Scaring the bejesus into people:
The effects of mortality salience on explicit and implicit religious belief

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To my mother,

a very long ‘thank you’ note
Abstract

The belief in supernatural agents is a universal feature of human social cognition. Recent cognitive theories of religion might explain the origins of supernatural concepts, but they do not adequately explain religious belief and the commonly costly devotion to deities. Many functional and motivational factors have been proposed, but the notion that religious beliefs are driven by fear of death recurs across the history of theorizing about religion. Some efforts have been made to examine these theories, but various methodological limitations (e.g., measurement, sampling) render the evidence ambiguous and inconclusive.

The present research further explores the correlational and causal relationships between mortality-related concerns and religious belief and tests between two theoretical accounts of this relationship. Terror Management Theory’s worldview defense hypothesis proposes that confidence in one’s beliefs—whether religious, moral, political, or otherwise cultural—mitigates fear of death; concomitantly, thinking about death leads individuals to defend their own worldviews, regardless of their content. According to this account, increased cognitive accessibility of death-related thoughts should increase religious belief among religious individuals, and increase religious disbelief among non-religious individuals. On the other hand, recent theories in the cognitive science of religion suggest that human beings have a distinct cognitive inclination toward belief in supernatural entities, which mitigate fear of
death by association with the possibility of literal immortality (e.g., afterlife scenarios, immortal souls, life-giving deities). According to this account, increased accessibility of death-related thoughts should increase religious belief for both religious and non-religious individuals, regardless of their prior worldview commitments.

The aim of Study 1 was to develop a self-report measure of religious belief. The Supernatural Belief Scale (SBS)—a 10-item questionnaire about cross-culturally common supernatural concepts—was found to be a reliable and valid measure of religious belief. This new scale was then applied in Study 2, which found that the statistical relationship between trait levels of death-anxiety and religious belief was moderated by categorical religiosity. For non-religious participants, fear of death increases as religious belief increases, whereas for religious participants, it decreases as religious belief increases. Study 3 then applied the SBS in an experimental study, examining the effects of mortality salience—increased death-thought accessibility—on religious belief. Consisting with Terror Management Theory’s worldview defense hypothesis, mortality salience led to increased belief among religious participants and increased disbelief among non-religious participants.

To address the possibility that Study 3’s results were confounded by strategic responding biases to which self-report measures are particularly susceptible, Study 4 employed an indirect measure of religious belief: the speed with which participants judge the existential status of religious concepts (e.g., God, Heaven). In this case, when primed with death, religious participants
categorized religious items as “real” faster, and non-religious participants categorized religious items as “imaginary” slower, than participants in the control condition. These results suggested that, consistent with the distinct cognitive inclination account (and inconsistent with the worldview defense account), mortality salience leads to increased religious belief (or decreased religious skepticism) for everyone, regardless of prior beliefs; furthermore, they also raise the possibility that mortality salience affects religious belief differently at the explicit and implicit levels. Study 5 therefore examined the effects of mortality salience on implicit religious belief, using a single-target implicit association test, a well-established measure of implicit cognitive associations. This final study showed that mortality salience increased implicit religious belief for everyone, regardless of their self-reported religious affiliations and beliefs.

Taken together, these studies suggest a dual-process model of religious belief in which explicit and implicit beliefs are differentially affected by mortality salience. In particular, mortality salience leads to explicit worldview defense and, simultaneously, implicit religious belief. The implications of the present research for theories on the development and evolution of religion are discussed, as are the philosophical implications of such scientific theories of religion.
Preface

Seven years ago, I arrived in Dunedin, homesick and heartbroken, and unsure why I wasn’t studying medicine or engineering or law, or something suitably “professional”. Or useful, some would (and did) unkindly say. Perhaps it was selfish and self-indulgent to come all this way and spend all this money to do an undergraduate degree in psychology, with no real plan about what happens next. But then, I walked into the university’s central library for the first time—the shelves seemed to go on forever; philosophy, psychology, and religion stood presciently together—and I was hooked, giddy at the opportunity to plumb the depths of my ignorance. Job prospects be damned; the point of education is learning, as my mother would say.

The first peer-reviewed research article I ever read was Deborah Kelemen’s (2004) article, ‘Are children “intuitive theists”?’. Little did I know then that I would eventually complete a doctoral thesis on the psychological underpinnings of religious belief. That realization took a few more years of classes and conversations about theology, philosophy, and social psychology...and Alexander Pope’s An Essay on Man, the second epistle of which opens, “Know then thyself, presume not God to scan; the proper study of mankind is man.” This thesis began precisely as an effort to understand myself, to figure out why, despite my secular upbringing, I found religious ideas so compelling. I think I now have some clues.
Acknowledgements

Nothing dispels the myth of autonomous, independent scholarship than embarking on a PhD. My primary supervisor, Jamin Halberstadt has taught me (almost) everything I know about experimental social psychology. Five years and three research projects later, I still want to be “just like him when I grow up”. Greg Dawes, my secondary supervisor and my favourite atheist, introduced me to the analytic philosophy of religion; as Kant once said about Hume, Greg woke me from my dogmatic slumber, and for this I am eternally grateful. Greg and Alan Musgrave taught me how to be a philosopher; they taught me to read and listen generously, and to think and speak clearly. I hope I have learnt something of their grace and rigour.

I have spent more time at the Social Cognition Lab than anywhere else in the last few years; it’s sort of become my home. First, an apology to my fellow lab members for having taken increasingly more real estate as time progressed. And then great thanks for the pastoral, practical, and critical support, especially for the last few months. I am indebted in particular to Matthias Bluemke, Tristan Philip, Rachel Butler, and Annelyse Gelman for their help and, more importantly, their friendship. Rachel, thanks for the banter and beer and Better Off Ted.

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The Internet is a wonderful thing, and has enabled my friends and family from all around the world to surrounding me with encouraging words; they make me feel all warm and fuzzy inside. Thanks in particular to Alice Irving, who was even willing to proof-read my thesis at very short notice. You are all grace and generosity. To my dear comrades-in-arm, Tristan, Kristen, Elaine, and Miriam: it’s nearly over and it’s going to be brilliant. To my family back home—mom and dad and Joel especially—whom I have missed dearly these last few years: I’m sorry I’m so awful at keeping in touch. Let’s hang out soon.

Finally, my mother deserves centre stage. She is a remarkable woman, to whom I owe at least my thirst for knowledge. It is no platitude to say that she made all this possible. Throughout my undergraduate years, she sent me almost half her paycheck to help me survive and struggled every year to find extra money for tuition fees. It was, by all accounts, a foolish decision to allow me to come to New Zealand to study, but she did it anyway. All my love and gratitude then, to Yap Siaw Phin, to whom this thesis is dedicated.

*A roadmap for the reader*

Chapter 1 provides an evaluative summary of historical and contemporary efforts to “explain religion”, the pan-cultural belief in supernatural agents that
so often incurs great resource and reproductive costs. Chapter 2 and 3 more specifically review the literature on the role of death anxiety in the development and evolution of religion, focusing on Terror Management Theory in particular.

Chapters 4 through 8 report a series of five studies, designed to examine the correlational and causal relationships between mortality-related concerns and religious belief. Chapter 9 summarizes and synthesizes the results of these empirical studies, and discusses their methodological and theoretical implications.

The thesis ends with a philosophical epilogue, reflecting on the philosophical and (a)theological implications of the cognitive science and evolutionary psychology of religion more broadly.
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Chapter 1
Explaining religion

1.1 Defining religion

Human beings are incorrigibly religious. This research participates in the effort to explain the historical and cross-cultural ubiquity, the pervasiveness and persistence of religion, to provide a causal analysis of a set of inter-related psychological phenomena, which we might call “religious”. This, of course, raises the definitional question: what is religion?

Like most categories in the natural and social sciences—“gender”, “ethnicity”, “species”, and “disease”, just to cite a few examples—“religion” is a fuzzy concept. If the history of the discourse on religion is any indication, it will be incredibly difficult, if not patently impossible to list necessary and sufficient conditions for something to count as being “religious” (Donovan, 1994; Hood, Hill, & Spilka, 2009). However, the inability to exhaustively define religion is not, as some might think (e.g., Lease, 1994/2009¹), devastating to the scientific enterprise of explaining or otherwise empirically investigating religious phenomena. As in other fields, what is required is a working definition that helps to specify and limit the area of enquiry. Such a working definition is a convenient starting point for research, and is neither presumed to be incontrovertible nor designed to include all and only those things that everyone agrees are “religious”. Even if a more robust definition of religion were possible—and it is not clear that it

¹Indeed, against “so-called theories of religion”, Lease (1994/2009, p. 130) writes, “There cannot be a ‘history of religion’ for the simple reason that there is no religion.”
is—it would be the product of a successful research programme, not the prelude to one.

In keeping with recent cognitive anthropological and psychological research, for the purposes of the current project, “religion” and its cognates will refer to the belief in supernatural agents and the phenomena associated with those beliefs, such as rituals, social structures, and emotional and perceptual experiences (see Atran, 2002; Barrett, 2004; Bering, 2011; Boyer, 2001; Pyysiäinen, 2009; Tremlin, 2006 for similar definitions of religion). This naturally leads to the question of what makes an agent “supernatural”, and again, a definitive answer to this question requires a better developed science than we currently have. Suffice to say for now, however, that agents are supernatural by virtue of their ability to “supersede...natural constraints”, to overcome “the intuitively expectable limitations of normal agents” (Whitehouse, 2004, p. 10-11). Gods, angels, demons, souls, and spirits are thus all examples of supernatural agents, by virtue of their unusual properties and abilities, their being able to walk through walls or watch us unseen or create the entire cosmos ex nihilo.

This definition of religion is an admittedly sparse one, requiring further elaboration before it can properly delimit the present investigation. However, it deliberately places the emphasis on belief, referring as it does to cognitive content; as such, it puts us closer to Tylor’s (1913/2929a, p. 424) “minimum definition of religion, the belief in Spiritual Beings”, than it does to definitions that emphasize, for example, sociological utility (e.g., Durkheim, 1915/1967; Wilson, 2002) or phenomenological experience.
(e.g., James, 1902/1960). Furthermore, it provides a launching pad from which the required elaboration on our *explanandum* may begin.

### 1.2 Costly commitments to counterintuitive characters

#### 1.2.1 The omnipresence of gods

Again, human beings are incorrigibly religious; the belief in supernatural agents—gods, angels, demons, spirits, and their ilk—is cross-culturally and historically ubiquitous. Indeed, despite the recurring efforts of acutely antagonistic, persecutory political regimes (e.g., in the Soviet Union, Maoist China, Socialist Albania) and the protestations of some public intellectuals (e.g., d’Holbach, 1770/1835; Dawkins, 2006; Hitchens, 2007; Russell, 1957), religion has shown no signs of waning at a global level (Berger, 1999). The demise of religion has been prophesied since the Enlightenment, but religious beliefs, practices, and communities seem to be here to stay (Bering, 2007; McGrath, 2004).

The universality and persistence of religious belief is, upon inspection, something of a psychological and evolutionary conundrum. Gods are terribly inconvenient, costly things to believe in. They often require risky rituals, such as massive pilgrimages and ecstatic acts of self-mutilation; they often mandate material sacrifices, from tithes and taxes to mass animal sacrifice; they often demand deprivative devotion, like abstinence from food and sex. Furthermore, such costs are neither phenomena of a primitive past, nor statistically abnormal aberrations.
1.2.2 Perilous pilgrimages and risky rituals

Every 12 years, millions of Hindus from all over the world gather in Prayag, India, for the Purna Kumbh Mela pilgrimage (Fuller, 2004); in 2001, 60 to 70 million people undertook the pilgrimage, perhaps making it the largest gathering of people in history (Carrington, 2001, January 25). Besides incurring proportionally great individual and institutional cost, religious pilgrimages also come with significant physical risks. For example, the Ganges river is infamously polluted with human and industrial waste; Kumbh Mela pilgrims who bathe in it for ritual cleansing are therefore ironically at heightened risk for infectious diseases such as cholera, hepatitis, typhoid, and dysentery (Chatterjee, 2007). Furthermore, human stampedes occur regularly at massive religious festivals like the Kumbh Mela, senselessly killing hundreds of devotees (Bavadam, Tripathi, Devarajan, & Puri, 2005; Rahman, 2003, August 28). Hinduism is not unusual here; other religious traditions have analogous pilgrimages and festivals, albeit at smaller scales.

Three million Muslims flock to Mecca annually to undertake the Hajj pilgrimage (Peters, 1994), which is said to generate “some of the world’s most important public-health and infection control problems” (Ahmed, Arabi, & Memish, 2006, p. 1008). Like Kumbh Mela pilgrims, Hajj pilgrims are at heightened risk of communicable diseases, including meningococcal disease, respiratory tract infections, and severe diarrhoea. Human stampedes are also common; there have been eight major incidences since 1990, killing 3,000 people in total and injuring thousands more. Millions of Christians also travel to pilgrimage sites all over the
world at great individual and institutional cost; conditions are often better at these sites, but popular pilgrimages to Jerusalem certainly pose health and safety risks. For example, visitors to the River Jordan, where Jesus was purportedly baptized, risk triggering landmines (Cook, 2011, January 20) and contracting bacterial infections from the polluted river (Sherwood, 2010, July 26). To please their gods, or perhaps even to catch glimpses of them, believers participate in perilous pilgrimages and risky rituals.

1.2.3 Material matters

Admittedly, such intense religious behaviours are usually rare (Whitehouse, 2004); most Muslims only undertake the Hajj once in their lives, for example (Peters, 1994). On top of these, however, religious belief also often comes with more mundane material resource demands. Most Christian denominations famously expect congregants to tithe—to give 10% of—their income to the church (Dahl & Ransom, 2002); furthermore, church taxes are still imposed on members, practising or otherwise, of officially–recognized state churches in various Western European nations, including Denmark, Germany, Sweden, and Switzerland.

Religious commerce has also kept religious organizations in business for millennia. First-century Palestinian Jewish money-changing (Sanders, 1985), medieval Catholic selling of Indulgences (Luther 1517/1957), and the modern multibillion U.S. dollar per annum Christian music industry (Romanowski, 2005) come readily to mind.

Again, the financial costliness of religious belief is not endemic to the Judeo-Christian tradition. Buddhism, for example is a costly affair for
Burmese villagers, who set aside a significant proportion of the family budget for expenditures related to ceremonies, supporting monks, and the upkeep of religious buildings (Nash, 1963). Indeed, Buddhist teachings, which denounce individual material wealth and encourage adherents to give up such wealth, have funded the building of some famously opulent temples (Kieschnick, 2003).

1.2.4 Deprivative devotion

Besides these physical health and material resource costs, religious belief and devotion may also incur significant reproductive costs, which raises an evolutionary puzzle. In the logic of Darwinian evolution, behaviours that curtail reproduction ought to be selected out, yet the taboos concerning sexual, and therefore reproductive behaviour found in many religious traditions, including the four major world religions seem to reduce adherents’ opportunities to reproduce. Roman Catholicism, Buddhism, and Hinduism include castes of celibate clerics or students (Olson, 2007); celibacy is not considered virtuous in Islam, but regular, temporary abstinence is required (Bashir, 2007). Indeed, adherents of other religious traditions are also often required to be temporarily abstinent for ceremonial purposes; furthermore, most major religious traditions condemn pre-marital sexual intercourse as sinful (Spilka, Hood, Hunsberger, & Gorsuch, 2003).

So, the belief in gods—who require risky rituals, mandate material sacrifices, and demand deprivative acts of devotion—comes, at least prima facie, at great cost to believers. Furthermore, the belief in gods is never as straightforward as belief in everyday objects; supernatural agents, be they
cosmic gods or tribal deities or ancestral spirits, are not directly detectable via normal sense perception. And yet, as expensive and elusive as they are, supernatural agents are believed in by billions of people all over the world and throughout history. This, then, is our explanandum: why, to paraphrase Justin Barrett’s (2004) titular phrase, would anybody believe in gods?

1.3 Theories of religion: an historical survey

The history of ideas is replete with explanations of religion. However, the diversity of definitions of “religion” across the various explanatory strategies renders them tricky to taxonomize and evaluate. Nevertheless, there is perhaps sufficient definitional overlap among the different theories to say that there are, broadly speaking, two explanatory strands to be found. The first appeals to some more basic human cognitive tendencies, chiefly that toward anthropomorphism; the second appeals to the psychological and sociological utilities of religion.

1.3.1 Anthropomorphic theories

The charge of creating gods in our own image, as it were, goes as far back as Xenophanes (c. 570–475 BCE), in what is often considered the first naturalistic theory of religion (Thrower, 1999; van Inwagen, 2010). In three fragments, Xenophanes (as cited in Lesher, 1992) observes: “But mortals suppose that gods are born, wear their own clothes and have a

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2 Even those that are not properly invisible might live in a normally unreachable realm (e.g., Asgard, Heaven, Mt. Olympus, and Trayastriṃśa in ancient Norse, Judeo-Christian, Greek, and Buddhist mythology respectively).
voice and body” (Fragment 14) and “Ethiopians say that their gods are snub-nosed and black; Thracians that theirs are blue-eyed and red-haired” (Fragment 16), further musing that “if horses or oxen or lions had hands or could draw with their hands and accomplish such works as men, horses would draw the figures of the gods as similar to horses, and the oxen as similar to oxen, and they would make the bodies of the sort which each of them had” (Fragment 15).

This old idea, that our beliefs in and about gods are heavily influenced by, perhaps even derived from, a tendency to project human attributes onto things around us has been picked up again and again. Hume (1757/2008, p. 141) certainly thought that our “natural propensity” and “universal tendency” to see “human faces in the moon, armies in the clouds” (i.e., to anthropomorphize nature) was an important factor in the origin of religion. Later theorists then elaborated this idea in various ways.

Feuerbach, for example, first thought of religion as the personification or hypostatization of human nature, “Religion is human nature reflected, mirrored in itself...God is the mirror of man” (Feuerbach, 1841/1989, p. 63). In this view, the belief in gods is a reification and personification of an abstraction, namely essential human attributes. Developing this thought further, Feuerbach (1846/2004, p. 7–8) proceeded to argue that “the spirit of man, his imagination” is projected or transferred “involuntarily into Nature”, making “her a symbol and mirror of his being” and giving rise to the “belief that in Nature another being is manifested, distinct from Nature herself”. That is, according to Feuerbach (1846/2004), religious belief derives from projections of human attributes to the natural world.
Similarly, from a sociological perspective, Durkheim (1915/1967) argued that gods are extrapolations and personifications of societies. Perhaps the most influential proponent of anthropomorphic theories of religion, however, was Edward Tylor (1913/1929a), mentioned earlier, who argued that the belief in spiritual beings comes from the human tendency to infer personal or anthropomorphic explanations for natural phenomena.

1.3.2 Functionalist theories

Besides the cognitive inclination toward anthropomorphism, also inherent in Tylor’s (1913/1929a, p. 368-369; 1913/1929b) central thesis is a functional claim that the belief in supernatural agents arose to fulfill a need for explanation, an intellectual appetite, a “craving to know the causes at work in each event”. The activity of gods therefore serve as important elements of primitive explanations of various phenomena, chiefly the difference between the living and the dead, and the appearance of humanoid figures in dreams. That is, gods primarily serve an intellectualist function. Tylor (1913/1929a) is certainly not alone in emphasizing the explanatory role of supernatural beliefs, nor is he the first to do so.

Hume (1757/2008, p. 140), for example, opined that, “Agitated by hopes and fears of this nature, [...] men scrutinize, with a trembling curiosity, the course of future causes, and examine the various and contrary events of human life. And in this disordered scene, with eyes still more disordered and astonished, they see the first obscure traces of divinity”. For Hume (1757/2008, p. 139), then, supernatural beliefs more fundamentally derived from a need for control or, at least, perceived control and
from “a concern with regard to the events of life…the incessant hopes and fears, which actuate the human mind”. Perhaps more charitably, many influential theorists following Tylor (e.g., Frazer, 1922, Horton, 1993) carried on this tradition in their work, variously comparing the belief in gods and participation in rituals to science and technology.

Picking up on such concerns, there have also been suggestions that religion emerged to address existential anxieties. Feuerbach (1851/1967), for example, supplemented his theory that gods are personifications of human nature, with a functionalist account: religious beliefs are projections of psychological needs, particularly the need to assuage the otherwise crippling fear of loneliness, meaninglessness, and death. Similarly and perhaps more famously, Freud (1927/1961) argued that religious beliefs were paradigmatic examples of wish-fulfillment, driven by “the oldest, strongest, and most urgent wishes of mankind” (p. 38), the desire for a powerful father who can protect us from the dangers of life and the finality of death.

Finally, as there were sociological anthropomorphic theories of religion, there have also been considerations about the sociological functions of religion. At this level of analysis, Durkheim (1915/1967), like Feuerbach (1851/1967) supplements his anthropomorphic theory with a functionalist component; for Durkheim (1915/1967), however, religion serves to preserve societal unity and cohesiveness. Marx (1843/1970, p. 131), on the other hand, supposed that religion arose to fill the psychological needs of the poor and oppressed, to distract the masses from their plight thereby
preventing revolt; religion is, famously, “the opium of the people...illusory happiness...about their condition”.

1.4 Theories of religion: the contemporary state of play

1.4.1 The cognitive science of religion

Although theorizing about religion and its “origin in human nature” (Hume 1757/2008, p. 134) has carried on for centuries, there has been a recent major shift in the field. First, it is only in the last two decades that efforts have been made to test causal theories of religion; indeed, it is only recently that theories have been formulated to be amenable to such empirical testing (Barrett, 2005, 2007b). Rather than making broad, sweeping claims about the origins of religion from textual, anecdotal, and ethnographic data, researchers are now generating and testing specific hypotheses. Contemporary theories are doubtless indebted to these rich theoretical traditions, but are not tethered to their dubious metaphysical assumptions (e.g., Freudian psychological ontology and psychosexual development; Marxist dialectics).

This nascent “cognitive science of religion” (CSR; Barrett, 2007a; Lawson, 2000) is informed by contemporary paradigms in evolutionary theory and cognitive psychology. Both the Darwinian and cognitive revolutions, in biology and psychology respectively, provide essential conceptual tools for reframing questions about the development and evolution of religious belief and behaviour. Little progress could be made before the formulation of robust theories about how the mind works (viz., cognitive psychology) and why it works in these ways (viz., evolutionary theory).
Finally, rather than examining “religion” as a single, albeit complex and multi-faceted phenomenon, contemporary CSR researchers incrementally identify psychological phenomena that might count as “religious” and attempt to explain their cross-cultural recurrence and variation. This bottom-up, piecemeal approach is also uniquely characterized by interdisciplinary collaboration, among psychologists, anthropologists, biologists, religious studies scholars, and philosophers; as such, more recent theorizing occurs at multiple levels and from a diversity of perspectives. Concomitantly, theory-testing employs a plurality of methods including ethnography, field studies, and lab-based correlational and experimental research (Barrett, 2007a).

1.4.2 Evolutionary adaptationism

Functional theories of religion in particular lend themselves to evolutionary analysis; indeed, there has been a recent proliferation of adaptationist explanations suggesting that religion somehow confers reproductive fitness on individuals or communities. Wilson (2002), for example, has recently put an adaptationist spin on societal- or group-level functional theories of religion. In his book, *Darwin’s Cathedral*, Wilson (2002) applies group-selectionist ideas from evolutionary biology, arguing that religion served such an important social function that groups with religious beliefs and practices survived better and reproduced more than groups without.

Along similar evolutionary lines, albeit from an individual-selection perspective, Bering (2011, p. 7) proposes that we believe in gods because they “directly helped our ancestors solve the unique problem of human
gossip”. The belief in invisible, moral-policing supernatural agents, who are constantly monitoring and evaluating us, keeps our baser instincts in check. Accordingly, we are less likely to commit socially undesirable acts, which protects our reputations from the potentially socially (and thereby, reproductively) costly effects of gossip. From a slightly different angle, others have also argued for a “costly signaling hypothesis, that religiosity evolved as a hard-to-fake signaling system to motivate trust, solidarity, and cooperation among nonkin in the ancestral world” (Bulbulia, 2006, p. 87; Sosis, 2006). In this view, religious beliefs and behaviours not only protect our reputations from ourselves, but even improve them by implying that we possess some pro-social attributes.

Furthermore, not all evolutionary adaptationist theories of religion focus on the relationship between religion and morality. In the paper cited above, Bulbulia (2006, p. 87) also suggests that “religiosity evolved as a mechanism for self-healing”. In this view, religious beliefs act as placebos, improving physiological health and fitness; before the emergence of more effective modern medicine, the health benefits of religion would have conferred significant survival and reproductive advantages. That is, those who believed were more likely to survive and reproduce, and so to pass down their tendencies to believe.

Evidently, the evolutionary psychology of religion is a theoretically fecund field. However, adaptationist theories arguably represent the minority report within the broader cognitive science of religion. Instead, religious beliefs and behaviours are more often construed as evolutionary by-products—spandrels, to use Gould and Lewontin’s (1979) famous
term—of a host of other evolutionarily adaptive psychological processes. As such, the main thrust of CSR research concerns itself with the way in which basic evolved cognitive processes lead to religious beliefs and behaviours.

1.4.3 Anthropomorphism, redux

The cognitive inclination toward anthropomorphism still features prominently in CSR research. Guthrie (e.g., 1980, 1993, 1996), for example, proposes a cognitive approach to religion as a form of anthropomorphic error. Human beings see, to use Guthrie’s (1993) book title, “faces in the clouds”, we hear voices in the wind, and our belief in gods is just a special case of this tendency, a product of our promiscuous anthropomorphism.

Expanding on Guthrie’s (1993) seminal work, Barrett (2004) suggests that two cognitive modules—the Agency Detection Device (ADD) and the Theory of Mind Mechanism (ToMM)—allow us to infer agency and mentation respectively. These cognitive tools have evolved to be automatic and hypersensitive, Barrett (2004) argues, such that we detect agents under evidentially ambiguous conditions. From an evolutionary perspective, this hypersensitivity was adaptive in a world full of deadly predators (Tremlin, 2006): in an evolutionary Pascal’s wager, it is better to mistake a boulder for a bear, than a bear for a boulder because while the former error comes at the cost of some energy spent running away unnecessarily, the latter comes at the cost of death by mauling and mastication. So, our hypersensitive ADD (HADD) sometimes commits false positives, picking
up non-existent agents; our ToMMs then automatically impute them with psychological states, with rich mental and emotional lives.

Besides being adaptive in our phylogenetic past, these cognitive devices or modules are still vital in modern contexts. Hunters and farmers, for example, are still better off with heightened sensitivities to potential game and pests; furthermore, the world, even in urban contexts, is still populated with dangerous agents best detected and avoided. Furthermore, our ability to automatically impute or infer mental states—beliefs and desires, moods and emotions—enables our participation in social interaction. All kinds of mundane and meaningful human activities require us to be able to quickly infer others’ thoughts and feelings from sparse information: what they say and how they say it, facial cues, body language, social context, and so forth. Indeed, reduced sensitivity toward these subtle cues compromises our ability to discern between socially appropriate and inappropriate behaviour (Halberstadt, Ruffman, Murray, Taumoepeau, & Ryan, 2011). Given the sociality of our species, desensitized or otherwise impaired ToMMs can be extremely debilitating, as research on autism clearly demonstrates (Baron-Cohen, 2004).

So, these same cognitive tendencies, which keep us fed and safe, and which enable us to engage in conversation, commerce, and courtship, also underlie our penchant for detecting and believing in gods who desire things like material sacrifice and moral behaviour (Barrett, 2004; Bering, 2011; Guthrie, 1993). Similarly, albeit from a slightly different angle, the same tendency that enables us to see art and artefacts as products of a human agent’s beliefs and desires, as opposed to, say, the mindless splash-
ing on of paint by a machine—our “promiscuous teleology” (Kelemen, 2004, p. 295)—leads us also to see, rightly or wrongly, crop circles, bacteria flagella, and rainbows as products of supernatural agents’ beliefs and desires (Bering, 2011; Heywood, 2010).

1.4.4 Maximally memorable, minimally counterintuitive agents

While these modern anthropomorphic theories of religion provide plausible accounts of where supernatural agent concepts come from, they do not explain the widespread belief in and costly commitment to them. To address this issue, the interaction of supernatural concepts with other cognitive and motivational variables must be considered. Indeed, the application of recent developments on the domain-specificity of human cognition to this question has yielded some important insights (Sperber & Hirschfield, 2004).

