

## **Extracting testable hypotheses from historical scholarship:**

### **What were the effects of the 1755 Lisbon earthquake on eighteenth-century religious minds?**

#### **Abstract (149)**

This paper articulates two competing explanations about cognitive effects of the Lisbon earthquake of 1755 and preliminarily assesses them against historical documents. Humanities scholars' voluminous writings on the earthquake imply a Secularizing Interpretation on which the earthquake caused cognitive change across social classes and geographical regions. Results from the cognitive science of religion yield a Supernatural Punishment account denying cognitive changes implied by the Secularizing Hypothesis and instead implying people interpreted this earthquake as caused by God on purpose as a punishment on the out-group. This paper advocates the Supernatural Punishment account in two steps. A preliminary review of writings of philosophers and elites reveals little to no secularizing cognitive change. A preliminary review of writings of religious authors reveals increases in religious and Supernatural Punishment cognition after the earthquake. This project suggests interdisciplinary methods for researchers in the Humanities with which to put their interpretations to the test.

## **Paper (10479)**

Correspondence of the Dutch in Lisbon at the time of the Lisbon earthquake reveals that The Hague's ambassador to Portugal Charles Bosc de la Calmette was moved by the suffering and desperation he witnessed amongst Lisbon Roman Catholics (De Jong 1955). Ambassador from 1751-1758, Calmette was a Huguenot who knew desperation. His Protestant family fled to Holland from persecution by Catholics in France. A letter dated 6 November 1755 written by Abraham Castres, King George II's envoy, indicates Castres and Calmette were the first ambassadors to have an audience with King Jose after the earthquake. Calmette himself engaged The Hague's States General in protracted, heartfelt communications to secure relief aid for Lisboans. Calmette mentions immediate support pledged to King Jose by Protestant King George II amounting to a whopping £100,000, half in bullion, half in material goods. (Using an average earnings index and factoring for inflation this £100,000 in 1755 is equivalent to £148m in 2012.) But the Protestant Dutch government donated no relief aid to Portuguese victims.

Why?

Historians conclude that Calvinist religious thinking prevented the donation of relief. "In this strongly Calvinist community there seems to have been little doubt but that the earthquake was an awesome example of the wrath of the Living God, and that Lisbon's addiction to 'Romish idolatry' had brought the visitation upon her" (Boxer 1956, 17). After studying Calmette's official correspondence De Jong (1955) comes to this conclusion too. If God is punishing idolatrous heretics, then one ought no more seek to end that retribution than one ought to storm the gallows when the civil government justly hangs a convicted murderer. Relieving the suffering of those being retributively punished by God risks countermanding divine authority.

Calmette's story prompts this paper's guiding question: How did the pain and suffering

caused by the Lisbon earthquake affect the religious minds of Europe? When I set out to answer that question I found historians circling around a common set of claims according to which the earthquake caused widespread secularization: the unparalleled shock, pain and suffering due to the earthquake caused a cognitive change in European Christian thinking because it presented abundant counterevidence to the existence of an all-powerful, all-loving God. This is the kernel of the 'Secularizing Interpretation' (explained in detail in §2.1). This dominant interpretation goes largely unchallenged in academic writing about the earthquake (though see Ingram 2005 for dissent), despite two facts. First, Type 1 error--failure to reject a null hypothesis, i.e. finding a false positive--suffuses the evidential basis of this interpretation (§2.2). Second, even if textual evidence were forthcoming for the Secularizing Interpretation, its advocates would not yet be justified in endorsing the Secular Interpretation due to methodological problems (§2.3).

What competing, testable hypothesis might plausibly explain cultural cognition in the wake of the Lisbon earthquake better than the Secularizing Interpretation? An alternative interpretation says that a set of well-confirmed theories from the psychology of religion explains cognitive and emotional reactions to the Lisbon earthquake much better than the Secularizing Interpretation. Members of this set of theories come together to retrodict that historical Christian believers interpret natural disasters typically as (i) caused by God (ii) on purpose (iii) as punishment (iv) of the out-group. Though the present paper is about a single disaster in eighteenth-century Europe, §3 illustrates the cross-temporal generality of the Supernatural Punishment account with texts from a different time period and different Christian culture.

The Supernatural Punishment account is explained (§4.1) then defended with preliminary textual evidence (§4.2). But bridging this disciplinary divide with Supernatural Punishment Theory faces methodological hurdles. Because the paper's intended enduring contribution to the

study of religion is the design and implementation of a methodological model for interdisciplinary hypothesis testing with texts, these hurdles are briefly but openly explained and discussed (§4.3). De facto what follows is a proof-of-concept since the paper does not quantitatively test these two hypotheses. This is instead the function of a companion project underway. De jure this paper aims to provide preliminary evidence against the Secularizing Interpretation and for the Supernatural Punishment account.

## **1 The Lisbon earthquake**

Writers about the Lisbon earthquake incorrectly report facts about the event and its aftermath with frequency. The purpose of this section is to convey, with the help of abundant source materials across disciplines, facts about the quake as best we know them.

The Lisbon earthquake, the largest documented seismic event to affect Europe (Mezcua et al. 1991), was produced by a thrust fault and caused recorded damages on land in Iberia and northwest Africa. The first shockwave hit Lisbon at 9:50 am (Mezcua et al. 1991; Degg & Doornkamp 1994), 9:40 am (Sousa 1919; Mullin 1992) or 9:30 am (Kozak & James 1999) fatefully on All Saint's Day, 1 November 1755. At the time causes of earthquakes were unknown and the field of seismology was yet to be born. The lack of scientific knowledge about the event generated uncertainty and religious terror, as is apparent in eyewitness testimony (Kendrick 1955).

From research on offshore bathymetry and the morphology of bays and shore features (Andrade 1992), geologists infer that in the Gulf of Cadiz the three tsunami waves reached Lisbon at heights of 20 meters (Chester 2001, 372, Table 4). A four-meter wave reached the

Caribbean (Degg & Doornkamp 1994; Chester 2001). Richter values have been estimated as high as 9.5 (Mezcua et al. 1991) and as low as 8.5-8.6 (Tiedemann 1991). If 9.5 is accurate then the Lisbon quake was the world's largest 'historic' earthquake at 2.7 gigatons. If 8.5, then the Lisbon quake compares with the largest earthquakes in the twentieth-century, namely Chile in 1960 and Alaska in 1964 (Chester 2001, 370). This does not include the Great East Earthquake in Japan, March 2011, having a revised Richter value of 9.0.

The earthquake's time of origin was to appear to Protestants around Europe as a divinely chosen means to God's ends. At 9:30-10:00 a.m. on All Saints Day Lisbon's parish churches and cathedrals were crowded. Attendance on this holy day was mandatory for all Roman Catholics in the city. As religious buildings--the tallest in the city--tumbled down, altar candles started fires, "the principal cause of the total ruin of the city" (Anonymous 1755, 560). Flames were fanned by strong, dry northeasterly winds. Estimates indicate fires lasted between three days and nights (Davis 2002) and more than a week (Sanders & de Boer 2005).

