

of the Holy Spirit, God can still communicate which moral intuitions we should listen to (e.g., do not harm others) and which ones we should perhaps ignore (e.g., nepotism). Given that human societies change over time, we should perhaps expect that the truth-value of moral claims could also change. In societies today, favoring members of the in-group over members of the out-group is arguably less morally defensible than it was in prehistory, when most interactions took place between in-group members, and when dealing with people outside of one's own group was mediated by social mechanisms like reciprocal gift-giving (Whallon 2006). Such mechanisms still play a role in current small-scale societies (Apicella et al. 2012) but are morally dubious in large-scale societies, where daily interactions are not restricted to in-group members or relatives.

Summary

Proponents of the moral argument and some evolutionary ethicists have argued for a close connection between theism and ethics. Defenders of the moral argument contend that if objective moral norms exist, metaphysical naturalism is false (the argument from moral objectivism). The argument from moral awareness holds that the human moral sense is inexplicable within a naturalistic framework.

In this chapter we have seen that recent evolutionary ethical theories have provided plausible, albeit tentative, explanations for the emergence of objective moral norms in human evolution. They have also offered reasonable accounts for our propensity to adhere to such norms. Thus both forms of the moral argument can be weakened by recent naturalistic models, as the former argued that *in principle*, naturalistic frameworks are incompatible with altruism and moral awareness. However, if the evolutionary explanations discussed above (which locate moral facts in human social institutions) are on the right track, they indicate that naturalism is not in principle incompatible with the moral sense and objective moral norms.

7 The Argument from Beauty and the Evolutionary Basis of Aesthetic Experience

50 minutes into ANAKA

The argument from beauty, or the aesthetic argument, denotes a family of arguments for the existence of God that take the beauty of the natural world or works of art (e.g., Bach's cantatas) as evidence for the existence of God. Some authors have articulated this connection between the divine and beauty as obviously true, as something that does not even require an explicit argument at all. For instance, Erazim Kohák (1984, 182) regards aesthetic experiences of nature as an integral part of its religious significance: "In lived experience, in the radical brackets of the embers and the stars, the presence of God is so utterly basic, the one theme never absent from all the many configurations of life's rhythm." In a similar vein, Alvin Plantinga (2000), following Calvin ([1559] 1960), submits that aesthetic experiences of the natural world can elicit the *sensus divinitatis*, the sense of the divine. Such experiences elicit a spontaneous and unmediated sense of God's presence in creation. They include

the marvelous, impressive beauty of the night sky; the timeless crash and roar of the surf that resonates deep within us; the majestic grandeur of the mountains; ... the ancient, brooding presence of the Australian outback; the thunder of a great waterfall. But it isn't only grandeur and majesty that counts; [Calvin] would say the same for the subtle play of sunlight on a field in spring, or the dainty, articulate beauty of a tiny flower, or aspen leaves shimmering and dancing in the breeze. (Plantinga 2000, 174)

Plantinga does not invoke these beautiful and awe-inspiring things in an argument.

It isn't that one beholds the night sky, notes that it is grand, and concludes that there must be such a person as God: an argument like that would be ridiculously weak. ... It is rather that, upon the perception of the night sky or the mountain vista or the tiny flower, these beliefs just arise within us. They are *occasioned* by the

circumstances; they are not conclusions from them. The heavens declare the glory of God and the skies proclaim the work of his hands: but not by way of serving as premises for an argument. (Plantinga 2000, 175)

As Plantinga's remark intimates, the aesthetic argument does not follow a classic argumentative structure. An explicit inference from "There is beauty" to "Therefore God exists" seems spurious. Dawkins (2006), one of the few contemporary nontheist authors who devotes some attention to the argument, remarks that the perceived beauty and sublimity of Beethoven's late quartets or Shakespeare's sonnets obviously do not prove the existence of God; if anything, they only establish the existence of Beethoven and Shakespeare (and even so, they do not do so conclusively, as they could have been misattributed). Unlike other arguments for the existence of God, which move from clearly stated premises to conclusions, the argument from beauty has an ineluctably phenomenological component, the experience of beauty and of awe, and its connection to religious experience. In this, it differs from other arguments: even the arguments from religious experience and from miracles can be clearly stipulated and assessed without having had religious experiences or having witnessed miracles for oneself.¹ This is because the connection between religious experience and God, as well as miracles and God, seems obvious. By contrast, the connection between beauty and God's existence is less directly obvious, even if it is convincing when one has an aesthetic experience.

What is the link between aesthetic experience and religious belief? CSR is remarkably silent on this. The prime elicitors of religious belief that CSR identifies are not aesthetic in nature but, rather, are unpleasant stimuli, such as suspicious sounds and sights, for instance, rustling leaves or creaking planks in a dark house. In this chapter, we will draw on evolutionary explanations of aesthetics and art to explore the connection between aesthetic experience and religious belief. Classical theories of aesthetics from the eighteenth century onward identify two aesthetic qualities as primary: beauty and the sublime. Since these two qualities also figure prominently in aesthetic arguments for the existence of God, they provide a suitable guideline for our investigation of the cognitive basis of aesthetic appreciation. We will examine evolutionary and cognitive approaches to beauty and the sublime and look at implications for the aesthetic argument.

Aesthetic Arguments

Currently, the argument from beauty enjoys relatively little philosophical interest and discussion. It is not incorporated in major anthologies of natural theological arguments (e.g., Craig and Moreland 2009). Nevertheless, the argument has ancient roots. Socrates, as recorded in Xenophon's *Memorabilia* ([4th c. BCE] 1997, 55–63), was one of the first to formulate it (see also chapter 1). According to Socrates, the world exhibits objective beauty, a beauty that is best explained by the existence of a creator. He argued that representational artists, such as sculptors, are admirable creators, even though their creations are not living things. Given that living things exhibit teleology, they are brought about by design rather than chance. From this, Socrates concluded that the being that produced living things is more praiseworthy than the most admirable of human artists.

One of the best-developed arguments from beauty can be found in the philosophical theology of Frederick Tennant. Tennant (1930, 89–93) observed that nature is *saturated* with beauty: it is all around us and permeates all of the natural world. Drawing an analogy with human-created works, he judged that manmade artifacts are rarely beautiful, and if they are made without any artistic intent, the probability of them being beautiful is slim indeed. As a case in point, he discussed the automobile—a noisy, smelly, and ugly thing made with only functional concerns in mind. (Nowadays, car manufacturers try to make attractive products, but this underscores Tennant's point: cars only became aesthetically pleasing—to some—when designers started paying attention to aesthetic features of car design.) If the natural world is the outcome of processes that are indifferent to aesthetic value, it is not likely that it exhibits beauty, just like human works made without artistic intent are unlikely to be beautiful. Nevertheless, nature exhibits such uniform and abundant beauty that we should conclude that the assumption that it was created without any regard for beauty must be false. Hence, the cause of nature likely had an active interest in beauty.