According to the increasingly influential domain-specific or modular theory of human cognition (e.g., Atran, 2001; Carruthers, 2006; Hirschfield & Gelman, 1994), the mind consists of multiple domains or modules, specialized tools—like the HADD and ToMM (Barrett, 2004) above—that process different kinds of information. In this view of cognitive architecture, all human beings categorize stimuli in broadly the same way; furthermore, we share some basic, unreflective, intuitive beliefs associated with these categories (Keil, 1979, 1986). For example, we believe that multiple physical objects cannot occupy the same space and that animals reproduce offspring like themselves. These intuitive beliefs are not always propositionally expressible by everyone, but people from all cul-
tures would be surprised at the sight of a solid object passing right through another solid object, or of puppies hatching out of chicken eggs (cf. Boyer & Ramble, 2001). So, we have folk theories, automatic expectations about different categories of things (e.g., artefacts, animals, plants). Of course, things—real or, especially, imagined—do not always conform to our expectations; objects and ideas can be more or less intuitive, they can violate any number of category-based expectations. For example, a chicken that lays eggs with puppies in them, but is otherwise normal, violates a single categorical expectation; a chicken that can walk through walls and also happens to lay eggs with puppies in them (but is otherwise normal) violates two, and is thus more counterintuitive. Taking it a few steps further, a chicken that is made of metal, walks through walls, speaks fluent Dutch, grants wishes, turns into a werewolf during full moons, and lays eggs with puppies in them (but is otherwise normal) violates many expectations, and is very counterintuitive indeed. There is increasing evidence that, all else being equal, *minimally counterintuitive concepts*—concepts that violate just a few category-based expectations—are more likely to be remembered and recalled than either perfectly intuitive concepts or massively counterintuitive concepts (Barrett & Nyof, 2001; Boyer & Ramble, 2001; Norenzayan, Atran, Faulkner, & Schaller, 2006).

These recent developments are consistent with and enable elaboration on the notion, proposed above, that supernatural agents are those that exceed “the intuitively expectable limitations of normal agents” (Whitehouse, 2004, p. 10–11). In light of the domain-specificity of human cognition, supernatural agents are those that fit pan-cultural domain-specific
expectations, our innate and implicit assumptions about persons (Boyer, 1994). They therefore activate the various cognitive mechanisms associated with persons, triggering our folk or naïve physical, biological, and psychological expectations (Atran & Norenzayan, 2004; Sperber & Hirschfield, 2004). At the same time, however, they violate and even exceed some of these expectations. For example, while we automatically categorize ghosts—the most cross-culturally common type of supernatural agent (Barrett, 2004; Boyer, 2001)—as persons, which are intuitively physical and living things, they are neither typically physical (e.g., they walk through walls) nor typically alive (they are, in fact, dead). In this way, supernatural agents are counterintuitive persons, agents that violate our intuitive expectations of persons (e.g., Atran, 2001; Barrett, 2004; Boyer, 2001). Indeed, Boyer (1994, 2001) has argued that supernatural agent concepts are minimally counterintuitive concepts, as described above, and are thereby more memorable and transmissible. Folk theological worlds are certainly populated with bodiless persons (which are otherwise normal; e.g., spirits), sensorily perceptive artefacts (which are otherwise normal; e.g., statues to pray to), and other such things that violate just a few categorical expectations (Boyer, 2001). Gods may therefore be generated by our hypersensitive agency detection devices and theory of mind modules, but they are kept and spread in cultural memories by virtue of their minimal counterintuitiveness: minimally counterintuitive concepts are maximally memorable concepts.

As Whitehouse (2004) argues, properties or abilities that overcome normal, expected constraints are precisely what makes supernatural agents super.
1.4.5 The Mickey Mouse Problem

While this focus on cognitive factors—agency detection and theory of mind, folk ontology and minimal counterintuitiveness and so forth—is fruitful at explaining the origin, memorability, and transmissibility of religious concepts, there is now widespread recognition that cognitive explanations by themselves suffer from explanatory limitations alluded to above: they may specify necessary conditions for religious belief and behaviour and explain the generation of religious concepts, but they do not explain the ubiquity of costly religious commitment (Atran, 2002; Barrett, 2009; Bulbulia, 2004; Sørensen, 2005). Such narrowly cognitive theories run into what is now popularly known as the “Mickey Mouse Problem” (Atran & Norenzayan, 2004, p. 764): most minimally counterintuitive agents—Mickey Mouse⁴, for example—do not inspire costly religious devotion. More recently then, efforts have been and are being made to address this question of what unique properties gods might have, such that they are so fervently believed in and worshipped.

One prominent suggestion has been to turn the problem on its head, looking at the effects of participating in costly religious behaviours (e.g., rituals) on religious belief (e.g., Atran, 2002; Boyer, 2001; Barrett, 2004; Whitehouse, 2004). This claim, that behaviours influence attitudes is hardly novel in social psychology; indeed, Festinger’s (1957) seminal work on cognitive dissonance reduction was applied explicitly to religious

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⁴There is an obvious disanalogy between Mickey Mouse and gods like Yahweh and Allah, in that Mickey Mouse is famously fictional; we do not believe Mickey Mouse exists because we know Mickey Mouse was invented by Walt Disney. The question is perhaps poorly phrased in terms of why some minimally counterintuitive agents do not become gods; instead, it is more helpful to think of the Mickey Mouse problem as asking what features gods have in common, such that they are believed in and worshipped.
beliefs (Festinger, Riecken, & Schachter, 1956). According to the theory of
cognitive dissonance, human beings strive toward consistency in their be-
liefs and actions and wherever there is dissonance—inconsistency among
cognitions or between cognitions and behaviour—we attempt to resolve it
by changing some of our beliefs and/or actions (see Cooper, 2007 for a
comprehensive review of fifty years of research on cognitive dissonance).
In Festinger and Carlsmith’s (1959) classic study, for example, participants
performed a boring and tedious task, and were then asked to lie about it
(i.e., to tell the next participants that it was interesting) for minimal remu-
neration. Relative to participants who did not lie and those who were well-
remunerated for lying (and therefore had a convenient explanation for the
inconsistency between their true feelings toward the task and what they
said to the next participant), the minimally remunerated participants re-
ported enjoying the task more. That is, they internalized the opinions they
expressed in an effort to reduce the inconsistency between their attitudes
and actions: their behaviours altered their beliefs. By the same token, par-
ticipating in rituals—especially highly arousing, risky or costly ritu-
als—might increase one’s commitment to the religious faith in question.

However, this strategy does not seem to explain why people engage
in costly religious behaviours in the first place; even if people readily per-
form relatively benign counter-attitudinal actions (e.g., a boring task; Fest-
inger & Carlsmith, 1959), participating in costly or dangerous acts pre-
sumably still requires some degree of belief. Perhaps social pressure is
sometimes sufficiently powerful to coerce individuals to engage in such
rituals, but even then there remains the question of where the rituals came
from (for more on the cognitive underpinnings of religious ritual and the role of rituals in the transmission of religious beliefs, see McCauley & Lawson, 2002; Whitehouse, 2004).

So, another strategy for addressing the explanatory limitations of narrowly cognitive theories of religion is that the doxastic success of religious concepts is due at least in part to their conceptual relevance in many different domains, their “inferential richness” (Barrett & Lanman, 2008, p. 115). Certainly, irrelevant minimally counterintuitive agents do not tend to become gods. Sentient trees, with which human beings can interact, do occur in religious mythologies (e.g., Druidic oracular oaks, Uduk listening ebony), but rarely do we get silent, inanimate humanoid gods, except perhaps as foreign foils for ingroup gods. Disinterested deities have been speculated about in religious philosophies and systematic theologies (e.g., Enlightenment-style Deism), but have never really caught on. There has never been a religion based around a god who lives in an alternate reality, who has never had and never will have anything to do with anything in our own world. That gods have to be relevant or inferentially rich is therefore something of a truism; the question, as Näreaho (2008, p. 91) rightly points out, is “Inferentially rich in relation to what?” The functional and adaptationist theories of religion such as those surveyed earlier, and previous research on psychological needs, provide a convenient starting point to identify existentially significant domains that might motivate religious belief.

While there is little consensus in the social psychological literature about what constitutes a psychological need, there is little doubt that hu-
man beings have a fundamental need for social interaction and relationships, as classic studies on social deprivation clearly show (e.g., Bowlby, 1952; Harlow, Dodsworth, & Harlow, 1965). Accordingly, various suggestions have been made that religious belief is motivated by the need for a secure attachment figure (Kirkpatrick, 2004) or social interaction more generally (Epley, Akalis, Waytz, & Cacioppo, 2008). Similarly, Boyer (2001, p. 150) appeals to our inherent interest in social information, so-called “strategic information”, which gods possess, by virtue of their special properties or powers (e.g., invisibility, omniscience). The fact that supernatural agents might possess knowledge we want or knowledge we would rather others not also possess motivates us to ingratiate ourselves to them.

Besides the fulfillment of our needs for social relationships and strategic information, supernatural agent concepts might also be successful because of their usefulness in explaining both natural and mysterious events (e.g., Barrett, 2004), which would fulfill the need for cognitive closure (i.e., the need for “an answer on a given topic, any answer...compared to confusion and ambiguity”; Kruglanski, 1990, p. 137; Webster & Kruglanski, 1994). Similarly, Kay, Gaucher, McGregor, and Nash (2010, p. 38) argue that religious belief is motivated in part by a fundamental fear that the world is a “random, bewildering, and unmanageable place”; indeed, Kay, Moscovitch, and Laurin (2010) found that physiological arousal associated with fear of randomness or disorder led to increased belief in God, providing some evidence for this link between fear of randomness and religious belief.
Yet another possibility—indeed, one emphasized throughout the history of theorizing about religion (cf. Feuerbach, 1851/1967; Freud 1927/1961)—is that religious belief is motivated by the need to alleviate existential anxieties (e.g., fear of death; Atran, 2002; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Indeed, there is a growing body of research on the potential role of existential anxiety in the evolution and development of religion, which variously invoke death as a cognitive and a motivational factor. This, the relationship between religious belief and death-related cognition and affect, is the focus of the present investigation.
Chapter 2

What has death got to do with it?

2.1 Decline and fall of thanatocentric theories

The fear of death has featured consistently in historical theories of religion. Hume (1757/2008, p. 140), for example, lists “the terrors of death” among the passions that led our ancestors to “see the first obscure traces of divinity”. More explicitly, according to Freud (1927/1961, p.22) gods “must exorcise the terrors of nature, they must reconcile men to the cruelty of Fate, particularly as it is shown in death.” Similarly, Feuerbach (1851/1967, p. 276) concludes his Lectures on the Essence of Religion with the claim that “the meaning and purpose of God are immortality” and Malinowski (1948, p. 47) exclaimed, “Of all sources of religion, the supreme and final crisis of life—death—is of the greatest importance”. This notion that religious belief emerged to comfort us from our existential terrors or to fulfil our wishes against death’s finality is a constant theme in the effort to explain religion.

Despite the popularity of these wish-fulfillment and comfort hypotheses, however, they are at least incomplete. As Boyer (2001, p.21) notes, “inasmuch as some religious thoughts do allay [mortality-related] anxiety, our problem is to explain how they become plausible enough that they can play this role”. Furthermore, it is unclear that gods actually exorcise terror or provide desirable afterlife conditions. Anthropologists have been quick to point out that many religions contain beliefs about gods and afterlives that are, prima facie, far from comforting. Mythical worlds are populated with malevolent as well as benevolent deities (Lambert, Trian-
dis, & Wolf, 1959); gods are often ambivalent or capricious in their dealings with human beings. Even in the Judeo-Christian traditions, with their emphasis on divine omnibenevolence, the God portrayed in the Bible is anything but straightforwardly good (Dawkins, 2006; Matthews & Gibson, 2005; Penchansky, 1999). Furthermore, not all religious belief systems come with afterlife beliefs (e.g., Baka Pygmies; Woodburn, 1982), and many which do posit gloomy graves or horrific hells. According to their own religious texts, Homeric Greeks (cf. *Iliad*) all descended into a dreary Hades regardless of merit, while ancient Mesopotamians were infamously cast into a terrifying netherworld populated by monsters (cf. *The Netherworld Vision of an Assyrian Crown Prince*) or a despairing one in which “dust is their food, clay their bread” and “they see no light, they dwell in darkness...over the door and the bolt, dust has settled” (cf. *The Descent of Ishtar to the Netherworld*; Dalley, 1998, p. 155). On perhaps more familiar territory, Buddhism brought to China “ten heavens and many hells” (Yü, 1987, p. 381). Similarly, hell concepts are arguably more dominant and influential than positive afterlife concepts in Japanese Buddhism (Umehara, 1996). Eternal torment in Hell is also a live possibility for contemporary Christians. Indeed, many ex-fundamentalists report experiencing intense fear of divine punishment, even after leaving fundamentalist Christianity (Hartz & Everett, 1989). These anthropological data present a challenge to wish-fulfillment and comfort theories; they call into question, at least, the universality and priority of death-anxiety reduction as a motivating factor for religious belief.
2.2 Death and religion: a cognitive connection

2.2.1 Death triggers multiple mental modules

The view that religion arose primarily to alleviate existential anxiety has fallen out of favour among many contemporary researchers, for the reasons outlined above. Much of the active theorizing on the relationship between death and religion posits cognitive, rather than motivational or affective, connections between them.

Boyer (2001), for example, locates the link between death and religion in our cognitive and emotional responses to corpses, rather than any ameliorating effects religion might have on a diffuse, general fear of death. Corpses, Boyer (2001) argues, are inferentially rich stimuli: they trigger a suite of automatic cognitive responses. When we perceive dead bodies—particularly their faces—our social intuitions tell us that they are somehow still present as persons, even familiar persons. However, we immediately infer from corpses’ inanimacy that they are non-living objects; indeed, our evolved intuitions about contagions tell us that they are polluting objects, to be disposed of or avoided. In this way, corpses generate a host of contradictory intuitions that require resolution; in keeping with cognitive dissonance theory (Festinger, 1957), Boyer (2001) suggests that one way by which we reconcile our contradictory intuitions is via ritual and theological elaboration. For example, dissonance may be reduced by after-life concepts that allow us to see corpses as disposable contagions and rituals through which we can get rid of with appropriate dignity. Supernatural agent concepts like disembodied souls, spirits, and ghosts are particularly helpful; paired with meaningful burial rituals, they enable us to
distance ourselves from corpses without thinking that we have disrespected a beloved person. It is no surprise, then, that burial rituals provide our earliest indication of religious belief and that afterlife-related concepts like souls, spirits, and ghosts are the most cross-culturally common supernatural agents (Barrett, 2004; Boyer, 2001; Rossano, 2006). These beliefs and behaviours are omnipresent precisely because they elegantly make sense of the cacophony of psychological responses to death-related stimuli. The fear of death therefore has no role to play here, except insofar as there is a fear of dead things and the diseases they carry.

While defending the view above, Boyer (2001) concedes that if fear enters the picture at all, it does so via the association between corpses and predation, which is an anxiety-provoking feature of our evolutionary history. Even here, however, supernatural agent beliefs are not motivated by a concern to extinguish fear; instead, they are by-products of a hypersensitive tendency to detect predatory agents (Tremlin, 2006). In this view, fear is an adaptive basic emotion, designed by natural selection to prepare animals to respond to threat, chiefly the threat of predation. Among other effects, our immediate and involuntary fear responses prime us to detect agency, so that we can respond quickly to any predators that may be present. That is, death-related cognition and the concomitant fear of predation triggers our hypersensitive tendency to detect agents (cf. Barrett, 2004; Guthrie, 1993; Pyysiäinen, 2009), which, as discussed earlier, renders supernatural agent belief more likely. This proposal therefore locates the role of fear of death—or, more specifically, predation—causally up-
stream, in contrast to wish-fulfillment theories: religion is an effect of our fear of death, but not because religious beliefs are comforting.

2.2.2 Death is unimaginable

Though promising, these proposals still await empirical investigation. There is still no experimental evidence that corpses trigger contagion or predator-avoidance mechanisms, for example. On evidentially firmer ground is the notion that afterlife-related supernatural agent (e.g., soul) beliefs are products of the unimaginability of death. As Freud (1918, p. 41) suggested, perhaps we believe in spirits because we “cannot, indeed, imagine our own death...in the unconscious, every one of us is convinced of his immortality”. This “simulation constraint hypothesis” (Bering, 2006, p. 455) assumes a simulationist account of second-order mental representations, according to which we normally infer the mental states of others by putting ourselves in their shoes, by simulating their mental states in our own minds (cf. Goldman, 2006; Harris, 1991; see Carruthers, 1996 against simulationist theories of mind). That is, our ability to infer particular mental states depends on our ability to simulate them in our own subjective experience. We are therefore able to infer a wide range of psychobiological (e.g., hunger, lack of thirst) and perceptual states (e.g., hearing, not seeing) in others because these states are common to our experience. However, some psychological states—particularly the absolute absence of proprioception, emotion, desire, and beliefs—are much more difficult, if not impossible to simulate, because we lack conscious experience of them. This
makes it particularly difficult to represent psychological death, a complete cessation of conscious experience.

This account explains why afterlife beliefs are so prevalent; namely because post-mortem cessation of consciousness is intuitively inconceivable. It also generates several specific predictions about afterlife beliefs. For example, afterlife beliefs should commonly include a location for the deceased (e.g., heaven, a haunted house), by virtue of the difficulty of simulating a complete lack of proprioception. Furthermore, mental states whose absence is difficult to simulate should occur more frequently in afterlife concepts. Indeed, there is some empirical evidence to this effect. Bering (2002) found that, regardless of self-reported beliefs about the afterlife, participants who were presented with a story about a person who had died suddenly were more likely to state that biological needs, and psychobiological (e.g., feelings of hunger) and perceptual (e.g., hearing) states ceased upon the character’s death than they were to state that emotional (e.g., love), desire (e.g., to be alive), and epistemic states (e.g., knowledge of own death) ceased. Notably, while all “extinctivists”—those who believe that personal consciousness ceases upon death—agreed that the character’s biological, psychobiological, and perceptual functions ceased upon death, about a third of them admitted to thinking that emotional, desire, and epistemic states survived. Extending this research, Bering and Bjorklund (2004) found that both children and adult participants were more likely to attribute emotional, motivational, and epistemic states to a dead mouse—a character in a puppet show who had been devoured by an alligator—than they were to attribute psychobiological and perceptual states to
it. Furthermore, this disparity was consistently larger among younger children, regardless of religious background; indeed, it appears that children hold such afterlife beliefs even before much religious indoctrination can occur.

In sum, the simulation constraint hypothesis holds that afterlife beliefs are straightforwardly intuitive, emerging as they do from the unimaginability of death. However, the relationship between death and religion is here too located in our automatic cognitive responses, rather than in our emotional responses to death.

2.2.3 Death is a misfortune to be explained

There have also been intellectualist theories relating death and religious belief, which construe death as a something to be explained with reference to supernatural agency (Barrett, 2004). Previous research indicates that unexpected and/or negative events lead us to spontaneously seek causal explanations and to form person-based rather than situation-based attributions (e.g., Wong & Weiner, 1981). As an unambiguously negative event, death therefore triggers this natural inclination toward explanation in person-based or social terms.

Expanding on this, Barrett (2004) argues that our social intuitions and moral intuitions lead us to see fortunes and misfortunes as morally-relevant social exchanges: rewards and punishments meted out by agents. Sometimes the agent in question is obvious: parents, pedagogues, police officers, and other such authority figures regularly reward and punish. However, fortunes and misfortunes often cannot easily be linked to human
agents. This opens up an epistemic gap for supernatural agent concepts to fill. Indeed, the kinds of supernatural agent concepts generated by our conflicting intuitions about death of our loved ones, such as the invisible spirit of an elder relative are eminently suitable for the explanatory job. Such a supernatural agent has increased access to morally-relevant information by virtue of being invisible, and is morally interested by virtue of being (or having been) an authority figure.

This kind of intellectualist proposal—that supernatural agent concepts help to explain or otherwise make sense of misfortunes such as death—may indeed be construed as a motivational hypothesis about religion, in which religious belief fulfills some psychological need (e.g., need for cognitive closure; e.g., Webster & Kruglanski, 1994). As we have seen, however, there are potentially more direct motivational links between death–related concerns and religious belief.

2.3 Once more, with feeling

2.3.1 Terror management as the primary function of religion

The anthropological objections and reticence of most contemporary theorists notwithstanding, various suggestions have recently been made that religion is motivated, at least in part, by a need to reduce our fear of death. Indeed, Donovan (2002) proposes a purely functionalist definition of religion as any belief system—regardless of content—that alleviates death-anxiety. In this view, belief systems that do not include supernatural agents or even avowedly eschew them (e.g., atheism) still count as religious, by virtue of their death-anxiety relieving function. Thus, “all that
really matters for the mitigation of death anxiety is that the individual have a firm commitment to some solution to the existential problems raised” (Donovan, 2002, p. 25). Unfortunately, Donovan (1994, 2002, 2003) neither provides a mechanism by which commitment solves existential problems, regardless of content, nor explains the widespread and costly commitment to supernatural agents in particular.

A potentially more theoretically satisfying account is offered by Terror Management Theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Vail, Rothschild, Weise, Solomon, Pyszczynski, & Greenberg, 2010). Drawing heavily from the work of the cultural anthropologist Ernest Becker (e.g., 1973), TMT begins with the observation that human beings are, perhaps uniquely, aware of their mortality. This cognizance of our inevitable deaths elicits crippling existential anxiety, which must be dealt with if we are to function in the world. We are therefore motivated to seek immortality—whether literal or symbolic—and this quest involves embedding ourselves in cultural worldviews or belief systems, which prescribe means for obtaining immortality. Although TMT researchers do not offer formal definitions of “literal” and “symbolic”, it is generally agreed that cultural worldviews offer literal immortality through afterlife concepts (e.g., immortal souls, heaven, reincarnation, nirvana) and symbolic immortality through lasting culturally-valued identifications and achievements, and the increased self-esteem they engender (e.g., Dechesne, Pyszczynski, Arndt, Ransom, Sheldon, van Knippenberg, & Janssen, 2003; Greenberg, Landau, Solomon, & Pyszczynski, in press).
According to TMT, religious worldviews are particularly effective at relieving existential anxiety by providing both symbolic and literal immortality. It is straightforward to see how religious worldviews—at least those with comforting afterlife beliefs—can provide literal immortality: they promise that, despite appearances, physical death is not final. Religious worldviews also provide symbolic immortality by allowing people to feel like valuable parts of something larger and more enduring than themselves (Vail et al., 2010). Indeed, Becker (1971, 1975) and Greenberg et al. (in press) suggest that religious worldviews offer symbolic immortality more effectively than do secular worldviews, by virtue of their self-esteem-enhancing notions of cosmic significance. More radically, some Terror Management Theorists (e.g., Greenberg et al., in press) claim that the quest for symbolic immortality is a surrogate for the quest for literal immortality; symbolic immortality is literal immortality in disguise, as it were. Becker (1973), much like Donovan (2003) after him, even goes so far as to claim that all secular, even atheistic worldviews are inadvertently “religious” in this way; however, Becker’s (1973) proposal maintains the uniqueness of religion as a particularly effective provider of both symbolic and literal immortality. Indeed, Vail et al. (2010, p. 65) claim, “there may be no antidote to the human fear of death quite like religion”.

In précis, according to Terror Management Theory, people are motivated to relieve existential anxiety by seeking literal and symbolic immortality in cultural worldviews and social groups, and religious worldviews are particularly effective at terror management and are therefore attractive; these facts converge to explain the ubiquity, if not the emergence of
religion. It is at this point, however, that Terror Management Theory becomes vaguer. Greenberg et al. (in press) claim that terror management is the primary function of religion, but it is unclear what they mean by the term “function”. At the level of the individual, it is just to claim that people participate in religious beliefs and behaviours to quell their fears of death: “uniquely human concerns about death are the motivational impetus for the formation of and adherence to religious beliefs and behaviour” (Greenberg et al., in press, p. 29). However, TMT’s functional claim might also amount to more specific cultural or biological evolutionary claims. Vail et al. (2010, p. 90–91), for example, argue that “a very important reason that religious memes spread so rapidly and effectively is the protection from existential fear that they afforded to those who possessed them”. Furthermore, in evolutionary biological discourse, the function of a trait usually refers to its selected function: the effect of the trait that conferred reproductive advantages, which led to its increased frequency in the population (Davies, 2000; Wright, 1973). Indeed, consistent with this evolutionary adaptationist understanding of function, Greenberg et al. (in press) provide a phylogenetic history of terror management: at some point in hominid evolution, our ancestors became aware of their inevitable fate as mortals, in response to which they adopted and embellished conceptions of reality that allowed them to deny the finality of death, either literally or symbolically. Those whose worldviews successfully mitigated these mortality concerns and assuaged this otherwise crippling existential anxiety were thus able to hunt and explore more confidently, which in turn made them
more successful at “propagating both their genes and their conceptions of an afterlife” (Greenberg et al., in press, p. 12).

TMT’s claim that the primary function of religion is terror management is open to various interpretations, as attested to by proponents of TMT themselves (Vail et al., 2010). In any case, however, these versions of TMT deny that religion is “an irrelevant byproduct of cognitive processes that emerged to glean accurate accounts of reality” (Greenberg et al., in press, p. 29). That is to say, TMT supplements cognitive theories of religious belief by positing a motivational factor on top of cognitive ones. Indeed, Vail et al. (2010, p. 90) claim to extend other contemporary theories that specify the cognitive structures and mechanisms that make religious beliefs possible (e.g., Boyer, 2001): “early humans used cognitive proclivities that evolved for other reasons to develop religious beliefs to quell existential fear. These beliefs spread and persisted because they were effective in doing so”.

2.3.2 Literal v. symbolic immortality

Besides the lack of specificity about the mechanisms of religious transmission (Greenberg et al., in press; Vail et al., 2010), there is also a lack of specificity over the mechanisms by which religious beliefs reduce fear of death. It is unclear whether religious beliefs alleviate existential anxiety by virtue of their content (e.g., god beliefs, afterlife beliefs) or their place in one’s cultural worldview more broadly.

The latter claim seems more consistent with TMT’s focus on worldview defense, on the significance of one’s own or one’s group worldview in
responding to death. Indeed, Landau, Greenberg, and Solomon (2004) reject the claim that religious beliefs are driven by the activation of universal psychological mechanisms when death is salient, arguing instead that the terror management functions of religion are mediated by the acceptance of particular religious worldviews. They therefore predict that one’s religious (or anti-religious) responses to death will depend on whether one subscribes to a religious worldview in the first place.

In contrast, working within a CSR framework, Atran and Norenzayan (2004, p. 727) emphasize the universality of religious beliefs and their uniqueness over other cultural beliefs, claiming that “the need for belief in supernatural agency is possibly a qualitatively distinct buffer against terror of death that overrides worldview defense needs”. By virtue of their content, the belief in supernatural agents—especially powerful, immortal agents (e.g., gods, souls)—are uniquely readily invoked to relieve existential anxieties; in other words, we have a “distinct cognitive inclination” (Norenzayan & Hansen, 2006, p. 183) toward belief in supernatural entities, which help to solve the problem of human mortality.

This latter suggestion, that human beings are inclined toward supernatural belief in a way that supplants our tendency to defend our cultural worldviews, may be couched in Terror Management Theory’s own terms. Vail et al. (2010, p. 88), for example, ask if religious worldviews are “more powerful” than secular worldviews. Similarly, Dechesne et al. (2003) investigated whether literal immortality beliefs render the pursuit of symbolic immortality redundant. Indeed, to examine the relationship between literal and symbolic immortality concerns, Dechesne et al. (2003)
exploited the empirically well-supported “mortality salience hypothesis”: the TMT prediction that increased accessibility to death-related thoughts (i.e., mortality salience) will lead to “worldview defense” and “self-esteem striving” (see Burke, Martens, & Faucher, 2010 for a recent meta-analytic review of nearly 300 experiments). These two responses to mortality salience overlap, but worldview defense effects are exemplified by increases in outgroup derogation (Greenberg et al., 1990) and punitiveness against those who violate social norms (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), whereas self-esteem striving effects are exemplified by increased cultural value–consistent behaviour (e.g., Jonas, Martens, Kayser, Fritsche, Sullivan, & Greenberg, 2008), increased identification with positive ingroups (e.g., Arndt, Greenberg, Schimel, Pyszczynski, & Solomon, 2002) and decreased identification with negative ingroups (e.g., Dechesne, Jansen, & van Knippenberg, 2000).