Casualty estimates vary considerably (Oliveira 1986), from 10,000 Lisboans dead (Marques 1976; Franca 1983; Dynes 2005) to up to 100,000 total dead (Degg & Doornkamp 1994). The event showed that nature could strike humanity where its power over nature seemed strongest, the urban city (Buescu 2006, 334). In 1755 Lisbon was the fourth-largest European city after Paris, London and Naples. Almost all major Lisbon buildings suffered extensive damage through a combination of the earthquake, waves and fires. Destroyed were 35 of 40 churches; 65 of the 75 convents; and 33 palaces, the Arsenal, the Royal Library and the Patriarchal Palace. Of some 20,000 dwellings housing 38,000 families, 3,000 remained habitable (Chester 2001, 172-4; Dynes 2005; Maxwell 1955, 24). The historic Baixia area on the north side of the Tagus, the seat of government, with narrow streets and timber-built houses, rested on

water-saturated alluvial sediment. This liquified during the earthquake and lost its bearing strength during the shockwaves. Down the coast Tavira, sitting on limestone, met with few casualties.

Geological effects of the earthquake, tidal waves and fires led to extensive political and economic catastrophe. Politically, the earthquake enabled Sebastião José de Carvalho e Melo, the 1st Marquess de Pombal, to assert authority over the governance of Portugal. Losses to Portugal hit forty-eight million Spanish dollars (Nur 2008, 252) and reduced by 10% the wealth of the entire seaborne empire of Portugal (Chester 2001, 172-4). Fear of the empire's dénouement permeated European financial and commodities markets as news spread across the continent. Commodity and stock exchanges crashed in the Netherlands on 26 November and in Hamburg on 29 November, when news reached those cities (Horst 2005, 14-5). England became a creditor for Portuguese bills of exchange but this measure failed to prevent fear about the fate of commerce and trade in Lisbon. Catastrophic runs on gold and silver were immediate. Undeniably the European world was put in a frenzy as international markets destabilized, a lavish, urbane capital city was in ruins, and the lives of hundreds of thousands of survivors were thrown into chaos.

## **2 The Secularizing Interpretation of the Lisbon earthquake**

Did people believe that the earthquake and its aftermath were caused by God on purpose? The Secularizing Interpretation suggests that the Lisbon earthquake and its toll on humans was conceived as a natural evil so horrible that it created cognitive shockwaves through Europe that reduced Christian belief in God as all-good and all-just, ended a popular 'optimistic' theology,

and raised widespread skeptical doubts as to God's existence. In order to impute as little of my own as possible to advocates of the Secularizing Interpretation, I labor to explain this theory in their words. Remarks are italicized when they emphasize key points of contrast with the Supernatural Punishment Hypothesis in an effort to establish that these two interpretations are mutually incompatible and cannot both be true.

2.1. Explaining the Secularizing Interpretation. Given information summarized in the previous section about the geological, social, financial, and geopolitical effects of the earthquake, historians have long felt a need to comment on it. Many historians and historians of philosophy, several eminent in their fields, say that the psychological and religious effects of the earthquake mirror in power and scope its other effects. Thorough, evidence-based conclusions about the effects of the earthquake by historians are much less common than are passionate generalizations about its religious and emotional consequences. It is not clear why this tendency has arisen amongst scholars and I hesitate to speculate. Possible sources of the Secularizing Interpretation include: that defenders of the Secularizing Interpretation engage in a post hoc, propter hoc explanation that seeks to account for the alleged secularizing of Europe in the late eighteenth-century; that defenders are unduly influenced by their study of an exceedingly small subset of prominent, elite European writers in the period; and that accounts of the event read by scholars have an overwhelming emotional salience that prompts unrestrained prose weakly tethered to evidence.

An overlooked but vital feature of this debate is that humanities scholars have lacked until recently the ability to test their hypotheses with data mining, large-scale textual analysis, topic modeling, collocation studies and other quantitative techniques. This state of affairs has now changed for the better.

Let's now examine how advocates of the Secularizing Interpretation describe in their own words the effects of the Lisbon earthquake of 1755. Emphasizing the earthquake's cognitive effects on belief in a moral God one author writes, “[C]onfidence in the harmony of the world and a gracious ruler of it was shattered” and the “optimistic conception of the world... collapsed” (Moltmann 1983, 565; in Bowden & Richardson 1983). God is no longer conceived to be the creator of a stable divine order on Earth. The Lisbon earthquake “struck the Western world like a thunderbolt, and forever transformed the philosophy of human thought” (Bestermann 1956, 23). It “destroyed a firmly fixed image of the divine order on earth” (Seligo 1958, 21). The Lisbon earthquake marked “the end of optimism” (McKendrick 1974, 22). The term 'optimism' was popularized by Alexander Pope in Essay on Man, in which he authors a theodicy aiming to “vindicate the ways of God to man” (l.16). Drawing upon a vision of God as omniscient and omnibenevolent and humans as small-minded and weak in comparison, Pope argues that humans should cognitively submit to God and in doing so achieve happiness in trust that God has our best interests in mind.

With the earthquake “cheerful optimism and self-assured theodicy in France and Germany ended in skepticism” (Lütgert 1928, 24). The earthquake is “for all of Europe the point in the century on which the Enlightenment turns from optimism to pessimism” (Weinrich 1971, 25). After remarking that “eighteenth-century Europe was marked by two significant events: the Lisbon earthquake and, in intellectual terms, the Enlightenment,” R. Jeffery adds that “With [the earthquake] the now commonplace distinction between natural and moral evils was established” (Jeffery 2008, 160). Jeffery implies the Lisbon earthquake is conceived as the first ‘natural evil’, a claim the Supernatural Punishment account explicitly rejects. This term from philosophy of religion refers to physical states of affairs productive of undeserved pain and suffering for which



no agent—human, Satan or God—is morally responsible. But if God caused the Lisbon earthquake to punish people for sins, then the earthquake is not an unjust, unfortunate natural evil. It is divine justice through punishment. Furthermore, God could no longer be trusted to help humans. “From that day onward, the responsibility for our suffering rested entirely with us and on an uncaring natural environment, where it has remained” (Shklar 1990, 51). “The debate as to where, or with whom, lay the responsibility for the Lisbon catastrophe—God, Man calling upon himself the wrath of God, or Nature—eventually led to the view that disasters such as that of Lisbon were forms of 'natural' evil, beyond the power of man” (D’Haen 2006, 355-6; my emphasis). D’Haen implies that God was not regarded as causing the Lisbon earthquake on purpose, let alone on purpose as a punishment, since the quake was produced by blind nature.