Tennant's argument was not meant as a proof for the existence of God. Rather, like the argument from design, with which it shares structural similarities, it is an argument to the best explanation. It thus also shares a weakness with the argument from design (see chapter 4), as both depend on an

analogy between the natural world and human artworks and artifacts. It seems reasonable that human-created beauty is usually the result of artistic intent, yet we cannot confirm whether natural beauty likewise requires artistic intent. In response, the defender of the argument from beauty could reply that the burden of proof here lies upon the skeptic, who should provide a reasonable explanation of why nature is saturated with beauty, given that in human works, it is unlikely to arise without prior artistic intent. Remarkably, as Mark Wynn (1997) notes, Tennant's argument does not critically depend on the presupposition that beauty is an objective (i.e., mind-independent) property. For, even if beauty were mind-dependent, we could just ask why it is that nature invariably has the effect on us that we find it beautiful, whereas products of human agency only have this effect when they are designed to be beautiful.

C. S. Lewis's version of the aesthetic argument focuses not on aesthetic experiences themselves but on the human longing for such experiences (e.g., Lewis [1949] 2001, 136–137). This argument from desire takes as a starting point the observation that people have a deep need, a longing that he denoted with the German *Sehnsucht*, which they attempt to fill with aesthetic and pleasurable experiences. Lewis proposed that our aesthetic desires remain unfulfilled and indeed insatiable and, hence, that whatever can satisfy such desires is not from this world. The books and music in which we believe beauty is located do not contain the object of this desire. Rather, it is through them that we glimpse the unreachable object we long for. The sense of the sublime that is present in our experiences of great works of art or natural beauty can be regarded as a manifestation of *Sehnsucht*: it is a sense of being overpowered by one's aesthetic experience and one's longing (and inability) to be part of what one is experiencing: "Beauty has smiled, but not to welcome us; her face was turned in our direction, but not to see us" (Lewis [1949] 2001, 40).

In this respect, the desire for aesthetic experience is quite different from other desires in that the latter can be fulfilled; for example, if one has a desire for ice cream, the desire is fulfilled by eating gelato, but the desire that fills one when enjoying a stunning work of art leaves one unfulfilled. The argument from desire relies on a phenomenological sense of longing, which the reader has to share in order for the argument to get off the ground; if the reader has never experienced this sense of longing, the argument does not get far. The idea that humans have a sense of incompleteness and a desire

for the transcendent has been proposed by a number of theologians and philosophers, including Augustine, Pascal, and Kierkegaard (Cottingham 2012). To these authors, these feelings of restlessness and incompleteness derive from a longing for God. As Augustine ([397–398] 1961, 21) wrote, "Our hearts find no peace until they rest in you." Given that all our other desires have objects (e.g., the desire for food can be satiated with a meal, the desire for sex with a suitable partner), Lewis conjectured that *Sehnsucht* also has an object, God. Lewis's argument thus relies on an inference to the best explanation in that the object of a desire figures in the explanation for why we have it. We will use naturalistic explanations of aesthetic desire and of our sense of the sublime to assess the argument from beauty.

Aesthetic Appreciation as Universal Human Behavior

A key premise of the aesthetic argument is that humans perceive the world as saturated with beauty. Lewis made the additional claim that humans have a desire (which he identified as a desire for God) that they attempt to quench with aesthetic experiences. Is there empirical support for this universal human quest for beauty? All known human cultures have at least music, dance, and some form of body adornment, and many others have plastic arts, such as sculpture or painting as well (Brown 1991, 40). This is even the case for societies with very limited material culture, such as the Yaghan, inhabitants of Tierra del Fuego, who traditionally had bark masks, jewelry, and body painting, even though they habitually wore almost no clothes, in spite of living in a mean annual temperature of only 5.5°C/41.9°F (Koppers 1924). Moreover, although not all non-Western languages may have words to denote art, they do have indigenous terms that capture aspects of the Western concept of art, such as skill or beauty (Van Damme 1997). In almost all cultures, including small-scale societies that do not have much division of labor or social stratification, there is a recognition of artistic expertise: some people are widely acknowledged within their community as being more skilled in producing aesthetically pleasing artworks, be they musical compositions, skillfully told stories, or masterly carved sculptures (Anderson 1989). This indicates a cross-cultural concern with beauty and the arts.

Art making and aesthetic appreciation are universal at the cultural level, but are they also universal at the individual level? This seems likely. Even

people who never visit an art gallery or a concert have personal aesthetic tastes, for instance, for particular musical styles and artists, or in furnishing and decorating their homes and gardens. Most untrained people are fairly skillful reproducers of music as well: they can sing tunes relatively accurately, and they do not make many errors in pitch and tempo (Dalla Bella, Giguère, and Peretz 2007). Art making and aesthetic sensitivity emerge early and spontaneously in child development, as is evident in an early disposition to draw, sing, dance, and play word games (Dissanayake 2000). Children require little, if any, prompting to engage in such behaviors, as compared to, for instance, reading and writing, which require long and explicit instruction. Although children can be taught to be better artists, the propensity to create aesthetically pleasing objects and performances develops very early.

Archaeological evidence for aesthetic concern and art making can be found in *Homo sapiens* populations across the Old World. The earliest convincing examples are body decoration: beads made of perforated seashells from Israel and Algeria, dated to 135,000–100,000 years ago (Vanhaeren et al. 2006). More elaborate forms of body decoration arise somewhat later, with beads made of finely polished circular fragments of ostrich eggshell from Enkapune Ya Muto, Kenya, dated to 50,000 years ago (Ambrose 1998). The earliest figurative sculptures are about 40,000 years old. They are small mammoth ivory figurines from Swabia, southwestern Germany, that represent animals, therianthropes (e.g., the so-called lion man) and humans (Conard 2003). The oldest securely dated figurative paintings have been found in Europe (Chauvet Cave, France, 32,600 years ago and El Castillo, Spain, 40,800 years ago); they show hand stencils and representations of carnivores and herbivores (Valladas 2003; Pike et al. 2012). Australian rock paintings in the Kimberley region (northwestern Australia) are probably more than 40,000 years old. Although direct dating of these paintings is difficult, several of them show accurate, naturalistic depictions of extinct animals such as marsupial lions, giant kangaroos, and giant flying foxes, species that died out between 46,000 and 40,000 years ago (Akerman and Willing 2009).² By about 40,000 years ago, humans also made music, as is clear from fragments of ancient flutes made of perforated bird bones found in southwest Germany (Conard, Malina, and Münzel 2009). Evidence for dance can only be indirectly inferred, from Magdalenian representations of dancers, such as the dancing “shaman” (half-human, half-deer being)

in the Grotte des Trois-Frères, France, dating to about 13,000 years ago (Clottes, Menu, and Walter 1990).

