

Chapter 12

Altruism, Religion, and Self-Enhancement in a Framework of Ad Hoc Evolutionary Adaptation

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Abstract We review evolutionary explanations for three major puzzles of the human mind: altruism, religiosity, and self-enhancement. Human altruism reaches beyond reciprocity or close-kin care readily explained by game theory and genetic kin selection. Group selection is widely seen as too weak to lead to substantial altruism as it struggles to contain selfishness favored by within-group selection. Yet, reciprocity and punishment leverage the effectiveness of altruism within a group, and genuine altruism is testified to be weak, leaving scope for explanation even by a force as weak as group selection. Moralistic religious culture appears tightly linked to altruism, yet the fitness advantage of a defector within a religious society makes it difficult to conceive religion or related genetic predisposition as an evolutionarily stable strategy. Self-enhancement has direct links to altruism and religiosity, leading to warm-glow altruistic contributions and increased receptiveness to comforting narratives of heavenly justice. Suggested intrapersonal and interpersonal benefits of self-enhancement do not detail how the trait should be competitive against more direct behavioral adjustments that yield similar personal benefits but avoid the fitness costs of misperception. We explain religion and bias as imperfect ad hoc evolutionary adaptations rather than perfect evolutionarily stable strategies (ESS). The scant time available for fine-tuning the mind since the emergence of higher cognitive capabilities means near-perfect traits were unlikely to emerge. Instead, the extraordinary evolutionary pressure induced by the rapidly evolving environment favored a broad range of genetic novelties despite extra costs.

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12.1 Introduction

Applied to the individual, the first principle of evolution, ‘survival of the fittest’ (Spencer 1864; Darwin 1869), would seem to favor a rationally calculating mind that acts in perfect accordance with its capabilities and with evidence weighted by statistical significance. Others—with the exception of close relatives if the principle was broadened to include kin—would be valued strictly according to the personal benefit one could expect to derive from them. It is difficult to imagine a world populated entirely with humans exhibiting such characteristics, notably the psychopathic substitution of empathy with purely manipulative rationality. A glimpse at our surroundings, as well as a host of scientific studies, confirms that the human mind differs in various ways from such a characterization. Three striking (categories of) variations fall under the complex concepts—for simplicity called *traits*—of altruism, religiosity, and self-enhancement. All three traits are puzzling in the sense that they have fitness costs but unclear (individual) benefits. The following provides an—necessarily incomplete—overview of proposed evolutionary explanations for the interrelated phenomena. Some implicit assumptions in the proposed theories seem difficult to reconcile with reality and we propose amendments to address these difficulties.

We consider altruism in the strict biological sense of an individual deliberately undergoing net (lifetime) fitness costs in order to increase the welfare of others (e.g., West et al. 2007; Okasha 2013). Evolutionarily, such behavior is, almost by definition, difficult to sustain in a simple world. The personal fitness cost means that genes of bearers of an allele for non-discriminatory altruism are underrepresented in the offspring, leading to a crowding out. The exception is altruism targeted at close kin: Kin share an elevated fraction of genes, so that helping them increases ‘inclusive fitness,’ the likelihood of *copies* of one’s own genes propagating (Hamilton 1964; Grafen 1984). It is important to delineate altruism from purely strategic cooperation between individuals to their mutual (longer term) advantage, two often confounded concepts (West et al. 2007). Cooperation, often sustained by direct and indirect reciprocity in repeated interactions with reputational concerns and/or punishment (e.g., Fehr and Fischbacher 2003, 2004; Nowak 2006), can improve the fitness of all involved. The first principle of evolution thus naturally explains strategic cooperation when cognitive capabilities allow tracking historic behavior of individuals (Bshary and Bergmueller 2008). Altruism observed in daily life, laboratories, and hunter-gatherer societies goes well beyond what kin-regarding preferences and strategic cooperation imply (e.g., Fehr and Fischbacher 2003; Bowles 2006), requiring further explanation. Group-selection forces, simplistic interpretations of which dominated the literature earlier in the twentieth century, were largely, and rather categorically, dismissed as inconsequential since Williams (1966) debunked a particularly naïve ‘good-for-the-species’ version of group selection among animals. The literature seems, however, to lack compelling alternatives to group-level explanations for the long reach of deep-rooted human altruism beyond kin-aid and strategic interaction. Section 12.2

considers evidence in favor of a plausible role of group-level forces in shaping human other-regarding preferences, drawing attention notably to the fact that on a general level, observed human altruism has to be understood as *being* of a very modest level itself (e.g., Kirchgässner 2008, 2010), so that the weakness of a force does not a priori dismiss it as a relevant explanatory factor.

Evolutionary biology mainly focused on genetic evolution of altruism, and experimental evidence suggests that altruism is deeply rooted in the physiology of the mind (Warneken and Tomasello 2009). Yet, no agreement has been reached as to the degree to which genes directly or culture instead has shaped human altruism: ‘Some would say that culture is so important that genes, whether selfish or not, are virtually irrelevant to the understanding of human nature. Others would disagree. It all depends where you stand in the debate over “nature versus nurture”’ (Dawkins 1989, p. 3).