The most renowned proponent of the Secularizing Interpretation is Susan Neiman. In her award-winning book Evil in Modern Thought (2002) she writes Lisbon’s earthquake “shocked more than any event since the fall of Rome. ... Since Lisbon, natural evils no longer have any seemly relation to moral evils; hence they no longer have any meaning at all” and adds, “no first-rate thinker proposed new forms of theodicy, in the narrow sense, after Lisbon” (Neiman 2002, 240, 257). Among the cognitive changes to the European Christian mind caused by the earthquake, she writes “The sharp distinction between natural and moral evil that now seems self-evident was born around the Lisbon earthquake” (3). The Christian’s “world was shattered by the Lisbon earthquake” (4). The earthquake caused “intellectual shockwaves” (5). Neiman makes explicit what others don’t: the Secularizing Interpretation supposes that the earthquake was caused by nature and was not a punishment from God. The earthquake “was the beginning of a modern distinction between natural and moral evil. It is crucial to such a distinction that natural evils have no inherent significance. They are neither punishment nor sign but part of an

order that is, literally, meaningless” (39). The earthquake “made something impossible” (239); it caused an “intellectual disaster” (242). The earthquake shook “the foundations of faith” and called “the goodness of Creation into question” (246). Some representatives of the Secularizing Interpretation explicitly say the changes were wrought on the minds of commoners and elites alike, and most at least imply this. Neiman, for example, writes that “The earthquake affected the best minds in Europe, but it wasn’t confined to them. Popular reactions ranged from sermons to eyewitness sketches to very bad poetry. Their number was so great as to cause sighs in the contemporary press...” (Neiman 2002, 1-2).

These authors imply that the earthquake caused widespread, increasingly secular cognitive change; the earthquake was regarded as a natural evil, for which God is not responsible; it was not intended by God, let alone as a punishment.

2.2. Evidential Considerations. Susan Neiman’s book represents the most complete rendition of the Secularizing Interpretation, and her evidence for it will now be considered. She cites philosophical thinkers as support, especially Kant, Goethe, Rousseau and Voltaire. Despite this, evidence drawn from their work fails to justify Neiman’s secularizing interpretation.

First, Kant and Goethe make little mention of the Lisbon earthquake, not to mention Hume (1711-1776), who never, i.e. ever, refers to the Lisbon earthquake in his entire corpus, as an electronic search reveals. Immanuel Kant (1724-1804) wrote three short treatises about it but these works of natural philosophy exhibit no evidence of conceptual shock and cognitive change. In discussions of theodicy Kant does not refer to the earthquake let alone discuss it as important. Goethe (1749-1832) is the exception in this triumvirate. In his autobiography Goethe mentions how profoundly the earthquake affected him as a wee six-year-old: "By an extraordinary world-event, the calm of the boy's spirit was moved to its depths for the first time. ... God, the creator

of heaven and earth, whom the explanation of the first article of faith represented to him as so wise and merciful, had proved himself to be in no wise fatherly in giving over righteous and unrighteous to destruction" (Goethe 1902 [1811-1833], v1, 25). Many advocates of the Secularizing Interpretation quote this passage. As a hook for readers Neiman drops it on the first page (2002, 1).

That a six-year-old can be moved to religious depths by the muted shaking caused by an earthquake whose epicenter was 2000 kilometers away is improbable. Worse, Goethe explicitly asked Bettina Brentano, to whom his mother Elizabeth had told many stories of Goethe's childhood, for any information with which to embellish his account of the earthquake in his autobiography (Brown 1992, 481-2). He only mentions the Lisbon earthquake twice in the (multiple volumes of his) autobiography. More likely than Neiman's naïve, self-confirming interpretation is another on which Goethe's dramatic recollection of the quake is only crass post hoc marketing of a narcissist who believed himself uniquely touched by the Weltgeist.

Voltaire's writings provide the best evidence for the claim that the earthquake produced significant cognitive change regarding religious belief. Neiman frequently cites Voltaire's Poem and his debate with Rousseau (Neiman 2002, 1, 4, 39-40, 137-38, 210-11). In Voltaire's Poem on the Lisbon Disaster he appears to infer from the disaster that God is not good:

But how conceive a God supremely good,  
Who heaps his favours on the sons he loves  
Yet scatters evil with as large a hand?  
What eye can pierce the depth of his designs?  
From that all-perfect Being came not ill:

And came it from no other, for he's lord:

Yet it exists. O stern and numbing truth! (Voltaire 1912, 259)

Voltaire presents an apparent inconsistency in the belief in a traditional God: if God is supremely good, whence natural evil? Also, in Chapter 31 of his Precis du Siecle de Louis XV, Voltaire singles out the earthquake as the watershed between Europe's past and future, an omen marking the end of peace and the abatement of the contagious optimism of the start of the century (Araujo 2006, 318).

Secularizing interpreters infer Voltaire's philosophical commitments from interrogative sentences delivered in the form of a poem intended for an audience of non-intellectuals. This appears methodologically dubious. Besides, elsewhere in the poem it is not God's existence or goodness Voltaire doubts but only a popular interpretation of God's goodness, Alexander Pope's. Voltaire's narrow dialectical targets—both in Candide and in his Poem—include Leibnizian philosophical Christianity, Pope's theologically infused optimism, and religious factionalism (see his letter to M. Tronchin, 24 Nov 1755). As to concern with religious faction and violence, Voltaire writes in Candide, "After the earthquake, which had wrecked three quarters of Lisbon, the wise men of Portugal had identified no more effective method to prevent the rest being destroyed than to hold a fine auto-da-fé to educate the people. It was decided by the University of Coimbra that the spectacle of a few people being burned over a slow fire, accompanied by the most elaborate rituals, was an infallible, if little known, method for preventing earthquakes" (Voltaire 2000, 12-13). After the earthquake government forces executed thirty-four people, mostly Protestant foreigners; Voltaire refers to this historical event. But Voltaire was an idiosyncratic Christian theist before and after the quake.

Rousseau also does not appear to have concluded that “since Lisbon, natural evils no longer have any seemly relation to moral evils” or that the Lisbon earthquake is “neither punishment nor sign”. Though used by Neiman, Jeffery and others as evidence for the Secularizing Interpretation, Rousseau replies to Voltaire’s poem by arguing that the pain and suffering following from seismic events is caused by human moral evil, not God.

[Y]ou must admit ... that nature had not assembled two thousand six- or seven-story houses there, and that if the inhabitants of that great city had been more evenly dispersed and more simply lodged, the damage would have been far less, and perhaps nil. All would have fled at the first shock ... but they were set on staying, on stubbornly standing by hovels, on risking further shocks, because what they would have left behind was worth more than what they could take with them. How many unfortunates perished in this disaster for wanting to take, one his clothes, another his papers, a third his money?  
(Rousseau 1997, 234)

This is a free will theodicy in favor of a traditional God: free human actions gave rise to most – perhaps all—of the pain and suffering indirectly caused by the earthquake. Rousseau explicitly questions the status of the pain and suffering as natural evil on the grounds that Lisboans chose to live in tall buildings and chose to endanger themselves through clandestine, selfish actions in the face of danger. (For the record, there were no six or seven story residential buildings in Lisbon in 1755.) Contrary to the Secularizing Interpretation’s use of Rousseau, he preserves a traditional view of God.