Focussing on self-esteem striving responses to mortality salience, Dechenese et al.’s (2003) participants read articles about the afterlife before being exposed to a mortality salience manipulation: half the participants underwent a death-priming procedure which consisted in writing about death, whereas the other half performed a neutral writing task. After this, the extent to which participants strove for self-esteem in various ways was measured. Across three experiments, Dechesne et al. (2003) found that participants who were encouraged to believe in an afterlife engaged in less self-esteem striving behaviour—agreeing with bogus positive feedback (Study 1, Study 2) and engaging in cultural value-consistent behaviour (Study 3)—under mortality salient conditions. In Study 3, they showed
also that encouraging participants to believe in an afterlife reduced the effect of mortality salience on punitiveness (cf. Rosenblatt et al., 1989).

This study provides some indication that literal immortality beliefs render symbolic immortality pursuits redundant, but as Vail et al. (2010) point out, Dechesne et al.’s (2003) findings do not necessarily entail that literal immortality concerns are “more powerful” than symbolic immortality concerns, or somehow take priority over them. Indeed, inverting the order of Dechesne et al.’s (2003) paradigm, perhaps the fulfillment of symbolic immortality concerns also renders literal immortality pursuits redundant. If, however, literal immortality concerns supersede symbolic immortality concerns, we would expect an asymmetry in Dechesne et al.’s (2003) redundancy effect. Furthermore, as Vail et al. (2010) also suggest, mortality salience should also increase preference for literal immortality beliefs over beliefs that imply symbolic immortality. All of which is to say that further evidence is required to argue that human beings are uniquely and universally motivated toward supernatural—including afterlife—beliefs, above and beyond worldview defense considerations (cf. Atran, 2002; Atran & Norenzayan, 2004). It is therefore to the empirical literature examining the relationship between fear of death and religious belief and behaviour that we now turn.
Chapter 3
Death and religion, in empirical perspective

3.1 Is religious belief unique?

3.1.1 A summary of the theoretical options

There have, as we have seen, been various theoretical proposals regarding the relationship between religiosity—construed as the belief in supernatural agents, and related psychological phenomena—and death-related cognition and affect. In particular, there is debate over the uniqueness of such religious or supernatural belief. Those working within the cognitive science of religion (CSR; Barrett, 2007a; Lawson, 2000) framework argue that human beings have a “distinct cognitive inclination” toward religious belief, above and beyond our commitment to other cultural beliefs (Atran, 2002; Atran & Norenzayan, 2004). Those working within the Terror Management Theory (TMT; Greenberg et al., 1986) framework are more ambivalent on this issue. On one hand, there is some suggestion that religious worldviews are uniquely effective buffers of existential anxiety, “more powerful” than their secular counterparts (Vail et al., 2010, p. 88), perhaps because literal immortality concerns supersede symbolic immortality concerns (Dechensne et al., 2003). On the other hand, the classic worldview defense account of religion—in which religious and secular worldviews are functionally identical, both providing some form of immortality to adherents—denies that supernatural beliefs can serve a terror management function independent of the individual’s worldview (Landau et al., 2004). Indeed, while Landau et al. (2004) admit that secular worldviews devel-
oped out of religious ones, they expect that the effect of mortality salience on religiosity will be moderated by individuals’ prior beliefs.

3.1.2 A summary of the empirical predictions

The question of the relationship between death anxiety and religious belief is one amenable to empirical investigation. Indeed, the further question of whether religious belief is unique, above and beyond worldview defense considerations (Atran & Norenzayan, 2004), whether literal immortality takes priority over symbolic immortality (Dechesne et al., 2003), whether religious worldviews are “more powerful” than secular worldviews (Vail et al., 2010, p. 88) is also testable via experiment.

To begin with, correlational data on the relationship between trait levels of death anxiety and religious belief would shed light on the tenability of both theoretical options. Both the worldview defense and distinct cognitive inclination accounts predict the same correlational relationship, albeit with different causal stories. According to the worldview defense account, everyone suffers from some level of death anxiety, which is alleviated to the extent that they are confident about their worldviews, regardless of the worldview’s content. Thus, the worldview defense account predicts a curvilinear relationship between religious belief and death anxiety: strong believers (e.g., religious fundamentalists) and strong non-believers (e.g., militant atheists) should report less death anxiety than their more ambivalent counterparts. That is, the relationship is moderated by categorical religiosity: among non-religious people, death anxiety and religious belief are positively correlated, whereas among religious people, they are
negatively correlated. The distinct cognitive inclination account predicts the same pattern of results, but for different reasons. On this view, death anxiety motivates even non-religious individuals toward religious belief; those who do believe then experience relief from these existential anxieties to the extent that they believe. So, the statistical relationship between religious belief and death anxiety is also curvilinear here, though the two accounts differ in their causal analyses. This common prediction between the two theoretical option entails that a falsification of this correlational prediction would simultaneously falsify both theories. If the prediction holds, however, the different causal analyses between the two theories can be distinguished through experimental investigation.

Indeed, Terror Management Theory’s own methodology provides a way to test between the two theoretical options. Simply put, if there is a distinct inclination toward belief, mortality salience should lead to increased religious belief, regardless of individuals’ prior worldview commitments. Conversely, if religious beliefs only act as a buffer within religious worldviews, the effect of mortality salience on religious belief will be moderated by individuals’ categorical religious commitments (Landau et al., 2004): mortality salience should increase religious belief for religious individuals but decrease religious belief for non-religious individuals.

The logic behind these predictions may be stated in terms of Terror Management Theory’s distinction between literal and symbolic immortality pursuits. According to the distinct cognitive inclination account, mortality salience leads to the pursuit of literal immortality, regardless of individuals’ prior religious commitments. However, according to the world-
view defense account, non-religious participants will not pursue literal immortality, only symbolic immortality. Furthermore, the pursuit of symbolic immortality manifests itself, for the non-religious individual (and for the atheist in particular), in decreased religiosity. The validity of a religious worldview should threaten those who do not accept its norms and values (e.g., theological, ethical, soteriological truth claims); the non-religious should therefore seek to undermine such worldviews, especially under mortality salient conditions. Even among non-religious individuals who do not identify strongly with being non- or anti-religious, the pursuit of symbolic immortality should be manifest in much the same way here as with other demographically-based outgroups; previous research has shown the mortality salience leads to bias against various kinds of outgroups (e.g., age; Martens, Greenberg, Schimel, & Landau, 2004), even minimally-defined, arbitrarily-assigned ones (Harmon-Jones, Greenberg, Solomon, & Simon, 1996).

To date, there are still very few experimental studies on the relationship between religious belief and death-related affect and cognition. In contrast, there are a substantial number correlational studies and reviews of those studies. In the following sections, this correlational and experimental research will be reviewed to empirically evaluate the worldview defense and distinct cognitive inclination accounts of religious belief respectively.

### 3.2 Correlational research

#### 3.2.1 Reviews of correlational research and their limitations
The theoretical diversity on the relationship between religious belief and death-related cognition is matched by evidential ambivalence. Even the nature of the statistical relationship between death-anxiety and religiosity is unclear, as various reviews of the correlational research have shown. Spilka, Hood, and Gorsuch (1985), for example, found that, of the 36 studies they reviewed, 24 showed negative correlations between death-anxiety and religiosity, three showed positive correlations, two showed mixed results, and seven showed no significant relationship in either direction. Reviewing 137 studies, Donovan (1994) found that 57% showed negative correlations between religiosity and death-anxiety and 9% showed positive correlations, while 33% showed no significant relationship or were otherwise inconclusive. So, an initial look at the available evidence suggests that, if anything, the relation between religiosity and death-anxiety is linear and negative, contrary to both the worldview defense and distinct cognitive inclination accounts. However, it is also evident that there is great inconsistency in the findings, and the true relation is likely more complex.5

The evidential ambiguity in extant correlational research might be due to various methodological limitations, chiefly sampling biases and measurement problems. As Hood, Hill, and Spilka (2009) have noted, the vast majority of the research in this area has been conducted with religious samples (e.g., American college students, who are predominantly religious); we have relatively little information about non-religious individuals.

5Moreover, it is unclear of curvilinear analyses were performed at all in these studies; it is certainly possible that the curvilinear relationship existed in these datasets, but were unexplored upon discovering linear correlations.
It is therefore particularly important to collect data from samples that include both religious and non-religious individuals.

Besides this sampling bias, research on death-anxiety and religion runs into the problem of definition and the concomitant problem of measurement. It is insufficiently precise to speak of the relationship between death-anxiety and “religion” or “religiosity”, especially given the multi-dimensional understanding of these terms. The notion, well-accepted within traditional psychology of religion (Hood et al., 2009), that religion is a multi-dimensional phenomenon has appropriately led to a preference for multi-factorial measures of religiosity that seek to capture its various aspects (e.g., affective, behavioural, cognitive, social), over “general religiosity” measures. However, uncritical uses of multi-factorial measures—those that do not examine each factor separately when appropriate, for example—fail to apply the theoretical insight from which these measures came. Death-anxiety may well be correlated with some aspects of religiosity, but not others; indeed, death-anxiety may be correlated with different aspects of religiosity in different directions. Merely aggregating across all items of a multi-factorial scale or, indeed, using a scale that measures theoretically inappropriate psychological constructs risks failing to pick up important statistical relationships. A piecemeal approach, driven by a subtly different understanding of religion as a multi-dimensional package of phenomena that coalesce around belief in supernatural agents (e.g., Boyer, 2011), is therefore especially important in this domain, as it enables different aspects of religion (e.g., belief) to be studied independently.
Accordingly, and in keeping with the current theoretical aims, the current research is concerned with the relationship between death-anxiety and religious belief in particular, that is, the belief in supernatural entities. A review of more recent empirical research, with these two sampling and measurement considerations in mind may suggest a way forward. This section therefore undertakes such a review, and attempts to make sense of the diversity in the findings.

3.2.2 A closer look at religious samples

Harding, Flannelly, Weaver, and Costa (2005) studied a Christian sample—parishioners of an American Episcopalian church—and found that death-related anxiety was lower among those who more strongly believed in God and an afterlife. Interestingly, Cohen, Pierce, Chambers, Meade, Gorvine, and Koenig (2005) found that, among Protestants, the relationship between death-anxiety and religiosity differed depending on the kind of religiosity measure used: death-anxiety was negatively correlated with “intrinsic” religiosity, but positively correlated with “extrinsic” religiosity measured on Allport and Ross’s (1967; Feagin, 1964) Religious Orientation scale. According to Allport and Ross (1967, p. 434), the intrinsically religious individual has “embraced a creed...endeavours to internalize it and follow it fully”, while, for the extrinsically religious individual the “creed is lightly held” and religious participation is “instrumental and utilitarian.” Evidently, these scales measure opposite religious orientations; indeed, Cohen et al. (2005) found that intrinsic and extrinsic religiosity were negatively correlated. Furthermore, afterlife belief was positively correlated
with intrinsic religiosity, but negatively correlated with extrinsic religiosity. Arguably, then, intrinsic religiosity is indicative of true belief or commitment, while extrinsic religiosity is not.

Both Harding et al.’s (2005) and Cohen et al.’s (2005) recent findings among religious individuals are consistent with the notion that religious belief assuages existential anxiety; indeed, religious believers fear death less to the extent that they hold religious beliefs. However, Cohen et al.’s (2005) results regarding extrinsic religiosity are more difficult to interpret. They imply, perhaps, that—in keeping with the notion that extrinsic religiosity is instrumental or utilitarian—extrinsically religious individuals are motivated to engage in religious participation to the extent that they fear death. While these results are suggestive, more evidence is required from studies on non-religious individuals, as well as from experimental research, before firmer conclusions may be reached.

3.2.3 Turning to a (more) non-religious sample

There is still a paucity of empirical research on non-religious samples, but a recent study by Dezutter, Luyckx, and Hutsebaut (2009) is similarly suggestive. Examining largely non-religious participants in Western Europe, Dezutter et al. (2009) found a positive relationship between fear of death and acceptance of literal interpretations of Christian belief. Interestingly, however, they also found a positive relationship between fear of death and rejection of literal interpretations of Christian belief. Unfortunately, it is unclear whether these results were driven by non-religious and religious participants respectively, especially as Dezutter et al. (2009) did not collect
data on religious self-identification or categorical religiosity; instead, they measured participants’ ratings of the importance of religion and the frequency of their church attendance, but did not include either measure in their analyses regarding death-related affect.

That non-religious individuals accept religious claims to the extent they fear death is again, like Cohen et al.’s (2005) findings regarding extrinsic religiosity, suggestive that fear of death motivates religious belief, even among ostensibly non-religious individuals. Alternatively, perhaps non-religious people who are nevertheless tempted toward religious belief have weaker buffers against fear of death. So, this aspect of Dezutter et al.’s (2009) correlational data is consistent with both theoretical proposals outlined in Chapter 2, that fear of death triggers religiosity, regardless of prior beliefs (cf. Atran, 2002), and that worldview defence assuages existential anxiety, regardless of content (cf. Landau et al., 2004) respectively.

Dezutter et al.’s (2009) results regarding the rejection of religious truth claims is more difficult to interpret. Proponents of the uniqueness of religious beliefs vis-à-vis death-anxiety would argue that the positive correlation between the rejection of religious belief and fear of death indicates that religious belief is an important buffer against fear of death, such that the absence of these beliefs enables such fears to arise. Proponents of the worldview defence account, on the other hand, might claim that non-religious individuals who are predisposed toward death-anxiety are also therefore driven to denigrate outgroup worldviews, one manifestation of which is the rejection of religious belief; however, this view notably implies that worldview defence is ineffective at managing terror here.
Again, these results on non-religious participants appear to be consistent with a variety of theoretical options; the causal relationship between death-anxiety and religious belief cannot be inferred from correlational data alone, especially not when such data are so scant.

3.2.4 A curvilinear relationship?

This critical review of previous research reveals, at least, that the oft-documented negative correlation between death-anxiety and religiosity, variously construed and measured, provides an incomplete account of the matter. The data on extrinsic religiosity (Cohen et al., 2005) and literal rejection of religious claims (Dezutter et al., 2009) in particular suggest a curvilinear relationship between death-anxiety and religious belief: as strength of belief increases, death-anxiety increases for religious non-believers, but death-anxiety decreases for religious believers. Indeed, a few studies have provided some evidence for just such an “inverted U” relationship (Aday, 1984–1985; Dolnick, 1987; Downey, 1984; Leming, 1979–1980; McMordie, 1981; Nelson & Cantrell, 1980; Wen, 2010; Wink & Scott, 2005). Even in these studies, however, little effort has been made to gather data on religious belief specifically, and from both religious and non-religious participants. More and better data on this statistical relationship are required.

At any rate, correlational data provide only very weak evidence for any causal (e.g., motivational, functional) claims about religious belief and death-anxiety. A quadratic relationship might, for example, imply that religiosity increases death-anxiety up to a point, after which it relieves death-
anxiety (e.g., Leming, 1979–1980; Nelson & Cantrell, 1980; Pyne, 2010); or it might imply that confidence in one’s beliefs or worldview, regardless of content, decreases death-anxiety (e.g., Landau et al., 2004); or it might imply that death-anxiety motivates non-religious people toward belief, and religious belief then reduces death anxiety (e.g., Atran & Norenzayan, 2004). Most importantly, the correlational evidence cannot adjudicate between the worldview defence account proposed by TMT and the distinct cognitive inclination account that has emerged out of CSR research. However, the fact that both accounts predict a curvilinear relationship between death-anxiety and religious belief, entails that the failure to find such a statistical relationship would amount to falsification of both accounts in one fell swoop. It is therefore still important, at least as a starting point, to collect good data from a representative sample on this matter.

3.3 Experimental research

3.3.1 Overview

While there have been over 100 correlational studies on death-anxiety and religiosity (cf. Donovan, 1994), there have been far fewer experimental studies, and the results of these studies are no less ambiguous. Although a review of this literature makes it clear that mortality salience (i.e., increased cognitive accessibility of death-related thoughts) strengthens religious individuals’ commitment to their own religious worldviews, what is less clear is how individuals respond to outgroup religious worldviews or how non-religious individuals respond to religious worldviews. Unfortunately, it is precisely this point that adjudicates between a worldview de-
fence account of religion (Laundau et al., 2004) and one in which human beings are uniquely inclined toward religious belief regardless of prior worldview (Atran & Norenzayan, 2004).

In this section, the extant literature will be reviewed and critically evaluated. The review begins with a null finding, a cautionary tale about the appropriate use of religiosity scales. It will then proceed chronologically, looking at how mortality salience affects religiosity, variously measured.

3.3.2 On how not to use religiosity scales

In an early experiment on Terror Management Theory, investigating the effects of mortality salience on status concerns and religiosity, Burling (1993) found that participants who were asked to think and write about themselves dying scored no differently on a measure of religious orientation—their “way of being religious”; Batson & Ventis, 1982, p. 137)—than those in a control group. In this experiment, participants were given pre-test measures of status concern and “interactional” (or “Quest”; Batson & Ventis, 1982) religiosity, a measure of attitudes toward religion as a quest for knowledge (e.g., “It might be said that I value my religious doubts and uncertainties”; Burling, 1993, p. 102). Participants in the mortality salience condition then wrote short descriptions about how they felt as they thought about themselves dying and about what would happen to them as they died (cf. Rosenblatt et al., 1989), whereas participants in the control condition went directly to the subsequent anxiety measure, and post-test measures of status concern and religiosity.
Burling (1993) found no statistically significant main effects or interactions (e.g., with pre-test religious orientation) on the post-test measure of “internal” religiosity, a measure of attitudes toward religion as a belief system (e.g., “It is necessary to have religious belief”; Burling, 1993, p. 102). The lack of mortality salience effects here seems inconsistent with both of the theoretical frameworks that concern us, as well as the general view that religious belief is motivated by existential concerns. Furthermore, as we shall see, these results differ from those of previous and subsequent research. However, there are reasons to think that Burling’s (1993, p. 104) conclusion that “religious beliefs may not be overtly affected” by mortality salience is premature.

First, the “religiosity” measure employed here was a measure of religious orientation, rather than one of religious belief or commitment; there is, for example, an important difference between thinking that religious belief is “necessary” (Burling, 1993, p. 102) and thinking that any given religious proposition is true. Indeed, mortality salience might well alter one’s inclination to believe in God, while leaving one’s opinion regarding the necessity of this belief (e.g., for salvation, for moral life) unchanged. Furthermore, the criterion by which Burling (1993) demarcated low- and highly-religious participants—scores on Batson and Ventis’s (1982) interactional scale—was wholly inappropriate. Again, scores on this scale are indicative of respondents’ approach to religion, rather than their actual commitments (e.g., cognitive, behavioural, social) to any given religion. Crucially, Burling’s (1993) designation of high scorers as highly religious is problematic. On the contrary, previous research has raised con-
cerns that high scores on this scale imply agnosticism or anti-orthodoxy (Batson & Schoenrade, 1991; Donahue, 1985); furthermore, religious fundamentalists or dogmatically religious people tend to score low on this scale (Altemeyer & Hunsberger, 1992).

In sum, the use of religious “orientation” scales tells us little about the effects of mortality salience on religious commitment, either cognitive, behavioural, or social; indeed, the inappropriate use of extant scales might lead us to false conclusions. As in psychological science more generally, the validity of a measure (Borsboom, Mellenbergh, & van Heerden, 2004) or test-score interpretation (Cronbach & Meehl, 1955) is a crucial issue in the study of religion; we should be clear about the psychological constructs we are interested in, and choose our measurement tools accordingly. This literature review therefore proceeds cautiously, paying close attention to the dependent measures used.

3.3.3 Mortality salience and religious behaviour, broadly construed

In a study on mortality salience effects on the inappropriate treatment of significant cultural symbols, Greenberg, Porteus, Simon, Pyszczynski, and Solomon (1995) had American participants either write about themselves dying or about watching television, and then to complete two practical tasks. For half the participants, the completion of these tasks was most efficiently done by using an American flag as a sieve and a crucifix as a hammer, while for the other half, more appropriate tools were provided. While mortality salience did not affect the extent to which the significant cultural symbols—American flag and crucifix—were used in this experi-
ment, participants who were previously primed with death-related thoughts took longer to use these symbols in this way, and also reported the task to be more difficult.

These results may be taken as evidence that mortality salience increases religious belief—as implied by participants’ reluctance to commit potentially sacrilegious acts—but, especially given identical effects on the use of the American flag, the experiment cannot distinguish between mortality salience effects on symbolic and literal immortality pursuits.

In another study, on the effects of mortality salience on religious intergroup attitudes, Greenberg et al. (1990, Study 1) presented Christian participants with questionnaires—one about the respondents’ self-concepts, the other about the respondents’ attitudes toward social issues—ostensibly completed by a Christian and a Jew; the participants were then asked to report their impressions of the respondents through a variety of rating tasks. Prior to this phase of the experiment, half the participants were asked to write about themselves dying and about the feelings that thoughts of death provoked in them; the other half received no such writing task.

Consistent with Terror Management Theory’s worldview defence expectations, Christian participants in the mortality salient condition generally reported more positive impressions of the Christian respondent and more negative impressions of the Jewish respondent; participants in the control condition demonstrated no such bias. For example, mortality salience led to increased attraction (e.g., the extent to which they would like to work with the target) toward the Christian respondent and decreased at-
traction toward the Jewish respondent. Likewise, mortality salience led to ingroup bias in terms of participants’ attribution of positive and negative traits to the respondents. Greenberg et al. (1990) take these results to imply that mortality salience causes individuals to bolster their own religious worldviews—which include literal immortality beliefs—and to denigrate others’ religious worldviews. However this conclusion requires the unverified assumption that the relative derogation of religious outgroup members is due to (or is at least a proxy for) the denial of religious outgroup truth claims. Indeed, the cultural differences between Christians and Jews are perhaps more salient than the theological differences between them (e.g., afterlife beliefs); if so, they can at best be taken as evidence that mortality salience triggers the pursuit of symbolic immortality, leaving aside the question of literal immortality.

In summary, the experimental research on mortality salience and religious behaviour—broadly construed to include sacrilegious and intergroup behaviour—is of limited value for our theoretical aims. This is unsurprising, given that Greenberg et al. (1990, 1995) were concerned with whether or not mortality salience would lead to individuals defending their own worldviews, and not with whether human beings have a distinct inclination to believe in supernatural agents, regardless of prior worldview. Such a view would predict, for example, that Christian participants would also be reluctant to use outgroup (e.g., Islamic) symbols inappropriately under mortality salient conditions, and not just ingroup, Christian ones (Greenberg et al., 1995). Greenberg et al.’s (1990) findings regarding intergroup behaviour come closer to falsifying the notion that our inclination
toward religious belief overrides our prior worldview commitments, but even in that case, to denigrate Jews is not necessarily to denigrate their beliefs. For example, Christians might engage in worldview defense by denigrating Jewish people, while also pursuing literal immortality by accepting their afterlife beliefs. At any rate, a review of these studies provides a clearer picture of the kind of evidence we need to adjudicate between theories. In particular, data on mortality salience effects on outgroup religious beliefs are required.

3.3.4 Mortality salience and afterlife belief

Before the development of Terror Management Theory, Osarchuk and Tatz (1973) ran a seminal experiment on the effects of death-related anxiety on participants’ belief in an afterlife. In this study, participants first completed one form of the authors’ Belief in Afterlife (BA) scale, which consists of 10 statements variously affirming or denying life after death. Participants were asked to rate their level of disagreement/agreement with each statement; scores for items denying life after death were then reversed so that higher scores indicated greater afterlife belief. Thirty participants with low BA scores (i.e., non-believers) and thirty participants with high BA scores (i.e., believers) were assigned to three priming conditions: death threat, shock threat, and control. Participants in the death threat condition were then simultaneously presented with an audio recording and slide-show. The audio recording gave an exaggerated estimate of the probability of death (e.g., by accident, from disease) for people of the participants’ age group (viz., 18 to 22 years) accompanied by dirge-like music playing in the
background, while the slideshow presented death-related scenes (e.g., car wreck, murder victim). Instead of the death-anxiety manipulation, participants in the shock threat condition were told that they would be given a series of shocks of various intensities, and participants in the control condition were given a child’s toy to play with. After the manipulation phase, participants completed an alternate form of the BA scale and reported their anxiety levels.

Osarchuk and Tatz (1973) found that while the death threat and shock threat both increased self-reported anxiety in both low BA and high BA participants, only high BA participants in the death threat condition experienced increased BA scores. That is, induced fear of death strengthened afterlife belief among people who already held strong afterlife beliefs, but not among those who disagreed with afterlife beliefs. In Terror Management terms, Osarchuk and Tatz’s (1973) non-believing participants did not engage in worldview defense; they did not denigrate outgroup beliefs. On the other hand, neither did they report a greater inclination toward afterlife belief, as predicted by the distinct cognitive inclination account.

These null results are somewhat surprising, given the well-documented readiness with which death-primed participants engage in outgroup derogation, even under minimal group conditions (e.g., Harmon-Jones et al., 1996), and are perhaps a function of the methods employed. Osarchuk and Tatz’s (1973) measure of religious belief is a very overt one; indeed, the structure of the experiment makes the research question fairly obvious, perhaps especially so to psychology students. These factors lend themselves to triggering self-presentational biases, which may have ob-
secured any effect that the death-anxiety manipulation may have had on afterlife belief.

3.3.5 Mortality salience and “spiritual religiosity”

Weisbuch, Seery, and Blascovich (2005) recently ran a more subtle study, employing the less overt mortality salience manipulation often used in Terror Management studies (e.g., Greenberg et al., 1994) and a multi-dimensional religiosity scale that did not contain any references to death or the afterlife. Furthermore, Weisbuch et al. (2005) informed participants that the study was about personality and culture, included several irrelevant questionnaires, and inserted a distracter task between the mortality salience manipulation and the religiosity scale.

Participants in this study were asked either to think and write about themselves dying and the feelings such thoughts arouse in them (mortality salient condition; e.g., Burling, 1993) or to complete an analogous writing task about watching television (control condition; e.g., Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Then, they read a 500-word essay on an unrelated topic as a distracter task, and then finally completed Kass et al.’s (1991) Index of Core Spiritual Experiences (INSPIRIT), a “spiritual religiosity” measure (Weisbuch et al., 2005, p. 6).

In contrast to Osarchuk and Tatz (1993), Weisbuch, et al. (2005) found that mortality salience increased spiritual religiosity among Christians, Jews, and Muslims and decreased spiritual religiosity among atheists, agnostics, and participants who self-classified as non-religious. These results are clearly consistent with Terror Management Theory’s worldview.
defense account (Landau et al., 2004), but contradict the notion that we have a distinct cognitive inclination toward religious belief (Atran & Norenzayan, 2004), which predicts that mortality salience should motivate religious belief in all participants. Indeed, Weisbuch et al. (2005) similarly concluded that their non-religious participants pursued symbolic immortality, rather than literal immortality.

While Weisbuch et al.’s (2005) study is a step in the right direction, and appears to provide fairly strong support for the worldview defense account (Landau et al., 2004), the religiosity measure they used might not be sensitive to changes in religious or supernatural beliefs. Indeed, Kass et al.’s (1991) INSPIRIT consists of seven items, only one of which is unambiguously about religious belief (viz., “God dwells within me.”); the other items ask about respondents’ self-identification as “strongly religious” and “strongly spiritually oriented”, and their participation in religious and spiritual practices. This emphasis on self-identification and characteristic behaviour might enable the INSPIRIT to detect changes in respondents’ self-concept as religious/spiritual or non-religious/non-spiritual, but not changes in their tendency toward religious, spiritual, or more broadly supernatural belief. Indeed, any actual increase in religious belief might be obscured by participants’ unwillingness to self-identify with religious or spiritual outgroups. It would therefore be interesting and important to see if Weisbuch et al.’s (2005) results are replicable with a measure that does not emphasize identification in this way. Until then, however, it seems reasonable to take Weisbuch et al.’s (2005) results as evidence against the
claim that literal immortality concerns supersede symbolic immortality concerns.

3.3.6 Mortality salience and belief in outgroup supernatural agents

More recently, Norenzayan and Hansen (2006) conducted a series of experiments examining the effect of mortality salience on religious beliefs. In contrast to Weisbuch et al.’s (2005) study, they specifically examined peoples’ beliefs in supernatural agents and agency.

In the first experiment, participants were asked to write a paragraph about what would happen when they died and how thinking about themselves dying made them feel, or an analogous paragraph about eating their favourite foods. After a distracter task, participants were asked to complete a demographic questionnaire that included questions about how religious they were, and how strongly they believed in God. Norenzayan and Hansen (2006, Experiment 1) found that the mortality salience prime increased religiosity and belief in God, relative to a neutral control task. However, as no religious background information was obtained in this experiment, these results do not help us adjudicate between the various theoretical positions.