Some archeologists suggest that aesthetic sensitivity predates the emergence of our species. From about 1.5 million years ago, hand axes appear in the archeological record. These highly symmetrical tools are about the size of a hand, shaped like a wedge or a teardrop, often finely finished beyond purely utilitarian concerns. Remarkably, an analysis of more than 800 hand axes, found at 148 sites across the Old World shows that their proportions (breadth/length relationship) conform approximately to the golden ratio (Pope, Russel, and Watson 2006). Taken together, the cross-cultural universality of art, the spontaneous development of artistic behavior in children, and its antiquity in the archeological record indicate that a sensitivity and concern for beauty, and a propensity to create beautiful things are stable parts of human cognition and behavior.

Evolutionary Aesthetics

The second step in the aesthetic argument connects the experience of beauty with God, where God is regarded as the best explanation for this ubiquitous perception and quest for beauty. To evaluate this part of the argument, we need to look at alternative, naturalistic explanations of aesthetic appreciation. Eighteenth-century aesthetic theories (e.g., Kant [1790] 1987) considered aesthetic appraisal as distinct from other kinds of evaluation. According to such theories, aesthetic judgments are characterized by a *disinterested attitude*: when we evaluate the tastiness of an apple or the functionality of a chair, we are concerned with utility and function. By contrast, evaluating the delicacy of a flower or the boldness of a painting does not involve such practical considerations.

Experimental aesthetics has challenged this radical division between everyday and aesthetic judgments, especially the notion of disinterestedness. Biological explanations of aesthetic appreciation date back to the nineteenth century. Experimental aesthetics (see Aiken 1998 for an overview) was in fact among the earliest domains of experimental psychological investigation. Experimental aestheticians examine what mediates our judgment of beauty and its opposites, dullness, ugliness, and blandness, and why we make such judgments. In a psychological sense, aesthetic evaluations are sensory and qualitative appreciations of natural or manmade

things. Such appraisals allow one to experience a subjective sense of positive affect (e.g., pleasure, awe) or negative affect (e.g., disgust, sadness), what psychologists collectively refer to as aesthetic experiences. Evolutionary aesthetics is the branch of experimental aesthetics that is concerned with the *why* of aesthetic experiences and judgments, that is, their ultimate level of explanation. As such, it can provide us with naturalistic explanations for the human quest for, interest in, and perception of beauty. In what follows, we will look at four types of evolutionary aesthetic theories of human aesthetic experience and judgment: sexual selection theory, evolved sensory bias theory, the biophilia hypothesis, and the prototype approach to awe. We will examine whether they provide a plausible naturalistic explanation for why humans perceive the world as saturated with beauty.

Beauty and Sexual Selection

Many species of mammals, fish, birds, reptiles, and insects have decorative features such as long feathers, elaborate antlers, bright colors, “carried ... to a wonderful extreme” (Darwin 1871b, 78). They engage in behaviors such as singing (e.g., passerine birds, gibbons) or decorating elaborate constructions with brightly colored flowers and other objects (e.g., bowerbirds). Initially, Darwin and Wallace were puzzled by this. A peacock’s tail does not contribute to its owner’s ability to survive—if anything, the bird is less able to escape predators and more susceptible to parasites. Early natural selection theory held that only traits that contribute to an organism’s capacity to survive are selected. Animal ornaments thus presented an anomaly to this theory.

To explain why animals have beautiful ornaments or why they engage in behaviors that are aesthetically pleasing, Darwin came up with sexual selection, appealing to aesthetic judgment as a driving force. Animals (usually females) prefer mates that are beautiful (e.g., have bright colors or sing elaborately). As a result, such traits will spread throughout the population.

Sense of beauty.—This sense has been declared to be peculiar to man. But when we behold male birds elaborately displaying their plumes and splendid colours before the females, whilst other birds not thus decorated make no such display, it is impossible to doubt that the females admire the beauty of their male partners. ... If female birds had been incapable of appreciating the beautiful colours, the ornaments, and voices of their male partners, all the labour and anxiety exhibited by them in displaying

their charms before the females would have been thrown away; and this it is impossible to admit. (Darwin 1871a, 63)

This attribution of an aesthetic sense to animals was not meant as a form of anthropomorphism but can be situated within Darwin’s broader project of looking for continuity between humans and other animals. In this way, he aimed to uncover the evolutionary origins and functions of human faculties. Darwin’s view of aesthetics was strongly influenced by eighteenth-century philosophical theory, in that he thought beauty was nonutilitarian: beautiful traits in animals served no other purpose than being attractive (Menninghaus 2009). He distinguished sexual selection, which favors aesthetic traits, from natural selection, which selects for functional, useful traits.

While sexual selection theory may explain animal ornaments, it does not explain aesthetic preferences. Why do animals prefer mates that are brightly colored or sing elaborate songs rather than mates with dull colors and monotonous songs? If aesthetic preferences are purely arbitrary, why do females seem to go for extravaganzas rather than discretion? Darwin explained this by appeal to a coevolution of taste and appearance: “The male Argus pheasant acquired his beauty gradually, through the females having preferred during many generations, the more highly ornamented males; the aesthetic capacity of the females having been advanced through exercise or habit in the same manner as our own taste is gradually improved” (Darwin 1871b, 401).

Wallace was unconvinced by Darwin’s appeal to arbitrary aesthetic preferences. While he did not deny the possibility of evolution by mate choice, he thought that aesthetic preference was not purely arbitrary but that ornaments correlated with quality. For example, to explain the bright colors in some bird species, Wallace (1877, 401) mused, “If, however, heightened colour is correlated with health and vigour, and these healthy and vigorous birds provide best for their young, and leave offspring which, being equally healthy and vigorous, can best provide for themselves, then natural selection becomes a preserver and intensifier of colour.”