Undeniably, culture plays a crucial role in shaping human altruistic behavior. Throughout the world, an extraordinary influence seems to stem from religions. Even if the popular saying ‘Without God, everything is permitted’ is hardly reconcilable with observations of atheistic societies, we find an impressive literature showing links between religion and moral behavior, and it is striking how closely the evolution of moralistic religions is linked to the enlargement of human group sizes in the past millennia (e.g., Wright 2010). While prehistoric religions and superstitions of bands and small tribes were largely unmoral, the emergence of life within larger groups was accompanied by a shift of the focus of supernatural agents from rather random behavior to the enforcement of more ‘moral’ behavior, beneficial for the provision of public goods in the progressively more anonymous groups (Wright 2010). A basic link between exhibited altruistic behavior,¹ or morality, and religion is straightforward, with a supernatural, possibly omnipresent punisher (or rewarder) enforcing moral norms when respecting them would otherwise not be in an individual’s self-interest. Evolutionarily, religion has thus been explained as spreading through cultural group selection, increasing group fitness by lowering the cost for the enforcement of moral norms. From a group perspective, the high cost of rites and distortionary rules opens the question of why more cost-effective ways to enforce moral norms, such as genuine altruism, did not evolve instead. Furthermore, from an individual perspective, defecting individuals with immunity against internal adoption of religious belief should enjoy a fitness advantage as they would be able to exploit the system. According to the first law of evolution, such immunity should thus spread over time within religious societies. Section 12.3 considers proposed solutions to the evolutionary dilemmas regarding the emergence of superstition and religions based notably on patternicity—the tendency to causally link independent random events (Shermer 2008, 2009; Foster and Kokko 2009)—and on costly signaling theory (Henrich 2009). Contrary to what has been inferred,

¹If helping others is based on piety, classification as altruism may seem counterintuitive, as no genuine other-(human)-regarding preference may be involved. However, from an evolutionary, biological perspective, the behavior does indeed imply the trade-off of a reduction in own fitness against an increase of others’ fitness.

we do not find these propositions convincing as (long-run) evolutionarily stable strategies (ESS) (Smith and Price 1973). Instead, we explain the observed traits as the result of *ad hoc evolutionary selection*, favoring adaptations that are imperfect yet broadly in line with the dominant evolutionary pressure, relevant when this pressure is strong and time for adaptation scarce on a genetic time scale, as was likely the case for the fine-tuning of the human mind since the emergence of our higher cognitive capacities.

Self-enhancement, or self-serving bias, denotes a class of perceptual biases that involve taking a tendentiously positive view about one's own personality, capabilities, and things associated with the self (Alicke and Sedikides 2011; Heine et al. 1999; Babcock and Loewenstein 1995; Codol 1995; Sedikies and Gregg 2008). This comprises tendencies such as that of substantially more than half of the population typically judging themselves as above average in various skills, attributing personal success to our ability but failure to bad luck, or judging favorably information in support of our own position while disregarding equally strong evidence against it (Codol 1995). Section 12.5 considers direct links of such bias to altruism and religiosity. Explanations the literature proposes for the evolution of self-enhancement can be classified as intrapersonal or interpersonal. Intrapersonally, self-enhancement is found to prevent evolutionarily unfavorable states of the mind such as depression (Greenwald 1980). Interpersonally, the personal bias lowers the cognitive burden of enhancing the self in front of others, helping to instill confidence and to achieve evolutionarily relevant social goals such as high status. Both dimensions have natural benefits, but an impressive list of overhead costs of the bias has been found, and Paulhus (1998) concluded 'self-enhancement is best viewed as a mixed blessing' (p. 1207). Fundamentally, it has been argued that the intrapersonal aspects are evolutionarily inconsequential as, instead of distorting perception in a costly manner, an ESS would more efficiently optimize directly the decision rule rather than the underlying perceptions whose distortion implies undesirable side effects (e.g., Pinker 2011). We explain that this critique strictly speaking extends to the case of interindividual effects, as observers perceive an individual's perceptions only indirectly, through implied actions and expressions of emotions. Updating the relationship between perceptions and the induced actions and expressions would be the efficient strategy, rather than biasing perceptions that are relevant for various other aspects of life. Nevertheless, biased perceptions as a pancultural human trait (Sedikides et al. 2003; Markus et al. 1991) are a well-documented fact that requires explanation. Section 12.4 suggests viewing also self-enhancement as the product of *ad hoc evolutionary selection*. When early hominids and humans emerged, attempts for other-deception would in many cases have been largely futile, owing to the intimacy of small band living, where direct observation offered a primary source of evidence on which judgment of others could largely rely. As group sizes increased over time (Aiello and Dunbar 1993; Dunbar and Shultz 2007; Grove 2013), secondary evidence, notably oral accounts, gained in importance, increasing the scope for other-deception (e.g., Wright 2010). This sudden emergence (or increase) of possibilities for personal fitness advantage through regular exaggerations about personal virtues and deeds must have

represented a strong pressure and a formidable playground for numerous genetic traits that could aid individual humans toward this deceptive aim. Ideally, from the individual's point of view, adaptations would have made of human a great, fully conscious storyteller that himself perfectly knows reality apart from his tales. This may not have been achievable in the short time available. Yet, a lot was gained with a possibly simpler rewiring of subconscious functions, leading to self-enhancement as an indirect way to influence others. Evidence of group-level biases derived from self-enhancement suggests that self-enhancement could have further played a role in containing a rather general level of altruism to group members.

