To Believe or Not Believe… or Not Decide: A Decision-Theoretic Model of Agnosticism

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Abstract

Using basic decision-theory, we construct a theory of agnosticism, where agnosticism is defined as choosing not to choose a religion. The theory indicates agnosticism can be supported as a rational choice if (a) adopting agnosticism provides in-life benefits relative to any religion, (b) the perceived payoff for agnosticism after death is not too much less than any religion, (c) no religion has a high perceived likelihood of truth, (d) probability of death is neither too high nor too low, or (e) it is less costly to switch from agnosticism to a given religion than from one religion to another, while at the same time there is a reasonable likelihood an informative signal may be received in life as to the truth of various religions.

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Abstract

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1. Introduction

If asked to identify their religion, approximately 1 percent of Americans will identify themselves as agnostics, according to the 2008 American Religious Identification Survey (Kosim and Keysar, 2009). This is a small fraction of the population compared to the 76 percent who will identify themselves as Christians. However, these statistics underemphasize the significance of agnosticism. About 15 percent of the respondents placed themselves in the broad “no religion” category, which includes the 1 percent of self-identified agnostics and 0.7 percent who identified themselves as atheists. This leaves much room for those who are agnostic but do not use the label to identify themselves. Indeed, when the participants were asked, “Regarding the existence of God, do you think …?”, 5.7% responded “I’m not sure” and 4.3% responded “There is no way to know.” This indicates about 10% of Americans may be agnostic, not just 1 percent. Moreover, Kosim and Keysar (2009) report that the most significant recent shift in religiosity in America has been from Christianity toward the “nones” (no stated religious preference, atheist, or agnostic), with 8.2% in the “none” category in 1990 to 15.0% in 2008.

Some famous people have openly expressed their agnosticism, and a sampling of these expressions provides entry into our inquiry. A few years before his death, Albert Einstein wrote, “My position concerning God is that of an agnostic” (Calaprice, 2000, p. 216). Charles Darwin wrote, “My judgment often fluctuates. ... In my most extreme fluctuations I have never been an atheist in the sense of denying the existence of a God. I think that generally (and more and more as I grow older), but not always, that an agnostic would be the more correct description of my state of mind” (Darwin, 1905, p. 274). Comedian and social commentator Bill Maher (2005) has said, “I’m not convinced that God exists. But I do allow the possibility. I’m not an atheist. I’m open... My view on spirituality is I don’t know. I never will as long as I’m alive.” The quotes of Darwin and Maher suggest agnosticism not only involves being indecisive and uncertain, but it also is at least partly motivated by an inability to obtain complete information.

In the next section, we focus on definitions, not only for agnosticism, but also for religion, beliefs, and faith. Given a definition of agnosticism versus other alternatives, the remainder of the paper provides a model of religious choice, offering an explanation of why agnosticism is observed, along with other religious alternatives. We conclude by summarizing our findings.
2. Defining Religion, Faith, Beliefs, and Agnosticism

What happens to you when you die? One way to partition the possibilities is: There is life after death, or not. If not, then your life has reached a dead end. If so, the possibilities after death might be further partitioned. Most will agree that there is uncertainty regarding what happens upon death. Because of this uncertainty, faith and beliefs are fundamental to religion and religious choice, including the choice to be agnostic.

When a religion is conceived to be a choice from a set of religious alternatives, and when decision theory is used to explain the choice, it is natural to adopt a definition of religion that encompasses both the envisioned set of possible alternatives and the payoffs the decision maker might associate with the alternatives. As in Melkonyan and Pingle (2009), we define a religion as a proposition regarding what happens to a person after death, accompanied by a set of prescriptions for how to live life. Using this definition, we assume the decision maker can partition her perceptions about after-death possibilities into a set of mutually exclusive religious alternatives, so one can be adopted as her chosen religion.

