Atheists

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Abstract

Atheists represent an inconspicuous minority, identifiable only by their disbelief in God(s). Despite being highly stigmatized and disliked, until recent scientific endeavors, little has been known about this group including why they don't believe, how many people are atheists, and why they trigger intense reactions. Thus, this paper aims to synthesize what is known about atheists (so far), and to help explain the widespread negative attitudes and prejudice towards atheists; the possible cognitive, motivational, and cultural origins of disbelief; and the unique challenges facing the study of religious disbelievers. To do so, we will explore current findings in psychological research on atheism by considering the complex interactions of cultural learning, motivations, and core cognitive processes. Although significant scientific progress has been made in understanding the factors underlying atheism, there remains much to be explored in the domain of religious disbelief.

Keywords: atheism; religious beliefs; cognition; culture; motivation

Atheists

Saying atheism is a worldview is like
saying not going skiing is a hobby
~ Ricky Gervais

Atheists. Heathens. Nonbelievers. The godless. Atheism, which is by definition a mere lack of belief in a god or gods, provokes strong popular reaction and has for millennia (just ask Socrates). Yet, psychological scientists are only beginning to pose many of the most basic questions about atheists and atheism. Who are atheists? How do people view atheists, and why? Just how many atheists are there? Why are there atheists? We attempt to briefly sketch out the current state of the field on these questions, and hope to provoke further questioning.

Who are Atheists?

Atheists are merely people who disbelieve or lack belief in a god or gods. This makes "atheism" an inherently negatively defined trait: knowing somebody is an atheist may or may not tell you anything else about that person. Describing atheists as a group may not even make much sense (thought experiment: what can we say about the group "people who do not watch hockey?"). Indeed, it appears that the vast majority of atheists (at least those in the USA) do not self-describe as atheists (e.g., Gallup, 2015 vs. Pew 2015). They may instead identify as agnostics, nonreligious, freethinkers, or use a variety of other labels. As atheists are solely defined by what they *aren't*, it is unsurprising that atheists are quite heterogeneous. There may even be distinct typologies of atheists (Silver, Coleman, Hood, & Holcombe, 2014). For instance, many atheists view their disbelief as an individualistic journey for discovering meaning and may even be accepting of many religious elements (e.g., De Botton, 2012), while others are generally

more scornful of religion in its entirety (Hashemi, 2016). The latter approach is often associated with the *New Atheism* movement, whose prominent figures frequently advocate for the spread of secularism through militant atheism and the denigration of religion (e.g., Dawkins, 2006, Krauss, 2015).

What is Atheism?

Atheism describes those who do not believe in the existence of any particular gods. While a seemingly clear definition, questions commonly arise regarding what religious disbelief truly represents. Given belief is not an obvious state of being, it presents an important question of whether belief and disbelief fall on a continuum, or rather represent two distinct and perhaps opposing worldviews. This question is further complicated when considering those who express doubt and skepticism about the existence of god, rather than more unambiguous postures of religious (dis)belief. And to complicate things even further yet, many people may claim to be an agnostic, rather than an atheist.

For our purposes, we treat belief and perceived knowability as distinct dimensions. Agnosticism is an *epistemological* stance about the knowability of a god's existence. Theism and atheism are *metaphysical* stances about the actual existence of a god. One can be a believer or an atheist, while similarly holding the stance that the ultimate questions of a god's existence is knowable (a gnostic stance) or fundamentally unknowable (an agnostic stance), as shown in Figure 1. In this stance, claiming to be agnostic rather than atheist fundamentally confuses the metaphysical question of whether or not one believes in a god with the epistemological question of whether one thinks that

the answer to a god's existence is ultimately answerable. One can just as easily be an agnostic theist (Soren Kierkegaard) as an agnostic atheist (Bertrand Russell).

How Do People View Atheists?

In a pioneering sociological investigation, Edgell, Gerteis, and Hartmann concluded atheists were at the "top of the list of groups that Americans find problematic" (2006, p. 230). Atheists were distrusted as political candidates and marriage partners, as well as believed to disagree with the vision of American Society well above other stigmatized minorities including Muslims, homosexuals, and all other ethnic and religious groups. Interestingly, while people are reluctant to express prejudice against many stigmatized groups (Crandall, Eshleman, & O'Brien, 2002), they are evidently quite comfortable voicing their dislike of atheists; anti-atheist prejudice is one of only a few socially acceptable forms of prejudice in America today (Brown-Iannuzzi, Najle, & Gervais, under review). Moreover, such prejudice is not simply a result of a highly stigmatized label (such as with feminists: Williams & Wittig, 1997), as descriptions of being an atheist versus not believing in god render similar reactions (Swan & Heesacker, 2012).