Interestingly, Wallace’s view, and not Darwin’s, currently prevails in evolutionary biology (Prum 2012). The leading neo-Wallacean hypothesis to explain sexual ornaments is Amotz Zahavi’s (1975) handicap principle. Zahavi argues that bright, loud, and colorful ornaments are a handicap: they make their owners less mobile or more visible and more vulnerable to

predation. Only high-quality individuals are able to bear the handicap and yet survive to adulthood. Thus, they provide a good proxy to the quality of potential mates. Signals that are costly are typically hard to fake and can be preferred because they are reliable. If females systematically go for the largest handicap, traits such as long tails and bright colors will get more pronounced over the next generations. These neo-Wallacean explanations are limited in scope: they can explain, through a mechanism of coevolution between traits and a preference for them, why we make aesthetic judgments about and derive aesthetic enjoyment of potential mates and things that resemble them (such as sculptures or paintings representing people of the opposite sex), but they do not explain why we derive aesthetic pleasure from delicate cherry blossoms or stormy seascapes. The evolutionary psychologist Geoffrey Miller (2000) puts forward a broad neo-Wallacean theory to explain why we enjoy and produce art. Human artworks are like the bowers of bowerbirds: they are a form of courtship display. Sculpting, painting, music making, and storytelling require considerable energy and time. Their costliness provides a reliable signal of the fitness of the art-producing person—in Miller's view, primarily an art-producing male in his prime. Just like a lush but burdensome tail in a male bird of paradise signals its owner's qualities that allow it to live with such a handicap, artworks honestly display the artist's qualities as a mate. Miller does not provide an account for why we find *nature* saturated with beauty, a key premise of the aesthetic argument. Indeed, he predicts that we prize mainly man-made objects and performances. Nevertheless, aesthetic appreciation of nature is cross-culturally ubiquitous, such as of the ephemeral beauty of cherry blossoms delicately dancing in the breeze (Japan), wide vistas of mountains (China), or a tempestuous sea (Europe). Sexual selection theory thus does not provide an adequate naturalistic explanation of our appreciation of nature.

Aesthetic Appreciation and Evolved Sensory Biases

As an alternative to sexual selection, some authors (e.g., Barry 2006) have proposed that aesthetic judgments are evaluative mechanisms that have evolved to deal more effectively with our surroundings. These *sensory bias theories* hold that aesthetic experiences draw on perceptual and motivational neural structures involved in everyday life. Given that our senses

are constantly bombarded by impressions, the nervous system needs to prioritize some cues over others. According to Ann Barry, aesthetic preferences find their origin in the brain's reward system, which guides attention to relevant perceptual input that is likely to yield information important for survival and reproduction. Most proponents of sensory bias theories are neuroscientists who study the neural correlates of our appreciation of art and other stimuli. Their findings can be summarized as follows: assessing artworks and other beautiful stimuli taps into normal propensities and biases of our sensory systems; aesthetic appraisals are primarily emotional and driven by reward- and motivation-related areas of the brain. In accordance with the redeployment hypothesis (see chapter 2), there is not one single area in the brain that deals with aesthetic appreciation but rather a network of areas involved with sensory perception, motivation, and reward (see De Smedt and De Cruz 2010 for an overview).

One prediction of sensory bias theories is that successful art homes in on biases and predispositions of human perception. Artists indeed tend to represent and emphasize those features that our visual and auditory systems are attuned to. To take an extreme example, the strong horizontal and vertical lines in the work of artists like Piet Mondriaan and Kazimir Malevich activate orientation-selective cells in the primary visual cortex (area V1) that respond selectively to dots and straight lines, especially to horizontal and vertical ones. Conversely, artists tend to ignore or underplay features that are less important to human perception, such as shadows. Humans are notably bad at correctly interpreting shadows, and, unsurprisingly, these are absent or incorrectly rendered in many paintings and other pictorial work (Cavanagh 2005). This intimate connection between the function of art and the function of the brain led Semir Zeki (1999, 10) to quip that artists are in a sense neuroscientists since art, in order to be successful, must appeal to human perceptual, conceptual, and motivational systems. In other words, art appeals to us because it exaggerates or appropriates features that human perception is attuned to.

Our aesthetic response to artworks is primarily reward-driven and emotional. Listening to music that gives us chills or looking at paintings we find beautiful activates reward- and motivation-related brain areas (Blood and Zatorre 2001; Vartanian and Goel 2004). A recent meta-analysis of ninety-three papers in neuroaesthetics found that the anterior insula (bilateral, but mostly the right) is strongly involved in aesthetic appreciation (Brown et al.

2011). The right anterior insula is a part of the limbic system that is consistently involved in mediating pain, sadness, cravings for food, recreational drugs, and providing an emotionally relevant context for perceptual experiences. More generally, this area of the brain is involved in the representation of the subjective self based on bodily awareness (such as taste, pain, longing), which corroborates the hypothesis that aesthetic appreciation is not a disinterested affair but rather emotional and reward-driven. However, sensory bias theories do not explain why many highly acclaimed works of visual art are hardly eye candy, such as Pablo Picasso's stark, uncompromising *Guernica* (1937). It predicts that artworks that exaggerate features that are salient to our processing of everyday stimuli will be more successful. This prediction is partially supported by the evolution of the work of individual artists, such as Paul Klee, Piet Mondriaan, and Henri Matisse, where one can observe the increasing use of strong lines, vivid colors, and bold contrasts. Nevertheless, abstract art does not appeal to a broad audience in a way we would expect if sensory biases were the main guide to aesthetic appreciation. Moreover, sensory bias theory, by its focus on early perceptual processing, is silent on our appreciation of nature. It seems therefore that sensory bias theories do not capture the full range of our actual aesthetic experiences.

The Biophilia Hypothesis

E. O. Wilson's biophilia hypothesis (1984) submits that humans have an innate, evolved disposition to be attracted to and aesthetically respond to nature. It is currently the best-developed naturalistic theory to explain our sense that nature is saturated with beauty. For the largest part of our evolutionary history, until a few hundred years ago with the advent of the Industrial Revolution, human biology has been embedded in natural environments, first as hunter-gatherers (from about 2.5 million years to about 10,000 years ago), then as horticulturalists and farmers (from about 10,000 years ago). It seems plausible that an affinity with natural environments provided a survival advantage: finding water sources, prey animals, and edible plants was—and in some remnant hunter-gatherer populations still is—a matter of life and death. This evolutionary scenario predicts a continued responsiveness to nature in humans who live in heavily urbanized environments. Even in industrialized countries, where contact with nature

is relatively sparse, depictions of animals and plants have not diminished in popularity: drawings by young Western children teem with flowers, trees, quadrupeds, birds, and fish.