In the second experiment, participants first reported their religious affiliation in a demographics questionnaire, and were then presented with a mortality salience prime, a religious prime, or a control prime. The primes consisted of narratives involving a child and his mother visiting their father in a hospital: in the mortality salience condition, the child ends up dying in an accident; in the religious prime, the child sees a man pray-
ing in a chapel; and in the control prime, the child watches an emergency drill (cf. Cahill, Prins, Weber, & McGaugh, 1994). After the priming phase, participants completed the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) and proceeded to read an article, allegedly from the *New York Times*. The article referred to a randomized-control trial which found that women undergoing fertility treatment were twice as likely to get pregnant if they were prayed for by a Christian prayer group than if they were not prayed for. Participants then rated the extent to which they agreed with a battery of statements, four of which measured belief in the Christian God, God/a Higher Power, God’s/a Higher Power’s ability to answer prayers, and the extent to which the scientific study provided evidence of this. Norenzayan and Hansen (2006, Experiment 2) found that only mortality salience increased belief in prayer and God, even when religion (viz., Christian v. non-Christian) was statistically held constant. However, as the majority (74%) of the participants were Christian, this study suffers from the sampling bias limitations discussed above, which limits the generalizability of the results.

To more properly examine the effects of mortality salience on belief in outgroup or culturally-alien supernatural agents and agency, Norenzayan and Hansen (2006) ran a slight modification of Experiment 2. In this experiment, participants' demographic information, including religious identification, was obtained by e-mail or phone two days to a week prior to the rest of the experiment. At the laboratory, participants were exposed to either the mortality salience or control prime, as above. Furthermore, some details of the dependent measure (e.g., information about the
scientific study, questionnaire items) were modified to refer to Buddha and Buddhist prayer, rather than to the Christian analogues used in Experiment 2. Furthermore, participants completed the PANAS twice in this experiment: once after the prime and once at the very end of the experiment. Notably, all but one of the items among the dependent measures—“The Buddha that prayer groups were praying to exists”—referred to “Buddha/a Higher Power”. In this experiment, Norenzayan and Hansen (2006, Experiment 3) found that mortality salience increased belief in supernatural agents and agency as measured by the “Buddha/a Higher Power” items, but not belief in Buddha specifically. This study therefore fails to unambiguously demonstrate increased belief in culturally-alien supernatural agents as a result of mortality salience. However, as they point out, Christian participants’ endorsement of the statements about “Buddha/a Higher Power” were, on average, below the neutral midpoint of the scale (indicating slight disagreement) under control conditions, and significantly above this midpoint (indicating agreement) under mortality salience conditions. So, there is some, albeit very weak indication that mortality salience shifted Christian participants’ attitudes toward culturally-alien supernatural agents.

Finally, to deal with various flaws and limitations of Experiment 3, Norenzayan and Hansen (2006) conducted a fourth mortality salience experiment. The mortality salience prime was identical to the one used in Experiment 1: participants were asked to imagine and describe themselves dying, and how they felt about thinking about their death. There was also an anxiety control prime, an analogous task about experiencing dental
pain; and a neutral control prime, an analogous task about participating in a team activity. After the priming phase, participants completed the PANAS and a distracter task before being presented with an article, allegedly from the South China Morning Post, about Russia’s employment of clairvoyant, ancestral spirit-guided Siberian Shamans during and after the Cold War. As in Experiment 2 and 3, participants then completed a questionnaire in which the dependent measure items were embedded. This time, 4 of the 7 items asked exclusively about the ancestral spirits, while the others were about clairvoyance and God/a Higher Power. After this task, participants completed the PANAS again and then provided demographic details, including information about their religious identification. This time, Norenzayan and Hansen (2006, Experiment 4) did not find a main effect of mortality salience. However, when they limited their analyses to religious people, mortality salience significantly increased belief in Shamanic ancestral spirits. Furthermore, mortality salience surprisingly did not increase belief in culturally familiar supernatural agents (e.g., God). Norenzayan and Hansen (2006) explain this finding by appealing to the fact that the questions concerning belief in Shamanic ancestral spirits always preceded the ones concerning belief in God, and therefore that participants’ need to believe in a supernatural agent—motivated by mortality salience—had already been fulfilled by the questions regarding ancestral spirits. Indeed, previous research on goal activation has shown such a “use it and lose it effect” (Moskowitz, 2005, p. 405), in which responses that fulfill a primed goal might deactivate the goal, such that participants’ later responses differ from their earlier ones. In this case, participants’ goal to
reduce existential anxiety was adequately fulfilled by increased belief in ancestral spirits, which made increased belief in God unnecessary.

Taken as a whole, Norenzayan and Hansen’s (2006) experiments provide some evidence that mortality salience can increase religious participants’ belief in both culturally-familiar and culturally-alien or outgroup supernatural agents. Contrary to Weisbuch et al.’s (2005) findings and the worldview defense account (Landau et al., 2004), mortality salience failed to have any discernible effect on atheists’ or non-religious participants’ religious beliefs. The lack of outgroup derogation by non-religious participants—especially given Christian participants’ increased willingness to endorse foreign gods—is suggestive, though inconclusive. Furthermore, as Norenzayan and Hansen (2006) themselves note, it is plausible that their non-religious participants were reluctant to admit to any decreased skepticism they may have experienced after contemplating their mortality. That is, any effects mortality salience might have had on non-religious participants were obscured by the limitations of explicit, self-report measures.

3.3.7 An evaluative summary of the empirical evidence

The extant experimental research on the effects of death-related cognitions and affect on religiosity provides contradictory evidence. Weisbuch et al.’s (2005) study provides evidence for a worldview defense account of religion, in which participants pursued symbolic immortality by bolstering their prior worldviews in the face of death awareness. Norenzayan and Hansen (2006), employing a similar experimental paradigm, but using a more subtle measure of belief in supernatural agency, found that partici-
pants became more inclined to believe in worldview-consistent and out-group gods; furthermore, non-religious participants did not engage in worldview defense. Osarchuk and Tatz (1973) similarly found that death-anxiety increased explicit afterlife belief among believers, but had no effect on non-believers.

There are of course, methodological differences across these studies, which might shed light on the differences in their findings. First, Osarchuk and Tatz’s (1973) study pre-dated Terror Management’s research program, and their death prime differed from the standard mortality salience prime in two significant ways: (a) it was more emotionally provocative, designed to elicit an affective response (e.g., dirge-like music); (b) it did not include a distracter task before the dependent measure to reduce conscious awareness of death-related cognitive and affect. Likewise, Norenzayan and Hansen (2006) only inconsistently inserted a distracter task between priming and measurement (viz., Experiments 1 and 4, but not 2 and 3).

These methodological differences are significant according to Terror Management Theory (Pyszczynski, Greenberg, & Solomon, 1999), which posits proximal and distal defenses to existential anxiety. Proximal defenses against existential anxiety are strategies activated when people are consciously aware of their death-related thoughts; such defenses are typically threat-focused (e.g., denying one’s vulnerability) and seemingly rational. Distal defenses, on the other hand, are strategies activated when thoughts of death are accessible but not conscious; they are typically semantically unrelated to death, instead involving increased commitments to
cultural worldviews and the acquisition of self-esteem. So, in TMT terms, Osarchuk and Tatz’s (1973) study was an examination of distal defenses. Accordingly, afterlife-believing participants affirmed these beliefs under mortality salience conditions, thereby denying their vulnerability to a finalizing death; for the non-believing participants, however, affirmation of afterlife beliefs was not an option, as it was not for them a viable strategy to escape death. However, this analysis does not work as well when applied to Norenzayan and Hansen’s (2006) results. TMT seems to be committed to the claim that Experiments 1 and 4 were examinations of distal responses, whereas Experiments 2 and 3 were examinations of proximal responses. Yet, in Experiment 4, participants endorsed foreign gods—that is, outgroup religious worldviews—but not their own ingroup gods; this straightforwardly contradicts TMT’s expectations regarding distal responses to mortality salience. Norenzayan and Hansen’s (2006, Experiment 4) results, both with regard to the endorsement of outgroup gods and non-religious participants’ failure to denigrate religious beliefs, are in stark contrast with Weisbuch et al.’s (2005) findings, though both ostensibly examined distal responses. Notably, however, Norenzayan and Hansen’s (2006) measure of religious belief is arguably more subtle than Weisbuch et al.’s (2005) explicit self-report measure of multi-dimensional spiritual religiosity. Indeed, there are two reasons, well-established in previous social cognitive research, that the subtlety of a measure might affect experimental outcomes.
3.4 Explicit measures (and their discontents)

3.4.1 Strategic responding

There are, broadly speaking, two classes of problems with explicit measures of psychological variables, as has been heavily discussed in the social psychological literature on attitudes (e.g., Fazio & Olson, 2003; Wittenbrink & Schwarz, 2007). The first is strategic responding: participants might not always be honest when asked directly about their beliefs, either because their true beliefs are socially undesirable, or because they are motivated to provide the experimenter with an answer that fulfills his or her expectations. Indeed, as alluded to earlier, Norenzayan and Hansen (2006) themselves raised the possibility that their non-religious participants were engaging in strategic responding, arguing that their null effects for non-religious participants were likely due to their reluctance to report increased religiosity. Similarly, Ozarchuk and Tatz’s (1973) null findings with respect to non-believers might also be due to such self-presentational concerns.

3.4.2 Implicit cognition

The second problem with explicit measures is that people might not be consciously aware of their own beliefs or some aspect thereof (Nisbett & Wilson, 1977). Over the last two decades, this view—that some attitudes are held or formed automatically and even unconsciously—has established itself as social cognitive orthodoxy. The literature is now replete with dual-process models of cognition, which distinguish between the implicit and explicit (e.g., Nosek, 2007), or the automatic and controlled (e.g., Bargh &
Chartrand, 1999), or the unconscious and conscious (e.g., Dijksterhuis & Nordgren, 2006), and so forth. There is still much empirical and theoretical work to be done on dual-process models of cognitive processes, but it is increasingly clear that traditional self-report measures are inadequate to capture implicit attitudes, even when they assess explicit attitudes accurately.

This implicit-explicit distinction is certainly applicable to religious belief. Various “implicit theism” (Uhlmann, Poehlman, & Bargh, 2008, p.71) effects are explicable in dual-process terms. As discussed in the previous chapter, for example, Bering (2002) found that extinctivists—people who explicitly reject any literal notion of an afterlife—nevertheless endorsed statements that implied post-mortem psychological functioning (viz., emotional, desire, epistemic states); furthermore, when they denied such psychological functioning, they took longer to do so than when they denied biological functioning. Similarly, Haidt, Björklund, and Murphy (2000) asked participants to sign a contract to sell their souls for $2; those who refused to sign were reminded that the contract stipulated itself to be entirely non-binding, and that they could even rip up and thereby void the contract after signing. Even after these counter-arguments, the majority of the participants—including atheists—refused to sign, though they had difficulty explaining for their refusal. Whether or not such findings justify the claim that “atheism is only skin deep” (Bering, 2010, p. 166), the empirical results do show a dissociation between non-believers’ stated atheological positions and their implicit assumptions, revealed in their behaviour and in how they process narrative information.
3.5 *Foxhole atheism, revisited: digging beneath the surface*

The explicit-implicit distinction in social psychology more generally and the cognitive science of religion in particular raise an interesting question regarding the effect of mortality salience on religious belief.

As reviewed above, recent research provides evidence for “implicit theism” among non-religious individuals, including atheists and extinctivists (Bering, 2002; Haidt et al., 2000; Heywood, 2010; Uhlmann et al., 2008, p. 71). Furthermore, while Weisbuch et al. (2005) reported classic worldview defense findings, Norenzayan and Hansen’s (2006) results suggest that non-religious individuals are reluctant to denigrate religious beliefs when religious belief is measured more subtly. These previous findings raise the possibility that non-religious individuals’ explicit and implicit responses to mortality salience might differ; that is, perhaps worldview defense occurs at an explicit level, simultaneous with implicit tendencies toward religious or supernatural belief that exist regardless of our conscious commitments. Indeed, non-religious participants’ reluctance to denigrate religious beliefs might be driven by changes in such implicit tendencies; there is increasing evidence that our intuitive, unconscious, or otherwise implicit cognitions do affect our conscious beliefs and behaviours (e.g., Bargh & Chatrand, 1999; Barrett & Lanman, 2008; Dijksterhuis & Nordgren, 2006).

This view predicts a dissociation between the effects of mortality salience on non-religious individuals’ self-reported propositional beliefs (e.g., as measured via a scale) and on their implicit beliefs. Mortality sali-
ence ought to lead to explicit worldview defense (cf. Weisbuch et al., 2005), manifested in the denigration of religious truth claims, and also an implicit tendency toward religious belief. To investigate these hypotheses, appropriate explicit and implicit measures need to be developed. Across a series of studies, the present research project aims to develop the necessary tools required, and to examine the effects of mortality salience on explicit and implicit aspects of religious belief.
Chapter 4

Study 1: Developing the Supernatural Belief Scale

4.1 The need for a measure of religious belief

Research into the motivational factors driving religious belief has been complicated by an insufficiently reflective use of measurement tools. Previous research on death-anxiety and religiosity has been characterised by a lack of clarity regarding psychological constructs (e.g., religiosity v. religious belief; Weisbuch et al., 2005), the use of ad hoc measures of religious belief (e.g., Norenzayan & Hansen, 2006), and inappropriate applications of specific scales (e.g., Burling, 1993). A more critical approach to measurement is required, clearly identifying the psychological construct(s) of interest, and employing reliable and valid scales that measure those constructs.

The present research takes an approach to religion that emphasizes religious belief: the pan-cultural tendency to believe in supernatural entities, and especially in supernatural agents. As it turns out, there is no psychometrically validated scale available to measure this particular construct. Researchers’ apt recognition of the multidimensionality of religion has unfortunately led to the proliferation of scales of a “hodgepodge nature” (Gorsuch, 1984, p. 234) that often conflate religious beliefs, values, experiences, and behaviours. Having compiled over 100 measures of religiosity (Hill & Hood, 1999), Hill (2005) recently categorized the best pre-existing scales into various domains of religiosity and spirituality and concluded that none of the measures of “Religious or Spiritual Beliefs and
Values” were straightforward, generalizable measures of belief in supernatural entities or events. Among the few belief scales that do exist, several are tailored for specific audiences and therefore refer to very specific theological beliefs (e.g., atonement and Trinitarian theology; Christian Orthodoxy Scale, Fullerton & Hunsberger, 1982; Love and Guilt Oriented Dimensions of Christian Belief, McConahay & Hough, 1973), while others measure highly diverse aspects of religiosity (Spiritual Belief Inventory; Holland et al. 1998), religious orientation (Religious Fundamentalism Scale; Altemeyer & Hunsberger, 1992), or beliefs about the attributes of a presupposed God (Loving and Controlling God Scale; Benson & Spilka, 1973).

Given this methodological gap, the first goal of the current research was necessarily to develop a psychometrically valid measure of supernatural religious beliefs, the “Supernatural Belief Scale” (SBS), appropriate for testing theories about the relationship between fear of death and religious belief. Additionally, the scale should be usable in or adaptable for future work in the psychology of religion in various contexts.

4.2 Development of the Supernatural Belief Scale
The Supernatural Belief Scale (SBS) is designed to measure the respondent’s tendency to believe in supernatural entities and events, with minimal use of jargon from particular religious traditions. This ensures its comprehensibility and applicability in religiously pluralistic or predominantly secular contexts, in which familiarity with sectarian doctrines and
accompanying terminology can no longer be taken for granted (e.g., New Zealand; Norris & Inglehart, 2004; Matheson, 2006)

Of course, the diversity in religious beliefs across individuals and groups raises a significant challenge for the construction of such a measure (Krause, 1993). Nevertheless, recent cognitive anthropological and psychological research argues that religious supernatural concepts are cognitively constrained and suggest several cross-culturally and commonly recurring religious themes (Atran, 2002; Barrett, 2004; Bering, 2011; Boyer 2001; Pyysiäinen, 2009; Tremlin, 2006; Whitehouse, 2004; Wilson, 2002). In particular, supernatural agent and afterlife concepts are outputs of maturationally natural cognitive systems (Barrett & Lanman, 2008; McCauley, in press), mental modules like HADD and ToMM that develop naturally as part of our biological endowment. Furthermore, recent research on ethno-graphic databases show that supernatural concepts vary in scope and power (e.g., high- and low-status gods) and valence (e.g., benevolent v. malevolent gods, pleasant v. painful afterlives) (Moor, 2009).

Accordingly, 10 commonly recurring types of supernatural concepts were selected, from which 10 statements were composed, each affirming belief in their actual existence or occurrence. The items included one positive and one negative high-order supernatural agent, one positive and one negative lower-level supernatural agent, one positive and one negative afterlife-related place, two neutral afterlife-related entities, and two neu-

While this thesis focuses on the ubiquity of supernatural agent and afterlife concepts, the cross-cultural diversity of specific supernatural agent and afterlife beliefs is a fascinating area of inquiry in its own right. On this matter, there is increasing work done with ethno-graphic databases such as the Human Relations Area File, the European Values Studies, and the World Values Studies (e.g., Atkinson & Whitehouse, 2001; Dickson, Olsen, Dahmn, & Wachtel, 2005; Moor, 2009)
tual supernatural events. The statements consisted of descriptions of these common supernatural concepts as well as labels that are familiar in the population under study (e.g., “God”); these served to disambiguate the supernatural concepts and to frame them to ensure comprehensibility. The final items in the SBS are displayed in Table 4.1 below and the full instructions appear in Appendix A.

Table 4.1. Items in the Supernatural Belief Scale

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>There exists an all-powerful, all-knowing, loving God.</td>
</tr>
<tr>
<td>There exists an evil personal spiritual being, whom we might call the Devil.</td>
</tr>
<tr>
<td>There exist good personal spiritual beings, whom we might call angels.</td>
</tr>
<tr>
<td>There exist evil, personal spiritual beings, whom we might call demons.</td>
</tr>
<tr>
<td>Human beings have immaterial, immortal souls.</td>
</tr>
<tr>
<td>There is a spiritual realm besides the physical one.</td>
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<tr>
<td>Some people will go to Heaven when they die.</td>
</tr>
<tr>
<td>Some people will go to Hell when they die.</td>
</tr>
<tr>
<td>Miracles – divinely-caused events that have no natural explanation – can and do happen.</td>
</tr>
<tr>
<td>There are individuals who are messengers of God and/or can foresee the future.</td>
</tr>
</tbody>
</table>

Respondents indicate their agreement or disagreement with each proposition on a 9-point Likert scale, anchored at −4 (Strongly Disagree) and 4 (Strongly Agree). That is, the negative end of the scale is designed to indicate extreme disbelief or atheism, and the positive end confident belief

^These labels may be translated for use in other cultural contexts (e.g., “Naraka” instead of “Hell”, when Sanskrit terms are more familiar, such as for predominantly Buddhist, Hindu, Sikh, and Jainist communities.
or religious conviction, with the midpoint implying agnosticism or uncertainty.

The purpose of Study 1 was to evaluate the reliability and validity of the Supernatural Belief Scale via several convergent methods. First, while the scale items refer to distinct supernatural agents and events (e.g., one may believe in God but not miracles; in Heaven but not Hell), it is intended to measure respondents’ general tendency to believe in existentially significant supernatural entities. As such, factor analyses should reveal an underlying factor—a latent variable—driving responses to all items (Borsboom, Mellenbergh, & van Heerden, 2003). Second, efforts to evaluate the construct validity of the scale will also indicate how well SBS scores discriminate between religious and non-religious respondents and how well they predict other attitudinal and behavioural measures of religiosity. Although different aspects of religion (e.g., supernatural belief, self-identification, ritual observance) are dissociable, they should covary with one another. As such, respondents who self-identify as religious should have higher SBS scores than those who self-identify as non-religious, whose should in turn score higher than self-identified atheists. SBS scores are also expected to be predict participants’ religious service attendance and the importance of religion to their identities, both of which are commonly used indicators of religiosity (Hood et al., 2009). The present study therefore seeks to test these predictions, and thus to evaluate the reliability and validity of the Supernatural Beliefs Scale.
4.3 Method

Participants. One hundred and fifteen female and 44 male psychology undergraduates ($M_{age} = 20.56$, $SD = 4.19$) participated in this study in exchange for partial course credit. The study was run in conjunction with several other, unrelated procedures.

Procedure. Directly after providing informed consent, participants completed a sociodemographic questionnaire, followed by the SBS. Included in the sociodemographic questionnaire were three questions pertaining to participants’ religiosity. The first religiosity question was simply an open-ended request for participants to state their religion. The second question was, “How important do you feel religion is to your identity?” to which participants responded on a 9-point scale anchored at −4 (Very unimportant) and 4 (Very important). The third question was, “How many religious services do you usually attend?” to which participants responded by selecting one of: “Never”, “Few times a year”, “Once a month”, “Every week”, or “More than once a week”. The sociodemographic questionnaire and the SBS were presented on separate sheets of paper. This study was followed by a series of unrelated experiments, after which all participants were debriefed.

4.4 Results & Discussion

To determine the structure of the Supernatural Belief Scale, a series of statistical analyses were performed, beginning with inter-item correlations and preliminary tests of internal consistency, followed by exploratory fac-

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*University of Otago psychology undergraduates participate in experiments and complete worksheets based on them to satisfy a small portion of course assessment.
tor analyses (EFA) and confirmatory factor analyses (CFA). Then, correlations between SBS scores and other measures of religiosity were examined as indicators of convergent validity. Unless indicated otherwise, the following analyses were computed with PASW18.

**SBS Inter-Item Correlations and Item-Analysis.** All SBS items were positively correlated, \( r_s = .48 \) to .88 (cf. Table 4.2). An initial analysis of Cronbach’s \( \alpha \) indicated a high internal consistency that could not be improved by item-elimination (.95), so all items were retained. Furthermore, split-half reliability based on the correlation of the test-halves’ sum scores as derived from splitting each SBS item-pair amounted to \( r = .87 \). The mean inter-item correlation amounted to \( r = .64 \), and the corrected item-total correlations ranged from \( r = .65 \) to .88.

### Table 4.2. Inter-item correlations between SBS items

<table>
<thead>
<tr>
<th>Items</th>
<th>God</th>
<th>Devil</th>
<th>Angels</th>
<th>Demons</th>
<th>Souls</th>
<th>Spiritual Realm</th>
<th>Heaven</th>
<th>Hell</th>
<th>Miracles</th>
<th>( h^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>God</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.76</td>
</tr>
<tr>
<td>Devil</td>
<td>.78</td>
<td>-</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>.75</td>
</tr>
<tr>
<td>Angels</td>
<td>.80</td>
<td>.76</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>Demons</td>
<td>.66</td>
<td>.88</td>
<td>.78</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>Souls</td>
<td>.64</td>
<td>.55</td>
<td>.68</td>
<td>.55</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.55</td>
</tr>
<tr>
<td>Spiritual Realm</td>
<td>.55</td>
<td>.48</td>
<td>.68</td>
<td>.52</td>
<td>.75</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>Heaven</td>
<td>.83</td>
<td>.71</td>
<td>.78</td>
<td>.64</td>
<td>.66</td>
<td>.55</td>
<td>-</td>
<td></td>
<td></td>
<td>.73</td>
</tr>
<tr>
<td>Hell</td>
<td>.73</td>
<td>.86</td>
<td>.69</td>
<td>.79</td>
<td>.54</td>
<td>.45</td>
<td>.80</td>
<td>-</td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>Miracles</td>
<td>.64</td>
<td>.58</td>
<td>.68</td>
<td>.58</td>
<td>.57</td>
<td>.58</td>
<td>.64</td>
<td>.58</td>
<td>-</td>
<td>.56</td>
</tr>
<tr>
<td>Prophecy</td>
<td>.55</td>
<td>.52</td>
<td>.64</td>
<td>.59</td>
<td>.49</td>
<td>.51</td>
<td>.49</td>
<td>.50</td>
<td>.62</td>
<td>.44</td>
</tr>
</tbody>
</table>
Exploratory Factor Analysis. The next step in exploring the structure of the scale was to run a data-driven common factor analysis. Both the Kaiser-Meyer-Olkin criterion (.89) as well as Bartlett’s test of sphericity, $\chi^2 (45) = 1517.81, p < .001$, indicated sufficient sample and data quality (Gorsuch, 1983). The scree plot showed that the eigenvalues levelled off after a strong first factor, with the subsequent factors having $EVs < 1$ (Cattell, 1966); the first unrotated factor accounted for 68% of the common variance ($EV = 6.80$). To determine how many factors to extract, two objective methods were consulted. Velicer’s (1976) Minimum Average Partial (MAP) test indicated that two components were required to best explain the data variability (Zwick & Velicer, 1986); a second factor accounted for an additional 9% of variance. However, extracting this second factor contradicts the Kaiser-criterion that $EV > 1$. The second method consulted—Horn’s (1965) parallel analysis, based on 1000 matrices of random variables—concurred that a second, orthogonal factor was required, given that the $EV$ of the second factor (.92) was significantly greater than one derived from mere chance variables ($EV = .45$ at the $95^{\text{th}}$-percentile; O’Connor, 2000).

In summary, the EFA showed that all items load significantly on the first factor— communalities also show that this first dimension account for most of the variance of the items ($h^2 = 44\%$ to 83%)—and that a second factor aids interpretation by partly explaining item content related to negatively-valenced concepts. Consequently, this second factor might be conceptualized as method variance similar to reversely phrased item content (Barnette, 2000; Knight, Chisholm, Marsh, & Godfrey, 1988; Woods,
2006). So, as expected, the EFA results suggest that there is a latent variable driving responses to all the scale items (Borsboom et al., 2004).

**Confirmatory Factor Analysis.** As a more stringent and theory-driven approach to determine the factor structure, CFAs were run on the same dataset (van Prooijen & van der Kloot, 2001). A CFA tests the model fit when the item variability is explained exclusively as a function of a specified model. By contrast, an EFA solution (a) cannot be used to estimate model fit, (b) allows items to load on common as well as unique factors, (c) allows all items to load on all extracted factors simultaneously, and (d) allows item covariances that are not explained by hypothesized factor(s).

CFAs were conducted using Structural Equation Modelling (SEM) and robust maximum likelihood estimation (MLR) in the R-software package *lavaan* (Rosseel, 2011); several fit indices were inspected (Jöreskog & Sörbom, 1986). As a starting point, a unidimensional structure that modelled one latent variable (viz., supernatural belief) as the factor causally influencing ten observed indicator items was tested. As expected, given the EFA results, an overall chi-square test showed that such a unidimensional measurement model was inadequate, $\chi^2(35) = 198.16$, $p < .001$, $\chi^2/df = 5.66$.\(^9\) Furthermore, the standardized root mean square residual (SRMR = .06) and residual mean square error approximation (RMSEA = .17) also failed to reach acceptable values.\(^10\) Likewise, the comparative-fit index (CFI = .82), a goodness-of-fit index ranging from 0.0–1.0, failed to exceed

\(^9\) $\chi^2/df \leq 3$ is generally taken to indicate reasonable fit (Iacobucci, 2010).

\(^10\) Smaller values indicate better fit in these badness-of-fit indices, but the combined prescription is SRMR < .09 and RMSEA < .06 (Hu & Bentler, 1999).
“close to .95” (Hu & Bentler, 1999, p. 27), further suggesting that one dimension was insufficient to explain the data. So, multi-dimensional models were evaluated.

Including an orthogonal method factor as a second latent variable, which accounts for additional variance in negatively-valenced items, as suggested by the EFA above, improved model fit, $\chi^2(32) = 133.42, p < .001; \chi^2/df = 4.17; SRMR = .051, RMSEA = .14, CFI = .89$. Furthermore, correlating errors within each item pair to reflect the pair-wise construction of the scale resulted in a model that fit reasonably well, $\chi^2(27) = 43.09, p < .05; \chi^2/df = 1.60; SRMR = .03, RMSEA = .061, CFI = .98$. This measurement model suggests that besides one major latent variable (viz., supernatural belief) that drives responses on all scale items, there are additional minor variables that further influence responses to the negatively-valenced items and the five item pairs (cf. Figure 4.1 at the end of the chapter).