Stigmatization of atheists may escalate to outright discrimination. In 2008, the online survey "Coming Out as an Atheist," was launched and quickly fluttered through internet communities collecting 8,200 atheist respondents (Arcaro, 2010). Of the Americans surveyed, only 16% reported that they felt *no* social stigma regarding being an atheist. Further, 57% felt the repercussions of stigma associated with their atheism in the workplace, 61% in their families, and 68% in the local community. In a nationally representative study, 41% of atheists had experienced discrimination in the last five years

based solely upon their identification as an atheist (Hammer, Cragun, Hwang, & Smith, 2012). While discrimination varied in severity, 96.7% experienced slander, 92.5% experienced coercion, 56.4% had been socially ostracized, 15.8% had been denied opportunities, goods, or services, and 13.7% experienced hate crimes. Textual analyses of participants' narratives suggest assumed religiosity, lack of secular support structure, lack of church and state separation, negative effects on family, unreciprocated tolerance, and anticipatory stress resulted in discrimination stress for atheists. Of the self-identified atheists, there was substantial evidence that many atheists were reluctant to disclose their atheism to many of their closest peers and family members.

…and Why?

Americans construct the atheist as the symbolic representation of one who rejects the basis of moral solidarity and cultural membership in American society altogether
~Edgell, Gerteis, & Hartmann, 2006, p. 230

Without God and the future life?
It means everything is permitted now,
one can do anything?
~Dostoevsky, *The Brothers Karamazov*

Atheists do not represent a coherent social group. According to many classic social psychological models of prejudice, groups are formed based either on social interdependence (Rabbie & Horwitz, 1988; Thibaut & Kelley, 1959) or social categorizations and identities (Tajfel & Turner, 1986; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Yet, neither of these frameworks—nor, indeed, many other classic approaches to prejudice—applies well to atheists, as disbelief is relatively individualized and atheism is an inconspicuous identity many actively conceal (Gervais, 2013; Gervais & Najle, 2017). Thus, atheists do not represent an easily identifiable or widely organized

social group. That is, atheists do not constitute the kind of cohesive group that could engender the sorts of intergroup conflict that drive many other prejudices (e.g., Allport, 1954). These traditional approaches to prejudice and stereotyping would generally not predict that atheists would provoke the strong negative reactions they so clearly do. Thus, it is worth considering which functional threats atheists might be seen to pose. To do so, the potential functions of religion should be considered including the domains of existential angst, morality, and ingroup prosociality.

At a motivational level, religions may flourish in part by easing peoples' existential concerns, such as the discomfort widely recognized from the awareness that all humans will one day die (Vail, et al., 2010). Considering this, terror management theory (Greenberg, Pyszcynski, & Solomon, 1986) posits religious beliefs serve to mitigate the anxiety associated with the knowledge of mortality by offering the comfort of an ostensible promise of a (literal or symbolic) life after death[1]. Supporting this, reminders of mortality increase religious faith in supernatural agents (Norenzayan & Hansen, 2006), confidence in afterlife beliefs (Schoenrade, 1989), and positivity towards those of shared worldviews and hostility towards outsiders (Greenberg, Solomon, & Arndt, 2008).

The existential threat or danger atheists may pose to believers by rejecting and challenging religious beliefs about mortality may help to explain anti-atheist prejudice (Cook, Cohen, & Solomon, 2015). Not only do people tend to feel more negatively and distrustful of atheists after thinking about death, but simply considering atheism has been shown to increase implicit thoughts of death, indicating an existential factor to anti-atheist attitudes (Cook et al, 2015). While religion may help assuage the anxieties of

mortality, atheists may be threatening reminders of existential terrors their beliefs may not completely alleviated. Although alternative worldviews (e.g., differing religious beliefs, ideologies, practices) themselves may pose existential threats, atheists may be seen as an especially dire existential threat by denying the supernatural altogether. That said, little to no available research clearly distinguishes between the terror management functions of anti-atheist prejudice, relative to other anti-outgroup attitudes.