The biophilia hypothesis derives support from a variety of converging lines of evidence. Studies indicate that proximity to nature increases well-being, including health, happiness, and life satisfaction. Many of these studies are not properly controlled but rely on observations in real-life settings. While they do not prove the biophilia hypothesis unequivocally, they are often taken to support it through a consilience of inductions. For example, patients who were recovering from surgery in rooms looking out on a small park with deciduous trees healed faster than patients who were looking out on a brick wall (Ulrich 1984). In a natural experiment in a large state prison in southern Michigan, half the prisoners were assigned to cells that had a view of farmlands and forests, with the other half looking out on the concrete prison courtyard. Prisoners confined in cells overlooking the courtyard had a 24 percent higher frequency of sick call visits (Moore 1981). Across cultures, people find natural environments more aesthetically appealing than urban surroundings (reviewed in Ulrich 1993), a remarkable fact given that humans built their urban environments to live in. The proximity of nature has a strong influence on real estate prices. Apartments that are otherwise similar in quality find buyers willing to pay between 8 percent and 60 percent more if they provide a view of a park, a lake, or the ocean. This preference for a home with a scenic view is cross-culturally robust, attested in the Netherlands, the United States, Hong Kong, New Zealand, and mainland China (Jim and Chen 2009). Our valuing of nature (including wildlife) is also reflected in the popularity of zoos, parks, and nature reserves, which attract more visitors per year than all sports events combined (Frumkin 2001).

While these empirical findings support the biophilia hypothesis, it remains problematic. One of its difficulties is testability: it is easy to pick evidence in favor of biophilia, but one can equally give evidence against it. After all, people seem to be relatively unconcerned with destroying large swaths of pristine nature, such as the equatorial rainforest, and most of us feel discomfort or fear for particular biological stimuli, such as wasps or spiders. To be more testable, the biophilia hypothesis has been refined: humans have an evolved preference not for nature in general but for some environments over others. For a large part of their evolutionary history,

our East African hominid ancestors have lived in savannah-like landscapes, large areas of grass in close proximity to gallery forests and water. Water sources not only provided drink, but were gathering places for the herbivorous animals that were the main source of food for hominids that first scavenged and later hunted them. A focused version of the biophilia hypothesis holds that humans have an evolved preference for landscapes that resemble this park-like environment. It has found good empirical support. Even people who have not grown up in savannah-like environments show an aesthetic preference for such landscapes: inhabitants of the Nigerian rainforest belt as well as American city dwellers aesthetically prefer photographs of savannah landscapes to pictures of rainforest, desert, deciduous woodland, and pine forest (Falk and Balling 2010). This preference for savannah-like landscapes emerges in young children from diverse ecological backgrounds (Orians and Heerwagen 1992).

However, this more developed form of the biophilia hypothesis fails to account for our aesthetic preferences of scenery that does not adhere to the savannah schema. Consider our sense of awe and aesthetic enjoyment of the night sky. Why this aesthetic preference, given that stars did not play an important role in our evolutionary history? We are, after all, not indigo buntings (*Passerina cyanea*), a species of bird that orients itself using star patterns during its biannual migrations. Indigo buntings pay attention to the night sky even as nestlings, and if we similarly relied on the stars, our fascination with the night sky would be more easily explained. In a similar vein, Plantinga's majestic mountains or brooding outback are not environments that are conducive to human flourishing. One way to explain this aesthetic response is to appeal to culture. The enjoyment of the mountains and the sea is a relatively recent phenomenon in Western culture—these places were perceived as threatening and hostile until well into the nineteenth century. It was only in the course of the late eighteenth century that people started to visit the beach for recreational purposes (Corbin 1988). But while such explanations indicate the malleability of our aesthetic responses by culture, they do not really explain why we have those responses in the first place. As Sperber (1996) points out, one cannot explain culture, in this case, a cultural preference for landscapes that did not play a role in our evolutionary history, by invoking culture. Surveying the evidence on evolved preferences for landscapes, Stephen Davies (2012, 98) concludes: "It is far

from clear how this [culture dependence] is consistent with the thesis of an environment of evolutionary adaptedness or the landscape aesthetic that is most widely espoused by evolutionary psychologists."

An alternative route might be to say that while we find savannah-like landscapes beautiful, we find mountains, the night sky, and the desert sublime. Since the biophilia hypothesis focuses on subjective judgments of beauty and feelings of well-being, it leaves open the possibility that different aesthetic judgments (such as a sense of the sublime) underlie our experience of hostile and threatening landscapes. As far as we are aware, there is only one naturalistic theory that attempts to explain the sense of the sublime. We will examine this in the next section.

Cognitive and Evolutionary Explanations of the Sense of the Sublime

The term *sublime* refers to qualities that inspire a sense of awe and wonder with a hint of challenge or danger. Sweeping mountainous landscapes, Niagara Falls, and the Northern Lights are classic examples. Awe (the emotion most associated with the experience of the sublime) has received some attention in aesthetics (e.g., Burke 1757), but there is surprisingly little psychological work on its cognitive foundations. In keeping with this general trend, evolutionary aesthetics has examined mainly beauty but virtually ignored how perception of the sublime contributes to aesthetic experience. This is perhaps because awe is not unique to aesthetic experience, as it can be triggered by a variety of stimuli, including mathematical equations, scientific theories, charismatic leaders, heroic acts, tornadoes, and transformative life experiences such as childbirth.

The *prototype approach to awe* (Keltner and Haidt 2003) is at present the best-developed psychological framework for the study of awe. Dacher Keltner and Jonathan Haidt propose that two features lie at the basis of prototypical cases of awe: vastness and the need for accommodation. *Vastness* is the experience of something being much larger than oneself. This can be purely a matter of size, as the experience of the starry night sky or of palatial ballrooms, but also social size, such as prestige, authority, or fame. As suggested by Kant ([1790] 1987), vastness can also be dynamic, when it expresses power or strength, for example, the might of a stormy sea or a hurricane. It can also be implied in other ways; for example, one may

encounter vastness in the grandeur of a scientific theory, not because it is literally long, but because of its scope and predictive power, as can be seen in the closing sentence of Darwin's *Origin of Species*:

There is *grandeur* in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved. (Darwin 1859, 490, emphasis added)

The *need for accommodation* is a psychological process by which one attempts but fails to assimilate a new experience. Reactions to disorienting and frightening experiences, such as Paul's vision of Christ on the road to Damascus (Acts 3:3–6) or Arjuna's vision of the world given to him by Kṛṣṇa (*Bhagavadgītā*, 11:9–46), are examples of this. Failed attempts at accommodation can also occur with less frightening stimuli, such as seeing a stunning landscape like the Grand Canyon. Awe can be "flavored" by diverse other emotions such as fear (as when one is in awe of hurricanes demolishing buildings) or beauty (being overwhelmed by a Renaissance motet).

