purpose to inanimate objects. When Deborah Kelemen of the University of Arizona in Tucson asked 7 and 8-year-old children questions about inanimate objects and animals, she found that most believed they were created for a specific purpose. Pointy rocks are there for animals to scratch themselves on. Birds exist “to make nice music”, while rivers exist so boats have something to float on. “It was extraordinary to hear children saying that things like mountains and clouds were ‘for’ a purpose and appearing highly resistant to any counter-suggestion,” says Kelemen.

In similar experiments, Olivera Petrovich of the University of Oxford asked pre-school children about the origins of natural things such as plants and animals. She found they were seven times as likely to answer that they were made by god than made by people.

These cognitive biases are so strong, says Petrovich, that children tend to spontaneously invent the concept of god without adult

intervention: “They rely on their everyday experience of the physical world and construct the concept of god on the basis of this experience.” Because of this, when children hear the claims of religion they seem to make perfect sense.

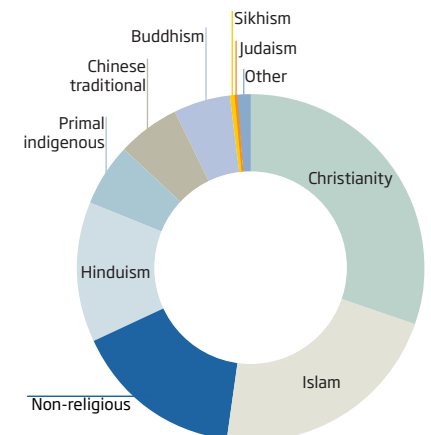
Our predisposition to believe in a supernatural world stays with us as we get older. Kelemen has found that adults are just as inclined to see design and intention where there is none. Put under pressure to explain natural phenomena, adults often fall back on teleological arguments, such as “trees produce oxygen so that animals can breathe” or “the sun is hot because warmth nurtures life”. Though she doesn’t yet have evidence that this tendency is linked to belief in god, Kelemen does have results showing that most adults tacitly believe they have souls.

Boyer is keen to point out that religious adults are not childish or weak-minded. Studies reveal that religious adults have very different mindsets from children, concentrating more on the moral dimensions of their faith and less on its supernatural attributes.

Even so, religion is an inescapable artefact of the wiring in our brain, says Bloom. “All humans possess the brain circuitry and that never goes away.” Petrovich adds that even adults who describe themselves as atheists and agnostics are prone to supernatural thinking. Bering has seen this too. When one of his students carried out interviews with atheists, it became clear that they often tacitly attribute purpose to significant or traumatic moments in their lives, as if some agency were intervening to make it happen. “They

It’s a religious world

84% of the people in the world believe in a supernatural force of some kind





NICK DEWAR

"I don't think there's an adaptation for religion any more than there's an adaptation to make airplanes"

don't completely exorcise the ghost of god – they just muzzle it," Bering says.

The fact that trauma is so often responsible for these slips gives a clue as to why adults find it so difficult to jettison their innate belief in gods, Atran says. The problem is something he calls "the tragedy of cognition". Humans can anticipate future events, remember the past and conceive of how things could go wrong – including their own death, which is hard to deal with. "You've got to figure out a solution, otherwise you're overwhelmed," Atran says. When natural brain processes give us a get-out-of-jail card, we take it.

That view is backed up by an experiment published late last year (*Science*, vol 322, p 115). Jennifer Whitson of the University of Texas in Austin and Adam Galinsky of Northwestern University in Evanston, Illinois, asked

people what patterns they could see in arrangements of dots or stock market information. Before asking, Whitson and Galinsky made half their participants feel a lack of control, either by giving them feedback unrelated to their performance or by having them recall experiences where they had lost control of a situation.

The results were striking. The subjects who sensed a loss of control were much more likely to see patterns where there were none. "We were surprised that the phenomenon is as widespread as it is," Whitson says. What's going on, she suggests, is that when we feel a lack of control we fall back on superstitious ways of thinking. That would explain why religions enjoy a revival during hard times.

So if religion is a natural consequence of how our brains work, where does that leave

god? All the researchers involved stress that none of this says anything about the existence or otherwise of gods: as Barratt points out, whether or not a belief is true is independent of why people believe it.

It does, however, suggest that god isn't going away, and that atheism will always be a hard sell. Religious belief is the "path of least resistance", says Boyer, while disbelief requires effort.

These findings also challenge the idea that religion is an adaptation. "Yes, religion helps create large societies – and once you have large societies you can outcompete groups that don't," Atran says. "But it arises as an artefact of the ability to build fictive worlds. I don't think there's an adaptation for religion any more than there's an adaptation to make airplanes."

Supporters of the adaptation hypothesis, however, say that the two ideas are not mutually exclusive. As David Sloan Wilson of Binghamton University in New York state points out, elements of religious belief could have arisen as a by-product of brain evolution, but religion per se was selected for because it promotes group survival. "Most adaptations are built from previous structures," he says. "Boyer's basic thesis and my basic thesis could both be correct."

Robin Dunbar of the University of Oxford – the researcher most strongly identified with the religion-as-adaptation argument – also has no problem with the idea that religion co-opts brain circuits that evolved for something else. Richard Dawkins, too, sees the two camps as compatible. "Why shouldn't both be correct?" he says. "I actually think they are."

Ultimately, discovering the true origins of something as complex as religion will be difficult. There is one experiment, however, that could go a long way to proving whether Boyer, Bloom and the rest are onto something profound. Ethical issues mean it won't be done any time soon, but that hasn't stopped people speculating about the outcome.

It goes something like this. Left to their own devices, children create their own "creole" languages using hard-wired linguistic brain circuits. A similar experiment would provide our best test of the innate religious inclinations of humans. Would a group of children raised in isolation spontaneously create their own religious beliefs? "I think the answer is yes," says Bloom. ■

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