Sections 12.2–12.4 discuss such evolutionary aspects of altruism, religiosity, and self-enhancement in detail. Section 12.5 brings the pieces together. It also considers how the interplay of flexible religiosity and self-enhancement could have outperformed a more stable innate altruism in an evolutionary setting with intermittent intergroup pressure (Habermacher 2014).

Only where necessary, the discussion on altruism refers to the tangent issue of purely strategic cooperation. By leveraging the effect of altruistic contributions from strong reciprocators (Fehr and Fischbacher 2003), reciprocal cooperation with punishment suggests that the effectiveness of altruism on group fitness can be large.

12.2 Altruism

12.2.1 *Group and Kin Selection*

In *The Descent of Man*, Darwin (1871) advanced the idea of group selection to rationalize notably human parochial altruism. By the 1930s, group selection was commonly used among biologists to explain all sorts of traits for which a benefit for groups or species seemed intuitive. Quantitative subtleties relevant to answer whether the force of occasional selection at group level could plausibly override more immediate forces of intragroup competitiveness were largely ignored. During the 1960s, this changed dramatically. Hamilton's inclusive fitness theory (Hamilton 1964), applied notably as 'kin selection,' explained many phenomena originally ascribed to group-level forces, as the natural outcome of selection of genes without direct invocation of explicit group boundaries (Smith 1964; Smith and Price 1973). The critics had good points. After all, genes for helping close-kin are readily explained by relatives sharing an elevated fraction of genes (Hamilton 1964); competing individuals may restrain aggression in their rivalry, preventing serious injuries, not so much for the benefit of the population but simply to their individual benefit (Smith and Price 1973); and empirical work found individuals reproduce at a rate that maximizes their longer run reproductive success rather than to practice reproductive restraint (Lack 1966; Krebs and Davies 1993). The categorical rejection went as far as the claim by Williams (1966) that whenever selection at a lower level could offer an alternative explanation, it be *impermissible* to invoke

group selection (Lack 1966, pp. 130–131). Such strong backlash was arguably an overshoot. Smith's (1964) haystack model, seemingly explaining the impossibility of effective group selection, has been found to artificially inflate the intragroup pressure (Wilson 1987), and the early haplodiploidy hypothesis, which seemed to explain eusociality as a trivial result of kin selection in various insects, had neglected longer run genetic dynamics whose recognition today means the original kin-based explanation requires revision (West and Gardner 2010). The idea of group selection, framed in modern multi-level selection models, is now understood as mathematically equivalent to kin selection (Frank 2012), yet the empirical relevance of the selective pressure at the group level for the shaping of traits within species remains debated (Wilson 2012; Traulsen et al. 2008; Sober and Wilson 1998; West et al. 2008).

12.2.2 *Human Altruism: Qualitatively Broad, Quantitatively Weak*

The long reach of human altruism is unparalleled in the animal kingdom and requires refined explanation. Eusocial animals seem more perfect altruists within their hive than humans among their entourage, but human altruistic behavior extends—at a however low level—to entirely unrelated members in experiments and natural settings where own material or reputational reward is unlikely, such as in many anonymous donations (Fehr and Fischbacher 2003; Bowles 2006; Sen 1977). So much of seemingly altruistic behavior has been found to be subtly self-serving that it is regularly held that genuine altruism would not be real. This position is hardly tenable and instead altruism at a low level is found to be so important that the functioning of modern society without it is hardly imaginable (e.g., Sen 1977; Kirchgässner 2010). Kin selection offers direct explanation only for altruism toward closer kin. The *big mistake hypothesis* proposes to see the extension as based on imprecise kin recognition (Henrich 2004; Boyd and Richerson 2002b). Subconscious kin recognition is a noisy process, and the closer physical (transport), informational (writing and new media), and economic (extended non-zero sum relations with extended trade) integration (e.g., Wright 2010) of society relative to prehistory could support an unconscious misinterpretation of strangers as more closely related than they really are. However, toward any lower-than-average-related individual, pure-kin-selection absent of group-selection pressure should lead to a weakly positive level of *spite*, rather than any altruism (Hamilton 1970), and it remains unclear how our subconscious mind should lead us to overestimate all strangers as close enough to us such as to not only compensate for non-kin spite, but to even attribute them a discernable amount of altruism. Henrich (2004) and Boyd and Richerson (2002b) detail further reasons why the big mistake hypothesis is unlikely to realistically explain the extension of kin selection to the global population. In this respect, preferences derived from group-selection forces

seem a more plausible explanation. Group selection naturally results in the valuation of the welfare of genetically unrelated group members, and it seems more plausible that the increased interconnectedness has led humans to implicitly think of strangers as what group members used to be. Modern trade, labor division, and communication mean that we share many things in a way our prehistoric ancestors used to do only with band or tribe members.