In a second theodicy--a greater good theodicy--Rousseau hypothesizes that one can still

affirm a traditional God since, in our impoverished epistemic positions, "we would not be able to tell for sure whether all those deaths in the earthquake were bad in an absolute sense—they might have been relatively good, in that they spared worse Sufferings" (Lettre a Voltaire, OC, iv.1062). God's mercy suffused the destruction since God only killed those who would have experienced even worse suffering. In the advocacy of a third theodicy Rousseau suggests that God was (being God, justly) punishing people for not living in nature in accord with God's and Rousseau's primitivism (LeVay & Sieh 1998, 169). A minor change Rousseau suggests to Pope's catchphrase mirrors the minor influence the earthquake had on Rousseau's religious thought. Rousseau writes, "In place of All is good, it perhaps would be better to say, The whole is good, or All is good for the whole [Le tout est bien, ou Tout est bien pour le tout]" (Voltaire 2000, 109). Rousseau is affirming something inconsistent with the Secularizing Interpretation. Not only this, he appears to believe God is a supernatural punisher.

2.3. Methodological considerations. The Secularizing Interpretation is produced by selective attention to writings of a minority of elite thinkers, despite the fact that it is alleged to explain non-elites' reactions to the event as well. Writings of elite thinkers do not support this interpretation. Worse, careful attention to this body of writing—only some of which was discussed here—reveals no or insignificant cognitive changes to their religious beliefs before and after they learn of the earthquake and its destruction. On top of these conclusions, limiting the testing of the Secularizing Interpretation to writings of elites gives unfair advantage to the Secularizing Interpretation since we have antecedent reasons to infer elite philosophers are more likely to make this cognitive change than commoners.

Nonetheless *this discussion does not entail that the Secularizing Interpretation is false.* The Secularizing Interpretation has yet to receive adequate testing. Reformulating the

interpretation as a hypothesis capable of testing will lead to significant gains in knowledge. That is a medium-term goal but evidence gathering using historians' secondary literature strongly suggests that most of the evidence given on behalf of the Secularizing Interpretation is irrelevant for a forthright assessment of its probability.

This is unfortunate and describes a state of affairs in need of methodological reconsideration. Integration of discussion by Humanities scholars of the earthquake, interdisciplinary hypothesis testing techniques drawn from psychology and social science, and data processing methods from digital humanities can increase the ratio of the production of knowledge to the production of informed speculation. How might we design a proper test of the Secularizing Interpretation? First, since the Secularizing Interpretation posits massive cognitive change in the wake of the earthquake, to test this as a hypothesis we need definitive evidence of cognitive change from writings in the period before and after the event. Ideally this will include sets of writings by different authors and sets of writings by the same author before and after they experienced or were informed about the earthquake. Second, the breadth of the populations to which the hypothesis applies--elites or commoners--must be specified and operationalized. Third, the timescale of the application of the hypothesis requires clarification. While quantitative techniques for the testing the Secularizing Interpretation are refined and piloted on large amounts of texts before and after the event, we can develop a competing hypothesis about the Lisbon earthquake. This competing hypothesis--the Supernatural Punishment account--has two sources: the first is a wealth of data from studies in the psychology and cognitive psychology of religion and the second is historical precedent itself, to which we now turn.

### **3 Early Christian earthquakes in their social, political and cognitive context**

Brief analysis of facts surrounding historical Christian earthquakes provides evidence that reduces the probability that the Secularizing Interpretation represents an accurate assessment of responses to the Lisbon earthquake. Responses to the Lisbon earthquake in Christian literature, like many responses to earthquakes in Christian history, for example, to the 1703 and 1720 earthquakes in Umbria, included frequent reference to Revelation (Hanska 2002, 158). But biblical discussion of earthquakes and other natural evils is limited. In John 9 Jesus is asked whether a man blind from birth was blind by virtue of his own sin or the sins of his parents. Jesus responds, 'neither this man nor his parents sinned; he was born blind so that God's works might be revealed in him' (John 9:3). Despite this remark, subsequent Christian reflection on natural evil tends not to hold, or not merely to hold, that the reason that natural evils occur is so that God's works might be revealed. Presumably this is due to the inscrutability of this remark if taken as the origins of a theodicy, and also because it appears unfair, at worst unjust, that someone must endure years of suffering so he could be healed (Young 2000, 688). When confronted about the deaths of eighteen people due to the fall of a tower in Silo'am, Jesus responds saying, "Do you think they were worse offenders than all the others living in Jerusalem? No I tell you; unless you repent you will all perish just as they did" (Luke 13:4-5). This remark introduces notions of collective responsibility and guilt, complicating the theological project (Chester & Duncan 2010, 86). As here, other instances of suffering and pain in the New Testament receive interpretations from various people that implicate the sufferers as guilty. Some people fell ill and some died in Corinth due to their scandalous use of the Lord's Supper, for example (1 Cor 11:30; see Travis 2009). These Biblical incidents contain reference to or appeal to sin as responses to cases of natural evil. But for more significant instruction about



psychological and sociological explanations of reactions to natural evils we turn to Revelation.

Recent Biblical scholarship on the New Testament uses sundry sources—literary, epigraphical, archaeological, and numismatic—to understand the sociological context and religious significance of seismic events in the Book of Revelation. This text mentions five seismic events in total, two of which (11:13 and 16:17-2) cannot be described as “stock-in-trade OT imagery” as the others have been (Beale 1998, 396). These two events represent Johannine innovations because of their urban setting in cities in Asia Minor. Seismic events in the Book of Revelation are portrayed as destroying Asian cities with political and religious loyalties to the Roman Empire. Early Christianity sought to combat the influence of the imperial cult, which explains why “the churches of the Book of Revelation were located geographically, organizationally, and culturally where the imperial cult was most heavily distributed.” (Thompson 1997, 160). Cities, especially Bablyon, were regarded as centers of human iniquity and anti-Christian antagonism.

During the reign of Domitian early Christians interpreted earthquakes as eschatological theophanies. Research about funding for earthquake reconstruction in this seismically active area reveals a Republican tradition that has the appearance of law according to which emperors gave generously to reconstruction efforts in affected cities. We know the city of Tralles by the name ‘Cesarea’ because it was renamed by officials following Augustus’ infusion of financial resources for the city’s rebuilding after an earthquake in 27 BC (Murray 2005, 150-2). As nodes in the empire, urban centers were preferentially given aid, which in turn fostered allegiance between these cities and Rome. Relief of destruction by earthquakes had become opportunities to influence the population favorably toward Rome. Subsequent symbolic use of this generosity by successive emperors took shape in many forms such as Augustus’ remarks in the *Res Gestae*--

Res Gestae Divi Augusti--and Tiberius' repeated, public pleas before the Senate for aid for earthquake-ravaged cities in Asia Minor. Thankful peoples in the cities of Asia erected grand statues to Roman emperors in signs of allegiance for this aid and amplified their religious devotion to the emperor (Murray 2005, 146).

The writing of Revelation dates to the reign of Domitian (89-96) and/or Trajan (98-117). Evidence for the Roman persecution of Christians during Domitian's reign, though present, appears fragmentary; evidence of such persecution during Trajan's reign is plentiful. The social and political environment for the expression of Christian religion was extremely hostile or lethal at the time of John's revelation. Under persecution, or under its impending prospect, John sought an "identity-forming and boundary-maintaining device in a time when sectarian communities are faced with questions as to how they will respond to the demands of the larger social environment" (deSilva 1992, 378). This meant, in part, that Christians sought to maintain "sectarian tension" rather than accommodation (Wilson 1967, 22). John's aspersions against forms of accommodationism between Christians and Greco-Roman society appear in Chapter 2 in his repudiation of the Nicolaitians and 'Jezebel'. The Nicolaitians advocated the permissibility of participation by Christians in certain religious rituals and meals because only by doing so could they maintain valuable membership in trade guilds, each of which had a patron deity. John's comparison of these groups to Balaam explicitly cues out-group antagonism. Balaam signaled Israel's apostasy and its loss of identity as God's chosen people due to increasing laxity of Israelites' ritual practice, which uniquely identified Israelites from others. Also in Numbers 25, Israelites are described "playing the harlot with the daughters of Moab", that is, they were intermarrying and risked losing their group identity.