Reliability of SBS scores. Although Cronbach’s $\alpha$ and split-half reliability of the SBS are high (see above), these preliminary analyses provide inappropriate indicators of internal consistency and reliability because they assume $\tau$-equivalence, uncorrelated errors, and unidimensionality (Bollen, 1989), none of which obtain for the SBS. Instead, SEM-based estimates better indicate how well a latent variable is measured by its indicators (Fornell & Larcker, 1981). Following Bacon, Sauer, and Young (1995), the construct reliability of the supernatural belief factor was first estimated along the optimal linear combination of the standardized regression coefficients, yielding $\Omega_w = .95$. Second, supernatural belief explained, on average, 76% of the variance in the scale item responses. Thirdly, collapsing
across the primary latent variable and method factors, the scale composite was also reliable, $\Omega_t = .81$ (Revelle & Zinbarg, 2009). Taken together, the explanatory power and reliability of the primary latent variable and the reliability of the scale as a whole suggest that it may be appropriate to aggregate across all scale items and treat the mean SBS score as a measure of the primary latent variable, supernatural belief.

Convergent Validity of SBS scores. Although the SBS is meant to capture a cognitive tendency toward religious beliefs in particular, it should nevertheless covary with other aspects of religiosity. Convergent validity of the SBS was therefore evaluated by examining the relationship between SBS scores and various other indicators of religiosity.

To examine SBS scores as a function of self-identified religious affiliation, participants were divided into three groups based on their responses on an open-ended question regarding their religion. There were 68 religious participants (88.2% Christian, 4.4% Muslim, 1.5% Buddhist, 1.5% Hindu, 2.9% Spiritual, 1% Other), 74 non-religious participants (87.8% None, 9.5% Agnostic, 1.4% Undecided, 1.4% Free Thinker), and 17 atheist participants. Descriptive statistics for the three measures of religiosity (viz., SBS, importance of religion to identity, religious service attendance) are displayed in Table 4.3 below.
Table 4.3. *Descriptive statistics for three religiosity measures*

<table>
<thead>
<tr>
<th></th>
<th>SBS</th>
<th>Religious Identity</th>
<th>Religious Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atheist (n = 17)</td>
<td>−2.49 (1.37)</td>
<td>−.35 (3.04)</td>
<td>1.06 (.24)</td>
</tr>
<tr>
<td>Non-religious (n = 74)</td>
<td>−.92 (1.59)</td>
<td>−1.20 (2.32)</td>
<td>1.26 (.50)</td>
</tr>
<tr>
<td>Religious (n = 68)</td>
<td>1.63 (1.66)</td>
<td>1.59 (2.35)</td>
<td>2.53 (1.14)</td>
</tr>
</tbody>
</table>

*Note. SDs in parentheses*

As expected, atheists’ \((M = −2.49, SD = 1.37)\) scored significantly lower on the SBS than did non-religious participants \((M = −.76, SD = 1.63)\), \(t(86) = −4.03, p < .001\); non-religious participants in turn scored significantly lower than did religious participants \((M = 1.37, SD = 1.90)\), \(t(140) = −7.18, p < .001\). That is, the SBS is able to distinguish within non-religious people (viz., atheists v. other non-religious) as well as between religious and non-religious individuals.

Furthermore, SBS scores were positively correlated with self-reported importance of religion to identity, \(r = .54\), and religious service attendance, \(r = .65\) \((\rho = .60; \tau(b) = .49; ps < .001)\).\(^{11}\) As these correlations might mostly be due to an offset of one of the two very different groups, we inspected the correlations for religious \((n = 68)\) and non-religious people \((n = 91, \text{including atheists})\) separately. Among dedicated religious participants strong correlations of SBS were evident with religious identity, \(r = .62\), and religious behaviour, \(r = .63\) \((\rho = .66, \tau(b) = .50)\). By contrast, among non-religious participants SBS scores were unrelated to religious

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\(^{11}\) In comparison, modeling the correlations between these religiosity measures and the primary latent variable in SEM, rather than just using mean SBS scores, revealed almost identical results: \(r = .567\) and \(r = .676\) respectively. This provides further justification for using the more convenient composite score.
identity, \( r = .15 \), and behaviour, \( r = .13 \) (\( \rho = .09 \), \( \tau(b) = .08 \), \( ps > .08 \)). The latter finding is no surprise, given the lack of meaningful variability in both variables among non-religious participants.

**Conclusions.** The SBS yields reliable test scores along a continuum ranging from a strong tendency to disbelieve to strong tendency to believe in supernatural entities and events. The group differences and correlations with independent behavioural and self-concept measures of religiosity demonstrate its convergent validity. Furthermore, the SBS reliably identifies religious and non-religious people; indeed, the current findings also suggest that SBS is even able to discriminate between emphatically atheistic and less trenchantly non-religious people. Finally, while it is correlated with measures of religious affiliation, identification, and behaviour, the SBS is a specific measure of belief, which is not empirically or conceptually identical to any of these constructs. The SBS is therefore a suitable measurement tool for testing theories about the psychological underpinnings of religious belief, including motivational theories of religious belief that emphasize the role of existential anxieties.
Figure 4.1. Measurement model for Supernatural Belief Scale.
Chapter 5

Study 2: Correlating death anxiety and religious belief

5.1 Death and religion: the case for curvilinearity

The aim of Study 3 was to apply the newly-developed Supernatural Belief Scale to investigate the relationship between death-related anxiety and religious belief. Some previous studies have found a negative relation between these variables: people who report greater religiosity (variously measured) also report less anxiety about death. As reviewed in previous chapters, however, a substantial minority report a positive relation, a curvilinear relation, or no relation whatsoever. This evidential ambiguity may be due in part to the diversity of measurement tools employed—and so, of psychological constructs examined—across studies, in combination with the “truncated range of religiousness” Donovan (2002, p. 23) of the samples. So, in Study 2 a mixed sample was studied, representing religious and non-religious individuals, and the SBS, a reliable and valid measure of the specific construct in question—religious belief—was employed.

An investigation of the statistical relationship between death anxiety and religious belief is particularly important as, contrary to the majority of previous research, both theoretical perspectives under consideration predict that this relationship should be moderated by categorical religiosity (viz., religious v. non-religious). According to Terror Management Theory existential anxiety is a psychological given for human beings, who combat it via the construction and use of worldviews that provide them literal and/or symbolic immortality. As the effectiveness of this terror man-
agement strategy is contingent upon our belief in or commitment to the worldview and its value system, this account predicts that confidence in one’s worldview—religious or otherwise—should reduce one’s fear of death. Thus, for those with a religious worldview, increased religious belief should be associated with decreased death anxiety; for those who hold a non-religious worldview, increased religious disbelief should be associated with decreased death anxiety.

The view that religious belief provides a unique buffer against existential anxiety also predicts that the relationship between death anxiety and religious belief is moderated by categorical religiosity (viz., religious believers v. non-believers). However, on this account, fear of death motivates religious belief, which in turn mitigates such fear. Accordingly, non-religious individuals should be motivated to believe to the extent that they fear death; religious individuals should experience less fear of death to the extent that they hold their religious beliefs confidently.

As both theoretical accounts generate the same predictions regarding the statistical relationship between death anxiety and religious belief, a correlational study on a representative sample (i.e., consisting on religious and non-religious participants) could falsify both accounts. Indeed, as the majority of extant research report linear statistical relationships between death anxiety and religiosity, the available evidence seems to count against both theories under consideration. However, the methodological limitations and concomitant evidential ambiguity (cf. Chapter 3.2 above) of this previous research makes definitive conclusions premature. Furthermore, a closer examination of recent correlational research (Cohen et al., 2005;
Dezutter et al., 2009; Harding et al., 2005; cf. Chapter 3.2.2–3.2.4) does suggest that the statistical relationship between death anxiety and religious belief in particular depends on the categorical religiosity (viz., religious v. non-religious) of the individual.

In keeping with these results and with both theoretical proposals, it was hypothesized that the relationship between death anxiety and religious belief is moderated by self-reported categorical religion (viz., religious v. non-religious). To ascertain this, correlational data were obtained using a pre-existing Death Anxiety Questionnaire (DAQ; Conte, Weiner, & Plutchik, 1982) and the Supernatural Belief Scale (SBS) developed in Study 1 (cf. Chapter 4). In addition Study 2 provides another opportunity to validate the psychometric properties of the SBS.

5.2 Method

Participants. Seventy-six male and 82 female non-psychology students at the University of Otago ($M_{age} = 22.04, SD = 2.78$) volunteered for the study in exchange for NZ$12 to cover their travel expenses. The study was run in conjunction with several other, unrelated procedures.

Materials. Fear of death was measured with the DAQ which consists of 15 questions about various aspects of death and dying (e.g., “Do you worry about dying?”, “Does the thought bother you that you might lose control of your mind before death?”), which they answered on a 3-point scale: “not at all” (scored 0), “somewhat” (scored 1), “very much” (scored 2). Conte et al. (1982) showed that the DAQ is reliable (split-half reliability $= .87$) and temporally stable (test-retest reliability $= .87$); furthermore,
DAQ scores correlate significantly with the Death Anxiety Scale (Templer, 1970; \( r = .51 \)) and the Death Concern Scale (Dickstein, 1962; \( r = .58 \)). The Supernatural Beliefs Scale, as described in Study 1 (cf. Chapter 4), was also included in this study.

**Procedure.** Each task was presented on separate sheets of paper in a questionnaire pack including several unrelated studies. The questionnaire pack always began with an informed consent form, followed by a sociodemographic questionnaire. Included in the sociodemographic questionnaire were two questions about participants’ religiosity. The first simply asked for the participant’s religion, which they could indicate by ticking “Christian”, “None”, or “Other”; if they chose “Other”, they were requested to specify what their religion was. The second question was, “How important do you feel your religious beliefs or lack of religious beliefs are to you?” to which participants responded on a 9-point scale anchored at −4 (Very unimportant) and 4 (Very important). The sociodemographic questionnaire was followed by SBS, DAQ and other unrelated questionnaires presented in random order.

After participants completed all the tasks in the questionnaire packs, they were debriefed, paid, and thanked.

### 5.3 Results & Discussion

*Replication of SBS psychometric evaluation.* Study 2 presented the opportunity to replicate the psychometric evaluation of the SBS. To cross-validate the model in Study 1, the assumption of factorial invariance must be tested, and the regression weights across the two samples should be
comparable (Byrne, 1993; Reise, Widaman, & Pugh, 1993). Participants from Study 1 and Study 2 were jointly analysed in a multi-group confirmatory factor-analysis approach (MCFA). Estimating the overall model fit—without applying any equality constraints, apart from the model configuration—model fit for the jointly analysed groups was again reasonably good, $\chi^2(54) = 114.29, p < .001; \chi^2/df = 2.11; \text{SRMR} = .04, \text{RMSEA} = .08, \text{CFI} = .97$. Second, after constraining loadings to be equal across groups, the fit was maintained $\chi^2(65) = 123.78, p < .001; \text{CMIN}/df = 1.90; \text{SRMR} = .05, \text{RMSEA} = .08, \text{CFI} = .97$. Furthermore, $\chi^2$-difference test confirms that measurement model did not differ across Study 1 and Study 2, $\Delta \chi^2 = 9.49$ (with $\Delta df = 11), ns$.

The convergent validity of the SBS was re-evaluated with this new sample. As the independent attitudinal religiosity measure was modified in this study to refer to both religious belief and lack of religious belief, convergent validity would in this case be evidenced by a curvilinear relationship between SBS scores and participants’ responses to the question, “How important do you feel your religious beliefs or lack of religious beliefs are to you?”. That is, participants who more strongly agreed or disagreed with statements affirming the reality of supernatural entities and events should also grant more importance to their beliefs. As expected, there was a significant quadratic component, $\beta = .31, F(2, 154) = 21.95, p < .01, R^2 = .22$; this quadratic model best fits the data, significantly improving on the linear model, $\Delta R^2 = .096, \Delta F = 18.93, p < .001$. These results provide further support for the SBS as a measure of individuals’ tendency to believe in religious supernatural entities.
Supernatural Belief and Death Anxiety. For the substantive analyses, participants were categorized as “Religious” and “Non-religious” based on their responses in the sociodemographic form. There were 76 religious participants (86.8% Christian, 13.2% Other) and 82 non-religious (96.4% None, 1.2% Agnostic, 1.2% Atheist, 1.2% Uncertain) participants. Average SBS scores were higher for religious participants ($M = 1.57, SD = 1.94$) than for non-religious participants ($M = -1.62, SD = 1.80$), $t(156) = 10.702, p < .001$, replicating Study 1.

Average DAQ scores did not differ between religious and non-religious participants, $t(156) = 1.14$, ns. Likewise, and contrary to previous research, a zero-order correlational analysis showed no significant relationship between SBS scores and DAQ scores, $r = .05$, ns; a curve estimation similarly failed to detect a significant linear relationship, but instead revealed a quadratic main effect, $\beta = -.22, F(2, 155) = 4.28, R^2 = .05, p < .05$. Furthermore, as predicted, a regression analysis predicting DAQ scores from SBS scores, categorical religiosity (viz., Religious v. Non-religious), and the interaction between them, showed a significant interaction effect, $\beta = -.29, t = -3.82, p < .001$. To more closely examine how categorical religiosity moderates the SBS–DAQ relationship, correlational analyses were then re-run on religious and non-religious participants separately. These analyses showed that SBS scores were negatively correlated with DAQ scores for religious participants, $r = -.30, p < .01$, but positively correlated with DAQ scores for non-religious participants, $r = .29, p < .01$. As Figure 5.1 shows, fear of death increased with religious be-
belief among non-religious participants, but decreased as religious belief increased among religious participants.

Figure 5.1. Relationship between SBS and DAQ scores as a function of categorical religiosity.

Conclusions. This study improved on previous efforts to discover the statistical relationship between death anxiety and religious belief by deliberately obtaining a sample of religious and non-religious participants and by employing a specific, psychometrically reliable and valid measure of religious belief. In contrast to the majority of previous research, these results add to the increasing evidence for the curvilinearity of the relationship between death-anxiety and religiosity (Aday, 1984–1985; Dolnick,
The fact that the relationship between death anxiety and religious belief is not uniformly linear, and is moderated by categorical religiosity is consistent with both the worldview defense and distinct cognitive inclination accounts of religious belief. Indeed, both accounts also offer the same explanation of the negative correlation for religious participants: confidence in religious beliefs mitigates baseline fear of death. They differ, however, in their explanation of the positive correlation for non-religious participants. From the worldview defense perspective, the correlation reflects the mitigation of existential anxiety by strong belief in participants’ non-religious worldviews; from the distinct cognitive inclination perspective, it represents the temptation toward belief with increasing death anxiety.

Given the multiple interpretability of these correlational findings, an experimental study, manipulating mortality salience and measuring religious belief, is required to test the two causal stories proposed. In this case, both theoretical accounts predict that mortality salience should increase religious belief among religious individuals, but they make competing predictions with regards to non-religious individuals. According to the worldview defense account, mortality salience should lead to increased religious disbelief among non-religious participants, whereas according to the distinct cognitive inclination account, it should lead to increased religious belief (or decreased skepticism), regardless participants’ prior worldviews.
Chapter 6

Study 3: The effects of mortality salience on religious belief

6.1 Fear of death, worldview defense, and religious belief

6.1.1 Literal immortality v. symbolic immortality

Having established that the statistical relationship between death-anxiety and religious belief is moderated by categorical religiosity (viz., religious v. non-religious), experimental studies are required to elucidate the causal relationship between religious belief and death-related affect and cognition. The aim of Study 3 study was therefore to examine the causal effect of mortality salience—increased cognitive accessibility of death-related thoughts—on religious belief in order to distinguish between the worldview defense and distinct cognitive inclinations accounts of religious belief. The Terror Management Theory framework poses this question in terms of symbolic and literal immortality. According to the worldview defense account, mortality salience leads to the pursuit of symbolic immortality (e.g., bolstering ingroup views, denigrating outgroup views), whereas according to the distinct cognitive inclination account, mortality salience leads to the pursuit of literal immortality (e.g., increased tendency toward supernatural agent beliefs), regardless of an individual’s prior worldview.

Two decades of empirical research on Terror Management Theory has shown, across nearly 300 experiments, that increased mortality salience motivates the pursuit of symbolic immortality (cf. Burke et al., 2010). Under conditions of increased death thought awareness, participants at-
tempt to bolster their own and denigrate others’ “worldviews”. Worldview
defense is not limited to the bolstering of well-elaborated metaphysical
and ethical systems, but also manifests itself as various kinds of intergroup
bias along gender, ethnic, national, and even arbitrary divisions. As this
form of worldview defense is not logically or semantically related to literal
death, it is, according to TMT, an effort to obtain symbolic immortality via
extensions of the self (e.g., social identity).

Like secular worldviews, religious worldviews include norms and
values, successful fulfillment of which confers self-esteem, social approval,
and, thereby, symbolic immortality. In addition to these, however, relig-
ious worldviews also often offer the possibility of literal immortality, ac-
tual escape from the death we so fear in the first place. Prima facie then,
religious worldviews, with their two-pronged approach to quelling existen-
tial anxiety, should be more powerful than their secular counterparts,
which offer only symbolic immortality.

There is indeed some evidence that increased belief in literal im-
mortality reduces the desire for symbolic immortality. Consistent with
previous Terror Management research, Dechesne et al. (2003) found that
participants who were primed with death sought to enhance their self-
estee (Study 1, Study 2) and became harsher toward moral and social
transgressors (worldview defense; Study 3); however, this tendency was
significantly diminished if participants were first exposed to afterlife-
confirming information (viz., an article arguing the near-death experiences
support afterlife beliefs). These results show, at least, that literal immor-
ality beliefs are sufficient to deal with death-anxiety, without further need
for self-esteem enhancement or worldview defense. However, they do not tell us whether literal immortality concerns supersede or take precedence over symbolic immortality concerns; they do not answer Vail et al.’s (2010, p. 88) question, “Are religious worldviews more powerful than secular worldviews?” Indeed, Vail et al. (2010) propose two further lines of research to answer this question. First, one could show an asymmetry in the relationship between literal and symbolic immortality concerns; Dechesne et al. (2003) showed that literal immortality belief rendered symbolic immortality concerns redundant, but perhaps symbolic immortality enhancement also renders literal immortality concerns redundant. Second, one could show that mortality salience increases literal immortality beliefs at the expense of symbolic immortality beliefs when they are in competition (i.e., if pursuing literal immortality entails rejecting symbolic immortality).

6.1.2 The effects of mortality salience on self-reported religiosity

Study 3 develops Vail et al.’s (2010) second recommendation above, by examining the effects of mortality salience on religious and non-religious participants’ tendencies toward religious belief. According to Terror Management Theory’s worldview defense hypothesis, individuals under mortality salient conditions should seek to bolster their own worldviews, regardless of content. Defending such a view, Landau et al. (2004, p. 742) asserted that, “substantial research...shows that [mortality salience]-induced increases in religion-consistent supernatural beliefs...are limited to individuals who subscribe to a religious worldview”, taking this as evi-
dence that supernatural beliefs only serve terror management functions within an individual's worldview. Unfortunately, Landau et al. (2004) failed to detail this research, and a review of the research literature reveals a more complicated state of affairs (cf. Chapter 3).

To recapitulate the experimental research on mortality salience and religiosity briefly 12: Weisbuch et al. (2005) found classic worldview defense effects, in which mortality salience increased and decreased self-reported religiosity among religious and non-religious participants respectively. On the other hand, using a much subtler measure, Norenzayan and Hansen (2006) found that mortality salience increased belief in ingroup and outgroup supernatural agents. This increased belief in foreign gods is noteworthy, as it provides some evidence that existential concerns might motivate religious belief over and against sectarian worldview defense. However, increased mortality salience seemed to have no effect on non-religious participants, neither motivating the worldview-consistent denigration of religious belief, nor motivating a worldview-inconsistent inclination toward religious belief. This is somewhat surprising, given the robustness of the effect of mortality salience on worldview defense, even under minimal group conditions (Harmon-Jones et al., 1996). Furthermore, contrary to TMT’s predictions and Weisbuch et al.’s (2005) findings, but following from the view that religious belief uniquely buffers fear of death by virtue of its content (e.g., gods who have power over life and death, afterlife concepts), Norenzayan and Hansen (2006) conjecture that a more

12The Osarchuk and Tatz (1973) experiment was omitted from this review because it departed significantly from the method employed in Terror Management research, explicitly manipulated death anxiety, not just mortality salience; furthermore, their study looked very specifically at afterlife beliefs.
covert measure might reveal an increase in non-religious participants’ tendency toward religious belief. This possibility will be addressed later in Study 4.

The goal of Study 3 is to clarify these discrepant experimental findings by employing more appropriate and specific measure of belief, the SBS developed in Studies 1 and 2 above. Study 3 will thereby test between the worldview defense and distinct cognitive inclination accounts of religious belief. As argued in Chapter 5, both theories predict that mortality salience will increase religious belief among religious individuals, for whom worldview defense and religiosity are equivalent in this context. However, they make competing predictions regarding non-religious individuals. According to the worldview defense account, mortality salience will cause non-religious participants to bolster their own beliefs and/or denigrate others’ beliefs; so, mortality salience should lead to increased religious disbelief (or decreased religious belief) among non-religious participants. According to the distinct cognitive inclination account, however, mortality salience will lead to an increased tendency toward religious belief, even among participants who are non-religious.

6.2 Method

Participants. Seventy-nine female and 14 male psychology undergraduates (\(M_{\text{age}} = 20.19, SD = 4.60\)) participated in this experiment in exchange for partial course credit. The study was run in conjunction with several other, unrelated procedures.
Materials and Procedure. Each task was presented on separate sheets of paper in a questionnaire pack including several unrelated studies. Following previous research (Norenzayan, Dar-Nimrod, Hansen, & Proulx, 2009; Norenzayan & Hansen, 2006, Experiment 4; Greenberg et al., 1997; Rosenblatt et al., 1989), mortality salience was manipulated via a writing task (see Appendices B and C). Under the auspices of a task examining participants’ ability to imagine various events, participants in the death priming condition were instructed to write down specifically “what you think will happen to you physically as you die and once you are physically dead,” along with the feelings that these thoughts arouse. Participants in the control condition were instructed to write down specifically “what happens to you when you watch TV” and “about the feelings that thoughts of watching TV arouse in you.”

Participants then completed a demographics form and the Supernatural Belief Scale. After completing all the tasks in the questionnaire pack, participants were debriefed and thanked.

6.3 Results & Discussion

Prior to analysis, participants were split into two groups on the basis of their self-reported religious identity in the demographics form. Forty-six participants self-categorized as being Christian, while forty-seven participants self-categorized as being non-religious (87.23% None, 10.64% Atheist, 2.13% Agnostic).

A 2 (religious identification) × 2 (death v. control priming) ANOVA showed no main effect of priming condition (death v. control), $F(1, 89) =$
.01, but did reveal a main effect of religious identification, $F(1, 89) = 122.89, p < .001, \eta^2_p = .58$ and an interaction, $F(1, 89) = 5.47, p < .05, \eta^2_p = .06$. That is, as expected, participants who self-identified as religious scored higher on the SBS than did those who self-identified as non-religious, once again confirming the discriminative validity of SBS scores. Furthermore, as shown in Figure 6.1, the effect of mortality salience priming (MS) on SBS scores differed qualitatively as a function of religious identity. For religious participants, MS increased SBS scores, $t(44) = 1.77, p < .05, \eta^2_p = .07$, whereas for non-religious participants, MS decreased SBS scores, $t(45) = -1.59, p < .06, \eta^2_p = .05$.

*Figure 6.1. Effects of MS on SBS, as a function of religious identification.*
The results are therefore consistent with the standard worldview defense interpretation of Terror Management Theory (Landau et al., 2004), which predicts that participants should pursue symbolic immortality by defending their religious or non-religious worldviews. For non-religious participants in particular, this involved a repudiation of literal immortality beliefs, whereas for religious participants, it involved a confirmation of them. These results therefore seem to refute the distinct cognitive inclination account, according to which even non-religious participants should experience increased religious belief, despite their prior convictions.

The findings of Study 3 are also inconsistent with Norenzayan and Hansen’s (2006) research that found that mortality salience increased sectarian worldview-inconsistent religious beliefs among Christians (Experiment 4). In that study, Christians reported increased belief in Shamanic ancestral spirits under mortality salient conditions, rather than repudiating these foreign gods and bolstering their own religious beliefs. However, religious individuals may be more ready to adopt supernatural beliefs than non-religious individuals. Indeed, mortality salience had no effect among non-religious participants in Norenzayan and Hansen’s (2006, Experiment 4) study; in the present case, non-religious participants even reported decreased religious belief under mortality salient conditions.

These results, while rather compelling, should not be taken as conclusive, given the limitations of self-report measures as discussed earlier. Such measures are, for example, susceptible to strategic responding biases. Indeed, as Norenzayan and Hansen (2006) note, while religious partici-
pants might readily report increased belief (e.g., because the confession of greater faith is normative in religious values systems), non-religious participants might be reticent to report any reduced skepticism about the supernatural. Before a firm conclusion may be drawn, this methodological limitation should be addressed. To do so, Study 4 employs a measure of religious belief that minimizes the effects of self-presentational biases.
Chapter 7

Study 4: Measuring religious belief indirectly

7.1 An indirect measure of religious belief

7.1.1 Response latency as an indicator of religious belief strength

In the previous study, which employed a self-report measure of religious belief, mortality salience increased religious belief among religious individuals and religious disbelief among non-religious individuals. The present study aims to address the possibility that these results were driven by self-presentational biases, to which self-report measures are prone. An indirect or covert measure of religious belief might reveal increased tendencies toward religious belief among both religious and non-religious people under mortality salient conditions, in keeping with the theoretical notion that fear of death uniquely motivates religious belief. Therefore, rather than using self-report measure such as a questionnaire, the method employed here involves an indirect measure based on participants’ response latencies in a categorization task.

While there is still much debate over the psychological underpinnings of response latency-based measures (cf. Gawronski & Payne, 2010; Wittenbrink & Schwarz, 2007), it now seems clear that response latencies in various kinds of categorization tasks contain information about cognitive association strength. Such tasks have been useful for measuring attitudes, understood as “object-evaluation associations of varying strength” (Fazio, 2007, p. 603). For example, two of the most commonly used response latency-based attitude measures in social cognitive research—the
affective priming task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986) and the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998; cf. Chapter 8 below)—infer the extent to which two concepts are associated from response latencies, though the cognitive processes underlying performance in these two tasks may differ (De Houwer & Moors, 2010). In the affective priming task, a target concept is presented before each trial of a categorization task, in which participants categorize positively- and negatively-valenced words. The extent to which the prime (viz., the target concept) facilitates (i.e., speeds up) the categorization of positive words relative to negative words indicates the extent to which the target concept is associated with a positive evaluation. Similarly, in the IAT, responses to the target concept are paired with responses to positively- and negatively-valenced words (see Chapter 8 below). The extent to which pairing the target with positive words facilitates responses relative to pairing it with negative words indicates the extent to which the target is associated with a positive evaluation.

The binomial choice reaction time (bCRT) task provides a simple and flexible paradigm through which to measure cognitive association strength. In this paradigm, participants categorize target stimuli (e.g., words) as quickly as possible into one of two attribute categories (e.g., positive v. negative, in the case of an evaluative task). As with the affective priming task and the IAT, the speed with which participants categorize stimuli is indicative of the strength of association between target and attribute. Indeed, bCRT tasks are increasingly being used to assess various psychological states and traits beyond just evaluative attitudes; they have
been applied to a variety of psychological domains, such as personality, (Robinson, 2004; Robinson, Vargas, Tamir, & Solberg, 2004), emotion (Robinson & Clore, 2002), and even religiosity (Cohen, Shariff, & Hill, 2008). Study 4 therefore employs a binomial choice reaction time task as an indirect measure of religious belief, construed in terms of cognitive associations between supernatural concepts (e.g., God) and existential concepts (e.g., real). In this task, participants categorize supernatural entities and events (e.g., God, miracles) as “real” or “imaginary” as quickly as possible; the strength of their cognitive associations—and so, of their religious beliefs—are inferred from their response latencies.

Note that there are two aspects to participants’ responses: (a) the proportion of supernatural items classified as “real” and “imaginary” (i.e., classification rates), and (b) the speed with which participants make these judgements (i.e., response latencies). As the categorization task itself is overt—participants are aware that they are categorizing supernatural items as “real” or “imaginary” respectively, even if these items are interspersed with neutral, non-religious control items—classification rates are inappropriate as indirect indicators of religious belief. However, as participants are blind to the relevance of their reaction times, examining participants’ response latencies allow us to circumvent at least the strategic responding limitations to which self-report measures are susceptible. This binomial choice reaction time task will therefore be taken as an indirect measure of

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13 Indeed, this notion of cognitive “associations of varying strength” (Fazio, 2007, p. 603) provides a useful way to conceptualize a broad range of psychological states and traits. Furthermore, Fazio (2007) compares attitudes to knowledge in this way, construing both as cognitive associations stored in memory. Similarly, Robinson and Clore (2002) construe of affective and personality traits as self-beliefs. The application of the cognitive associative framework and the concomitant methodological tools (e.g., bCRT) directly to beliefs should therefore be uncontroversial.
participants’ beliefs; as such, militant atheists and staunch religious believers should respectively categorize supernatural entities as “imaginary” and “real” quickly, relative to their more ambivalent counterparts (e.g., nominally religious or non-religious individuals).