J.B.S. Haldane's 'I will jump into the river to save two brothers or eight cousins' (Nowak and Sigmund 2007) conveys the strength of kin-selection forces, observed in families and readily explained by Hamilton's rule: For a known genetic relatedness, sacrifices are evolutionarily stable whenever the targeted kin's benefit multiplied by the relatedness exceeds the personal costs. The conditions for group selection to support a *high* level of altruism are severe (Smith 1964; Levin and Kilmer 1974; West et al. 2007). However, as Kirchgässner (1992, 2010) explains, human exhibited altruism toward non-kin is quantitatively very low in most cases. How low a level of altruism interdemic selection could support among humans has not been systematically studied. Yet recent evidence about prehistoric population structures suggests group dynamics may have supported the emergence of a limited albeit significant level of within-group altruism (Bowles 2006, 2009; Weibull and Salomonsson 2006; Sober and Wilson 1998; Traulsen et al. 2008). Group selection is thus conceivably in line with both the qualitatively broad scope and the quantitatively limited level of observed, possibly innate, altruism.²

Section 12.5 further details how effects of self-enhancement may help explaining the extension of a group-selection-rooted altruism beyond any specific group borders in the modern world.

12.2.3 *Cultural and Indirect Sources of Altruism*

Human altruism is a highly complex phenomenon, and disagreement prevails regarding its innateness. Undeniably, cultural norms have a tremendous influence. Reciprocity leverages the altruism of strong reciprocators in norm enforcement (e.g., Fehr and Fischbacher 2003, 2004), and religion is found strongly related to morality. Many altruistic acts can be seen as conspicuous on a personal level, with a low cost but an often even incomparably lower impact, satisfying the personal desire to feel good about oneself: a 'warm-glow' effect related to self-enhancement (Andreoni 1990; Crumpler and Grossman 2008). Religiosity and self-enhancement thus linked to altruism are themselves evolutionarily complex, partly puzzling phenomena, discussed in the next two sections.

²Warneken and Tomasello (2009) propose experimental evidence showing innate altruism in young humans.

12.3 Religion

12.3.1 *Omnipresent Spirituality*

Spirituality accompanied the modern human species throughout its history (e.g., Frazer 1922). Our banding ancestors saw the elements of nature as animated and used past observations to infer rules how to win them over, hopping to elicit benign weather and to avoid calamities (for a detailed account, see Wright 2010). Not dissimilar to pigeons in Skinner's famous boxes (Skinner 1948), they drew links between their own behavior and observations that appear rather random, and importantly, their animistic beliefs were essentially unmoral (Wright 2010; Tylor 1958).³ In larger tribes and chiefdoms, spirits or Gods with moral concerns of increasing complexity emerged (Wright 2010; Stark 2001). How can such a development be rationalized within an evolutionary framework?

12.3.1.1 Theory of Asymmetric Payoffs: A False Positive

Measured against the criterion of ESS, early animistic beliefs seem puzzling. Their unmoral character is seen as a natural consequence of the low importance of supernatural norm enforcement in small band living, where intimate contact between all group members sufficed to limit the scope of hideous free-riding on public goods (Wright 2010). Yet, it makes the significant resources devoted to please the spirits even more puzzling, as the practices have no obvious fitness advantage for such groups or their individuals. The standard explanation refers to the asymmetry between fitness costs of statistical errors of type I (believing a falsehood) and type II (rejecting a truth) (Shermer 1998, 2008, 2009; Foster and Kokko 2009; Beck and Forstmeier 2007), and the basic idea is easily understood with an example: You hear a rustling in the grass that may be from wind or from a predator. In the majority of cases, a harmless gust is the cause. But uselessly running away has little cost, while staying when it was the predator can be lethal. In this case, the theory maintains, it is evolutionarily favorable to *interpret* the rustling as predator's deed; after all, with asymmetric enough payoffs in the sense of an overly high risk from ignoring the sign, we definitely fare better running away! It is claimed that the ubiquity of such asymmetric payoff situations means that superstition as the false attribution of causality (and intent) is '*an inevitable feature of adaptive behavior in all organisms, including ourselves*' (Foster and Kokko 2009), that is, necessarily a long-run ESS, and that the superstitious tendencies would today still be beneficial even for modern humans, rather than just an inherited trait (Beck and Forstmeier 2007). This is perplexing. A modern educated human could obviously enjoy a material benefit from behaving according to adequate statistical inference rather than to live

³Despite occasional claims to the contrary, evidence seems clear on that point; cf. Stark (2001) for an overview.