Previously stated definitions of religion have varied. Iannaccone (1998, p. 1466), following Stark and Bainbridge (1985), defines a religion as “any shared set of beliefs, activities, and institutions premised upon faith in supernatural forces.” This definition is consistent with, though perhaps more general than, Jorden’s (2006, p. 9 and p. 86) definition of a theism as a proposition which posits the existence of a supernatural person. Azzi and Ehrenberg (1975) distinguish religion by its promise of afterlife rewards, which can be thought of as equivalent to theism, but can also be thought of as a more general definition. Saka (2001, p.313) equates atheism with no belief in a supernatural person, or God, so as to contrast atheism with theism, and he gives Buddhism as an example of an “atheistic religion.” Commenting on Saka’s definition, Jorden (2006, p. 86) prefers to use the term non-theism to describe a belief in an afterlife with no supernatural person, reserving atheism for the proposition that there is “no supernatural reality.”

An advantage of our definition of religion is it encompasses all acts of faith relative to “after-death” perceptions, including theisms and atheisms in their varying forms. In our model, the decision maker assumes one and only one of her perceived religions is “true,” but she admits doubt as to which is true. We define faith to be the act of choosing one of the religions to adopt over the other alternatives while recognizing some self-doubt. Whether the choice is an
atheism that proposes no afterlife or a sect of Christianity that proposes an afterlife with God, the decision maker demonstrates faith when she accepts a proposition she believes may not be true. More faith is demonstrated when there is less certainty that the chosen religion is true.

The word agnostic was created by Thomas Henry Huxley in the 19th century by combining the prefix “a” (without) and the word “gnosis” (knowledge). In describing how he created the word, Huxley (1889) commented, “They were quite sure they had attained a certain “gnosis,” [about the existence of God]…, while I was quite sure I had not, and had a pretty strong conviction that the problem was insoluble.” Because the meaning of the words faith, belief, and agnosticism all relate to knowledge or the lack of it, it now is useful to briefly consider what it means to know something.

Since the time of Socrates, philosophers have associated knowledge with the intersection of “belief” and “truth,” though this intersection has never been considered sufficient. I may believe a particular proposition about what happens after death, and my belief may be true, but how do I “know” my belief is true? Traditionally, “justification” has been the word used to describe the third essential ingredient for knowledge. Gettier (1963, p. 121) presents the standard philosophical representation of “propositional knowledge” as: A person S “knows” proposition P if and only if (a) P is true, (b) S believes P, and (c) S is justified in believing P. Using this definition of knowledge, I would know what happens after death if my belief about what happens is justified.

How belief should be justified has long been a subject of debate. Responding to Gettier’s (1963) famous critique of the standard definition of knowledge, Kirkham (1984) showed only “self-evident” propositions can be infallibly known. Kirkham (1984, p. 502-503) defines a self-evident proposition as either a single self-evident premise, or a necessarily true conclusion derived from self evident premises. Kirkham (1984, p. 512) concludes “very few” propositions can meet his infallibility standard, implying “most of the knowledge claims we make in ordinary life are simply incorrect.” However, he suggests we should not despair, claiming “a belief or proposition does not become less valuable merely because we can no longer apply the ‘hurrah’ word ‘knowledge’ to it. Only the discovery that it has less justification than we thought it had can cause it to lose epistemic value.” For our purposes, Kirkham’s perspective suggests no proposition concerning what happens after death can be infallible knowledge, but each
proposition will have some epistemic value, and this knowledge value will change as justification is either weakened or strengthened.

“Reliabilism” is theory of knowledge that provides a measure of epistemic value to associate with beliefs identified as knowledge. It proposes knowledge is of a higher quality, or more justified, when the process generating the belief less often generates false beliefs. Goldman (1967) is recognized as one of the principle contributors. He describes justification as an “inference” process, that of constructing a causal chain of reasoning that connects the belief to the proposition. The simplest process is “perception,” which seems to be in the neighborhood of Kirkham’s (1984) self-evidence in terms of providing justification. But, most knowledge is not the product of mere perception. For our purposes, reliabilism indicates the belief in a proposition about what happens after death is higher quality knowledge if the belief is inferred using a more reliable reasoning process.