Although religion involves personal beliefs, such as beliefs about the afterlife, religion should also be considered through the broader social functions it serves. For instance, the group processes of religions (e.g., collective behaviors, shared rituals) help to form a moral community built upon shared beliefs and encouraging communal actions (Graham & Haidt, 2010). Similarly, religion also serves to promote ingroup prosociality while expanding social networks by extending to larger groups connected by similar systems of values and beliefs. Thus, the historical growth of large scale societies occurred along with the wide-spreading belief in powerful supernatural overlords monitoring human behavior, or *Big Gods* (Norenzayan et al., 2016). Through such periods of expansion, religion has allowed for the spread of rituals and beliefs encouraging large scale cooperation and solidarity between groups.

Threats posed by atheists can also be considered through the framework of moral foundations theory, which postulates that moral intuitions comprise five distinct categories including care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, and sanctity/degradation (see Graham et al., 2013). In a study comparing judgements on the moral intuitions of ingroups and outgroups, Christians believed their ingroup to endorse all five moral foundations significantly more than atheists, whereas atheists

considered their ingroup to endorse only fairness/justice more than Christians (Simpson & Rios, 2016a). These results corroborate similar findings of atheists being the most frequently thought to violate moral foundations (Gervais, 2014). Although Christians consider atheists less likely to endorse moral foundations, perceptions of how caring, kind, and compassionate atheists are significantly predict prejudice towards them (Simpson & Rios, 2016b). Atheists could thus be considered threatening not simply to an individual, but threatening the loyalty, authority, and sanctity foundational to closely-knit moral communities (Graham & Haidt, 2010).

Atheists may also pose a threat to moral purity, or sanctity described in moral foundations theory. Reflecting this idea, Christians experience disgust responses to copying text from *The God Delusion* (Ritter & Preston, 2011). However, this disgust was successfully alleviated when they were given the opportunity to symbolically cleanse themselves by washing their hands. Similarly, atheists elicit more moral disgust, negative emotions, and are considered a greater threat to participants' values than gay men, Muslims, and people with HIV (Cook, Cottrell, & Webster, 2015). Further, when values are threatened, negativity and discriminatory reactions (e.g., unwillingness to vote for or support their businesses) towards atheists increase.

The threats atheists pose result in them being morally distrusted, as evidenced through several findings (Gervais, Shariff, & Norenzayan, 2011). First, untrustworthy conduct is viewed as more characteristic of atheists than gay men, feminists, Jewish people, Christians, and Muslims alike. The only group considered to be similarly distrusted, alongside atheists, was rapists. In fact, cultists are the only group found to be more widely disliked than atheists (Cragun, Henry, Homan, & Hammer, 2012). Second,

distrust of atheists is not a function of perceived unpleasantness, competence, or warmth. Third, untrustworthiness has a strong implicit association with atheists. Fourth, the perceived untrustworthiness of atheists manifests through discrimination in hiring situations, as atheists were far less likely to be chosen for jobs requiring highly trustworthy employees (i.e., daycare worker; Gervais, Shariff, & Norenzayan, 2011).

Acute distrust of atheists may stem from people's intuitions regarding the origins of morality. Most people around the globe view religious belief as an essential component of morality and values (Pew, 2015). This implies that individuals without religious beliefs would be viewed as unfettered moral wildcards who cannot inhibit their basest urges. As a result, American participants—even atheist participants—intuitively assume that the perpetrators of immoral actions (including animal abuse, cannibalism, incest, necrobestiality, and even murder) are atheists (Gervais, 2014). This is not an American peculiarity, as a recent investigation probed intuitions about the assumed identity of serial murderers in 13 countries around the globe (Gervais et al., 2017). This project included both highly religious (e.g., United Arab Emirates) and highly secular (e.g., Netherlands, Czech Republic, China) societies. In every investigated country except for Finland (and to a lesser extent New Zealand), there was overwhelming evidence that people intuitively assume that the perpetrators of outright moral evil are atheists. As in the USA, even atheists shared this intuition. It would seem Dostoevsky's famous query in *The Brother's Karamazov* pithily captures people's intuitions about the moral fabric of atheists: without God, everything is (apparently, according to survey respondents) permitted.