according to superstitious rules. The simple asymmetric payoff-theory ignores the human capability of attributing probabilities to relations (e.g., Vyse 2013, p. 117), going beyond dichotomous linking. Humans act contingent on both, *probabilities* and *payoffs* of outcomes. A great meal awaiting on the other side of the river, we are not limited to reflecting ‘there is an alligator in the river and he will kill me’ or there ‘is no alligator and I can just swim through.’ Instead, we will inevitably ponder on the *likelihood* of there being an alligator and *weigh* it against our appetite. Ancestors, and their modern counterparts alike, are prone to cross the river when starving and the river normally found to be rather safe, but will abstain if the region and its waters are populated by dangerous animals and alternative sources of food abound. This puts into perspective simple explanations of patternicity, based on which superstition and early spirituality are maintained as obvious, evolutionarily (long-term) stable strategies. Instead, we propose that superstition in humans is more directly a natural characteristic of a mind whose higher cognitive capabilities were strongly shaped by interaction with indeed ‘animated’ peers and selected throughout time according to its ability to capture and anticipate what other minds think and do to reach their aims. In this sense, the tendency to find intent in natural happenings may indeed be primarily an artifact of these mental core functions, rather than *itself* a directly selected trait. This seems plausible considering the only recent emergence of higher cognitive capacities of the mind as suggested by the final major step of brain size some 200,000–100,000 years ago (e.g., Donald 1991). The few thousand generations at disposal for selection to improve the structure of the final brain were arguably scant time for genetic fine-tuning. In this case, a rather unrefined, general mental tendency of seeking agency in the world, stemming from a rather *ad hoc* adaptation to the environment in which it evolved, needs not surprise.

12.3.2 *Big City Life*

The evolutionary challenge for modern moralistic religion typical of evolved human societies such as chiefdoms, kingdoms, and states is distinct from that of unmoral spirituality. The (evolutionarily) costly rites, sacrifices, and taboos (e.g., Atran and Henrich 2010) of moral religion may be justified by implied fitness benefits. The larger groups, characterized by more ephemeral social relationships, offer increased scope for free-riding, jeopardizing the production of public goods crucial for group fitness. A supernatural surveyor and punisher is thus a welcome aid, plausibly decisive for the group’s stability and success (Wright 2010; Norenzayan and Shariff 2008), and many studies suggest an empirical link between morality and religiosity (Saroglou 2012, 2013; Atran and Henrich 2010). Some maintain religious *practices* (rather than the underlying *beliefs*) could be major explanatory factors for morality (Bloom 2012; Galen 2012). Stark (2001) considers different types of religions and finds religiosity sustains the moral order only if it is centered on active and morally concerned Gods. This fits well the above evolutionary account with moralistic

elements of religions emerging only when larger group sizes imply an important benefit from heavenly surveillance.

Section 12.2 suggested that innate altruism emerging from group selection would unlikely be strong. Yet, religions are regularly associated with substantial sacrifices by individuals. Boyd and Richerson (2002a) and Henrich (2004) explain that challenges typically associated with genetic group selection need not apply to cultural group selection (see also Fehr and Fischbacher 2003; Atran and Henrich 2010). The need for genetic replacement is dropped; cultural traits, aka memes (Dawkins 1989), can spread by simple imitation. A rational tendency to mimic successful groups could mean that beneficial memes spread and conformist traits stabilize cultural groups when integrating migrants. From the perspective of the cultural *group*, this seemingly explains the evolutionary success of religions.

12.3.3 *Uncostly and Costly Signaling*

Even cultural evolution must, however, ultimately be understood at the level of the *individual*. Proposed intrapersonal explanations of belief include that religiosity increases fitness by offering relief from terror of death (Vail et al. 2010) and by preventing costly real punishment by others (Johnson and Bering 2006). Such largely intrapersonal explanations leave important questions open. An individual with a psychology evolved so as to cope with fear from death directly fared better than one relying on personally costly religious traits. Johnson and Bering's implicit assumption of an underestimation of the costs of prospective punishment would require explanation in the first place.

This begs the question of what facilitates the mind's acceptance of a belief with an individually costly⁴ moral code, supported only by oral delivery (and potentially partly by patternicity). Henrich (2009) proposes that costly, 'conspicuous,' rites act as *credibility enhancing displays* (CRED), belief-enforcing signals to observers.⁵ This idea is closely related to the economic concept of costly signaling as a rational means to separate truthful private information from cheap talk (e.g., Akerlof 1970; Farrell and Rabin 1996). However, the following argues that Henrich's concept of CRED (i) does not directly explain why specifically *moralistic* religious beliefs emerged instead of more arbitrary beliefs, and (ii) it ignores that the display of the rites by individual community members does not present any truly costly display; for an unbeliever, it can instead easily be seen as individually rational to respect the customs in order to prevent the exclusion from the overall successful club. Yet, considering the functioning of the community itself as the only unbiased testimony

⁴The group's general adherence to the belief may be beneficial to the individual, but it does not make personal adherence to the *belief* beneficial to the individual.

⁵Empirical evidence suggests costly rites increase the longevity of religious communes (Sosis 2000).

of the belief by individuals, we find indeed a truly costly, but indirect signal exhibited by the general member of the group, suggesting that specifically for *moralistic* religions, costly signaling can enhance the evolutionary stability.

An individual within a moralistic religious group would strictly have to judge other individuals' attendance to the rites as non-costly: They have direct costs, but exclusion plausibly following non-attendance could itself have higher real material costs, so that the relative costs of attending could naturally be seen as below zero. Only considering the religious belief as the ultimate source on which enforcement of the morality relies, and this morality being essential for the functioning of the community, an observer finds indeed a directly observable signal of costly commitment: If members generally were unbelieving, the community would be malfunctioning, so that the sheer functioning of the religious society itself constitutes the required signal. This mechanism does not generally support belief systems involving costly rites as membership criteria and, potentially, supernatural beings, without moralistic code that specifically relies on the belief itself (rather than on largely rational reciprocity and punishment), for the (relatively) vigilant learner would not find evidence for a truly costly signal confirming the belief.