In his book, *An Enquiry Concerning Human Understanding*, Hume (1789 [1910]) section IV, part 1) claims “our reason, unassisted by experience, [can never] draw any inference concerning real existence and matter of fact.” This is an expression of the “empiricism thesis” about how beliefs are reliably obtained: “We have no source of knowledge in [a subject] or for the concepts we use in [the subject] other than sense experience” (Markie, 2008). On the tomb of King Inyotef, dating 2650-2600 B.C. we find the words “There is no one who can return from there, to describe their nature, to describe their dissolution, …, no one goes away and then comes back (Kaplan, 2002, p.3). This quote indicates humans, for all of recorded history, have recognized we cannot obtain experiential evidence regarding what happens after death. If we accept this, and if we accept Hume’s empiricist view that we must rule out as unreliable all non-experiential processes for developing beliefs, then we must conclude we cannot then obtain knowledge of what happens after death.

This was the conclusion Thomas Huxley reached in defining agnosticism, but he went further, arguing it is unethical to adopt a religious belief without knowledge. He declared agnosticism “is not properly described as a ‘negative’ creed,” but rather “a principle, which is as much ethical as intellectual.” Agnostics, Huxley said, “deny and repudiate, as immoral, … the … doctrine that there are propositions which men ought to believe, without logically satisfactory evidence.” Huxley’s doctrine satisfies “Clifford’s Rule” that “it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence (Clifford, 1879, p. 186).”
In presenting his “wager,” Blaise Pascal (1670 [1995]) rejected Huxley and Clifford’s ethical stance, and adopted what Jordan (2006, p.1-5) describes as a pragmatic perspective. Pascal (1670 [1995], p. 122) recognized evidence was lacking of the kind that would satisfy Hume, Clifford, and Huxley, noting, “If there is a God, he is infinitely beyond our comprehension.” However, he viewed choice as ethical because it cannot be avoided. “God is or He is not.” Pascal (1670 [1995], p. 122-123) said, “But to which side will we incline? ... What will you wager? ... You must wager. It is not optional.” William James (1896, p. 28) concurred that pragmatically choosing is ethical when one must choose, criticizing the application of Clifford’s Rule to religious choice: “A rule of thinking which would absolutely prevent me from acknowledging certain kinds of truth if those kinds of truth were really there, would be an irrational rule.”

As Jordan (1994, p.3) explains, Pascal invented what we now call decision theory as a suggestion for how one can logically make a choice that cannot be avoided in an environment where lacking information implies uncertainty. For the problem Pascal posed, the decision theoretic approach is to “weigh up the gain and the loss involved in [wagering] that God exists” (Pascal, 1670 [1995], p. 123). In the simplest version of his wager, he presented the payoffs as “if you win, you win everything, if you lose you lose nothing.” So, his conclusion was, “do not hesitate then; wager that he does exist” (Pascal 1670 [1995], p. 123).

Of course, the decision matrix Pascal presented may not represent the perceptions of all decision makers, and this naturally brings us to a discussion of beliefs. While the word belief in philosophy has tended to mean the acceptance of a particular proposition, the word belief in economics has tended to mean the probability a decision maker associates with a particular possible state of the world.\textsuperscript{1} In our model, the different states of the world are truth states associated with the various \( n \) religions the decision maker envisions, and the probability \( p(i) \) is the subjective probability the decision maker associates with the truth of religion \( i \). Thus, in our model, we use the word belief as it is used in subjective expected utility theory, the workhorse of economics. The after-death proposition chosen is the decision maker’s belief as the word is used in philosophy. By allowing our decision maker to conceive any proposition about what

\textsuperscript{1} In recent decades this representation of beliefs has been extended to characterizations by sets of probabilities (e.g., Gilboa and Schmeidler, 1989) or by non-additive probabilities (e.g. Schmeidler, 1986). See Melkonyan and Pingle (2010) for a decision theoretic religious choice model with ambiguous beliefs represented by the \( \alpha \) - maximin expected-utility preference functional.
happens after death, and allowing flexibility in subjectively assigning probabilities, our model is more general than those presented by Pascal, so our decision maker will be able to rationally adopt any religion one might conceive.

The innovation in our model is the addition of agnosticism as an alternative religious choice. It is not a religion like the other alternatives. Rather, we define agnosticism as the option of “choosing not to choose.” While Huxley (1889) did not intend his word agnosticism to describe a creed, the word he proposed for choosing not to choose, “freethinker”, a word he used to describe himself, has not caught on. The regular use of agnosticism by people like Darwin, Einstein, and Maher to describe their religious creed, and the regular use of the word outside the religion context to mean consciously indecisive, suggests it is reasonable to define agnosticism as choosing not to choose.