Keltner and Haidt look into our primate ancestry for clues to explain features of awe. They propose that the prototypical case of awe is that of a subordinate in the presence of a dominant individual. Like most other apes, humans have complex dominance hierarchies.³ Emotions play an important role in the maintenance of dominance hierarchies and may have adaptive value. For instance, a sense of pride might give one the motivation to obtain a dominant position and defend it against rivals. By contrast, individuals who are not able to attain a dominant position might do better if they defer to higher-quality group members. This could lead to the evolution of emotions that discourage attempts to overturn the social hierarchy, such as awe. Perceived vastness, failure to accommodate, and the willingness to surrender are feelings that may accomplish this.

Louise Sundararajan (2002) expands Keltner and Haidt's model by adding the component of *self-reflexivity*. Awe frequently brings about a self-reflective attitude: we are having the experience and also perceive ourselves as living it. This form of self-reflexivity is frequently encountered in the writings of mystics, who express a willingness to be wholly absorbed by or surrender to this experience. This is what Lewis denotes as *Sehnsucht* or what Rudolph Otto (1923, 21–22) calls "self-depreciation." Remarkably, this self-reflexivity results in a sense of humility, whereas other positive

emotions such as happiness lead to an increased focus on oneself and a more positive appraisal of oneself. Self-reports of recent aesthetic experiences of natural beauty indicate that participants are likely to feel a sense of smallness or personal insignificance, a decreased awareness of day-to-day concerns, a sense of something greater than oneself, and a desire for the experience to continue (Shiota, Keltner, and Mossman 2007).

Keltner and Haidt's account of awe fails to explain why not just powerful individuals but also divergent stimuli such as landscapes, the starry night sky, or a choral work by Palestrina elicit this emotion. Indeed empirical research indicates that other human beings are not the primary elicitors of awe, as they predict. For instance, Caldwell-Harris et al. (2011) found that the three most important elicitors of awe in Christians, Buddhists, and atheists are nature (54 percent), science (30 percent), and art, especially music (12 percent). Shiota et al. (2007) found that the most common elicitors of awe are nature (27 percent) and art, especially music (20 percent). The prototypical example of an awe-inducing stimulus in both studies is a panoramic scene of natural beauty. If awe evolved to modulate our behavior adaptively in response to powerful others, why is its main elicitor a nonsocial entity? The current best scientific explanation for awe does not explain why natural beauty is its most important elicitor.

Linking Aesthetic Properties with God's Existence

Arguments from beauty, while lacking a strong argumentative structure, propose that aesthetic experience, or a desire for this experience to continue, is linked to the existence of God. While, as we have seen, there are a number of naturalistic explanations for our subjective sense of beauty and the sublime, these do not provide a good explanation for why we experience nature as saturated with beauty. Can a proponent of the aesthetic argument maintain that God is a plausible explanation for aesthetic experience and judgment? Failure to come up with an alternative hypothesis to explain a given phenomenon can provide nonempirical evidence in favor of a hypothesis (Dawid, Hartmann, and Sprenger in press). If God's creative work is a viable explanation for why we find nature saturated with beauty, and there is no alternative naturalistic explanation for this, in spite of significant efforts to devise one, this constitutes defeasible evidence for God's existence. It is defeasible because such an explanation may be offered in the

future (for analogous cases, see chapter 4 on the evolution of language and chapter 6 on naturalistic explanations of the moral sense).

To do this successfully, defenders of the aesthetic argument need to establish why God would be a good explanation for our experience of beauty and the sublime. While it may seem evident to a theist that God would want to create beauty, a nontheist may simply experience beauty as the sense of being moved by nature and its properties, or, in the case of art, being moved by artworks. For instance, Noël Carroll (1993) regards aesthetic experience of nature as a visceral form of appreciating nature for what it is, not as some religious sentiment. The aesthetic argument should make explicit how aesthetic experience is explained by theism.

There are at least two ways to link God and beauty: by appeal to design, and by regarding beauty as an element of religious experience. As we pointed out earlier, many versions of the aesthetic argument (e.g., Socrates, Tennant) make a connection between aesthetic properties and design. They infer the existence of a creator from the perceived beauty and harmony of creation. This strategy is commonly found in Patristic and early medieval writings, including Basil of Caesarea and Augustine. An alternative view is to see beauty as a form of religious experience: to experience beauty is to experience God. In this interpretation, beauty somehow reflects God's nature. In Christianity, the Eastern Orthodox tradition has maintained an intimate connection between beauty and holiness, which it inherited from the Patristic tradition. Accordingly, beauty allows humans to share in God's nature (Viladesau 2008).

Beauty as a Result of Design Intentions

Aesthetic arguments can consider why God would design humans in such a way that they have aesthetic experiences. For example, Polkinghorne (1998, 82) argues that our perception of beauty in the world can be explained as a sharing in its maker's delight in creation. Karl Rahner (1982) thought that some artworks, for example, symphonies by Bruckner or paintings by Rembrandt, are inspired by God to say something about what humans are that cannot be expressed in words. Together with other human cognitive features, such as our moral intuitions (see chapter 6) or our knowledge of the empirical world, appreciating beauty provides us with an insight into God's mind.

The *artistic design stance* can provide a useful analog to explore this idea further. In chapters 2 and 4, we saw that humans have a design stance by which they infer the intentions of the makers of artifacts. Applied to artworks, the design stance allows viewers to infer the complex causal history of artworks, taking into account their art historical context. Often, this is a mediate activity, as when we infer the intentions of the artist based on art historical considerations. This is what Bullock and Reber (2013) have termed "taking the artistic design stance." For example, a dog in a medieval painting, such as in Jan Van Eyck's portrayal of the Arnolfini bridal couple, can be interpreted as a symbol for fidelity in marriage because dogs were a symbol of fidelity for medieval artists. But recognizing design also relies on non-inferential cognitive processes. For instance, when reading Jane Austen's novels, we gain insight into her mischievous delight in creating morally poignant characters and situations. Such insight does not follow explicit inferences about Regency culture but, rather, relies on the direct experience of reading her work, encountering the characters, and vicariously living the situations she depicts.