Similar threats faced Christians at the turn of the first century. The Book of Revelation

contains John's condemnation of accommodation. Six of the seven cities mentioned in John's apocalypse were regional judicial and assize centers for Rome, "the Great Whore" of Revelation 17 and 18. Five were official homes for altars for the imperial cult, that is, altars for the worship of the Roman emperor. In Imperial Cults and the Apocalypse of John: Reading Revelation in the Ruins Steven Friesen argues that John singles out these locations as especially worthy of God's destruction because of their ideological loyalty to Rome (Friesen 2001, 37). God's wrath upon Rome via the destruction of Roman cities in Asia by theophanous earthquakes indicates between-group competition and out-group religious violence. Christianity as portrayed in Revelation "demands unfaltering resistance to the imperial cult because honouring the emperor would mean ratifying Rome's dominion over all people and denying the eschatological life-giving power of God and Christ" (Fiorenza 1985, 24). The eschatological earthquakes foretold by John represent the most awe-inspiring physical events recorded in the Bible since the flood. Like the flood, God is portrayed as causing the earthquakes John foretells for moral and religious reasons: punishment of the out-group and purification of the in-group. Asia Minor functions as a battleground for the confrontation between the God of the followers of Jesus and the God of Rome, the Emperor. God is portrayed as targeting the cities most zealous in their devotion to the imperial cult, most important for their infrastructural support of Roman financial domination in Asia, and the cities that had received the most aid from Rome in lieu of their earlier destruction by earthquakes.

This historical data significantly increase the prior probability of the Supernatural Punishment account of the Lisbon earthquake. This is primarily because this data fit a pattern confirmatory of retrodictions from a set of theories in psychology of religion on which is based the Supernatural Punishment account while simultaneously being drawn from a period safely

over 1600 years from the writing of Revelation and written in cultural, social and linguistic contexts very different from Enlightenment Europe. The text of Revelation indicates four important outcomes describing early Christian thinking about earthquakes. God is believed to cause earthquakes, intentionally, in order to punish, specifically, to punish members of an opposing religious group, in this case believers in the divinity of Emperor Trajan, who was actively persecuting Christians. Each of these features also describes the interpretations of the Lisbon earthquake by most religious thinkers of influence in the mid-eighteenth century. With the preceding information about earthquakes recorded in the New Testament and their context now within our store of background information on which to form tentative inferences, the Lisbon earthquake is less likely to be a natural evil that ‘forever changed the mind of Christian Europe’.

#### **4 The Supernatural Punishment Account of the Lisbon earthquake**

The Supernatural Punishment account of the Lisbon earthquake is something that I affirm as a contemporary researcher and not something I attribute to religious people in 1755. The truth of the Supernatural Punishment account of the Lisbon earthquake logically entails that a majority of Protestant religious persons in 1755-56 and shortly thereafter who knew intimately of the earthquake and its destruction believed that the earthquake was (i) caused by an agent (ii) on purpose (iii) to punish (iv) out-group Catholics. If these factual claims have a demonstrably low probability of being true, then the Supernatural Punishment account is likely false. The next section proceeds through a stepwise discussion of the reasons drawn from psychology of religion on behalf of statements (i) through (iv).

4.1. Statement of the account. Psychology of religion represents a family of theories the results of which, properly applied to available historical texts, significantly increase the probability of the Supernatural Punishment hypothesis of the Lisbon earthquake over the Secularizing Interpretation. These two interpretations cannot both be true since they offer competing explanations for available data. What will be referred to with the term ‘Supernatural Punishment account’ is actually the product of several theories in the psychology and cognitive science of religion, including Supernatural Punishment Theory, Terror Management Theory and the Just World Hypothesis.

In contrast to the Secularizing Interpretation, the Supernatural Punishment account retrodicts that Christians in the period would believe that (i) God caused the earthquake (ii) on purpose. Psychological studies show humans naturally attribute intention to the origins of natural phenomena, as revealed in Justin Barrett’s research on hyper-sensitive agency detection and Deborah Kelemen’s experiments on teleological cognition. Kelemen’s lab has tested a number of hypotheses regarding what she calls ‘promiscuous teleology’, the tendency to ascribe purpose to physical events and states of affairs. Data confirm the presence of these propensities in children (Kelemen 1999a, 1999b). Children prompted with pictures of physical objects, like storm clouds or sharp rocks, are asked to select between explanations and results show they vastly prefer teleological explanations (1999b, 1443). The presence of promiscuous teleology explains the origins of the ‘intentional stance’ adopted in the context of religious explanations of natural facts (Evans 1996) and has been the subject of a stream of research in psychology of religion since Stewart Guthrie’s Faces in the Clouds (1993).

Humans not only attribute intention but moral reasons and purposes for natural events, especially for events of ‘natural evil.’ Support for this claim is found in rare experiments directly

on theodicies (e.g. Furnham and Brown 1992) and in data in support of the Just World Hypothesis (Lerner 1980). According to the Just World Hypothesis we attempt to believe that the world is fair and things happen for a reason. For example, in Rosseau's theodicy for the evils caused by the earthquake we witnessed him write that people who built six-story residential buildings in Lisbon are to blame for their own suffering and death. This represents a textbook example of the psychological tendency discovered in studies of the Just World Hypothesis. Results support hypotheses that people have a need to make meaning in their lives, exert control over external situations and seek just explanations for unjust events. Evidence for this hypothesis has been found in over 50 experiments (Hafer and Begue 2005).

Activation of the emotional and cognitive systems that lead to effects predicted by the Just World Hypothesis need not involve any appeal to a deity, but in fact they often do. Bulman and Wortman (1977) analyzed reactions of victims to their spinal cord injuries. The most common explanation was that the severe injury was part of God's plan. Pargament and Sullivan (1981) found that causal attributions to God in the context of health-related situations were greater than to any other source including oneself. In a coding experiment involving interviews with 145 parents of children who had died of cancer or blood disorders, parents appealed to a just God for an explanation of their suffering (Cook and Wimberly 1983). On the basis of the Just World Hypothesis Pargament and Hahn (1986) confirmed hypotheses that attributions to God's will and purpose would be more frequent in unjust situations than in just situations, and God's anger more frequent in negative outcome situations. This response pattern reflects a "desire for a controllable just world, one in which an individual's ability to cope is never exceeded, with God's help" (1986, 203).