Indeed, using a version of the task employed here, Cohen et al. (2008) found a curvilinear relationship between response latencies and self-reported religiosity; very religious and very non-religious participants responded more quickly that items of religious faith (e.g., Adam & Eve, God) were “real” and “imaginary” respectively, compared to their more moderate counterparts. In this case, the bCRT task reflects trait religiosity: according to the authors, the chronic accessibility of participants’ attitudes manifest themselves as relatively short response latencies in this task. The present study extends this logic in using the bCRT task as a measure of state religious belief, sensitive to mortality-primed changes in association strengths. Even if participants are unwilling or unable to report shifts in their religious beliefs, such shifts may be inferred from changes in their response latencies in the choice reaction time task.

7.1.2 Mortality salience and response latencies

The aim of Study 4 is to examine how mortality salience affects religious belief via this indirect measure, using self-reported religious belief (viz., Supernatural Belief Scale) as a pre-manipulation benchmark. Results in the control condition should show a quadratic relationship between response latencies and SBS scores (cf. Cohen et al., 2008): participants with strong tendencies toward religious belief and disbelief (evidenced by high
and low SBS scores) should be fastest to categorize supernatural entities and events as “real” and “imaginary” respectively.

Of more theoretical interest, mortality salience may change this relationship in one of two ways, consistent with one of the two theoretical approaches under investigation. Specifically, if mortality salience affects participants’ beliefs via worldview defense, then explicit believers (i.e., those scoring high on the SBS) and explicit non-believers (i.e., those scoring low on the SBS) should both become faster at categorizing supernatural concepts as real and imaginary respectively, compared to control participants. As all participants would respond more quickly as a function of the extremity of their belief, this result would be manifest as a more strongly quadratic relation between SBS and existence judgment latencies, relative to the control group. If, however, people are specially inclined toward supernatural belief under mortality salience conditions (the distinct cognitive inclination hypothesis), then explicit believers should associate existence with supernatural agents more quickly, but explicit non-believers should associate non-existence with supernatural agents more slowly (i.e., show reduced skepticism). So, by this account, rather than becoming more strongly quadratic, the relationship between baseline SBS scores and existence judgments latencies should be cubic relative to the control group.

Death priming was not expected to affect real/imaginary classification rates, as it is unlikely that mortality salience would lead to categorical changes in religious belief. Furthermore, this aspect of the choice reaction time task is overt; morality salience was only expected to alter the strength of participants’ beliefs, as reflected by response latencies. Finally, no dif-
ferences were expected between control and death-primed participants in their processing of real or imaginary concepts that are unrelated to religion.

7.2 Method

Participants. Seventy four non-psychology students (40 male, 34 female; 30 Christian, 44 agnostic/atheist/non-religious; $M_{age} = 22.48, SD = 6.13$) at the University of Otago volunteered for the study in exchange for NZ$12 to cover their travel expenses. The study was run in conjunction with several other, unrelated procedures.

Materials and Procedure. Participants first completed a demographics form and the SBS on a computer. Then, as in Study 3, mortality salience was manipulated via a writing task; participants were randomly assigned into the death priming or control condition.

After the priming phase, participants were told that the next task was about the “cognitive processing of beliefs”. Participants were presented with a series of 20 nouns, which they were instructed to categorize as “real” or “imaginary” as quickly and accurately as possible, by pressing one of two labeled keys on their keyboard. Of the 20 nouns (cf. Table 7.1), 10 were associated with the supernatural concepts in the Supernatural Belief Scale (e.g., God, Angel, Heaven, Miracles), 5 were real items (e.g., Turtle, Helicopter) and 5 were imaginary items (e.g., Genie, Narnia). Each trial consisted of a fixation cross (750 ms), followed by the item to be categorized; the fixation cross re-appeared immediately after each response. All stimuli were presented in black on a white background via SuperLab™
software running on Macintosh iMac desktop computers in individual light and sound attenuated experimental cubicles. After categorizing all stimuli, participants were debriefed, thanked, and paid.

Table 7.1. *Stimuli for religiosity choice reaction time task*

<table>
<thead>
<tr>
<th>Category</th>
<th>Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supernatural</td>
<td>Angel, Demon, Devil, God, Heaven, Hell, Miracle, Prophet, Soul, Spirit</td>
</tr>
<tr>
<td>Real</td>
<td>Eagle, Helicopter, Otter, Puerto Rico, Turtle</td>
</tr>
<tr>
<td>Imaginary</td>
<td>Batmobile, Fairy, Genie, Mermaid, Narnia</td>
</tr>
</tbody>
</table>

### 7.3 Results & Discussion

One response faster than 200ms, one qualitatively outlying response, and all data from one participant who classified all stimuli as “real” were eliminated from analysis. The remaining response times were log transformed to reduce the positive skew typical of such data (Ratcliff, 1993). Preliminary analyses revealed that real and imaginary stimuli were almost always classified correctly (96% and 89% respectively), while religious stimuli were classified as real 46% of the time. The proportion of religious stimuli classified as real was highly correlated with SBS score, $r(74) = .86, p < .001$ confirming that explicit believers and non-believers were generally judging the religious stimuli as real and imaginary, respectively. The correlation did not differ between death-priming ($r = .85$) and control ($r = .86$) conditions, nor did the classification rates differ as a between death-
As explained above, the two hypothesized effects of mortality salience are evidenced by the quadratic and cubic components of the relation between explicit belief (SBS score) and existence judgment latencies. Specifically, if mortality salience increases adherence to one’s worldview, then believers and non-believers should more quickly judge religious supernatural entities as real and imaginary respectively, thereby producing a more strongly quadratic SBS-latency function relative to the control group. Alternatively, if mortality salience increases implicit belief in supernatural agents categorically, then believers should judge existence more quickly, but non-believers should judge non-existence more slowly, adding a cubic component to the model.

To examine the linear, quadratic, and cubic components of the SBS-latency relationship, experimental condition (death v. control priming, coded −1 and 1); mean-centered SBS (the linear main effect), squared SBS (the quadratic main effect), and cubed SBS (the cubic main effect), and all three condition × SBS interactions, were entered simultaneously into a multiple regression predicting log-transformed response times. The analysis revealed a significant quadratic main effect of SBS, $\beta = -0.48, t = -4.18, p < .001$, such that, overall, both believers and non-believers in religious supernatural entities classified religious stimuli relatively quickly (i.e., as real and imaginary respectively) compared to participants with more moderate SBS scores. The analysis also revealed significant interactions be-

\footnote{Classification rate means express the proportion of “religious” words classified as “real”.
}
tween experimental condition and both the linear and cubic components of SBS, $\beta = .65, t = 2.3, p < .05$, and $\beta = -.76, t = -2.6, p < .05$. The same analyses conducted on real and on imaginary items revealed no significant effects on either stimulus category, indicating that the effects of mortality salience are specific to religious stimuli and do not extend to real/imaginary categorization tasks more generally.

In order to examine the nature of the interactions on religious stimuli, separate regressions were run on each experimental condition, with linear, quadratic, and cubic SBS entered on separate steps. As seen in Table 7.2, in both conditions, the inclusion of quadratic SBS represented a significant improvement over the linear model, which was not significant on its own. However, the addition of cubic SBS improved the model further for death-primed participants, $\Delta R^2 = .11, p < .05$, but not for controls, $\Delta R^2 = .04, ns$. Thus, a quadratic model best fit the controls’ data, but a cubic model best fit the death-priming condition.

Table 7.2. Regression models for control and MS conditions

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>MS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
</tr>
<tr>
<td>Step 1</td>
<td>Constant</td>
<td>7.06</td>
</tr>
<tr>
<td></td>
<td>SBS</td>
<td>-.014</td>
</tr>
<tr>
<td>Step 2</td>
<td>Constant</td>
<td>7.23</td>
</tr>
<tr>
<td></td>
<td>SBS</td>
<td>-.005</td>
</tr>
<tr>
<td></td>
<td>SBS$^2$</td>
<td>-.024</td>
</tr>
<tr>
<td>Step 3</td>
<td>Constant</td>
<td>7.25</td>
</tr>
<tr>
<td></td>
<td>SBS</td>
<td>-.053</td>
</tr>
<tr>
<td></td>
<td>SBS$^2$</td>
<td>-.029</td>
</tr>
</tbody>
</table>
The nature of these relationships can be appreciated by plotting the classification times predicted by the regression model at various levels of supernatural belief (Aiken & West, 1991). As can be seen in Figure 7.1, in the control group, believers classify religious stimuli more quickly the more strongly they believed in them, while non-believers classify religious stimuli more quickly the more strongly they disbelieved in them. When death was primed, however, the relationship among believers becomes stronger, while the relationship among non-believers becomes weaker, and indeed reverses for extreme disbelief (cf. Figure 7.2). That is, thoughts of death strengthened believers’ beliefs in the supernatural and weakened non-believers’ skepticism regarding the supernatural.
Figure 7.1. Best fit curve estimate for SBS scores predicting log-transformed response latencies to religious items in the control condition.
Thus, when belief is measured indirectly, the results appear inconsistent with Terror Management Theory’s worldview defense account, providing an important counterpoint to previous research as well as the findings in Study 3. The worldview defense account assumes that people respond to mortality salience by bolstering their own or ingroup worldviews, and therefore predicts the strengthening of both supernatural and skeptical beliefs under mortality salience conditions. However, the data show that while believers strengthened their beliefs, non-believers wavered from their disbelief. This pattern is more consistent with the notion that literal immortality concerns supersede symbolic immortality concerns, that, in Norenzayan & Hansen’s (2008, p. 183) terms, we have a “distinct cognitive inclination” toward supernatural belief; we are naturally and uniquely attracted to belief in supernatural agents. From this perspective supernatural agents and related concepts might offer a unique buffer against death-related anxiety that tempts—albeit does not fully convince—the non-believer.

7.4 Interpreting response latencies

The simplicity of the choice reaction time task comes at the cost of being multiply interpretable, in part because response latencies are determined by multiple cognitive processes (Luce, 1986; Welford, 1980). In this study,
response latencies were treated as an index of participant’s religious beliefs, defined as the strength of cognitive associations between supernatural (e.g., God) and existential (viz., real, imaginary) concepts (cf. Gawronski & Bodenhausen, 2007). However, some previous commentators have interpreted response latencies in similar tasks as indicators of the accessibility, rather than the strength of participants’ attitudes (Cohen et al., 2008). The distinction between associative strength and accessibility may be clarified by examples in which they are dissociated. For example, for a self-identified agnostic, who does not strongly associate the supernatural with either existential category, agnosticism might nevertheless be a highly-accessible aspect of his or her self-concept. Furthermore, the strength and accessibility of one’s religious beliefs may be modified in different directions by the same stimulus: a persuasive argument against religious belief might increase the salience of someone’s beliefs, but also simultaneously weaken them.

Although an interpretation of response latencies in terms of accessibility cannot be ruled out in the present case, theory and previous empirical research suggest that the changes to response latencies are best understood as changes to cognitive associative strength (and so, to belief). Firstly, according to the cognitive associative strength interpretation of the response latency data, mortality salience strengthened religious belief among believers and weakened religious disbelief among non-believers; this interpretation is consistent with the view that mortality salience triggers a distinct cognitive inclination toward religious belief or, in Terror Management Terms, to the pursuit of literal immortality. According to the
attitude accessibility interpretation, on the other hand, mortality salience increased the accessibility of religious individuals’ beliefs but decreased the accessibility of non-religious individuals’ beliefs. However, there is no theoretical basis for predicting that mortality salience should have differential effects on the accessibility of religious and non-religious individuals’ beliefs. Indeed, previous empirical research suggests that increased mortality salience typically leads to increased accessibility of worldview-relevant concepts. For example, employing typical measures of concept accessibility (viz., lexical decision task, word fragment completion task; e.g., Dovidio, Evans, & Tyler, 1986; Meyer & Schvaneveldt, 1971; Tulving, Schacter, & Stark, 1982), Arndt, Greenberg, and Cook (2002) found that death priming increased the accessibility of worldview-relevant concepts (e.g., relational concepts among women; nationalistic concepts among men). Indeed, even subliminal death priming led to increased accessibility of worldview-relevant concepts. The claim that death priming in Study 4 led to decreased accessibility of worldview relevant concepts (viz., religious concepts) among non-religious participants would therefore be inconsistent with previous research.

Thus, there are both theoretical and empirical reasons to prefer a cognitive associative strength interpretation of the response latency data collected in Study 4. However, regardless of how response latencies are interpreted—whether in terms of association strength or attitude accessibility—the results of the present study are inconsistent with Terror Management Theory’s worldview defense account of religion, which expects that mortality salience facilitates worldview-consistent responses. Neither a
weakening of worldview-consistent beliefs (i.e., decreased association strength) nor a suppression of such beliefs (i.e., decreased attitude accessibility) is consistent with this view.

7.5 The (different) effects of death priming on religious belief

Study 3 and Study 4 both examine how thoughts of death influence belief in religious supernatural entities and events, employing two different methods of measurement and yielding seemingly inconsistent results. In Study 3, belief was measured with an explicit measure of respondents’ tendency to believe in existentially significant supernatural entities. In Study 4, belief was measured supernatural belief indirectly, by assessing the strength of respondents’ cognitive associations between supernatural concepts (e.g., God) and existential concepts (viz., “real”, “imaginary”).

Consistent with results in the Terror Management literature, all participants in Study 3 appeared to defend their respective worldviews in response to morality salience, such that Christians more strongly believed that supernatural religious entities exist, while non-religious participants more strongly believed that they do not. However, as previously discussed, self-report measures of attitudes on sensitive issues are liable to biases (e.g., social desirability); furthermore, they might not be sensitive to subtle attitudinal changes. So, Study 4 employed a response latency-based indirect measure of religious beliefs and sought to examine the effect of mortality salience on cognitive associations between supernatural and existential concepts. This study revealed that mortality salience generally increased the inclination toward belief in supernatural entities; those who
identify as religious believers were faster to affirm the existence of such entities, while self-identified non-religious individuals were slower to deny them.

7.6 Accounting for the discrepancy

There are, broadly speaking, three ways to account for the pair of results. First, the results of Study 4 might be discounted (e.g., as somehow reflecting worldview defense, despite non-religious participants’ increased religious belief; cf. Landau et al., 2004). Second, the results of Study 3 might be discounted (e.g., as not reflecting participants’ “true” beliefs; cf. Norenzayan & Hansen, 2006). Third, neither study need be discounted on the assumption that both reveal participants’ beliefs, but different types of (e.g., implicit, explicit; Gawronski & Bodenhausen, 2006).

7.6.1 Defending the worldview defense account: re-interpreting Study 4

The results of Study 4 appear to falsify the prediction generated by Terror Management Theory’s worldview defense account, as non-believing participants’ religious disbelief or skepticism was weakened under mortality salient conditions. Although this pattern of results is inconsistent with the simplest notion of worldview defense, they arguably represent a bolstering of a more general acceptance of Western culture, dominated as it is by religious beliefs and values, including supernatural religious concepts. However, Study 3 showed classic worldview defense effects in participants from the same population: relative to those in the control condition, religious participants primed with death reported increased religious belief and
non-religious participants primed with death reported decreased religious belief. If this broader view of “wordview defense” is applied consistently to both studies, non-religious participants in Study 3 must be said to have repudiated these ostensible symbols of Western culture under mortality salience conditions. So, rendering Study 4 consistent with a worldview defense account renders Study 3’s results inconsistent in its place.

Another interpretation of the results, which would render them consistent with the worldview defense account, involves Pyszczynski et al.’s (1999) distinction between “proximal” and “distal” defenses. Proximal defenses are strategies employed as immediate responses to conscious existential anxiety, whereas distal defenses are employed later, once one is no longer aware of mortality-related cognitions. Previous Terror Management research has treated worldview defense as a distal defense, and has typically found worldview defense responses to mortality salience after a delay period or distracter task. As the death prime in Study 4 was not followed by a distracter task, the weakened skepticism observed might have been a proximal defense, rather than a distal defense; perhaps the immediate response to mortality salience is to increase belief in supernatural agents (and other sources of literal immortality), but a secondary response, once death-related thoughts and anxiety become less conscious, is to engage in worldview defense (i.e., seek symbolic immortality), which—for non-religious people—involves disparaging such beliefs. However, again, since Study 3 demonstrated classic worldview defense effects usually considered to be distal responses, there is no reason to believe that the Study 4 results were proximal responses. Furthermore, response latency-
based measures like the one employed in Study 3 are designed to measure cognitive associations of which respondents are not necessarily consciously aware; that is, they are sensitive to subconscious effects of priming manipulations. To be more certain that the responses observed here are distal effects, however, further experimental research should be carried out with distracters or delays between priming and measurement.

7.6.2 Rejecting self-reports

Although the results of Study 4 are inconsistent with the worldview defense hypothesis that mortality-threatened individuals bolster their prior beliefs regardless of content, they are consistent with a more general terror management perspective. Dechesne et al. (2003) showed that the fulfillment of literal immortality concerns renders symbolic immortality pursuits redundant. This at least raises the possibility that a motivation for literal immortality may override the motivation for symbolic immortality when the two are in conflict (cf. Vail et al., 2010). Study 4 results lend further support to this view: non-believers became less skeptical of supernatural concepts associated with literal immortality, despite the fact that this reduced skepticism is tantamount to a violation of their own worldview. However, this conclusion leaves the results of Study 3—which support the worldview defense hypothesis—unaccounted for.

The decrease in self-reported religious belief among non-religious participants under mortality salient conditions in Study 3 may be attributable to strategic responding or self-presentational biases, to which self-report measure are prone. Indeed, as Norenzayan and Hansen (2006) sug-
gest, non-religious participants might be unwilling to reveal shifts toward religious belief; instead, dissonance between an increased tendency toward religious belief and non-religious participants’ self-concepts might lead them to explicitly repudiate religious views in an effort to affirm their self-concepts (see also Stone & Fernandez, 2008 regarding dissonance leading to behaviour change).

While this account is possible, it is premature to conclude that three separate studies on three different samples and using three different self-report measures (viz., Study 3; Norenzayan & Hansen, 2006, Experiment 4; Weisbuch et al., 2005) failed to accurately detect attitudinal shifts. Indeed, there is no direct evidence that non-religious participants in these previous studies (including Study 3) were affected by self-presentational concerns; none of these experiments measured participants’ perceptions of the social desirability of religious belief, for example. This account therefore proposes an unduly pessimistic conclusion about the veracity of self-report measures, even given their susceptibility to self-presentational biases. Such a conclusion is not sufficiently justified, especially if there is an alternative account that can integrate the findings of these previous studies with the results of Study 4.

7.6.3 From indirect measures to implicit beliefs

Besides the susceptibility to strategic responding biases, self-report measures are also limited in that they do not pick up respondents’ implicit beliefs, the beliefs of which even they might not be aware. The divergent results between Study 3 and Study 4 might therefore reveal a divergence be-
tween non-religious individuals’ explicit and implicit beliefs under mortality salience conditions. Indeed, even within Study 4, mortality salience affected response latencies, but not classification rates. That is, although the binomial choice reaction task used here was treated as a covert or indirect measure of religious belief that is less susceptible to strategic responding, it might have served as a measure of implicit belief as distinct from explicit belief. On the understanding of beliefs as cognitive associations between objects and existential or truth-value concepts (e.g., the association of “God” as “real” or “God exists” as “true”), this entails that implicit associations are distinct from explicit associations or reflective elaborations of associations (cf. Gawronski & Bodenhausen, 2006; Sperber, 1997).¹⁵

This account—that Study 3 and Study 4 examined different levels of religious belief—does not just discount previous findings (viz., Study 3; Norenzayan & Hansen, 2006; Weisbuch et al., 2005) as products of strategic responding. Instead, it posits implicit beliefs that are influenced by mortality salience independent of explicit beliefs. The next chapter explores this possibility, employing a well-established method of measuring implicit attitudes—the implicit association test (Greenwald et al., 1998)—that improves upon the bCRT task employed in Study 4 as it does not involve an explicit component that requires to make existential judgements of supernatural entities and events.

¹⁵The proliferation of so-called “implicit measures” in the last two decades has generated a lot of discussion over the nature of attitudes in general and implicit and explicit attitudes in particular; these questions goes beyond the scope of the present research, but see Gawronski’s (2007) editorial and the ensuing discussion in the special issue of Social Cognition, as well as Gawronski and Payne’s (2010) and Wittenbrink and Schwarz’s (2007) edited volumes.
Chapter 8

Study 5: Mortality salience and implicit religious belief

8.1 Implicit theism

8.1.1 Dual-process models of cognition

Over the last two decades, the notion that our explicit attitudes are disso-
ciable from our implicit attitudes, and indeed, that some attitudes are held
or formed automatically and even unconsciously, has established itself as
social cognitive orthodoxy. The literature is now replete with dual-process
models of cognition, which variously distinguish between the implicit and
explicit (e.g., Nosek, 2007), or the automatic and controlled (e.g., Bargh &
Chartrand, 1999), or the unconscious and conscious (e.g., Dijksterhuis &
Nordgren, 2006), or the heuristic and systematic (e.g., Chen & Chaiken
1999), or the intuitive and reflective (e.g., Sperber, 1997). The conceptual
and empirical relationships among these different distinctions are yet to be
fully understood, but it is clear at least that human cognition and emotion
are not limited to our conscious, verbalizable experience.

The distinction between explicit and implicit cognition has been ap-
plied to many domains in social psychology. Research on prejudice (cf.
Devine, 2001 for review\textsuperscript{16}), for example, has repeatedly demonstrated that
implicit prejudice predicts behaviour, even when controlling for explicit
prejudice (e.g., Knowles, Lowery, & Shaumberg, 2010). Furthermore, ex-
plicit and implicit measures of prejudice, which putatively measure explicit

\textsuperscript{16}Devine (2001) introduces a special issue of the \textit{Journal of Personality and Social Psy-
chology} on this topic.
and implicit prejudice respectively, predict different kinds of prejudiced
behaviour (e.g., Dovidio, Kawakami, & Gaertner, 2002).

8.1.2 The explicit-implicit distinction in religious cognition

Recent research on religious cognition highlights just such a decoupling of
reflective, propositional belief from unreflective, implicit beliefs. Barrett
and Keil (1996), for example, demonstrated that people often employ theo-
logically incorrect, overly-anthropomorphic assumptions that contradict
their explicitly stated religious beliefs, when processing narratives about
God. In a series of three studies, participants read narratives about God
acting in the world (e.g., answering prayers), and were later asked to rec-
ognize or recall information from the narratives under various conditions.
Barrett and Keil (1996) found that both religious and non-religious par-
ticipants committed recognition (Study 1, Study 2) and recall (Study 3) er-
rors, revealing conceptions of God that impose upon God psychological
and physical constraints. For example, participants frequently mis-
remembered God performing tasks sequentially (as opposed to simultane-
ously), moving from place to place (as opposed to being omnipresent), and
being unable to attend to multiple competing sensory stimuli at the same
time. These errors occurred despite participants’ explicitly reporting that
God is and would not be thus anthropomorphically constrained. Indeed,
participants responded in theologically incorrect ways even when they
were reminded not to anthropomorphize God (Barrett & Keil, 1996, Study
2). Furthermore, this dissociation between reflective and intuitive beliefs is
not limited to religious believers, as Barrett and Keil (1996) found that religious and non-religious participants anthropomorphized God equally.

Furthermore, there is increasing evidence that participants who explicitly deny religious belief nevertheless behave like “implicit theists” (Uhlmann et al., 2008, p. 71). For example, participants who denied belief in the soul nevertheless declined to sell their souls to the experimenter, even though the contract was explicitly marked as bogus (i.e., “not a legal or binding contract, in any way”; Haidt, et al., 2000, p. 22). Bering (2002, p. 274) also found that many “extinctivists”—people who believe that “the self is wholly extinguished at death”—nevertheless implied that certain kinds of psychological functioning persisted after death. In this study, participants read a narrative in which the main character unexpectedly dies in a vehicular accident, and then answered a series of questions about the deceased characters’ present states. While they had little trouble denying the continuation of biological needs and psychobiological experiences (e.g., hunger), even extinctivists often endorsed statements that implied the post-mortem persistence of emotional (e.g., love for family member), desire (e.g., to be alive), and epistemic (e.g., knowledge that they were dead) states. Furthermore, they took significantly longer to deny the persistence of such psychological states than they did the persistence of biological and psychobiological ones. In a related study, Heywood (2010) interviewed atheists about major events in their lives, and found that they often saw intrinsic meaning or purpose in significant events, as though they occurred in order to teach them something or to convey some important message. These results, Bering (2010) argues, reveal that even trenchant non-
believers (e.g., extinctivists, atheists) are subject to implicit and incorrigible tendencies toward afterlife beliefs and teleo-functional reasoning, which are important aspects of religious belief.

Findings like these strongly suggest a need to attend to implicit aspects of religious cognition, and therefore to develop the methodological tools to do so. Fortunately, various measures have been developed in the last two decades of social psychological research on implicit cognition, which may be adapted to study implicit religious cognition. The present study employs one such measurement tool—the single-target implicit association test (ST-IAT; Wigboldus, Holland, & van Knippenberg, 2006)—to examine the effects of mortality salience on implicit religious belief. This extends the work done in Study 4, which employed a binomial choice reaction time task as an indirect measure of religious belief to circumvent strategic responding biases. Participants in that study responded consistent with the cognitive inclination account of religious belief. However, as the bCRT involves explicit existential judgements regarding supernatural entities and events, it is unclear what if any variance in response times can be attributed to implicit belief. Study 5 therefore aims to re-test the worldview defense and distinct cognitive inclination accounts using an established measure of implicit cognition.

8.1.3 The Single-target IAT

The ST-IAT is a version of the implicit association test (IAT; Greenwald et al., 1998), a dual task measure that has repeatedly been used to reliably and validly measure a wide variety of implicit attitudes (Nosek, Greenwald,
& Banaji, 2006). Structurally, IATs consist of two simultaneous binomial categorization tasks that potentially interfere with each other: a target categorization task (e.g., images of George W. Bush and John Kerry; Nosek & Hansen, 2008) and an attribute categorization task (e.g., positive and negative words; Nosek & Hansen, 2008). Both tasks require responses using the same two keys or buttons; compatibility between a target and an attribute should facilitate (i.e., speed up) responding, whereas incompatibility should impair (i.e., slow down) responding. It should be noted that IAT scores—computed from response latencies—can only indicate respondents’ attitudes on the targets relative to each other. Nosek and Hansen’s (2008) IAT, for example, only measures the positivity or negativity that respondents associate with George W. Bush relative to John Kerry. Thus, the standard IAT is most useful when we are interested in relative preferences (e.g., Black v. White, Democrat v. Republican) or when there is an obvious alternative category. However, IATs are much less helpful for evaluating people’s attitudes toward single targets. Wigboldus et al.’s (2006) ST-IAT seeks to address this limitation of the IAT.

The ST-IAT consists of three phases. Phase 1 is an attribute categorization task (e.g., positive and negative words); Phase 2 couples the attribute categorization task with a target classification task, in which participants respond to targets (e.g., Christian terms; Wigboldus et al., 2006)

Even in this case, however, an IAT score that shows relative preference toward one target might be driven by (a) a positive evaluation of that target and a neutral evaluation of the other, (b) a neutral evaluation of that target and a negative evaluation of the other, or (c) both.

For the same reasons, Karpinski & Steinman (2006) have also developed a Single Category IAT, structurally identical to Wigboldus et al.’s ST-IAT. Analogously, Penke, Eichstaedt, & Asendorpf (2006) have developed a Single-Attribute IAT for comparisons of two targets on the same evaluative concept.
by pressing a key shared with one of the attribute categories; Phase 3 is identical to Phase 2, except that the target is paired with the other attribute category. Again, compatibility between the target and an attribute facilitates responding, whereas incompatibility impairs responding. This time, however, ST-IAT scores indicate respondents’ evaluation of the single target by showing which attribute the target is more strongly associated with. Although research on and utilizing this version of the IAT still relatively new, Bluemke and Friese (2008) concluded that, if cautiously used, the ST-IAT can be a psychometrically reliable and valid measure of attitudes toward the target, even more so than the IAT.