Keith Lehrer (2006) asserts that we gain ineffable and immediate knowledge of an artwork by directly interacting with it. A verbal description of its content still leaves out something essential of what that work is like. A detailed account of, say, Vincent van Gogh's intentions when painting *Starry Night* (1889), based on ego documents and art historical information, does not impart all of his intentions. This knowledge can only be gained by perceiving the artwork itself, for example, design intentions evident in the bold color contrasts and the whirling brushstrokes. Conversely, even if all information on van Gogh's life, work, and cultural context were destroyed, we would still know something about these design intentions as long as we have perceptual access to his oeuvre (De Smedt and De Cruz 2013a). It is in this context that we can understand Polkinghorne's aesthetic argument: enjoying the natural world provides an ineffable knowledge of God's artistic design intentions. By endowing humans (and presumably also other animals) with a sense of beauty, God grants insight in his relationship with creation (for a further exploration of these ideas, see De Smedt and De Cruz 2013b). As we saw in chapter 4, adopting the design stance critically depends on background information. For a theist, the picture of God wanting to share his design intentions through beauty may seem plausible, but

it may not convince those who do not regard the natural world as a created entity.

Aesthetic Experience as Religious Experience

A second way to connect aesthetics and God is by regarding aesthetic experience as a subspecies of religious experience. God reveals something of his nature through the beauty and sublimity of his creation. This view has been developed extensively by the Syrian mystic Pseudo-Dionysius the Areopagite (5th–6th c.), who wrote that God's beautiful nature shines through in creation in the beauty, harmony, and splendor of all things. Twentieth-century theologians such as Karl Barth and Hans Urs von Balthasar have further elaborated this idea of divine beauty (see Viladesau 2008 for an overview). Thus conceived, the aesthetic argument is not an explicit argument anymore but makes an externalist case: forming theistic belief through aesthetic experience is justified because there is a proper connection between God's existence and aesthetic properties in the world. Plantinga (2000), a contemporary defender of this view, argues that aesthetic experiences of nature can elicit the *sensus divinitatis*. These experiences draw forth belief in God in a non-inferential manner: he has designed our cognitive faculties in such a way that they will form theistic belief under a broad range of circumstances, for instance, when confronted with beauty or with one's moral sense. To Plantinga, the proper functioning of our cognitive faculties justifies belief in God formed through aesthetic experience.⁴

Here, the aesthetic quality of the sublime plays a prominent role. Empirical studies have shown that the experience of the sublime increases religious belief. Valdesolo and Graham (2014) showed participants a video montage of nature clips, composed primarily of grand, sweeping views of plains, mountains, and canyons. The control group saw nature videos with animals involved in amusing antics. The participants who witnessed the awe-inducing nature scenes reported higher belief in a God who providentially controls the world than the subjects who saw the funny videos. Saroglou, Buxant, and Tilquin (2008) used a similar method and found that people who saw natural beauty reported higher levels of spirituality.

The relationship between the sublime and religion is thus experiential rather than the result of a premise-conclusion style argument. The Jewish theologian Abraham Heschel did not want to prove the existence of God through our awe of nature but took the existence of God as a given and

regarded awe and wonder at natural beauty (not only vast things, but also diminutive things such as snowflakes) as an essential element of religious sensibility. To Heschel ([1955] 2009, 74), awe "is more than an emotion; it is a way of understanding." This understanding is like perception; it provides immediate insight:

It is not by analogy or inference that we become aware of it [transcendence]. It is rather sensed as something immediately given, logically and psychologically prior to judgment ... a universal insight into an objective aspect of reality, of which all men are at all times capable. (Heschel 1965, 77)

A cultivated sense of awe and wonderment at nature

enables us to perceive in the world intimations of the divine, to sense in small things the beginning of infinite significance, to sense the ultimate in the common and the simple; to feel in the rush of the passing the stillness of the eternal. (Heschel [1955] 2009, 75)

Clifton Edwards (2012) regards an aesthetic, religious sensibility of the world as a form of practice, an outlook that is afforded through a sensibility to natural beauty. Just like a scientist can gain access to a sphere of knowledge through practice (e.g., an engineer can easily discern the supporting components of a structure), where she learns to perceive things that would otherwise escape her, a religious person may get knowledge of God through acquiring *beauty skills*. For Plantinga, Heschel, and Edwards, aesthetic experience provides a direct, non-inferential, and experiential ground for religious belief. In this way, a religious believer need not provide any direct links between aesthetic experience and the existence of God, just like someone who believes "this tree exists" based on perception need not explain how her perception connects to her belief. As long as this experience is connected to God's existence in the right way (for instance, because God instills this belief in us through aesthetic experience), this belief is justified.

Aesthetic Experience and Religious Fictionalism

The argument from beauty infers the existence of God from the experience of beauty. However, as with the other arguments we have encountered in this book, this inference depends on prior beliefs, in particular, the probability one assigns to the existence of God. Some nontheists are attracted by the aesthetic dimension of religious practice without coming to religious belief. So the fact that one experiences beauty, in particular beauty within

religious contexts (the poetry of the psalms, communal hymn singing, arousing artworks, gripping sermons) does not always lead to an inference to the existence of God. *Religious fictionalism* holds that a person can coherently engage in practices such as prayer and religious discourse without endorsing a realist position about God's existence (Eshleman 2005). Following in-depth interviews with Christian atheists, Brian Mountford (2011) found that aesthetic experience in religious painting, music, and literature was one of the main reasons for remaining observant.

The philosopher of religion Howard Wettstein (2012) provides a detailed philosophical defense of religious fictionalism, arguing that the moral and aesthetic dimensions of a religious lifestyle can be enjoyed by nontheists. Drawing on his own tradition, Judaism, Wettstein looks at awe as a form of practice rather than a doxastic attitude. Awe, rather than belief, is the cardinal attitude of observant Jews: *yirat hashem*, the awe of God, is almost a synonym of religion, and a religious person is not merely a believer, but *yare hashem*, he who stands in awe of God. The theist has a sensibility or aptitude, which is nurtured and trained through practices such as prayer, study of the Talmud, ritual, and *berakhot*, regular blessings uttered at various occasions. Wettstein makes the radical claim that one can be in awe of God without actually believing in God: one can conduct rituals and voice blessings at numerous moments of the day, actions that nurture a sense of awe at the world, a sensibility to morality and to beauty, without believing that God exists.