Distrust and prejudice against atheists seem to be a function of religious belief, rather than religious practices. In a large sample across 41 counties, people belonging to religions emphasizing the importance of *belief* (i.e., Protestants & Muslims) had more anti-atheist attitudes than did people from religions with a greater emphasis on *practices* (i.e., Jews & Hindus), suggesting prejudice may be moderated by cultural differences between religions (Hughes, Grossman, & Cohen, 2015). Comparatively, Buddhists, Jews, Unitarian Universalists, and secular undergraduates had more appreciative attitudes towards atheist students than did Protestants, Mormons, Evangelicals, Muslims, and Catholics (Bowman, Rockenbach, Mayhew, Riggers-Piehl, & Hudson, 2017).

Just How Many Atheists are There?

Obtaining valid estimates of how many atheists remain closeted presents both a challenge and an opportunity for understanding the consequences of stereotypes and prejudice associated with religious disbelief. The question of how many atheists there are turns out to be quite complicated to answer, given that many atheists may avoid self-identifying as such in the face of pervasive stigma and stereotypes associated with religious disbelief. Moreover, as atheists are an invisible minority, individuals may choose, to some extent, how "out" they would like to be (Smith, 2010). Recognizing this trend, several secular organizations have developed initiatives encouraging atheists to come out of the closet in attempts to normalize and destigmatize disbelief (e.g., *Openly Secular*). However, for those living in particularly religious areas of the United States, including the "Bible Belt," the pressure to conform to - or at least not to dissent from - established social norms is likely more pronounced (Norenzayan & Gervais, 2013). Thus, non-believers' may determine that disclosing their atheism is not worth the stigma and

social costs accompanying this identity. Even anonymous polls may be susceptible to various self-presentational biases, leading to underestimates of actual atheist prevalence.

Thus far, traditional approaches using nationally representative samples based on telephone polling suggest that around 3% of Americans self-identify with the term "atheist" (Pew, 2015), while 11% indicate that they do not believe in God (Gallup, 2015). Social desirability bias (admitting only to behaviors and beliefs consistent with social norms), may keep many from freely identifying as atheists even when such information is anonymous (Cox, Jones, & Navarro-Rivera, 2014). Hence, claims of religiosity based on traditional telephone polling are likely inflated.

To circumvent the conformity pressures of religious norms and explore underreporting of atheism, Gervais and Najle (2017), used the *unmatched count technique* (e.g., Dalton, Wimbush, & Daily, 1994; Raghavarao & Federer, 1979)—a widely used experimental technique for indirectly deriving prevalence estimates for socially undesirable or forbidden attitudes and behaviors—to estimate the prevalence of atheists in the USA across two nationally representative samples. The unmatched count technique is a count task in which participants are given a list of statements and they indicate how many items on the list are true of them (but not which specific items). Crucially, participants are randomly split into two groups. One group's list consists of only mundane statements (e.g., I am a vegetarian; I work outside; I brush my teeth daily); the other group receives an identical list that also includes one socially sensitive item (e.g., I am a vegetarian; I work outside; I brush my teeth daily; I smoke crack cocaine). The difference in average counts between the two groups can be attributed to the addition of the socially sensitive item. This method was adapted whereby the socially sensitive

items included statements about belief or disbelief in God to better assess atheism rates (Gervais & Najle, 2017). Such statements included *I believe in God* in one sample and *I do not believe in God* in a second sample. Similar to previous use of the UCT, participants reported how many statements from the presented list were true of them. This produced an indirect estimate of roughly 26%, more than twice as high as Gallup's estimate and nearly ten times that reported by Pew, see Figure 2. If accurate, this figure indicates a large number of atheists—from a third to half—are deeply "closeted" and unwilling to admit their atheism even in anonymous polls. This 26% figure should be treated with some caution, as indirect measures of the prevalence of atheism are still in their infancy. However, if true, it would suggest the existence of nearly 100 million atheists in the USA alone, perhaps implying well over a billion atheists worldwide.

Why are People Atheists?