Both the IAT and the ST-IAT have predominantly been used as measures of positive or negative evaluations of target stimuli, such as preferences for ingroups (Rudman, Feinberg, & Fairchild, 2002), attitudes toward various political parties (Bluemke & Friese, 2008), and even attitudes toward religion (Bassett et al., 2005) and various religious groups (Wigboldus et al., 2008). However, neither procedure requires valenced attributes. As their names suggest, the IAT and ST-IAT are tests of implicit associations; that is, they measure the strength of association between any target and attribute. The ST-IAT can therefore be used as an implicit measure of religious belief, defined as the cognitive association between religious entities and existential concepts (e.g., real, imaginary). Indeed, Shariff, Cohen, and Norenzayan (2008) recently used religious words (e.g., god, devil) as targets, and synonyms for true (e.g., true, real) and false

19The ST-IAT is therefore still a relative measure, in the sense that it measures associative strength between the target category (e.g., supernatural entities) and one attribute (e.g., real) relative to another attribute (e.g., imaginary). On top of this, however, the IAT also compares two target categories (e.g., supernatural entities v. natural entities).
(e.g., false, bogus) as attributes, and found that ST-IAT scores significantly correlates with self-report religiosity measures. Furthermore, ST-IAT scores were sensitive to experimental manipulation: participants who were first exposed to a paragraph arguing against the existence of God showed decreased religiosity on both the ST-IAT and the self-report measure.

8.1.4 Mortality salience and implicit religious belief

Study 5 aims to examine the effect of mortality salience on implicit religious belief, thereby extending the results of Study 3 and 4. In contrast to the binomial choice reaction time task employed in Study 4, the ST-IAT does not involve explicitly evaluating supernatural entities as real or imaginary; religious belief is therefore inferred from response latencies to religious stimuli when they are associated with different existential concepts (viz., real, imaginary). Furthermore, unlike Study 3 and Study 4, Study 5 includes a distracter task between the mortality salience manipulation and the measure of religious belief. According to Terror Management Theory, mortality salience will lead to worldview defense only after death-related cognitions fade from conscious awareness (however, see Study 3 for evidence to the contrary). In previous Terror Management research, these so-called distal effects of mortality salience were elicited by inserting a distracter task between the manipulation and the dependent measure. Thus, the insertion of a distracter task in Study 5 addresses the possibility that the effects of mortality salience on religious belief found in Study 3 are merely proximal effects.
In sum, Study 5 improves upon Study 4 in two ways: (a) by employing a purer measure of implicit associations (i.e., one without an explicit existential judgement component), and (b) by introducing a distracter task between the mortality salience manipulation and the measure of religious belief. Applying the logic of Studies 3 and 4, if existential anxiety uniquely motivates religious belief, rather than general worldview defense, mortality salience should increase participants’ implicit religious belief, regardless of their explicitly stated religious affiliations and beliefs. If, on the other hand, existential anxiety motivates worldview defense, regardless of the content of the worldview, mortality salience should increase religious and non-religious participants’ implicit beliefs in different directions: even at an implicit level, religious participants should believe more strongly, non-religious participants should disbelieve more strongly.

8.2 Method

Participants. Seventy-six female and 25 male psychology undergraduates (M<sub>age</sub> = 20.14, SD = 3.74) participated in this study in exchange for partial course credit. The study was run in conjunction with several other, unrelated procedures.

Materials and Procedure. The experiment consisted of two parts, separated by a five-minute break, during which participants completed an unrelated task. In Part 1, death thoughts were primed under the auspices
of a study on imagination. As with Study 3 and Study 4, participants were either told to write about “what you think will happen to you physically as you die and once you are physically dead” and “the feelings that the thoughts of your own dying arouse in you” (death priming), or about “what happens to you when you watch TV” and “the feelings that thoughts of watching TV arouse in you” (control).

In Part 2, participants completed a computer-based ST-IAT, which consisted of three phases. In the training phase, participants categorized synonyms of “real” ($n = 7$) and “imaginary” ($n = 7$) as quickly and accurately as possible, using the “z” and “/” keyboard keys respectively. Each item was presented three times in random order, preceded by a fixation cross at the centre of the screen (500 ms). In the second phase, participants categorized the items from the training phase, and also responded to words referring to religious supernatural entities ($n = 7$) by pressing the same key as responses to “real” items. “Imaginary” items were presented six times, whereas “supernatural” and “real” words were presented three times each; as “supernatural” and “real” words were associated with the same key, this ensured equal number of correct keystrokes per key (Wigboldus et al., 2006). The third phase was identical to the second phase, except that “supernatural” and “imaginary” words were now associated with the same key; as with the second phase, the number of correct keystrokes per key was kept balanced. All stimuli were presented in black on a white background via SuperLab™ software running on Macintosh iMac desktop computers in individual light and sound attenuated experimental cubicles.
After completing the ST-IAT, participants completed a sociodemographic questionnaire, which included a question about their religious identity, the SBS, and several other unrelated tasks. They were then debriefed and thanked.

8.3 Results & Discussion

Responses on the sociodemographic questionnaire indicated a mixed sample of religious ($n = 42$; 100% Christian) and non-religious participants ($n = 59$; 95% “no religion”; 5% “agnostic”). Self-reported SBS scores were marginally in the direction of disbelief ($M = -0.40$, $SD = 2.34$), $t(101) = -1.74$, $p = .085$, reflecting the trend in participants’ self-categorization.

ST-IAT data were prepared according to guidelines specified by Bluemke and Friese (2008). First, errors and response latencies below 300 ms and above 3000 ms were omitted from analysis. Then, individuals’ response latencies (across all ST-IAT blocks, excluding training trials) were $z$-transformed to control for extraneous individual differences in response times. Each participant’s ST-IAT scores were calculated by subtracting the mean response latency in the second phase (in which “real” and “supernatural” required the same response) from the mean response latency in the third phase (in which “imaginary” and “supernatural” required the same response). In this case, positive scores indicate a stronger association between religious concepts and “real” than between religious concepts and “imaginary”; this may be interpreted as a tendency to think of supernatural entities as real rather than imaginary entities.
ST-IAT scores were overall significantly negative, \( (M = \cdot.11, SD = \cdot.32) \), \( t(101) = -3.41, p < .001 \)\(^{21}\), and were significantly correlated with SBS scores, \( r = 0.27, p < .01 \). Previous research has shown similar correlations with self-report religiosity measures (\( r = 0.31 \); Shariff, Cohen, & Norenzayan, 2008).

A 2 (death priming v. control) × 2 (religious v. non-religious) ANOVA on ST-IAT scores revealed two main effects on ST-IAT scores: religious participants (\( M = \cdot.03, SD = \cdot.30 \)) scored higher than non-religious participants (\( M = \cdot.17, SD = \cdot.30 \)), \( F(1, 97) = 6.10, p < .05 \); and death-primed participants (\( M = \cdot.05, SD = \cdot.32 \)) scored higher than control participants (\( M = \cdot.17, SD = \cdot.29 \)), \( F(1, 97) = 5.62, p < .05 \). There was no interaction, \( F < 1, ns \). Furthermore, SBS score did not moderate the death-priming effect, \( \beta = 0.049, t(97) = 0.509, ns \). When SBS was partialled out of ST-IAT scores, the initial priming effect (\( \beta = 0.20, p = 0.042 \)) became stronger (\( \beta = 0.24, p = 0.021 \)), though the change did not reach statistical significance (\( p = 0.13 \)).

This experiment extends and improves on Study 4 in two ways. First, in keeping with previous Terror Management research, a distracter task was introduced between the mortality salience manipulation and the implicit measure of religious belief. According to Pyszczynski et al. (1999) this delay allows the death-related cognitions primed via the writing task to exit conscious awareness, resulting in distal responses, such as world-

\(^{21}\) The negative trend is in part due to order effects, as practice improves participants’ performance in the imaginary-supernatural phase. So, the fact that ST-IAT scores were overall negative does not by itself indicate that the sample was relatively non-religious; however, this trend is consistent with the sociodemographic and SBS results. Furthermore, as the order effects obtain in both death priming and control conditions, they should not affect the interpretation of those results.
view defense. Second, and more importantly, the ST-IAT, a well-validated measure of implicit cognition, revealed that mortality salience increases implicit belief for all participants, independent of either their categorical religiosity or their chronically held explicit beliefs.

These results provide a challenge to classic Terror Management accounts of religion. Even if the results in Study 4 are taken as proximal responses to mortality salience, and therefore consistent with Pyszczynski et al.’s (1999) extension of Terror Management Theory, Study 5’s results are more difficult to reconcile. Instead of engaging in worldview defense as a distal response to mortality salience, participants showed an increased implicit tendency toward religious belief, regardless of their self-reported explicit religious identities and beliefs. It would seem, then, that literal immortality concerns do supersede symbolic immortality concerns, when we look beneath the surface to examine individuals’ implicit cognitions.

While the primacy of literal immortality is in violation of the worldview defense account of religion (e.g., Landau et al., 2004), the uniqueness of religion is not altogether antithetical to a broader terror management approach to religion. After all, TMT concedes that religion is unique in its provision of both literal and symbolic immortality. Indeed, the findings of the three experimental studies taken together suggest an intriguing possibility: a dual-process model of religious belief, in which explicit and implicit beliefs may be differentially affected by mortality salience. In this view, mortality salience could lead to explicit worldview defense and implicit religious belief, allowing even non-religious people to pursue for
symbolic and literal immortality. The plausibility and implications of this model are discussed further in the next chapter.
Chapter 9
General Discussion

9.1 Précis

Despite centuries of speculation about the role of death anxiety in the development and evolution of religious belief, the scientific evidence on the matter is equivocal. Previous correlational studies suffer from sampling biases and from insufficiently critical measurement methods. Previous experimental research on the effects of death-related cognition on religiosity is similarly methodologically limited and has relied exclusively on self-report measures of religiosity. In a series of five studies, the present research sought to clarify the correlational and causal relationship between religious belief and death-related affect and cognition. In particular, it sought to determine the effects of mortality salience on religious belief and so to adjudicate between two theoretical proposals.

According to Terror Management Theory’s worldview defense hypothesis, mortality salience leads individuals to defend their own prior worldviews: that is, mortality salience should strengthen religious belief among religious participants and strengthen religious disbelief among non-religious participants. In contrast, according to the distinct cognitive inclination account, religious beliefs are unique buffers of existential anxiety by virtue of their content (e.g., powerful gods; immortal souls) rather than their location in individuals’ worldviews, so mortality salience should strengthen religious belief (and weaken religious skepticism) regardless of participants’ prior worldviews. To empirically evaluate these theoretical
proposals, explicit and implicit measures of religious belief were developed and employed in a correlational study and three experimental studies on the effects of mortality salience on religious belief.

First, to address the psychometric limitations in previous research on self-reported religiosity, the Supernatural Belief Scale was developed as a measure of religious belief, defined specifically as the tendency to believe in supernatural entities and events (cf. Study 1, Chapter 4). Study 2 then examined the statistical relationship between trait levels of death anxiety and this particular aspect of religiosity, revealing that participants’ categorical religiosity (viz., religious v. non-religious) is a critical moderator. In contrast to the majority of previous findings, which have found linear negative correlations between levels of death anxiety and religiosity, Study 2 shows that death anxiety increases with religious belief among the non-religious, but decreases with religious belief among the religious.

Next, to test between Terror Management Theory’s worldview defense account against the competing distinct cognitive inclination account, Study 3 examined the effect of manipulated mortality salience on self-reported religious belief. Consistent with the worldview defense hypothesis, mortality salience increased religious belief among religious participants and decreased religious belief (or increased religious skepticism) among non-religious participants. However, given the various limitations of self-report measures as discussed at length in previous research (cf. Gawronski & Payne, 2010; Gibson & Barrett, 2008; Norenzayan & Hansen, 2006; Wittenbrink & Schwarz, 2007), Study 4 and Study 5 employed two different response latency-based measures of religious belief and
found that mortality salience led to increased religious belief (or decreased religious skepticism), regardless of participants’ prior self-reported religious affiliations and beliefs.

Taken together, the correlational study shows that the relationship between death-anxiety and religious belief is moderated by categorical religiosity (viz., religious v. non-religious) and the experimental studies show that mortality salience leads to explicit worldview defense and implicit religious belief. These findings have methodological and theoretical implications for research on the cognitive foundations of religious belief.

9.2 Methodological and theoretical implications

9.2.1 Definitions and measurement in the psychology of religion

In keeping with previous theoretical and empirical research in the cognitive science of religion, religion was defined as the belief in supernatural agents, and the cluster of psychological phenomena associated with such belief. But what is religious belief. Although the matter of defining and measuring beliefs in general is by no means settled, the present research suggests a way forward in conjunction with the recently converging philosophical and psychological literatures (e.g., Gendler, 2008; McKay & Dennett, 2009; Sperber, 1997).

The present findings, that mortality salience differentially affects self-reported beliefs (cf. Study 3) and indirectly-measured beliefs (cf. Studies 4 and 5), support a dual-process model of belief in keeping with other dual-process models of cognition (e.g., behaviour; attitudes; decision-making; memory; Bargh & Chatrand, 1999; Gawronski & Bodenhausen,
2006; Kahneman & Frederick, 2005; Schacter & Tulving, 1994; see also Smith & DeCoste, 2000 for a conceptual integration of dual-process models). Sperber (1997, p. 71), for example, makes the distinction between intuitive and reflective beliefs, in which intuitive beliefs are mental representations of actual states of affairs and reflective beliefs are metarepresentational “credal” evaluations of intuitive beliefs (i.e., as true or false). Similarly, Gawronski and Bodenhausen (2006) distinguish between associative and propositional processes that underly implicit and explicit attitudes respectively. In this view, an implicit attitude toward an object consists in the evaluation cognitively associated with or automatically triggered by, that object (cf. Fazio, 2007); explicit attitudes, on the other hand, are those that have been translated into propositional form and reflectively validated. Indeed, in the present research, religious belief was conceptualized propositionally in Study 3 and associatively in Studies 4 and 5. In Study 3, participants’ explicit beliefs were inferred from their responses to propositional statements that make up the Supernatural Belief Scale; in Studies 4 and 5, participants’ implicit beliefs were inferred from their performance in associative tests (viz., binomial choice reaction time task, single-target implicit association test).

Such dual-process models allow the two kinds of beliefs to converge or diverge in any one individual: applied to religious belief, one might im-

\[\text{\^{22}}\text{Although this theoretical work focusses on attitudes, it applies equal well to beliefs. In the case of attitudes, the evaluation associated to the object is some positive or negative affective response (Gawronski & Bodenhausen, 2006); in the case of belief, the evaluation associated to the object is an existential concept (e.g., real, imaginary). That is, attitudes and beliefs are represented in the same way in memory (Fazio, 2007; Simon & DeCoste, 2000). Indeed, this notion of cognitive associations of varying strength provides a conceptual framework for analyzing various psychological states and processes like beliefs and attitudes and knowledge.}\]
plicitly associate “God” and “real”, but explicitly disavow this association. Indeed, implicit theism (e.g., Bering, 2002; Haidt et al., 2000; Heywood, 2010) and theological incorrectness (e.g., Barrett & Keil, 1996; see also Slone, 2004) effects reviewed earlier exemplify such a distinction between explicit and implicit beliefs. The present research further bolsters the dual-process approach to religious belief, by showing that explicit (Study 3) and implicit (Studies 4 and 5) beliefs about the same objects (viz., supernatural entities and events) may be influenced in different directions by the same factor (viz., mortality salience).

So, religious belief—the belief in supernatural entities and events—consists in cognitive associations between supernatural objects (e.g., gods) and existential concepts (e.g., real) as well as propositional representations that may be consciously and reflectively evaluated, held, or rejected. This dual-process model of religious belief highlights the need for the development and critical use of implicit and explicit measures, especially as the two aspects of belief are dissociable. The development of the Supernatural Belief Scale and the adaptation of response latency-based measures here therefore represent steps forward.

9.2.2 Religion in Terror Management Theory

The present findings are consistent with the view that mortality-related concerns motivate religious belief; however, they raise challenges for the most straightforward interpretation of Terror Management Theory’s worldview defense hypothesis. According to this account, mortality salience triggers worldview defense, the bolstering of ingroup values and the
denigration of outgroup values. Applied to religious belief, mortality salience should lead to strengthened religious belief among religious individuals and strengthened religious disbelief among non-religious individuals (Landau et al., 2004).

Contrary to the worldview defense hypothesis, in two experimental studies, employing two different response latency-based implicit measures of religious belief, mortality salience increased religious belief (or decreased religious skepticism), regardless of participants’ prior stated religious beliefs or affiliations. In Study 4 (cf. Chapter 7), mortality salience did not affect the extent to which participants categorized religious entities as real or imaginary, but did facilitate religious participants’ “real” responses and impair non-religious participants’ “imaginary” responses. Study 5 (cf. Chapter 8) examined the effects of mortality salience on participants’ implicit associations between supernatural and existential concepts by using an ST-IAT and found that mortality salience strengthened supernatural-real associations (relative to supernatural-imaginary associations), regardless of participants’ self-identification (viz., religious v. non-religious) and self-reported religious belief (viz., SBS score).

Taken together, the results of the experimental results are also inconsistent with Terror Management Theory’s distinction between proximal and distal responses to increased death thought accessibility (Pyszczynski et al., 1999). According to this extension of Terror Management Theory, conscious and unconscious death-related thoughts trigger different defense mechanisms. Conscious death thought accessibility triggers proximal responses, which are logically or semantically related to literal death (e.g.,
Denying mortality, whereas unconscious death thought accessibility triggers distal responses, which are not logically or semantically related to literal death (e.g., worldview defense). This dual-process model of terror management predicts that mortality salience triggers worldview defense only when the death-related thoughts fade from conscious awareness; the standard TMT experimental paradigm therefore includes a delay and distracter task between the death prime and the dependent measure to examine the worldview defense effects of mortality salience. Furthermore, the model also predicts that mortality salience should trigger literal immortality concerns when death thoughts are still consciously accessible.

Neither Study 3 nor Study 4 included delays or distracter tasks; so, mortality salience should theoretically have triggered proximal defenses such as the pursuit of literal immortality. However, while Study 4 did find this expected effect, Study 3 found that mortality salience led to worldview defense, a characteristic distal response. Furthermore, Study 5 did include a distracter task, which ought to have led to distal responses to mortality salience (e.g., worldview defense); however, as in Study 4, mortality salience led to increased religious belief, regardless of participants’ prior self-reported religious affiliations and beliefs. That is, while there was no difference in participants’ proximal and distal responses to mortality salience, there was a difference in their explicit and implicit responses. So,

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23 Indeed, the point is reinforced if we consider Weisbuch et al.’s (2005) study. Both Weisbuch et al.’s (2005) study and Study 3 here employed self-report measures and both found that mortality salience led to worldview defense, despite the fact that one included a distracter task (Weisbuch et al., 2005) and the other did not (Study 3). In contrast, both Study 4 and Study 5 here employed implicit measures and both found that mortality salience led to increased religious belief, despite the fact that one included a distracter task (Study 5) and the other did not (Study 4).
the explicit-implicit distinction appears to cut across the proximal-distal
distinction, at least with regards to religious belief.

Although the present research challenges Terror Management Theory’s worldview defense account of religion, it remains consistent with a
more general Terror Management Theory approach to the development
and evolution of religion. The uniqueness of religion as a buffer of existen-
tial anxiety is acknowledged by TMT itself, which recognizes that, unlike
secular worldviews, religious worldviews potentially fulfill both literal im-
mortality (e.g., via afterlife beliefs) and symbolic immortality (e.g., via the
longevity of religious groups) concerns. Furthermore, there have been sug-
gestions that the concept of symbolic immortality is semantically parasitic
on and historically derived from the concept of literal immortality, and
even that symbolic immortality is a substitute for literal immortality
(Becker, 1973; Greenberg et al., in press). The question that remains is
whether it is an inferior substitute, whether religious worldviews are “more
powerful” than secular ones as buffers of existential anxiety (Vail et al.,
2010, p. 88).

The empirical research presented here certainly suggests that peo-
ple are distinctly inclined toward religious belief even at the expense of
their own worldviews. However, according to the dual-process model of
religious belief, individuals’ explicit and implicit responses to death-
related thoughts are dissociable: mortality salience may lead to explicit
worldview defense and, simultaneously, implicit religious belief. If so, even
non-religious individuals may simultaneously pursue symbolic and literal
immortality when faced with death. The current research therefore high-
lights the limitations of the worldview defense hypothesis as it stands, and encourages theoretical and empirical research on terror management and literal immortality, after over two decades focussing almost exclusively on the former (cf. Burke et al., 2010).²⁴

9.2.3 Fear of death and the evolution of religion

Recent theoretical treatments of religion within the Terror Management Theory framework (Vail et al., 2010; Greenberg et al., in press) have argued that terror management—the alleviating of existential anxiety—is a “major function” (Vail et al., 2010, p. 86) or, indeed, “the primary function” (Greenberg et al., in press, p. 1) of religion. This claim can be interpreted in several ways, depending on one’s understanding of psychological and biological function (cf. Ariew, Cummins, & Perlman, 2002). Although it is still unclear what TMT proponents mean by these functional claims, there is some indication that they refer to biological and/or cultural evolutionary adaptiveness. For example, Greenberg et al. (in press, p. 12) suggest that religious worldviews that alleviate the otherwise crippling fear of death allowed the “first modern humans...to hunt and explore with bold confidence”, which made them “more successful in propagating both their genes and their conceptions of an afterlife”. From a more overtly cultural evolutionary perspective, Vail et al. (2010, p. 90-91) claim that, “a very important reason that religious memes spread so rapidly and effectively is the

²⁴Indeed, to my knowledge, Vail et al.’s (2010) paper is the only published theoretical account of religion within a TMT framework, which emphasizes the lack of attention paid to religion by TMT proponents so far.
protection from existential fear that they afforded to those who possessed them”.

These proposals place the broader Terror Management perspective on religion among other theories that address the limitations of merely cognitive theories of religion (i.e., the Mickey Mouse problem; cf. 1.4.5) in general, and evolutionary adaptationist theories of religion in particular (e.g., Bering, 2011; Bulbulia, 2006). At any rate, the claim that terror management is the major or primary function of religion is still empirically un-justified. The present research provides evidence that is consistent with this claim, but there is a long way to go from a failure to falsify to successfully establishing a scientific theory.25

First, the anthropological objection—that religious beliefs are often far from comforting vis-à-vis death—has to be met. Proponents of the view that religion evolved to mitigate existential anxiety must explain why many religious belief systems seem to involve malicious (or morally ambivalent) deities and negative conceptions of the afterlife. A plausible response might invoke the explicit-implicit distinction or the distinction between theologically correct beliefs and the intuitive beliefs of the “person in the pew”: scriptures might contain gloomy or horrific depictions of the afterlife, but the beliefs of actual adherents might depart from the textual testimony. Calvinism might state that God predestines some for eternal damnation, but Calvinists might nevertheless believe otherwise. It is, of course,

25Indeed, the fact that mortality salience increases religious belief is also consistent with theoretical views that by-pass fear or anxiety altogether. It is, for example, consistent with Bering’s (2002, 2011) thesis that religious beliefs are the consequence of the unimaginability of death. In this view, mortality salience triggers attempts to imagine death, the failure of which generates supernatural agent beliefs. However, such theories do not account for the correlation between death anxiety and religious belief.
an empirical question whether this is so, and so more empirical research is required.

Second, as the evidence stands, evolutionary adaptationist theories are severely under-determined by data. For a trait to count as an adaptation, the trait must vary within a population, it must be heritable, and it must confer reproductive advantages. Proponents of adaptationist theories in general, and those who posit existential anxiety as the evolutionary problem to be solved in particular, have to provide evidence that religion meets these criteria. Greenberg et al.’s (in press) claim that religious belief conferred survival and reproductive advantages to adherents, for example, might be tested experimentally by examining the effects of increased religious belief on death-anxiety, or via archival ethnographic research on the correlations between comforting afterlife beliefs and resource gathering success. Furthermore, the quantitative claim that terror management is the major or primary driver of religious belief requires testing against other adaptationist claims, such as those that prioritize the prosocial effects of religious belief (e.g., Bering, 2011; Wilson, 2002), the placebo-related health benefits of religious belief (e.g., Bulbulia, 2004), and so forth.

Similarly, Vail et al.’s (2010) cultural evolutionary claim that religious ideas spread as a function of their ability to quell existential anxieties may be tested by examining whether or not the inclusion of afterlife concepts significantly improves the transmissibility of religious belief systems. As with the biological evolutionary claim above, the emphasis on afterlife beliefs distinguishes the Terror Management account from other proposals.
about the inferential richness of religious concepts that focus on other psychological needs, such as the need for positive relationships (e.g., Kirkpatrick, 2004; Epley et al., 2008), the need for cognitive closure (e.g., the desire to explain tragedies; Barrett, 2004), and so forth. And again, the claim that terror management is the major or primary driver of religious belief requires testing by comparison with these and other potential factors.

Given the preponderance of other potential causal factors, and the increasing evidence for their effects on religious belief, it might well turn out that there is no single major or primary driver of religious belief, no one function, evolutionary or otherwise. Indeed, given the diversity of religious beliefs, it is unclear if it makes sense to talk about “religious belief” as an adaptation, as if it were a unitary construct (cf. Atran, 2002). In this view, if—as the present research suggests—mortality concerns motivate religious belief, it does so as one of a whole host of interacting factors, none of which are by themselves essential and all of which converge together to contribute to the persistence and pervasiveness of religious belief. That is, religious beliefs are not essentially or necessarily effective buffers against existential anxiety, but insofar as they are, religious commitment and transmission is enhanced.

9.3 Caveats

Although the present research extends and improves upon previous research on the relationship between death-anxiety and religious belief, it is also limited in several respects. For example, although the Supernatural
Belief Scale is a reliable and valid measure of respondents’ tendency to believe in supernatural entities and events, it suffers several weaknesses. First, it is a uni-directional measure of religious belief: all of the items affirm the existence and occurrence of supernatural entities and events; none deny them. Although participants can and do “disagree” with the items, claims regarding religious skepticism or disbelief (cf. Study 3) are perhaps better substantiated with items denying the existence and occurrence of supernatural entities and events. Second, while the SBS is intended as a general measure of religious belief and not just an index of sectarian religious beliefs (e.g., specifically Christian beliefs), its inter-religious applicability has not yet been evaluated. It seems unlikely that the SBS, as it is currently formulated, can be used as a cross-cultural measure, as it includes culture-specific labels (e.g., God, angel). However, if the concepts the scale refers to are, as intended, cross-culturally ubiquitous, the labels should be easily adaptable for different contexts.26

The validity of the “non-religious” samples in the studies is also vulnerable to criticism. As the causal analyses of the worldview defense and distinct cognitive inclination accounts differ only with respect to non-religious individuals, the data from these participants are particularly informative, and the fortuitous secularity of New Zealand society made it easier to gather them. However, while the non-religious individuals did not explicitly commit to any particular religious faith27, it is unclear how

26 At the time of writing, efforts to adapt the SBS for a multi-religious South East Asian context are underway.

27 That is, they self-identified as being non-religious or stated their religion as “none” or claimed to be agnostic or left the question about their religion blank, etc.
many of them avowedly *reject* religious beliefs, and therefore the extent to which non-religiousness forms a positive part of their worldviews. On the other hand, previous Terror Management research has shown that people engage in worldview defense even under minimal group conditions (e.g., Harmon-Jones et al., 1996). The worldview defense account therefore does not require individuals to be deeply invested in a belief system before defending it under mortality salient conditions. Indeed, the non-religious participants in Study 3 report decreased religious belief under morality salient conditions. So, it seems that the non-religious sample available was non-religious enough to engage in worldview defense by repudiating religious belief. It would therefore be inconsistent to accept these findings, consistent as they are with previous Terror Management research, and reject the findings of Studies 4 and 5. Still, the question of how mortality salience affects religious belief among militant atheists remains to be addressed.

The proposal that religious belief has independent explicit and implicit components implies that the two are empirically dissociable. Indeed, this dissociation was inferred from comparisons across three independent studies (viz., Studies 3, 4, and 5). However, to conclusively show that individuals’ explicit and implicit religious beliefs may be differentially affected by increased mortality salience, both types of belief should be assessed within a single experimental paradigm. The comparison in Study 4 between classification rates and response latencies approaches such a test; however, future research should compare the effects of mortality salience on scores of a psychometrically validated explicit measure (e.g., Super-
natural Belief Scale) against the effects of mortality salience on performance in a measure of implicit belief (e.g., ST-IAT).