Agnosticism has been presented as ambiguity, rather than choosing not to choose, but this representation has been criticized. Monton (1998) and Hajek (1998) each review and critique the analysis of agnosticism offered by Van Fraasen (1985). Monton (1998, p 207) reports, “Van Fraasen’s analysis represents agnosticism as involving vague opinion,” but discounts this representation, arguing, “Someone who gives precise probability assignments to all propositions a domain of discourse can nevertheless be agnostic about some of those propositions.” For Monton (1998, p. 209), to be agnostic is “to refrain from making a commitment to belief or disbelief.” Hajek (1998, p. 202) concurs stating, “What is essential to the agnosticism, I contend, is the suspension of belief.” While we recognize that the uncertainty associated with religious choice is more likely genuine uncertainty, or ambiguity, we reserve modeling agnosticism in an environment with ambiguity for future work. Our definition of agnosticism is consistent with the views of Monton and Hajek, and our model identifies the underlying circumstances in which agnosticism is rational, when the uncertainty about religious truth is mere risk, not ambiguity.

3. Signals

Religious doctrines tend to reject the view that knowledge of God cannot be obtained. For example, the Catholic Online Encyclopedia (2010) identifies two sources of knowledge about God—revelation and reason. The encyclopedia defines revelation as “the communication of some truth by God to a rational creature through means which are beyond the ordinary course
of nature.” The entry for agnosticism says, “The agnostic denial of the ability of human reason to know God is directly opposed to Catholic Faith.” Catholic doctrine declares, “God, …, can, by the natural light of human reason, be known with certainty from the works of creation. ... God’s indirect manifestations of Himself in the mirror of nature, in the created world of things and persons, … [are] true sources of knowledge distinct from revelation.” These encyclopedic entries indicate people perceive revelation as valid justification, along with observations of nature. Regardless of the source, we will model information received by the decision maker as a signal that can alter the truth probabilities assigned to the recognized alternative religions.

A decision maker may not perceive it possible to receive informative signals through revelation, but may nonetheless receive a signal that increases the truth probability of a religion that has not been adopted. An interesting example is a near death experience of A.J. Ayer, who is credited with founding positivism, the philosophy that anything not verifiable by the senses is nonsense. In reporting on his near death experience in the London Sunday Telegraph on August 28, 1988, which had occurred in June, Ayer said his near death experience had “slightly weakened” the “conviction that my genuine death will be the end of me.” Two months later, he published revised remarks, saying the only thing weakened was his “inflexible attitude” toward that conviction (Rosenthal, 2004, p. 514). As our model represents belief formation, Ayer’s first report indicates that the near death experience reduced the truth probability he associated with the version of atheism he had accepted, while the second report indicates that he had not adjusted the probability but was open to the possibility that the probability could change.

In our model, the decision maker receives a signal and changes her religious beliefs as warranted by a Bayesian updating process. The signal may come in any form (e.g., from revelation, from nature). It may be real or perceived. It may radically alter the truth probability assigned to a particular religion or have no impact.

Because we simply apply Bayesian updating to a given prior in response to a signal, our model is subject to the belief formation criticism offered by Montgomery (1996). He notes that economists have a standard way of modeling the evolution of beliefs and do not accept the proposition that beliefs can be strictly individual, like preferences. The standard approach assumes all beliefs have been derived from an initial “common prior” set of beliefs, and it assumes probabilities are adjusted to objectively perceived information. In our application, there is little reason to expect two decision makers would start by recognizing the same set of possible
religious alternatives, so it would be lofty to presume a given set of beliefs had arisen from a common prior. Furthermore, because objective evidence from after death cannot be obtained, and because there would often be subjective disagreement on how the information should revise probabilities, it is likely that probability updating would be more subjective than objective. It seems that, just as Pascalian pragmatism may be a reasonable way to make a choice when the lack of information precludes a choice method relying upon experience, pragmatically applying Bayesian updating subjectively may be a reasonable way to alter beliefs when the lack of information precludes the standard approach. At minimum, our analysis provides a comparison benchmark for analyses that provide the more developed model of belief formation called for by Montgomery.