Why are some people religious while others are not? What leads to religious belief? Further, what factors predict atheism? To synthesize current psychological research on religious belief and disbelief, Norenzayan and Gervais (2013) postulate that religious beliefs result from an interaction of cognitions, motivations, and cultural learning. These pathways give rise not only to religious beliefs, but also provide the origins of atheism or religious disbelief. Using this framework, four mechanisms from which religious beliefs depend have been proposed: (a) the ability to intuitively create mental representations of supernatural beings; (b) motivation to treat supernatural agents as essential sources of meaning, control, and comfort; (c) cultural learning regarding which representable supernatural agents are "real"; and (d) maintenance of belief over time. Although these factors sustain belief, disruption of any of these channels may

naturally result in atheism. This framework tentatively implies four kinds of atheists delineated by the specific origins motivating their disbelief in religion (Norenzayan & Gervais, 2013).

Mindblind Atheism. The first develops from the inability to intuitively mentally represent supernatural agents. This draws upon research including neuroimaging studies examining brain activation reflecting mentalization of thoughts about God (see Kapogiannis et al., 2009; Schjoedt, Stødkilde-Jøgensen, Geertz, & Roepstorff, 2009), the relationships between mentalizing inclinations (also known as Theory of Mind and mind perception) and individual personifications of gods (Gray, Jenkins, Heberlein, & Wegner, 2010), and higher rates of religious disbelief observed in relation to the autism spectrum (Norenzayan, Gervais, & Trzesniewski, 2012). As mentalizing, or inferring others' mental states, is likely a necessary but not sufficient condition for belief in supernatural agents, individual differences across most of the spectrum of mentalizing should not predict religious belief; however, individuals with more severe mentalizing deficits are hypothesized to be quite unlikely to believe in personalized gods. Thus, any mentalizing-belief relationships ought to be both small in magnitude and potentially curvilinear in nature. Indeed, they may not even exist in countries lacking strong cultural support for religion (Maij et al., 2017).

Apatheism. The second pathway to atheism is distinguished by a lack of motivation or indifference towards the need for religious belief. One strong motivating force for religion is the security and support provided by religious social structures during times of hardship (Atran, 2002; Gray & Wegner, 2010). Moreover, risks to existential security such as suffering (Gray & Wegner, 2010) and natural disasters (Sibley &

Bulbulia, 2012), isolation (Epley, Akalis, Waytz, & Cacioppo, 2008), inequality and poverty (Gray & Wegner, 2010; Norris & Inglehart, 2004), uncertainty (Kay, Moscovitch, & Laurin, 2010; Rutjens, van der Plight, & van Harrenveld, 2010), and thoughts about mortality (Dechesne et al., 2003; Norenzayan & Hansen, 2006; Jong, Halberstadt, & Bluemke, 2012; Vail, Arndt, & Abdollahi, 2012) have been found to motivate individuals to seek comfort or stability through religious beliefs and their associated practices. In the absence of these threats, religion becomes less prominent (Norris & Inglehart, 2004). Likewise, many of the least religious countries are those which provide the most existential stability and security through secular institutions (e.g., high income equality, healthcare & social services; low crime; Zuckerman, 2008).

InCREDulous Atheism. The third pathway to disbelief develops from limited cultural learning and exposure to credible sources of religion. Cultural sources of religion may include being raising by religious parents, attendance of religious services, participation in various religious practices, and exposure to religious icons or figures. Nevertheless, for religious belief to develop, these cultural sources must also be considered reliable and credible (Norenzayan & Gervais, 2013). Most importantly, the sources must display potentially costly actions that prove their faith, termed credibility enhancing displays or CREDs (Henrich, 2009). CREDs are any actions that would be costly to an actor who does not actually hold the beliefs she espouses. For instance, eating a mushroom can serve as a CRED of an actor's underlying belief in the statement "these mushrooms are nutritious and nontoxic" for if the actor were trying to exploit learners by poisoning them, she is actually exposing herself to the same poison. Indeed, in this case learners should be especially wary of vouched-for mushrooms that go uneaten

by those extolling their safety. Religious CREDs include a range of behaviors, whereby believers reflect their dedication to their belief, from martyrdom to fasting. Therefore, disbelief is more likely to occur when exposure to trusted religious sources—or exposure to religious CREDs—is lacking. Cultural contexts in which religious CREDs support belief in a given deity promote belief among naïve cultural learners; in the absence of such CREDs for any specific deity, atheism flourishes (Gervais & Henrich, 2010; Gervais & Najle, 2015; Gervais, Willard, Norenzayan, & Henrich, 2011; Lanman, 2012).