The Supernatural Punishment account also implies that (iii) God intentionally causes

earthquakes in order to punish. Supernatural Punishment Theory builds upon familiar adaptations for human ultra-sociality, including Theory of Mind. Theory of Mind enables us to attribute mental states, including intentional mental states, to others as unseen personal causes of events (Bering 2002; Povinelli and Bering 2002). After language acquisition, the self-interest of our species altered so as to avoid selfish behavior when it could readily be observed and communicated to others in one's social group. When being watched—especially by someone with power—we ought not cheat since the watcher can communicate our behavior to others. But merely having Theory of Mind does not insure cooperation amongst the in-group.

Without reliable mechanisms of punishment, patterns of human cooperation break down (Sigmund et al. 2001; Trivers 1971). Mere rewards fail to sustain cooperation (Fehr and Gächter 2002; Yamagishi 1986). Cheating costs in-group members but punishing cheaters also costs in-group members, making punishment a second order public good (Yamagishi 1986). The necessity of punishment for the sake of cooperation rises as societies grow in population as kinship based cooperation decreases in frequency. Mechanisms that enhanced cooperation amongst groups and reduced defection and cheating would have offered individuals in the group fitness advantages. Theories of evolutionary cooperation, including kin-selection, reciprocal altruism, indirect reciprocity, and group selection, do not fully explain the extent to which humans cooperate. The incompleteness of these accounts of cooperation to explain ultra-sociality and strong reciprocity (Fehr and Fischbacher 2003; Henrich et al. 2004) has led to their supplementation by Supernatural Punishment Theory, sometime called Supernatural Monitoring Theory.

A recent body of diverse results from field anthropology, theoretical biology, experiments in evolutionary psychology, and experiments in cross-cultural psychology shows

religion promotes within-group cooperation (Wilson 2002). Shariff and Norenzayan (2007) demonstrate cooperation effects using just a scrambled-sentences paradigm. Others suggest correlations between hard-to-fake religious signals and pro-social behavior (Cronk 1994; Irons 2001). But it is Supernatural Punishment Theory that hypothesizes that the priming of supernatural agencies endowed with strategic knowledge of the moral valence of one's actions and with power to punish "was an effective way to caution oneself against transgressions and thereby avoid "real" worldly retribution by other group members" (Bering and Johnson 2006, 226; see Johnson 2004, 413-4). Religion enhances in-group cooperation through Supernatural Punishment Theory, even if religion's status as an adaptation remains unjustified (Murray and Schloss 2011).

Recent experimental results confirm that priming of religious concepts correlates with greater self-control in decision-making domains that are theoretically relevant to humans' evolutionary success (Rounding et al. 2012). A series of papers by Jesse Bering shows supernatural monitoring correlates with increases in self-control regarding moral decision-making and reductions in 'cheating' behavior in children (Bering 2003) and adults (Bering 2006, 2011). But not any god will function in this way. A wrathful, monitoring high god with a concern to punish appears to correlate with the biggest gains in in-group cooperation (Johnson and Kruger 2004). Dominic Johnson uses the Standard Cross-Cultural Sample of 186 human societies around the globe (Murdock and White 1969) to establish a series of correlations between a culture's adoption of 'high gods' and a culture's adoption of a series of moral behaviors hypothesized by Supernatural Punishment Theory. Cultures with high gods contain individuals who, as compared with individuals from non-high god cultures, are "more compliant with social norms and decisions", are "more loyal to the local and wider community", "have



centralized enforcement and sanctioning systems”, and are “more willing to contribute to the public good” (Johnson 2004, 425). Roes and Raymond (2003) found that group size correlates with belief in supernatural watchers concerned about the morality of human interactions. Gods of small groups were statistically unlikely to be omniscient or omnipotent (Shariff, Norenzayan & Henrich 2009, 125). Supernatural agency concepts, most especially the presence of high god concepts like the concept of God used in the eighteenth-century, are correlated with punishment and its value.

Supernatural deities correlate with decreases in cheating and with increases in self-monitoring both of which enhance cooperation in the in-group. But evolutionary psychology of religion suggests societies also leverage Supernatural Punishment Theory to foment out-group aggression. Thus when an earthquake kills tens of thousands of people in the religious out-group, the Supernatural Punishment account retrodicts that they will believe that (iv) God causes the earthquake on purpose as a punishment of the out-group. Data show that religious persons extend less altruism and more punishment to people known to be members of another religion. Perceived in-group religious membership correlates with the rate at which prosociality is attributed to another person (Widman, Corcoran & Nagy 2009; see also Bulbulia & Mahoney, 2008; Ruffle & Sosis, 2006; and Tan & Vogel, 2008).

Degree of religious conviction has been shown highly correlated with intolerance for out-group political and moral views (Smidt & Penning 1982; Powell & Steelman 1982; Eckberg & Blocker 1989). Using Christian and Islamic fundamentalists as participants, a study by Rothschild, Abdollahi and Pyszczynski (2009) sought to measure effects of mortality salience on prosocial cognition and behavior directed at religious out-group members (Moslems and Christians, in both directions of fit). ‘Mortality salience’ here refers to primes of death. Terror

Management Theory suggests that conditions after 1 November 1755 would incubate extreme rates of mortality salience. On these bases we expect that the earthquake would be interpreted as God's punishment of the out-group, thus it is no surprise that natural disasters cause outpourings of violence against minority groups.

Lastly and directly, consider results of a recent study (Sibley and Bulbulia 2011) called "Faith After An Earthquake: A Longitudinal Study of Religion and Perceived Health Before and After The 2011 Christchurch New Zealand Earthquake". The 22 February 2011 earthquake in Christchurch New Zealand, occurred as authors were in the middle of data collection for a longitudinal study of religiosity. They conclude that "religion became more appealing among those exposed to the Christchurch earthquakes and aftermath, relative to those who were not exposed" (2011, 5). Evidence from this study further decreases the probability of the Secularizing Interpretation and increases the probability of the Supernatural Punishment account.

4.2. Evidence for the Supernatural Punishment account. Advocates of the Supernatural Punishment account would expect confirmation of its hypotheses when data is gathered from writings of religious persons. The aim of this section is to draw on some of the most widely circulated sermons of the period as evidence for the Supernatural Punishment account rather than formally to test this hypotheses against a database of documents. These sermons include Protestant and Catholic sermons like John Wesley's "Serious Thoughts" (J. Wesley 1756), which went through seven printings in the 1750s alone.

A Supernatural Punishment-infused interpretation of the Lisbon earthquake often begins with statements about the ability of earthquakes to cause panic and fear more rapidly and at higher rates than other disasters. Charles Wesley opens his 8 March 1750 sermon "The Cause and Cure of Earthquakes" writing, "Of all the Judgments which the righteous God inflicts on

Sinners here, the most dreadful and destructive is an Earthquake. This He has lately brought on our Part of the Earth, and thereby alarmed our Fears, and bid us prepare to meet our GOD!”

Their sudden onset, incomparable physical power and symbolic terror would be reason enough to believe the effects of earthquakes on religious psychology are uniquely potent.