In a straightforward framework, it could thus indeed suffice that individuals accept widespread, really (individually) costly action as a truthful signal, in order for learners to specifically accept moralistic religions, explaining the stability of such belief systems. Moralistic religious belief systems, which emerged in genetically very recent times, are thus *exceptional* self-enforcing equilibria in the way they may be largely explicable based on attendance to costly signaling of their models, even absent a fully rational foundation.

Are such systems easily exploited? The clue is that the believer has no incentive to exploit the community—supernatural wrath incurred by defection can be prohibitively large. Nevertheless, the systems seem exploitable, and indeed, the very formers and transformers of belief systems seem to have shaped religions in ways supportive of their own worldly aims throughout history (Wright 2010). Self-enhancement (Sect. 12.4) can partly explain such moves, even absent a conscious abuse of power by such leaders: Their convictions may themselves have been unconsciously biased (Wright 2010).

Self-enhancement offers a further explanation for the ease of adoption of many religious narratives: Promised heavenly justice seems often a potent relief from life circumstances and hence presents a naturally attractive option for a mind predisposed to believe what pleases.

12.4 Self-Enhancement

Mechanisms proposed as evolutionary explanations for self-enhancement act on an intrapersonal or an interpersonal level. Intrapersonal explanations, proposed notably by psychologists, identify benefits the self derives from misleading itself (Greenwald 1980; Alloy and Abramson 1979; Lewinsohn et al. 1980; Sedikides

and Skowronski 2000; Krebs and Denton 1997). For example, an overly positive self-perception is thought to prevent depression, which naturally would suggest a fitness benefit of biased perception by means of avoiding unhealthily low life activity and other effects characterizing depression. Proposed interpersonal benefits include notably reduction of the cognitive cost and increased credibility when deceiving others (von Hippel and Trivers 2011; Myers and Ridl 1979; Alexander 1987; Trivers 1985), high self-esteem increasing esteem by others (Sedikides and Skowronski 2000), as well as the beneficial treatment of happy persons in social interactions (von Hippel and Trivers 2011).

12.4.1 Perceptions and Their Translation into Action

The behavior of a self-aware individual can be described with two mapping functions, one translating real-world observations into perceptions of the self and the world, and a decision rule leading to actions based on perceptions. The intra-personal explanations for self-enhancement have been criticized as evolutionarily inconsistent because it is more efficient to optimize decision rules given an accurate perception rather than to distort perceptions which must induce overhead costs (e.g., Pinker 2011). This critique can be extended to interpersonal explanations of self-enhancement. Similarly to our own decisions, our personal perceptions can affect others only via our personal, conscious, and unconscious decision rules. As biased perception has high extra costs (Leary 2007; Funder 2011), this means an ESS would be to adapt directly the decision rules and to leave own perceptions unbiased, in line with Pinker's critique (2011). Fully thinking through the Pinker's critique hence implies that proposed explanations of self-enhancement, in so far as they consider the trait as an ESS, seem not entirely satisfactory. Yet, most proposed explanations of self-enhancement, explicitly or implicitly, seem to advance the trait as an optimal long-run strategy.

12.4.2 Moderately Skilled Liars

There is an ongoing debate about the degree to which humans are good liars or, instead, good lie detectors. Evidence seems mixed; depending on circumstances, humans appear to get away with lies rather successfully or, instead, be caught rather easily (for an overview see von Hippel and Trivers 2011; Vrij 2011). It may thus be fair to call humans rather moderately skilled in lying. This view will ultimately square well with the reflections that follow.

12.4.3 *Ad Hoc Evolution*

The following suggests that delivering a genuinely ‘optimal’ self-perception (and decision rule) in terms of evolutionary fitness would be by far too demanding for the framework within which the genetic foundation of the human mind evolved. Instead, the evolutionary time since the beginning of the explosive development of conscious, abstract intelligence of humans or hominids, was likely far too short to support largely optimal adaptation. Strong evolutionary pressure raised support for the spread of features in line with (but not identical to) the evolutionary optimum, but due to fundamental genetic laws was unable to increase directly the pool of new genetic arrangements to draw from. This meant that even features only roughly in the direction of the evolutionary fitness pressure, and with potentially substantial overhead costs, were selected; *ad hoc* evolution rather than ideal evolution. On the order of 200,000–100,000 years may have been at disposal since the emergence of our species *Homo sapiens*, with enlarged brains (e.g., IHO 2008) presumably fundamental for the distinctly human cognitive capacities (e.g., Donald 1991). This is very brief on a timescale for genetic human evolution, especially considering the fine-tuning of novel machinery such as the enhanced human cognitive apparatus. In times of moderate evolutionary pressure, one might simply expect relatively moderate genetic changes, but the explosive change in cognitive capabilities, accompanied by demographic and social changes, meant an extraordinary evolutionary pressure (e.g., Haidt 2012) that likely was able to help spreading a range of beneficial though suboptimal adaptations, and the following explains how self-enhancing biases are plausibly among them. Conceptually, this means that while thinking in terms of ESS may be adequate for evolution in gradually changing environments (or when plenty of time follows a change), the rapid pace of changes in the case of recently emerged human cognitive capacities warrants a broader perspective, an ‘everything that tends into the right direction goes’ view. ESS, i.e., traits that would be long-run optimal, will in this case, rather than themselves emerge, figure as guidance for *ideal* features against which realistically selected traits are to be benchmarked.