Atheism may result from both a lack of exposure to religious CREDs and exposure to pro-atheist CREDs. Rather than relying on religious cultural sources, atheists may turn to alternatives for meaning and comfort better reflecting their values such as science (Farias, Newheiser, Kahana, & de Toledo, 2013; Rutjens, van Herreveld, van der Pligt, Kremmers, & Noordewier, 2013) and belief in human progress (Rutjens, van Herreveld, van der Pligt, van Elk, & Pyszczynski, 2016). In addition, credibility undermining displays (CRUDs) of religion—such as priest sex scandals—may undermine religiosity among believers, contributing to atheism (Lanman, & Buhrmester, 2016).

Analytic Atheism. The fourth, and perhaps both most popular and controversial, pathway to disbelief is through analytic cognitive style. Popularly, atheism results from rational, scientific thinking (LaBrie & Earleywine, 2000). Self-reports by atheists also prominently feature rationality and science as sources of their own disbelief (Caldwell-Harris, Wilson, LoTempio and Beit-Hallahmi, 2011). Moreover, many academic fields of natural and social sciences house a disproportionate number of religious disbelievers (Ecklund & Scheitle, 2007) with estimates of only 33% of scientists in the American

Association for the Advancement of Science reporting belief in God (Pew, 2009). Finally, there are small but stable negative correlations between intelligence and religiosity (Zuckerman, Silberman, & Hall, 2013) that may be partially driven by analytic thinking. So, atheists often perceive their disbelief as rooted in rationality. Is there any actual relationship between the two?

Theoretically, there is some reason to suspect a relationship between rational thinking and religious disbelief. Longstanding traditions in the cognitive science of religion (Barrett, 2000; Bloom, 2007; Boyer, 2003) frame religious beliefs as rooted in everyday intuitions about things like intentional agency (Barrett, 2000), function (Kelemen, 2004), and order. Yet independent work in psychology describes two distinct yet interacting systems for processing information (Evans, 2003). Often, we rely on intuitions and simple heuristics, but we can also engage in more analytic, deliberative, effortful, and rational thinking. If religious belief is in part rooted in intuition, perhaps analytic thinking might reduce religious belief.

In 2012, three research teams independently performed essentially identical studies to test this idea. Using performance-based task, the Cognitive Reflection Test (see Table 1; Frederick, 2005), all three teams found that analytic thinking predicted lower levels of religious belief (Gervais & Norenzayan, 2012; Pennycook, Cheyne, Seli, Koehler, & Fugelsang, 2012; Shenhav, Rand, & Greene, 2012). Further, two of the teams found that experimental prods designed to trigger analytic thinking produced statistically significant reductions in self-reported religious belief (Gervais & Norenzayan, 2012; Shenhav et al., 2012). Atheist self-reports of rational origins for their disbelief were vindicated! Atheism results from rational thinking!

Not so fast. A number of very necessary caveats are in order. First, a negative relationship between analytic thinking and religious belief in no way implies that atheism *generally* results from analytic thinking. Second, it is worth noting that the effects in all studies were very small in magnitude, explaining only a very small proportion of variance in religiosity. Third, while the correlational link between analytic thinking and religious disbelief appears robust in some contexts (Pennycook, Ross, Koehler, & Fugelsang, 2016), the experimental results are much more tenuous. There exists at least one published failure to replicate one of the experimental results (Sanchez, Sundermeier, Gray, & Calin-Jageman, 2017), and no public successful direct replications of any of them. The reported effects may not be especially robust—a pattern increasingly common in social psychology (Open Science Collaboration, 2015). Finally, the vast majority of research on this topic focuses on North American samples—again, a problem hardly unique to this topic (Henrich, Heine, & Norenzayan, 2010)—and very little is known about the cross-cultural generalizability of these relationships. That said, one forthcoming paper (Gervais et al., 2017) finds that even the correlation between analytic thinking and religious belief is highly culturally circumscribed, appearing robustly in North America, but very rarely in other parts of the world. In sum, there does appear to be a (small) relationship between analytic thinking and atheism (in North America). But this relationship is far weaker than would be implied by anecdotes and self-report data from atheists who claim that their atheism stems from rationality. This may suggest self-presentational biases promoting the portrayal of rationality and science-mindedness among some atheists, a topic for future investigation.