Finally, like any research, the current studies also leave a number of questions unaddressed. For example, what is the effect of enhancing religiosity—either via priming or via controlled persuasion—on fear of death? According to the worldview defense account, challenging non-religious individuals’ religious skepticism should increase their fear of death or at least the accessibility of death-related thoughts (Schimel, Hayes, Williams, & Jahrig, 2007). However, if religious beliefs mitigate existential anxiety uniquely by virtue of their content, rather than their location in individuals’ worldviews, then thusly increasing non-religious participants’ inclinations toward religious belief should reduce fear of death. Alternatively, the effects of manipulating non-religious participants’ explicit and implicit religious beliefs might differ; consistent with Terror Management Theory, explicitly threatening participants’ non-religious worldviews might increase death-anxiety, whereas increasing their implicit tendencies toward religious belief might decrease death-anxiety. None of these possibilities were explored in the present research.

9.4 Concluding remarks

Religion—the belief in supernatural agents, and the emotional and behavioral displays of devotion that follow—is pervasive and persistent, is historically and cross-culturally ubiquitous. Human beings are incorrigibly religious, perhaps even inexorably so. Doubtless, this is so for many reasons; many causal factors converge in the development and evolution of
religious belief and behaviour. The present research suggests that one such factor is the fear of death. As the studies reported here have shown, mortality-related concerns can and do motivate religious belief, and not merely as general defense of our own or ingroup worldviews. In the face of death, at least, we cannot help but be tempted toward faith, even if only at an implicit level. If there are atheists in foxholes, it seems there are no militant ones.
10.1 Introduction

In light of the advancements in the cognitive science and evolutionary psychology of religion in past two decades, scientists and philosophers have begun to reflect on the theological and atheological implications of naturalistic—and in particular, evolutionary—explanations of religious belief and behaviour.

The discussion around these issues has only just begun, and much like everything else in this nascent field, there are a diversity of perspectives. For the most part, researchers within CSR have chosen not to engage in debates about the philosophical or theological implications of their findings; indeed, those who do tend to espouse a neutral position in which the science is “independent of whether someone should or should not believe” (Barrett, 2004, p. 123) and “blind to [religious truth claims] and can elucidate nothing about them” (Atran, 2002, ix). However, other scholars on both sides of the theist-atheist debate have recently begun to chime in to predictable effect. Anti-religious public intellectuals alude to CSR research in their efforts to “break the spell” (Dennett, 2006, p. 15) of religion, to dismiss religious belief as delusional (Dawkins, 2006). In response, theistic philosophers have not only defended the neutral position outlined above (e.g., Murray & Goldberg, 2009; van Inwagen, 2009), they have even argued that CSR supports particular theological

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28 However, see Bering (2011) for an exception to this, and Jong (2011) for a critical evaluation of Bering’s philosophical speculations.
claims (e.g., Calvinist *sensus divinitatis*; Clark & Barrett, 2011). Perhaps unsurprisingly, however, there have been philosophical and scientific misunderstandings from scientists and philosophers respectively, especially in popular publications; evidently, a proper meeting of minds between the cognitive science of religion and the philosophy of religion is required. The aim of this chapter is therefore to draw from these recent contributions, point out some philosophical pitfalls and common misunderstandings about the cognitive underpinnings of religious belief, and suggest a way forward in reasoning about the psychology and philosophy of religious belief.

As the extant literature focusses exclusively on the theism of the Abrahamic traditions (viz., Judaism, Christianity, Islam; indeed, when a more specific religious tradition is discussed, it is invariably Christian theism), this chapter will be similarly limited.

10.2 Definitions

For the purposes of this chapter, the salient features of the cognitive science of religion are as follows: CSR is a naturalistic research programme that aims to provide general explanations for the cross-culturally recurring collection of psychological phenomena (e.g., beliefs, behaviours) associated with supernatural agents. Such phenomena include, for example, supernatural agent (e.g., gods, souls; Pyysiäinen, 2009) beliefs, religious rituals (McCauley & Lawson, 2002), and religious group dynamics (Wilson, 2002).
CSR’s explanatory project is pluralistic and draws mainly from cognitive science and evolutionary psychology. According to CSR’s standard model, religious beliefs and behaviours are by-products of evolutionary adaptive cognitive mechanisms; furthermore, some features of religion may themselves have conferred adherents with reproductive advantages (cf. Atran, 2002; Barrett, 2004; Bering, 2011; Boyer, 2001).

As for theism, Swinburne’s (1995, p. 314) definition is adequate for our purposes: theism is the belief in “a personal being, bodiless, omnipresent, creator and sustainer of any universe there may be, perfectly free, omnipotent, omniscient, perfectly good, and a source of moral obligation; who exists eternally and necessarily, and has essentially the divine properties...listed”. Not every aspect of theism or of CSR, as briefly defined here, will be directly relevant to the ensuing discussion; conversely, some of these points will require expansion in the context of particular arguments below. However, these sketches will suffice as definitional starting points for exploration of the relationship between CSR and theism.

10.3 On explanation, justification, and refutation
To begin with, the cognitive science of religion is the study of a specific, albeit complex set of human psychological facts: religious beliefs, feelings, and behaviours. In other words, it is the study of human persons, not divine ones; it is the study of people’s concepts of gods, not the gods themselves. As such, the question of whether or not any given god exists technically goes beyond the field. However, while the cognitive and
evolutionary psychology of religious belief might not have metaphysical implications, they might well have epistemic implications for religious belief.

Hume (1757/2008, p. 134) is as good a place as any to start. In the introduction to his *The Natural History of Religion*, Hume famously draws the distinction between the “foundation [of religion] in reason” and its “origin in human nature”. This is, of course, an example of the quite apt distinction between justification and explanation, respectively; between whether (and why) we ought to believe and why we in fact believe, respectively. More generally, justification and explanation are clearly not the same thing; what is perhaps less obvious is that explanation does not necessarily entail either justification or refutation.

It is, or should be, uncontroversial in ethics, for example, that a successful explanation of a behaviour does not by itself entail that the behaviour is either moral or immoral. The move from any kind of evolutionary explanation of rape, for example, to any normative claim about rape requires an additional ethical premise (cf. Wilson, Dietrich, & Clark, 2003). The move from “Rape is an evolutionarily adaptative behaviour” to “Therefore, rape is morally acceptable/unacceptable” is a *non sequitur* without the bridging premise that “Evolutionarily adaptive behaviours are morally acceptable/unacceptable”. Similarly, bridging premises are required even if rape was an evolutionarily maladaptive behaviour or if it were a by-product of an adaptation, and so forth. Whether or not these bridging premises are true or false, acceptable or otherwise is, of course, up for debate; what is clear, however, is that
explanations of behaviours do not by themselves entail normative positions on those behaviours. None of this is to say that explanation and justification never bear upon one another: circumstances might mitigate or aggravate, exculpate or condemn. That is, the relationship between explanation and justification is contingent and requires examination on a case-by-case basis.

As in ethics, so in epistemology: to explain a belief (or act of believing) is neither to justify nor to refute it. To assert otherwise is to confuse between the “context of discovery” and the “context of justification” (Reichenbach, 1938, p. 36). The context of discovery concerns how someone came to believe something, in the origin of the belief. The context of justification concerns how someone comes to prove or defend or otherwise justify the belief. To use a famous example from the history of science, August Kekulé recounts discovering the chemical structure of benzene in the dimly-lit study of his bachelor quarters in Ghent; day-dreaming as his writing was stagnant, he saw a snake seizing its own tail and behold he “recognizes truth without knowing the evidence for it” (Benfey, 1958, p. 22). Upon receiving this revelation, Kekulé worked out his implications of his new theory, and marshaled arguments and evidence for it. In this case, the fact that Kekulé’s original idea came from a dream—which, we will assume, is an unreliable way of discovering chemical structures—certainly does not make his claim that benzene has a

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29 The distinction between the contexts of discovery and justification has been interpreted and used in multiple ways since Reichenbach (1938) introduced the terms. As the exegesis of Reichenbach’s work goes beyond the scope of this thesis, I refer the reader to Schickore and Steinle’s (2006) edited volume on the matter.

30 Benfey (1958) is a translated reprint of Kekulé’s (1890) speech, first published in Berichte der Deutschen Chemischen Gesellschaft, 23, 1302.
ring structure either true or false. Under a correspondence theory of truth, at least, the truth or falsity of a proposition is independent of the conditions under which the proposition comes to be entertained by any epistemic agent (Kirkham, 1992). Furthermore, neither is the belief that benzene has a ring structure irrational, despite its questionable provenance; it is not irrational because we can provide evidence and construct persuasive arguments for this belief. Whether a belief is reasonable, then, depends on the context of justification, not the context of discovery. Although Kekulé’s exhortation, “Let us learn to dream, gentlemen, then, perhaps we shall find the truth” might seem unwise to epistemological reliabilists, his counterpoint should be reassuring: “But let us beware of publishing our dreams till they have been tested by the waking understanding” (Benfey, 1958, p. 22). Again, none of this is to say that explanation and justification are necessarily unrelated: doxastic conditions might well have epistemic implications. That is, the relationship between the origin of a belief and its reasonableness is variable; again, the implications of an explanation of a belief for whether or not the belief is justified requires examination on a case-by-case basis.

Applied to the relationship between religion’s “foundation in reason” and its “origin in human nature” (Hume, 1757/2008, p. 134), between the reasonableness of religious belief and the success of explanations of religion, the lesson is clear: explanations of religious belief do not by themselves entail justifications for or refutations of religious belief. Certain kinds of explanations (e.g., naturalistic explanations) might undermine certain kinds of religious belief, but—as the Kekulé case
illustrates—if there are sound arguments for religious belief, explanations of such belief are epistemically benign. Indeed, after arguing that religious beliefs are particularly susceptible to “evolutionary debunking arguments”, Wilkins and Griffiths (2011, p. 206-207) conclude, “But debunking is not disproving. If there are independent reasons for religious belief, their cogency is not removed by the fact that religious beliefs have evolutionary explanations.”

10.4 On naturalistic explanations

Although successful arguments for religious belief justify such belief regardless of how the belief arose to begin with, naturalistic explanations do seem especially problematic for religious believers; indeed, this is precisely because they seem to undercut traditional arguments for religious belief. Prima facie, naturalistic explanations and theological explanations of phenomena in general seem to be in mutually exclusive competition. Furthermore, unfavourable comparisons of theological explanations to naturalistic or “scientific” explanations, are often used in arguments against religious belief.

Whether or not intellectualist theorists of religion are right in claiming that religion emerged to explain or otherwise make sense of events, mundane and marvelous, terrific and terrifying, Western philosophers of religion have certainly relied on the putative explanatory power of theism in their attempts to justify belief in God. Traditional cosmological and teleological arguments for theism, for example, may be construed as arguments that the existence of God is the only or best
explanation of facts about the world, such as the contingent existence of
the physical universe or the functional complexity of biological features
(see Oppy, 2006 for review). In addition, arguments from miracles and
religion experiences posit unusual events to be explained by the existence
and activity of God. In these cases, naturalistic and theological
explanations are in competition: if naturalistic explanations suffice as the
best explanations for these phenomena, these arguments for theism are
defeated, as parsimony dictates a preference for the more ontologically
economical explanation, and theism includes one additional supernatural
agent than does atheism.

At least in principle then, successful naturalistic explanations of
religious belief have the potential of defeating particular kinds of theistic
arguments: theistic arguments that religious belief itself is only or best
explained by the existence and activity of God. There is, however, an
important difference between general and specific explanations of
religious belief. A successful naturalistic explanation of a particular
religious belief system, $R$, might count against $R$ if it insists on its own
supernatural origins. However, a successful naturalistic explanation of
religious beliefs in general or, more to the point, of a propensity toward
religious belief does not count against $R$ in quite the same way. To explain
a tendency toward $R$-like beliefs is not to explain $R$ in particular. General
theories can, of course, often easily be adapted to explain special cases. For
example, a plausible account of the transmission of costly religious beliefs,
such as those offered by CSR undermines Thomas Aquinas’s claim in
_Summa Contra Gentiles_ that the “wonderful conversion of the world to the
Christian faith is the clearest witness of the [miraculous] signs given in the past”. That is, CSR might well be able to show how costly religious beliefs (e.g., Christian faith) can spread without wondrous signs, such as the miracles reported in the New Testament. Now, there might be independent justifications for believing the miracles accounts in the New Testament, but a naturalistic explanation of the spread of Christianity such as that potentially offered by CSR would refute any attempt to establish the veracity of these New Testament accounts on the basis of the allegedly surprising spread of Christianity.

In summary, naturalistic explanations for religious belief such as those offered by CSR may be applied to particular religious beliefs (and religious belief systems), and insofar as they are, they challenge theological explanations as naturalistic explanations are more parsimonious than theological ones. However, not all religious belief systems insist on their own supernatural origins; furthermore, some which do might contain features that are inexplicable within a naturalistic framework. Finally, naturalistic explanations of religious belief, as with explanations of religious belief in general, are toothless if there are good independent reasons for religious belief.

10.5 On levels of explanation

In the previous section, we have seen that naturalistic and theological explanations of phenomena, religious or otherwise, may conflict and insofar as they do, might render theological arguments redundant:

31 There is, as Dawes (2009) argues, no sound principled objection against supernatural explanations; it is certainly possible that some facts require supernatural explanations.
Ockham’s Razor dictates a preference for the more ontologically economical option (i.e., the one without an additional supernatural agent). However, this is only true when naturalistic and theological explanations occur at the same level of explanation.

Current theoretical and empirical research in CSR is carried out at multiple levels of explanation. Much of the work that has been discussed here has focussed on our cognitive architectures and processes, on how our minds are structured to process information like religious concepts. This level of analysis is important, but leaves unanswered questions about how our minds got to be that way. Such questions are to be answered at developmental and further, at evolutionary levels. The emphasis on theory of mind, for example, draws heavily on developmental research about the ToMM as a *maturationally natural* cognitive system (Barrett & Lanman, 2008; McCauley, 2011); there has also been increasing speculation about the evolutionary adaptiveness of ToMM (e.g., Bering, 2011). Similarly, the work on anthropomorphism and teleo-functional reasoning has lent itself to developmental (e.g., Kelemen, 2004) and evolutionary analyses (e.g., Guthrie, 1994). In none of these cases do the different kinds of explanations—cognitive, developmental, and evolutionary—compete, occurring as they do at different levels. The research at different levels do constrain each other, of course: developmental and evolutionary theories have to account for actual cognitive structures and processes and cognitive theories have to make developmental and evolutionary sense. However, the fact that there is a successful evolutionary theory of religious
phenomena would hardly count against developmental or cognitive theories.

One way to construe the relationship between these more or less proximate or ultimate explanations is in terms of the transitivity of causation. Our incorrigible religiosity might be caused by (say) our promiscuous anthropomorphism and teleology, which in turn are determined by the way in which our genes and environment interact in development, which is in turn a product of natural selective processes in our phylogenetic history. That is, there are evolutionary causes of developmental facts, and developmental causes of facts about cognitive architecture and process, and finally, cognitive causes of religious phenomena. In this case, cognitive explanations of religion are proximate explanations whereas evolutionary explanations of religion are ultimate explanations, causing religious phenomena via developmental and cognitive variables. All of this is just to say that discussion of multiple levels of analysis is far from foreign in CSR.

Like naturalistic explanations, theological explanations might occur at any level, might be proposed as more or less proximate or ultimate explanations. Creationist and Intelligent Design theories of biological facts, for example, occur at the same level as Darwinian theories, and therefore compete and conflict at that level. Theistic evolutionist theories, on the other hand, occur at a more ultimate level, and purportedly account for why the evolution of life on Earth occurred as it has. Indeed, theistic conceptions of God in the Western philosophical tradition imply that theists are, or ought to be, much more concerned with theistic ultimate
explanations than theistic proximate explanations. Cosmological arguments for the existence of God, for example, seek to establish God as the ultimate cause of all events and entities. In this vein—as implied by the definition provided above—theistic philosophers of religion conceive God as creator and sustainer, asserting that “everything that exists at each moment of time (apart from [God]self) exists because, at that moment of time, [God] makes it exist, or permits it to exist” (Swinburne, 2004, p. 7) and that “created things are totally dependent on God for their existence from moment to moment” (Peterson, Hasker, Reichenbach, & Basinger, 2003, p. 65). Now, these claims about the reliance of all things—the existence and occurrence of all entities and events—on God are not meant to deny the causal efficacy of natural laws or human action. Instead, God is said to work through such, more proximate, causes to achieve God’s ends (e.g., Edwards, 2010).

In the same way that cognitive, developmental, and evolutionary explanations of religion do not compete with one another, theological explanations do not compete with either of them insofar as they occur at a still higher level of explanation than do evolutionary theories. If, for example, kalām cosmological arguments for the existence of God were successful such as to establish God as the first cause of the universe, of its initial conditions and concomitant laws of nature (e.g., Craig, 1979), God would, by the transitivity of causation, be the ultimate cause of all subsequent entities and events, including the evolutionary, developmental, cognitive, and indeed contextual variables that lead to religious belief. If such an argument were successful, the theist might say that God worked
through these natural processes to cause religious belief. There is, of course, no guarantee that such an argument could be successful; there is no guarantee that it makes sense to ask questions about ultimate causes or that a theological explanation will turn out to be the best one for such questions. The evaluation of such theistic arguments are certainly beyond the scope of this current project, but must be undertaken for a fuller analysis of the implications of any naturalistic explanation of any phenomenon for theistic or religious belief.

10.6 On the error-proneness of religious cognition

Although to explain religion is not necessarily to explain it away, naturalistic explanations of religion do raise problems for certain kinds of religious belief; these problems are not insurmountable, but they have to be met. So, as a naturalistic research programme, CSR does pose some challenges for religious faith; furthermore, certain more specific features of CSR also seem to imply the irrationality of religious belief. In particular, the language used in CSR research—of “hypersensitive” (Barrett, 2004) and “promiscuous” (Kelemen, 2004) cognitive mechanisms—suggest that the psychological causes of religious belief are error-prone and that religious beliefs are false products of recklessly trigger-happy cognitive mechanisms, a “set of seductive cognitive illusions” (Bering, 2011, p. 8). Of course, as previously discussed, the fact that a belief is formed by an unreliable belief-forming process or mechanism does not render it false; it might, however, give us cause to be skeptical of the belief, until we have independent reasons for the belief. As before, if there are successful
independent arguments for a given religious belief, the fact that it originated from error-prone mechanisms is something of a red herring. Even this aside, however, it might be premature to uncritically accept the premise that the cognitive faculties that ostensibly produce religious beliefs are unreliable or error-prone.

Despite the rhetoric, most CSR theories argue that religious beliefs are products of properly functioning evolutionary adaptive and currently indispensable cognitive mechanisms. The way we detect agents (HADD; e.g., Barrett, 2004; Guthrie, 1993) and infer mentation (ToMM; e.g., Bering, 2011; Baron-Cohen, 2004), and how category-based information is triggered automatically (Boyer, 2001; Fazio, 2001) under evidentially ambiguous circumstances were and still are eminently useful tendencies. The *hypersensitivity* of these cognitive mechanisms is hardly a “design” flaw; rather, our ability to detect agency and infer psychological states and generate category-based expectations quickly, with little, fragmented pieces of information makes normal human activities such as hunting and farming, and interacting with strangers and loved ones possible. Our everyday beliefs—and indeed, our scientific beliefs—are necessarily under-determined by data and this is, for the most part, a patently good thing for human life, survival, and reproduction.

Rather than thinking of this suite of cognitive mechanisms as being error-prone by definition—“a particular built-in irrationality mechanism,” as Dawkins (2006, p. 184) puts it—it is perhaps more accurate to think of them as truth-tracking mechanisms that are able to generate useful evidentially-underdetermined beliefs (e.g., about the presence of agents,
about agents’ mental states). However, like any other aspect of our cognitive faculties, these mechanisms are fallible and their reliability in any given context is a matter for empirical investigation. As it turns out, these cognitive mechanisms can and do commit false positives, detecting agency and inferring mentation in their absence, generating false category-based expectations; this is not in dispute, and has been demonstrated by our own experiences and previous research.

However, it is in some cases very difficult to verify or falsify these generated beliefs. Take, for example, the intuitive belief generated by ToMM that other human beings have rich mental and emotional lives. The infamous “problem of other minds”, for example, represents a challenge for this common sense belief by raising the possibility that other people might well be philosophical zombies, non-conscious automata (Chalmers, 1996). Never mind immaterial souls, even our belief in others’ conscious experiences are not obviously justifiable. At any rate, while it is certainly the case that these evolved and currently adaptive cognitive mechanisms sometimes commit false positives, it is equally certainly unclear how error-prone they are, and whether any given output is a hit or false positive. We might freely assume that all supernatural agents that we detect are false positives, of course, but this would simply beg the question unless there is good reason for such an assumption. It certainly does not follow from the theoretical and empirical research on HADD, ToMM, and other such cognitive mechanisms that supernatural agent-beliefs are or even are probably false positives.
According to these cognitive theories of religion, the mechanisms that produce religious beliefs are not orthogonal to truth; instead, they are truth-tracking mechanisms, albeit fallible ones. Purely functional, and evolutionary adaptationist analyses of religion, on the other hand, tend to posit benefits conferred onto believers that are orthogonal to truth-seeking considerations. Terror Management Theory, for example, does not suppose that our tendency to construct and defend worldviews that confer the assurance of literal or symbolic immortality is one that is particularly concerned with correspondence with reality. Wilson’s (2002) group-selective analysis similarly suggests that it is “practical realism based on behavioral adaptedness”, which explains the evolutionary success of religion, and not “factual realism based on literal correspondence” (p. 228). Indeed, on these views, the mechanisms that give rise to religious belief are either orthogonal to truth concerns or, indeed, antithetical to them. Given the evidence that positive illusions are important for psychological well-being (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000), it might be reasonable for theories that emphasize the psychological benefits of religious belief (e.g., TMT) to construe religious beliefs as promoting positive illusions (e.g., biased evaluations). At a glance, then, such functional or adaptationist theories of religion perhaps seem more threatening to religious belief than are the cognitive or cognitive-motivational theories discussed above. Even here, however, independent arguments for religious belief may nullify the threats posed by these causal explanations of religion.
10.7 On the naturalness of religious cognition

So far, we have seen that CSR theories of religion—that is, naturalistic, evolutionary, cognitive-motivational explanations of the persistent, pervasive belief in supernatural agents—are perhaps less problematic for religious belief than they appear, especially if there are independent reasons for holding those religious beliefs. There is, of course, a long history of critical reflection for such reasons for theism, for the belief in God, as construed by Jewish, Christian, and Muslim theologians and philosophers, the evaluation of which is beyond the scope of this project.

On top of theism’s relative immunity from arguments from CSR theories of religion, by virtue of its emphasis of God as the ultimate cause, creator, and sustainer of all things, it is also consistent with the naturalness of religion thesis, the notion that supernatural agent beliefs are maturationally natural beliefs that arise “through the ordinary functioning of human biological endowment in ordinary human environments” (Barrett & Lanman, 2008, p. 113; McCauley, 2011). The consilience here is effected by the widely-accepted doctrine that God is interested in somehow being in relationship or interacting with human

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32 As discussed above, theistic philosophers have attempted to argue for a God who is causally involved in all things, and who is the ultimate cause and sustainer of all things. Now, this does not preclude God from intervening in a way that makes divine action a proximate causal factor in direct competition with other proximate causal factors. However, in principle, to think of divine action as primarily action as a proximate cause is at least bad Christian theology, if not also bad Jewish and Islamic theology. To assume that the sufficiency of naturalistic theories of proximate causes of phenomena (e.g., religion) constitutes disproof of God’s existence is to mistakenly place God as some sort of quasi-physical object or force alongside moving billiard balls, gravitational forces, and human decision-makers.
beings. This theologicla assertion is uncontroversial among most Jewish, Christian, and Muslim lay-believers, philosophers, and theologians; all three religious traditions stress the importance of a personal or collective relationship with God, emphasize God’s revelatory activity (e.g., the giving of the Mosaic Law, the Incarnation in Jesus Christ, the revelations to the Prophet Muhammad at Hira), and have long histories of natural theology. If God is indeed interested in relating to us, then God would have to make religious belief psychologically possible. Theists should expect God to enable human beings to relate or interact with God, to believe in God, and to attribute some experiences as divine relational acts. Indeed, it would be terribly surprising if a God who is ostensibly interested in relationship with human beings did not enable human beings to interpret any experiences as divine acts, did not provide any psychological tendency toward belief in supernatural agents. Such a God would be like an ostensibly loving parent who never provides any communicative, or epistemic access to her child. Furthermore, such a state of affairs would greatly exacerbate the problem of divine hiddenness (Howard-Snyder & Moser, 2001). Indeed, the fact that we have a natural tendency to interpret some of our experiences theistically seems to mitigate this traditional challenge to theism.

Clark and Barrett (2011, p. 11) have recently taken this line of argument further by arguing that the various cognitive mechanisms that converge to produce intuitive religious beliefs make up a “god-faculty”

\[33\] To say that God is interested in relating or interacting with human beings is just to deny deism; it neither commits the theist to classical theism or theistic personalism (cf. Davies, 2004, p. 2-14), nor does it commit her to any position on different possible types of revelation (e.g., general, special).
which is consistent with the Calvinist doctrine of *sensus divinitatis* in which God has imbued human beings with an innate sense of the divine, albeit an ambivalent and inchoate one that may manifest in theologically-divergent beliefs across different individuals and cultures. That is, they propose a theological explanation for the maturational naturalness of religious belief that is consistent with a naturalistic one; indeed, they propose that this theological explanation is bound to be an ultimate explanation, mediated by evolutionary and psychological factors more familiar to science. Just as an atheistic interpretation of CSR depends largely on failure of arguments that God is the ultimate cause “of any universe there may be” (Swinburne, 1995, p. 314), so does this theistic (indeed, Calvinist) interpretation of CSR depend on the success of such arguments.

### 10.8 Conclusion

Over the last two decades, the cognitive science of religion has continued to generate testable hypotheses about the development and evolution of various aspects of religious affect, behaviour, and cognition. The progress made thus far has brought us closer than ever before to understanding where religion—this pervasive and persistent collection of psychological phenomena centred around supernatural agents, which can simultaneously lead to such altruism and atrocity, such compassion and cruelty—comes from. And with an increasingly better view of the cognitive, motivational, and evolutionary underpinnings of such existentially significant concepts—gods and souls and afterlives—which human beings
seem to share all across the world and throughout history, it is difficult not to ask whether any of these beliefs are true, are justified. Somewhat counterintuitively, and perhaps a little disappointingly, these recent advancements in our scientific understanding of the causes of religious belief turn out to have very little to say about the veracity of those beliefs. The philosophical and (anti-)theological hard yards still have to be done.
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of hypocrisy and cognitive dissonance to motivate behavior change.

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Appendix A

Supernatural Belief Scale

In this next experiment, we are interested in various beliefs people have. Your topic for today is:

Religious beliefs

Rate the following statements on the extent to which you agree or disagree with them, using the scale below. Write your rating in the boxes provided:

1. There exists an all-powerful, all-knowing, loving God. [ ]
2. There exists an evil personal spiritual being, whom we might call the Devil. [ ]
3. There exist good personal spiritual beings, whom we might call angels. [ ]
4. There exist evil, personal spiritual beings, whom we might call demons. [ ]
5. Human beings have immaterial, immortal souls. [ ]
6. There is a spiritual realm besides the physical one. [ ]
7. Some people will go to Heaven when they die. [ ]
8. Some people will go to Hell when they die. [ ]
9. Miracles – divinely-caused events that have no natural explanation – can and do happen. [ ]
10. There are individuals who are messengers of God and/or can foresee the future. [ ]
Appendix B

Mortality salience manipulation: death prime

Now, please complete the imagination exercise below. You may take as long as you like. Your imagination exercise topic is: **Death**.

In the space below, jot down, as specifically as you can, what you think will happen to you physically as you die and once you are physically dead.

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________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
________________________________________________________________________

In addition to the physical description, write in some detail about the feelings that the thoughts of your own dying arouse in you.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
Appendix B

Mortality salience manipulation: control

Now, please complete the imagination exercise below. You may take as long as you like. Your imagination exercise topic is: Watching TV.

In the space below, write a paragraph about what happens to you when you watch TV.

________________________________________________________
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Write in some detail about the feelings that thoughts of watching TV arouse in you.

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