Having evolved in intimate bands of a few handfuls of people, early hominids and ancestors interacted with their peers day in, day out. Individuals knew their peers’ qualities almost as well as their own, having stood by or been close to most major happenings of everyone’s life. In such an environment, little scope is to be expected for deceiving others about most of one’s personal qualities. With others witnessing one’s qualities directly, the brunt of the social costs of personal misperception would be borne individually, as others would not be fooled. The cost of misperception and the likely following misjudgment and suboptimal decisions means that self-enhancing traits would have a net fitness cost and would be evolutionarily unstable. But after several million years of life in bands and smaller tribes, what implication does emergence of living in larger groups, which over time lead to tribes with higher headcounts, then to chiefdoms of often hundreds, potentially up to many thousands of people, imply, regarding expressed, and felt,

self-esteem? A state with biased self-esteem and misled interactants appears unstable in two ways. First, one would ideally only *express* a better picture about oneself, rather than believe it personally. Second, others should develop a healthy skepticism that dismisses cheap talk about good characteristics lacking evidence beyond personal communication. In this sense, a substantial level of self-enhancement as an ESS seems unlikely. However, as we have seen, there was scant time for evolution to allow optimal adaptation. In a dynamic system, starting from a mind tuned to act honestly given its perceptions, the new situation with enlarged groups would clearly have supported an ad hoc adaptation by the individual to personally perceive one's own skills as better than they are: This addressed the shortcoming of the individuals' historically limited ability to actively deceive and allowed exploiting an (equally historically grounded) naivety of the audience. In parallel, the same evolutionary pressure that selected such misperception could have selected traits enhancing the ability to *consciously* deceive. Furthermore, conscious and unconscious deception, in turn, implied a pressure for the audience to develop more vigilance against deception. Time was scarce so none of the three adaptations were perfect; the evolutionary support for each of them remained intact.

In addition to the genetically very short time that was available to fine-tune the recently enhanced human cognitive apparatus, the high overhead cost of self-enhancement supports this theory of self-enhancement as ad hoc adaptation rather than an optimal trait (Leary 2007; Funder 2011). Moreover, the theory fits particularly well to experimental evidence of self-enhancement (Paulhus 1998): Self-enhancing individuals appear disadvantaged in intense (long) social interactions, but advantaged in more casual interactions, in line with the idea of self-enhancing as an adaptation to exploit an environment of more casual or anonymous interactions in enlarged social groups.

12.5 Bringing It All Together

The previous sections considered evolutionary explanations for altruistic, spiritual, and self-enhancing traits relatively independently. The three phenomena are strongly interlinked, occasionally even difficult to dissociate—famously, religiosity appears often so tightly linked to altruistic behavior that the former is sometimes considered indispensable for the latter, and the evidence for an increased popularity of narratives of heavenly redemption in dire times (Atran and Henrich 2010) fits the idea of an opportunistic mind whose subconsciousness makes believe whatever pleases. How do the traits, and the explanations for them, relate to each other?

The presented discussion about altruism maintains the possibility of differences in survival rates of groups based on their fitness to have supported a low level of positive other-regarding preferences. However, self-enhancement is proposed to have emerged as an unconscious strategy for the deception of peers, potentially at a substantial social cost. This paradox, of the simultaneous selection of an

individually costly trait for its benefit to the group and a trait costly to the group for its benefit to the individual, is readily solved. Whether the selective pressure at the group level suffices to outweigh individual fitness costs depends on trait-specific, quantitative particularities. Essential public goods, whose provision would have been difficult to maintain in groups of purely selfish reciprocators that psychopathically tried to exploit others wherever possible, may have implied a very strong group advantage of some altruism. Self-enhancement, in contrast, though not entirely petty, may not have had nearly as dramatic consequences for group survival; rather than primarily reducing the social surplus, it could have mainly led to a shift of resources from some to those most 'skilled' in self-enhancement. According to Sedikes and Skowronski (1997), self-enhancement could even have fostered altruistic behavior, as warm-glow effects related to the desire to see ourselves as nice increase our propensity to help. Furthermore, if self-enhancement selectively allows the self to justify certain egoistic positions, it may even have increased the cost-effectiveness of the altruistic provision of key public goods: Rather than behaving altruistically in all aspects of communal life, a properly shaped bias could lead the individual to justify contributing only in areas key for group strength rather than for peers personally.