Summary & Future Directions

The scientific study of atheism and its origins is in its infancy. Yet this early work has already begun to generate some promising leads, and at least one framework trying to integrate various lines of research. Thus far, it seems mentalizing, motivation, culture, and cognitive style may be four crucial factors that interactively lead to atheism. However, this framework is necessarily tentative and many questions are yet unexplored. Future research has many areas beckoning scholarly attention including uncovering a more complete understanding of the negative perceptions of atheists and threats they may pose to religious believers, continued work exploring the underreporting of atheism both in populations estimates and motivations to avoid the *atheist* label, elucidating the lines between belief and disbelief, further examining the relationship between disbelief and analytic thought, as well as investigating the experiences of atheistsregion themselves.

Regarding perceptions of atheists, there is now a fair amount of evidence suggesting that atheists are seen as potential moral wildcards, who may be threatening to believers for various reasons. However, scant research has addressed ways to mitigate anti-atheist prejudice. The concealability of atheism makes traditional interventions such as intergroup contact complicated. We suspect that the peculiarities of anti-atheist prejudice may require more specific tailored interventions.

We have presented initial evidence that atheism prevalence in the United States may be considerably higher than self-reports suggest. It would be well worth expanding this initial foray to generate more complete estimates of the global distribution of atheism.

Future research should aim to further elucidate the processes by which people become atheists. While four candidate processes have been implicated, little is known

about how atheists born in religious families might come to leave atheism, or how people might shift from belief to a stage of doubt or agnosticism, to full-fledged disbelief. Similarly, there may be identifiable psychological differences between lifelong atheists (e.g., those born in areas with little cultural support for religion) and religious deconverts. Finally, it is unknown which factors most powerfully contribute to the global spread of atheism. There are notable cross-cultural and regional differences in atheism (Norris & Inglehart, 2003). We speculate that such differences are primarily driven by the interaction between existential security and cultural learning, rather than mentalizing or analytic thinking.

Finally, additional research is needed to further elucidate the very nature of belief and disbelief. Are these independent constructs? Do they represent a psychological dichotomy, or merely endpoints on a continuum including various gradations of doubters, skeptics, and true believers? Does the psychology of belief and disbelief map neatly onto the two philosophical dimensions of belief-disbelief and gnosticism-agnosticism? Future research on belief can move beyond supernatural beliefs and consider the basic nature of belief in any concept.

Coda

Religion is a core aspect of human nature, an apparent cross-cultural human universal. However, belief in God or gods is also highly variable. Understanding the sources and consequences of variability in belief in gods is central to the scientific study of religion. Atheism therefore represents a key testing ground for theories of religion, and the scientific study of atheists—currently in its infancy—represents an area ripe for future investigation. The methodological and theoretical toolkits of personality and social

psychology will be indispensable in this endeavor, and insights drawn from the study of atheists can enrich basic theory on personality and social psychology.

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Footnotes

[1] We do not wholeheartedly endorse this view, as the afterlives described in many religions are not exactly comforting in nature (e.g., Dante's *The Divine Comedy*). This point has long been made within the cognitive science of religion literature, and may provide a serious theoretical stumbling block for approaches that view fear of death as fundamental to the origins of religion (e.g., Boyer, 2001).

Table 1

Items	Intuitive answer	Analytic answer
A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? ____cents	10	5

If it takes 5 machines 5 min to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____minutes	100	5
In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____days	24	47

The Cognitive Reflection Test (Frederick, 2005)