Rasmusen (2010) notes that, if God exists, different signals may purposefully be sent to different people. His “concealment argument” is that “God wishes some, but not all, humans to become convinced of His existence.” For example, many Christian sects have a predestination doctrine which proposes that God chooses an “elect.” Those in the elect, Rasmusen (2010. P.7) suggests, “might receive private information—a personal revelation, perhaps, or the sight of a miracle—that would convince any reasonable man.” But then, Rasmusen continues, “God wishes for that information to remain private, so the convert cannot credibly communicate it to the public.” As Rasumusen notes, this concealment argument can explain a diversity of religious beliefs and, if true, would preclude the possibility that all people can be convinced by informative signals of the true religion.

4. The Model

Consider a decision-maker DM who lives at most two periods and faces a religious choice. For simplicity and concreteness, assume DM perceives only two religions—theism and atheism. However, also assume DM may procrastinate, so she actually perceives three

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2 Following Melkonyan and Pingle (2009), we define a religion as a perspective about what happens to a person after death. Using this definition, atheism qualifies as a religion as does theism. Our results can be extended to a finite number of religions, but the extended model is substantially more complex. Melkonyan and Pingle show a model with more than two alternatives does yield insight that cannot be obtained from a model restricted to two alternatives. Here, the two religion model is already rather complex because of the addition of the agnosticism alternative, an extra time period, a probability of death, and a signal. Our judgment is that the insight obtained by allowing for more than two religions is not worth the cost of obscuring the results we obtain with this two-religion model.
alternatives in period 1---theism, atheism, and agnosticism. In period 2, assume DM knows death is imminent, so agnosticism is not an option, and DM must choose between theism and atheism.

DM constructs perceived utilities, distinguishing utility in life from utility after death. In life, DM perceives theism generates the net benefit $B(T)$ when adopted in a given period, atheism generates $B(A)$, and agnosticism generates a net benefit normalized to zero. The signs of $B(T)$ and $B(A)$ are not restricted, so adopting a religion may generate a net cost in life.

DM’s perceived afterlife payoffs depend upon her religious choice and the stochastic resolution of religious truth. DM perceives the uncertainty regarding religious truth is resolved upon death, and she assumes one and only one religion is true. Let $u_s(X)$ denote DM’s perceived afterlife payoff when religious alternative $X$ is chosen and religion $s$ is true. We assume DM perceives $U_T(T) > U_T(A)$, $U_T(T) > U_T(AG)$, $U_A(A) \geq U_A(T)$, $U_A(A) \geq U_A(AG)$. That is, DM perceives the afterlife payoff for any realization of religious truth is the highest when DM’s religious choice matches the realization of the uncertainty regarding religious truth.

At the end of period 1, the uncertainty is resolved regarding whether DM lives to period 2. Nature chooses from the set $\{l, d\}$, where $l = \text{lives}$ and $d = \text{dies}$. DM lives to period 2 with probability $q$, so $1 - q$ is the probability of death at the end of period 1.

If DM lives, she receives a signal (e.g. a miracle, unanswered prayer) at the beginning of period 2, chosen by nature from the set $\{\sigma_1, \sigma_2\}$. The payoff $u_s(X)$ does not directly depend on the signal. Rather, the signal is information that may alter the likelihood, perceived by DM, that a given religion is true. Observing the signal, DM updates her beliefs about the truth of the two religions and then chooses either theism or atheism.
Summarizing, DM perceives three types of uncertainty are resolved by nature: whether DM lives to period 2, which signal is received, and which religion is true. So, in advance of making any decision, DM knows nature chooses one of the eight elements in the set

\[ S = \{\{d, \sigma_1, T\}, \{d, \sigma_1, A\}, \{l, \sigma_1, T\}, \{l, \sigma_1, A\}, \{d, \sigma_2, T\}, \{d, \sigma_2, A\}, \{l, \sigma_2, T\}, \{l, \sigma_2, A\}\}. \]

The draw \{l, \sigma_1, T\}, for example, implies DM survives through period 2, receives the signal \(\sigma_1\) at the beginning of period 2, and learns theism is true when she dies at the end of period 2. These three uncertainties determine the structure of the decision model, which is completely represented in Figure 1.