A moralistic element has become a widespread component of spirituality only recently, along with the enlargement of human tribes, chiefdoms, or states, and its prior absence has been explained by the redundancy of a heavenly surveillance camera (Gervais and Norenzayan 2012) when members of small-sized bands are in intimate contact. Genes evolving more slowly, the independent component of innate altruism maintained above has presumably emerged much earlier. How can moral religious rules have been redundant in an earlier past, while genuine altruism was central for social life? On the one hand, originally smaller group sizes meant that an adequate level of public goods provision could be sustained even with a relatively limited degree of truly good intention, so that the limited level of sustainable genuine altruism (aided not least by reciprocity) could have sufficed. On the other hand, the increase in group size in recent times meant that public goods gained in importance, and their provision in the more anonymous societies became increasingly difficult, so that the altruism inherited from past life in smaller groups became relatively helpless.⁶ Moreover, supernatural supervision and punishment or reward specifically addressed the problem of anonymity accruing as group size increased. The problem of anonymity may not have been so much at the centre in the small bands, where instead other issues (e.g., containment of tendencies by strong individuals to overtly exploit others) could have been dominant.

Self-enhancement seems naturally conducive to the stability of religion: A mind prone to believe what pleases it seems attracted to comforting promises that things eventually turn out well (Gorelik and Shackelford 2011; Krebs and Denton 1997).

⁶While the evolutionary sustainability of altruism beyond kin in *small* groups is a matter of ongoing debate (cf. Sect. 12.1), for large groups of hundreds or more members, it is widely considered implausible.

Assuming the benefit from comforting belief to increase in dire times, this suggests a positive relationship between material deprivation and the level of religiosity, a relationship that is confirmed in experiments and surveys (Atran and Henrich 2010). In a dynamic world with intermittent environmental pressure affecting the survival of group, this can imply a tandem between self-enhancement and religiosity leading to a flexible level of culturally underpinned altruism. The bias means that cultural altruism is strongest in dire periods, when it is most useful for the group's survival. Habermacher (2014) shows with numerical simulations in a multi-level selection framework with continuous degrees of self-enhancement, religiosity, and genuine altruism, how such a tandem of self-enhancement and religiosity could in the long run crowd out more stable genuine altruism despite overhead costs of bias and religious cult.

A further relationship plausibly links the evolutionary origin of altruism and self-enhancement. Self-enhancement leads to an overly positive view not only about the *self* but equally about groups one identifies with, and it can explain a negative view of out-group members (Krebs and Denton 1997). In this regard, self-enhancement may have played a role in helping to direct or 'contain' altruism toward in-group members, lowering the requirement to strictly restrict the underlying altruistic compassion itself to group members. It would allow for deep-rooted human altruism itself to have been 'imprecisely' designed as rather encompassing from the outset—we could again talk of an *ad hoc* adaptation. In the past, a separate, negative bias against foreign groups grounded in self-enhancement was able to contain within the group the effect of the otherwise more general altruism, so that a strict group benefit was obtained. Ultimately, this would imply that the today observed extension of altruism beyond clearly defined kin or group circles is, in some sense, more natural than otherwise implied by the big mistake hypothesis. In this case, the main challenge boils down to explaining how modern culture leads to the containment of negative out-group perceptions that are based on deep-rooted self-enhancement. Plausibly, the increased availability of information about the people of the world largely explains this; it may simply have become difficult to decry all others as inherently repugnant if the facts show that they are, after all, just quite like us.

12.6 Conclusions

Altruism, religiosity, and self-enhancement are complex and intertwined facets of human societies, and a multi-disciplinary literature studies their evolutionary origins. Biological altruism is often seen as mainly relevant for kin relationships, for which it is readily explained by kin selection, with remaining phenomena explained as strategic cooperation, attributable to reciprocity with repeated interaction. This ignores the deeper reality of human, genuine altruism, extending—arguably on a low level—to humanity rather generally. Such an extent seems an unlikely expansion for other-regarding preferences ultimately based purely on direct

kin-level selection. Selection on multiple levels with non-negligible force acting at the level of groups could offer an explanation, and rather than devaluating group-selection forces because of their quantitatively limited impact, this weakness fits well with the apparent low *level* of the general component of human altruism.

Literature has proposed explanations for unmoral spirituality, moral religiosity, and self-enhancement, often as ESS, implying them to be optimal adaptations to a given environment either in the past or today. Critics have pointed out caveats of such explanations; ultimately, prevalent theories may have to be revised.

Here, it is proposed that rather than as ESS, the traits should be viewed as what might best be called ad hoc adaptations. Time available since the development of the higher human cognitive capabilities, roughly the past 200,000–100,000 years, was scant for an optimal fine-tuning of all brain functions. It seems perfectly conceivable that in the longer run, our brains would have improved in distinguishing genuine causal relationships from random events, limiting superstition. It seems equally plausible that in the longer run, self-enhancement, widely considered an aid to avoid cognitive costs when deceiving others, would largely be crowded out by an increased ability to consciously deceive. The reason for the presence of the apparently imperfect traits is that this evolutionary ‘long run’ has never materialized, because on an evolutionary timescale, the modern brain is young; the limited time available for adaptation to have been ‘complete’ offers a natural explanation for the evolutionarily interesting state of the human mind.

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