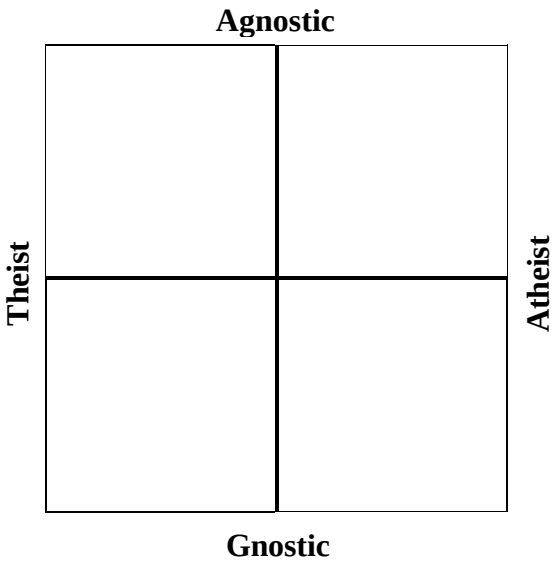

Figure 1. Orthogonal relationship between atheism and agnosticism

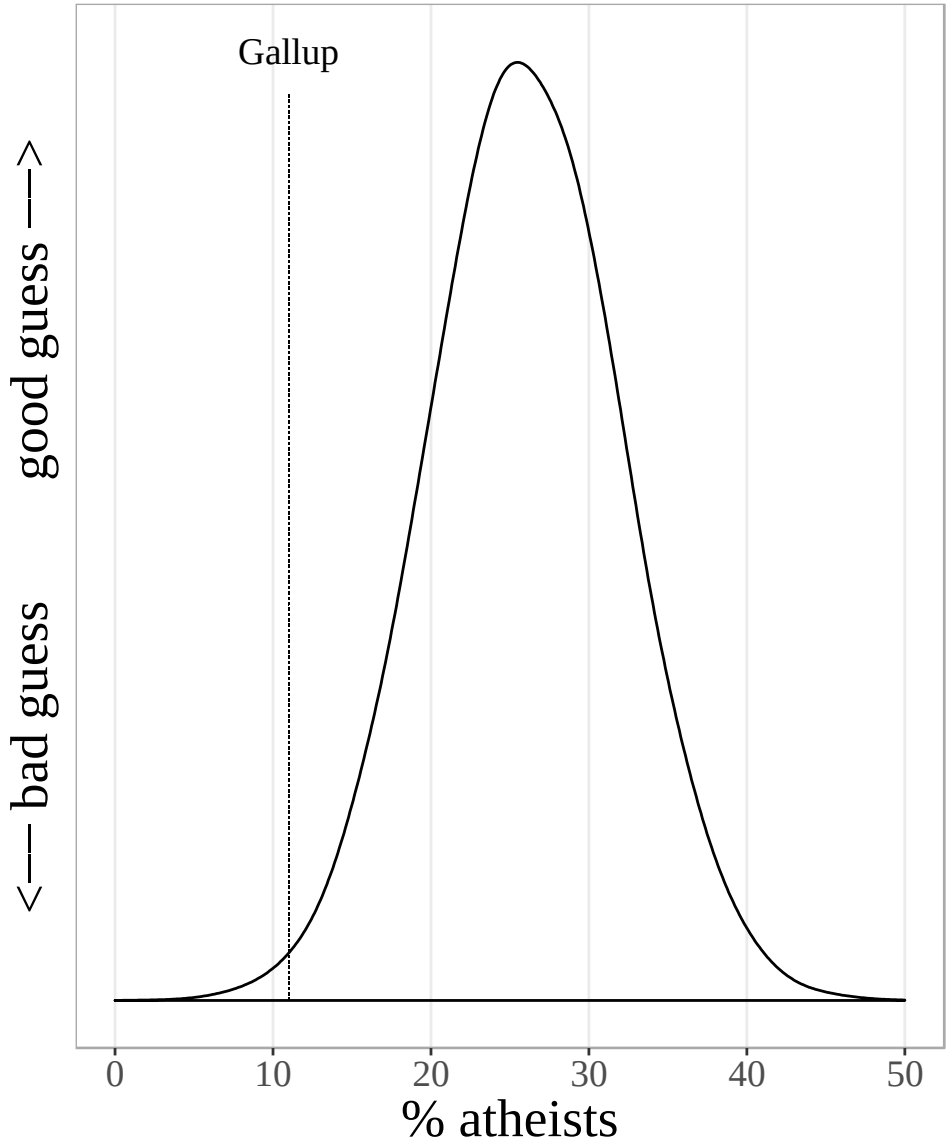

Figure 2. Posterior atheist prevalence estimate from pooled model. Y-axis represents the relative credibility with which different parameter values could have plausibly generated the observed data. Values higher on the y-axis represent more plausible parameter estimates; values lower on the y- axis represent less plausible parameter estimates. Adapted from "How may atheists are there?" by W. M. Gervais, & M. B. Najle, 2017, *Social Psychological and Personality Science, 1-8*, 5. Copyright [2017] by SAGE Publishing.

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