In John and Charles Wesley’s writings we see evidence of the affirmation of (i)-(iv) both before and after the Lisbon earthquake. Charles Wesley had composed a number of hymns in the wake of a pair of earthquakes that hit Great Britain in Spring 1750. After Lisbon 1755 he composed more earthquake hymns and republished the collection in 1756. Hymn 53 invokes elements of the Book of Revelation to convey the punishing action of the earthquake:

The mighty Shock seems *now* begun,  
Beyond Example great,  
And lo! the World's Foundations groan  
As at their instant Fate!  
Jehovah shakes the shatter'd Ball,  
Sign of the general Doom!  
The Cities of the Nations fall,  
And *Babel's* Hour is come (C. Wesley 1756, 10)

His brother John wrote late in life to Christopher Hooper about homiletics: “There is no divine visitation which is likely to have so general an influence upon sinners as an earthquake” (Telford 1931, v6, 284). Historians of Christianity conclude the sweeping growth of Methodism in the mid-eighteenth-century is due in significant part to the effects of the use of the 'earthquake

sermon' genre. Methodists in the 1750s and 1760s used “powerful preaching” that gave “free rein to affective responses” and emphasized God’s wrath expressed in terms of death “from disease, from the effects of starvation, from war and from natural disasters like the Lisbon earthquake of 1755” (Brown 1991, 120). As Terror Management Theory has confirmed, traumatic events that cue anxiety about mortality and safety effectively heighten the saliency of religious belief.

The Wesleys' condemnation of non-supernatural explanations of the earthquake is consistent with explanations drawn from Theory of Mind and 'promiscuous teleology'. John Wesley argues in “Serious Thoughts” that "If by affirming, "All this is purely natural," you mean, it is not providential, or that God has nothing to do with it, this is not true, that is, supposing the Bible to be true. For supposing this, you may descant ever so long on the natural causes of murrain, winds, thunder, lightning, and yet you are altogether wide of the mark, you prove nothing at all, unless you can prove that God never works in or by natural causes. But this you cannot prove” (Wesley 1772, 12-13). In a sarcastic passage mocking secular interpretations of the earthquake he asks, “why should we not be convinced sooner... that it is not chance which governs the world? Why should we not...acknowledge the hand of the Almighty, arising to maintain his own cause? Why, we have a general answer always ready, to screen us from any such conviction: “All these things are purely natural and accidental; the result of natural causes.” But there are two objections to this answer: First, it is untrue: Secondly, it is uncomfortable” (Wesley 1772, 12-13). It is uncomfortable if God did not cause the earthquake as a punishment, Wesley argues, because this implies that pain and suffering happen to people at random and without them deserving it.

Clearly God caused the earthquake intentionally—in order to punish the Portuguese Catholics. In “Serious Thoughts” John Wesley writes, “And what shall we say of the late

Accounts from Portugal? That several thousand Houses, and many thousand Persons, are no more? That a fair City is now in ruinous Heaps? Is there indeed a God that judges the World? And is He now making Inquisition for Blood? If so, it is not surprising that He should begin there, where so much Blood has been poured on the Ground like Water” (Wesley 1756, 4). His inversion of the term ‘inquisition’ would need no explanation to British audiences: by visiting the quake on Lisbon God condemns the Jesuit inquisition there. Countless other British Protestant sources sound this alarm (Georgi 2005, 93), with many choosing key Bible verses that convey components of the Supernatural Punishment account. Though the Wesleys were the most popular preachers of their day, a thorough review of sermons from before and after the earthquake indicates many, many others interpreted the Lisbon earthquake in accord with components of the Supernatural Punishment account. (It also indicates that not all British Protestant preachers did so.)

But how did the Portuguese Christians themselves react to the quake? They too believed that the earthquake was clearly caused by God. T.D. Kendrick, an early historian of the earthquake, says that compared with Portuguese sermons and pamphlets saying that the earthquake was evidence of God’s judgment, "the pamphlets suggesting that the Lisbon earthquake was a natural happening, like eclipses, thunder, rain, or anything else that was alarming or disastrous in man's celestial or terrestrial environment, are far fewer in number. To advocate this view openly was a bold act likely to shock most devout Portuguese people and anger their religious instructors..." (1955, 92). Naturalistic, secular interpretations of the event were difficult to communicate and disseminate, but they pop up in small numbers. Juan Luis Roche of Puerto de Santa Maria, Gulf of Cadiz, reported some scientific observations about the effects of the earthquake. Though Roche wrote this under cover of a free-thinking tract that he

republished from a Benedictine in Oviedo, he was still rebuked by Dr. Miguel Cabrera of Seville and Miguel de San Jose, Bishop of Guadix (Kendrick 1955, 103-5). (Censorship of those who would have argued that the earthquake was not caused directly by God presents a known confound in testing this hypothesis with historical documents.)

The majority of Portuguese and Spanish thinkers who believed the quake to be God's punishment confronted a problem. Unwilling to cut God's intention and action out of the causal process, they did not adopt the English Protestant perspective, as that would amount to a repudiation of Roman Catholicism itself. Instead they needed to deflect the anomie and anxiety generated by God's judgment, seemingly on and only on them. Cognitive Dissonance Theory would retrodict that in this situation extreme "buffering" would arise (Festinger 1956). So it did. Some theologians, like the canon of the cathedral at Seville, Francisco Olazaval y Olavrola, reasoned that the sins of people in the city of Seville brought down God's wrath and that the earthquake was a call to repentance (Olazaval y Olayzola 1755; Udias 2009a, 45). Another defender of the supernatural character of the earthquake was Miguel de San Jose. Like Protestants, he worried people would deny God's role in the disaster. Like Wesley and others, he moralizes to the effect that advocacy of the secular, naturalistic interpretation may result in damnation: "to deny or doubt that earthquakes and other disasters are usually the effect of the wrath of God, can be considered as an error in the faith" (San Jose 1756; Udias 2009a, 42). Francisco Javier Gonzalez, a friar in the Mimims Order, alights on a convenient trope for the Christian management of cognitive dissonance, one with a very long pedigree in theology and philosophy. God caused the earthquake, on purpose, as a punishment. But it was a punishment for original sin, which all humans inherited from Adam and Eve, and not just for sinful Iberians (Gonzalez 1757; see Udias 2009a, 45). This is consistent with the Supernatural Punishment

account but not the Secularizing Interpretation.

But Portuguese and Spanish thinkers had two more creative responses to this theological challenge. A 1675 book on geophysics by Jose Zaragoza, professor of mathematics at the Jesuit Imperial College of Madrid, inspired the first of these inventive responses. Zaragoza argued that though natural causes are at the source of some earthquakes, “at other times God causes them, or lets the Demon do it, in order to punish men” (Zaragoza 1675; Udias 2009a, 42). Attributing the action to Satan implied that God was not necessarily, or not directly, punishing the Portuguese and Spanish. Taking this lead Pablo Trebna, an intellectual from Seville, defended this response to the earthquake: Satan played a causal role in the earthquake, so it was a moral evil rather than a natural evil (Trebna 1756; Udias 2009a, 46), an understanding inconsistent with the Secularizing Interpretation. This minority affirms promiscuous teleology and attributes intentions to a supernatural being for the quake, and even affirms that the quake was caused as a punishment on Iberians. But Satan did it. This undoubtedly would have called to mind the suffering endured by Job, a biblical allusion that paints Lisboans in a favorable, righteous, faithful light—all the while managing dissonance.