The philosopher of religion Eleonore Stump (1997) is skeptical of this, arguing that belief in God is an essential element of religious faith. The aesthetic element of the religious lifestyle is greatly enhanced by doxastic faith: it will be a lot easier and effective to maintain motivation to study the Talmud if one believes God exists than if one simply regards this study as a way to train one's mind to have a particular sensibility about the world. Besides, if one does not believe in God, why accord any special status to the Talmud or the Gospels? More generally, while faith is more than belief, it does have doxastic elements, and it seems doubtful that one can simultaneously have faith that *p* while believing that not *p* (Pouivet 2011). Taking away the doxastic dimension alters the experience of religious art:

Consider, by way of comparison, Homer's description of Apollo shooting plague-causing arrows at the helpless Greek army because Agamemnon has dishonored Apollo's priest. The passage is poetically powerful; it catches one's attention and

remains in one's memory. But it's hard to imagine its stimulating religious awe in us or giving us a sense of the holy. And that's precisely because we think that there is no supernatural being such as Apollo, that no deity causes diseases by shooting arrows into people, and that there are perfectly good naturalistic explanations of diseases which have nothing to do with Apollo's seeking revenge for being dishonored. Just because we have such naturalistic views, though the literary beauty of the passage may strike us, it hardly moves us to religious awe. (Stump 1997, 285)

Similarly, many people are struck by Western religious music, such as Bach's *Matthew Passion* or the Gregorian mass for the dead. The promulgation of Christian beliefs was an important, even central element of such musical traditions. Can a nontheist have the same aesthetic experiences listening to them as someone who endorses these beliefs? Neill and Ridley (2010) maintain that an atheist can share such experiences through fictionalism: one enjoys the Christian elements as purely fictional, just like one can be moved by Anna Karenina's suicide, full well knowing she never existed. Robin Le Poidevin (1996, 118–121) also draws attention to this parallel between art as fiction and religion as fiction: just like we can become emotionally involved with fiction through some form of make-believe (as in Anna Karenina's case), the fictionalist holds that we can make-believe that there is a God. Even if the religious beliefs are true in a realist sense, religious art still requires imagination as well, for instance, in the way Bach translated Matthew's passion into music, or in the way a group of Balinese dancers act out scenes from the *Mahābhārata*.

This equivocation of imagination with make-believe is problematic. Even if Christ's death and resurrection or the battle between the Kaurava and Pāṇḍavaḥ princes are compelling from a narrative point of view, a realist position (i.e., a belief that these events occurred) still places one in a better epistemic position to explain the religious stance that believers adopt toward these narratives. Differently put, if the beauty of religious art or scripture compels individuals to adopt a religious lifestyle, it is much more straightforward to say that they do so because they nurture or foster religious beliefs than to say that they do so because these practices allow them to engage in religious make-believe (Pouivet 2011). Moreover, fictionalism seems to work better for beauty experienced in liturgical context and in religious art than as a stance to make sense of the wonder felt for natural beauty. How could a fictionalist interpret the awe one experiences on a majestic mountain? Wettstein would reply: this is awe for God. But here, it seems more straightforward for the naturalist to interpret this as awe

for nature (as Carroll 1993 insists) rather than awe for a God one does not believe in. It is thus more difficult for fictionalists to interpret aesthetic experiences religiously than it is for realists. Aesthetic experiences may not reliably lead to belief in the existence of God, but theism still seems the most compelling attitude to adopt in the face of the aesthetic dimensions of religious art and practice, especially when experiencing awe for the beauty of nature.

Summary

The aesthetic argument for the existence of God relies on the observation that humans universally have a concern and appreciation for beauty, and that this appreciation is directed to natural beauty as well as created artworks. This chapter has reviewed work from evolutionary aesthetics that indicates that humans are indeed sensitive to beauty, especially natural beauty. There is at present no satisfactory naturalistic explanation for why humans value natural beauty that does not conform to their evolved tastes. Hence, the proponent of the aesthetic argument can hold that God is currently the best explanation for this sense of beauty. However, it remains hard to link God and beauty in such a way that the existence of God is not already presupposed. The argument from beauty is perhaps most compelling to those already convinced that theism can plausibly explain beauty as a design feature of the world or as a form of religious experience.

As we saw in chapter 1, natural theology not only consists of providing arguments for or against the existence of God, but is also the project of embedding experiences of the world, such as the experience of beauty, within a theistic framework. The aesthetic argument belongs to this latter strand of natural theological thinking. It can start out with fairly modest assumptions about God's existence and his relation to the world, and, through the phenomenology of aesthetic experience, ratchet up to more knowledge about the creative intentions of God by taking the artistic design stance. Within a theistic worldview, our pervasive tendency to perceive beauty becomes intelligible as a result of God's design intentions, while our tendency to seek beauty can be explained as a quest for God. We have seen that it is possible for nontheists to enjoy these experiences without a realist commitment to God's existence, although it remains an open question to what extent religious fictionalism is a coherent, live option.

8 The Argument from Miracles and the Cognitive Science of Religious Testimony

Can one infer the truth of theism, or more specific religious doctrines, from the testimony to miracles? The argument from miracles, also known as the historical argument, answers in the affirmative. It has been severely criticized, notably by Hume (1748), who asserted that no one is ever justified in accepting the testimony to miracles. The philosophical study of the argument from miracles consists of three interrelated questions:

- What do we mean by "miracle"; is this a coherent, intelligible concept (the semantic question)?
- Under what conditions could one accept the testimony to miraculous events (the epistemic question)?
- Can the testimony to miracles be used to argue for particular religious beliefs (the argumentative question)?

Answering "yes" to these questions leads to claims of increasing strength. Clearly, the argumentative question cannot be answered positively if one is never entitled to accept the testimony to miraculous events, and accepting such testimony is only possible if miracles form a coherent, intelligible concept.

In this chapter, we examine these interrelated questions from a cognitive perspective. As we shall see, a better insight into the cognitive basis of our understanding of miracles and their testimony can throw new light on the apologetic function of miracles and on their use as premises in religious arguments. We rely on evidence from CSR and the cognitive science of testimony to uncover psychological mechanisms that underlie the testimony to miraculous events. We will argue that miracles can be best understood as events that violate intuitive ontological assumptions; such events are termed *minimally counterintuitive*. Combined with historical definitions of