Father Gabriel Malagrida, a Jesuit and the Billy Graham of his day, offers a daring theodicy for the quake's destruction. Malagrida published a sermon called “A judgment on the true cause of the earthquake” (“Juzio da verdadeira causa do terremoto”) that appears to reach an even wider audience than did Wesley's “Serious thoughts”. Like the Wesleys, Malagrida shows rhetorical subtlety, pausing to repudiate secular interpretations of the earthquake. The causes “are not Stars, not steam, nor exhalations, not Phenomena, not contingency, nor natural causes; but solely our unbearable sins” (Malagrida 1756, 3-4). Physical explanations may be partially true but their utter irrelevance at preventing future disasters incensed Malagrida. The “devil”, he

writes, "couldn't invent a dogma that will lead us more to our irreparable ruin" than naturalism and secondary causes (12). Malagrida goes to great (promiscuous teleological) lengths to preserve God's agency in the earthquake (22) and emphasizes God's role as a supernatural monitor. He writes, "there is God in Heaven, who is continuously watching over our actions" (9).

The reason he thought God punished Lisbon, killed tens of thousands of Roman Catholics at mass on All Saint's Day, and crippled a Catholic empire is what sets Malagrida apart: God destroyed Lisbon because Jesuit Lisbon admitted too many out-group Protestants into the city. Malagrida warily makes this argument with Biblical illustrations of occasions on which God is portrayed as purifying the in-group by punishing out-group members who masquerade as in-group members. He cites Ezekiel 6 to attest to God's desires for purity amongst the faithful and for lethal punishment of false worshippers. Citing Leviticus 10 Malagrida uses the story of Nabab and Abihu and God's lethal consumption of them by fire to describe Protestant "Heretics" who were burned to death in the fires of Lisbon (26-27). A historian remarks, "The populace of Lisbon, excited by fanatic preachers, believed that the tolerance manifested toward the heretics living in town was one of the causes of their misfortunes" (Poirier 2006, 175). Domingos dos Reis Quita and Father Cermelli, grand inquisitor of Lombardy, join Malagrida in pushing this line (1766). This patterned reaction to the quake by members of the in-group of victims of the quake is elegantly retrodicted by the Supernatural Punishment account.

Harrowing accounts of English Protestants in the city testify that death by the hands of Lisboan Roman Catholics was no idle fear. One writes, "Since yesterday morning, I have spent the time in anguish and terror, without eating or sleeping ... I was sweating from fear, because I figured that the superstitious populace had put into their heads that this sad destiny had been visited on them because of the heretics" (quoted in Poirier 2006, 172). Other Protestant



eyewitness reports include tales of violence and of being forcibly baptized into the Roman Catholic faith. But in the end by impugning the judgment of civic leadership and the crown, Malagrida's fate was not much better. Marquis de Pombal imprisoned Malagrida on falsified evidence concerning his involvement in a plot to kill the king. Malagrida was held for years then gruesomely executed on 21 September 1761.

As stated, the Secularizing Interpretation says that the Lisbon earthquake changed people's religious cognition by prompting them to deny God caused it on purpose and deny that it was a punishment. Malagrida and the Wesleys, the most efficient cultural transmitters in Portugal and Britain during this period, unambiguously adopt a position about the Lisbon earthquake that is much better explained by the Supernatural Punishment account because they both affirm that the earthquake was (i) caused by God (ii) on purpose (iii) as a punishment (iv) on the out-group, or, in Malagrida's peculiar case, (iv) on the in-group but for being too friendly with the out-group.

4.3. Methodological considerations. Though the Supernatural Punishment account avoids several methodological problems that the Secularizing Interpretation does not, objections remain. First, in §4.1 the paper cites approvingly studies done with contemporary human subjects and argues that data from such experiments provide valuable information for understanding historical patterns in religious belief and behavior. In doing so the paper makes a methodological assumption to the effect that human nature is substantially the same across the centuries. More precisely, subjects of experiments today and people living in the eighteenth-century share key mental systems for cognition and emotion, for example, systems responsible for promiscuous teleology or just world thinking. This might be considered controversial or dubious to humanities scholars who favor a psychology committed to a Lockean tabula rasa. Briefly in response, first,

significant cross-cultural and cross-temporal differences between groups of human beings are undeniable. Yet this does not imply that significant cross-species generalizations about cognition are false. Second, the notion of a Lockean blank slate has been widely discredited by scientists and psychologists, not least by Steven Pinker in The Blank Slate: The Modern Denial of Human Nature (2002). Thus prior to considering this objection more seriously, further evidence on its behalf and against evolutionary generalizations about our species must be adduced.

A second objection, perhaps the most important one, contends that turning to sermons to gather data to test is biased because preachers were very religious and are disproportionately likely to believe the earthquake was a punishment by a just God. By way of response, first this fails to show that data drawn from sermons does not or cannot falsify the Secularizing Interpretation. Second, the Secularizing Interpretation and the Supernatural Punishment account both imply hypotheses testable from a database of religious writings from the period. On the Supernatural Punishment account we expect to see a distinctive interpretation of the earthquake's cause and purpose that is explicitly denied by the Secularizing Interpretation. Third, other sources support the interpretation presented here through sermons, e.g. Ingram (2005) reports that newspapers often describe the earthquake in providentialist terms. Fourth, the objection presupposes that, because someone is a religious leader in the mid-Eighteenth century, he must believe the earthquake is a punishment by a just God. This is false. Thomas Anguish, vicar of St. Nicholas, Deptford, for example, preached a sermon shortly after the Lisbon earthquake using Luke 8:4-5 about the fall of the tower of Siloam. With it Anguish warns British Protestants by arguing God is not punishing Lisboans for their sins: "In our reflections upon the desolations abroad the text gives a caution, not rashly to input them to the greater guilt of the sufferers" (Anguish 1756, 4). He opts for strong agnosticism about the cause of the quake (6) and empathy,

not hostility, for the Lisboans (8). Interpreting the earthquake as something other than divine judgment on Lisbon was not only a live option for Protestants at the time but an interpretation that receives sustained articulation and defense in sermons by Christian preachers.

Whether or not the Secularizing Interpretation is true is an empirical question. Whether the Supernatural Punishment account is true is also.

Natural disasters, especially earthquakes, provide focal points for the activation and expression of noteworthy psychological functions relevant to religious cognition. As such the historical study of disasters offers unique opportunities for interdisciplinary researchers to clarify and test hypotheses in the psychology of religion. Sometimes disasters prompt religious cognition and emotion that increase cooperation. Sometimes, as Bosc de la Calmette knew too well, they prevent cooperation and produce out-group antagonism. We have inched closer to a determination of the cognitive, affective and behavioral effects of the Lisbon earthquake on thinking in Early Modern Europe by construing surrounding literature in terms of two competing interpretations about these effects, which give rise to two competing sets of hypotheses. The Secularizing Interpretation explained reactions to the earthquake in terms of its widespread secularizing effects while the Supernatural Punishment account explained reactions to the earthquake in terms of yielding beliefs that it was caused by God on purpose as a punishment of out-group members. A preliminary assessment of influential historical documents supports the Supernatural Punishment account.

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