To model the belief updating process, let \(\Sigma\) denote the set of all subsets of events associated with the state space \(S\), and assume DM’s beliefs about the likelihood of the occurrence of any of these subsets is represented by a unique probability distribution \(p: \Sigma \to [0,1]\). In particular, \(p(\{T\})\) and \(p(\{A\})\) are DM’s prior beliefs about the truth of the two religions. After receiving the signal at the beginning of period 2, DM updates religious beliefs using Bayes’ law:

\[
p(\{T\}|\{l, \sigma_i\}) = \frac{p(l|\sigma_i, T) p(\sigma_i)}{p(l, \sigma_i)} \quad \text{and} \quad p(\{A\}|\{l, \sigma_i\}) = \frac{p(l|\sigma_i, A) p(\sigma_i)}{p(l, \sigma_i)}.
\]

Assuming the probability of survival to period 2 is independent of both religious truth and the signal received, these updating conditions reduce to

\[
p(\{T\}|\{l, \sigma_i\}) = \frac{p(T|\sigma_i)}{p(\sigma_i)} \quad \text{and} \quad p(\{A\}|\{l, \sigma_i\}) = \frac{p(A|\sigma_i)}{p(\sigma_i)}
\]

for the two signals \(i = 1, 2\).

Without loss of generality, assume \(p(\{T\}|\{\sigma_1\}) \geq p(\{T\}) \geq p(\{T\}|\{\sigma_2\})\). That is, the signal \(\sigma_1\) will increase DM’s belief in theism, while \(\sigma_2\) will decrease it. Letting \(p\) and \(\tilde{p}\) be two

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3 To further illustrate the notation we are using, the event \(\{T\}\) includes all the elements of set \(S\) in which theism is true. That is, \(\{T\} = \{\{d, \sigma_1, T\}, \{l, \sigma_1, T\}, \{d, \sigma_2, T\}, \{l, \sigma_2, T\}\}\). Alternatively, the event \(\{l, \sigma_1\}\) includes the elements of set \(S\) in which DM lives to period 2 and receives the signal \(\sigma_1\), which is the set \(\{l, \sigma_1\} = \{\{l, \sigma_1, T\}, \{l, \sigma_1, A\}\}\).
probability distribution functions defined over $\Sigma$, the information structure $\tilde{p}$ is said to be more informative than $p$ when the following condition is satisfied:

\begin{equation}
\begin{align*}
    p(\{T\}) &= \tilde{p}(\{T\}), \\
    p(\{l\}) &= \tilde{p}(\{l\}), \\
    p(\{\sigma_1\}) &= \tilde{p}(\{\sigma_1\}) \text{ and } \tilde{p}(\{T\} | \{\sigma_1\}) \geq p(\{T\} | \{\sigma_1\}).
\end{align*}
\end{equation}

Intuitively, a more informative information structure is one that can more significantly change beliefs.
Figure 1: Structure of the Decision Model

1 = 13 = \( u_T(T) + 2B(T) \); \( 2 = 14 = u_T(A) + B(T) + B(A) \); \( 3 = 15 = u_T(T) + B(T) + B(A) \); \( 4 = 16 = u_T(A) + 2B(A) \); \( 5 = 17 = u_T(T) + B(T) \); \( 6 = 18 = u_T(A) + B(A) \);

\( 7 = 19 = u_A(T) + 2B(T) \); \( 8 = 20 = u_A(A) + B(T) + B(A) \); \( 9 = 21 = u_A(T) + B(T) + B(A) \); \( 10 = 22 = u_A(A) + 2B(A) \); \( 11 = 23 = u_A(T) + B(T) \); \( 12 = 24 = u_A(A) + B(A) \).
5. Implications of the Model

Using the principle of dynamic optimization, we solve for DM’s optimal choice using backward induction starting with period 2. Given her posterior beliefs, following realization $\sigma_i$ of the signal, DM will prefer theism to atheism if and only if the expected utility of theism exceeds that of atheism:

\[
B(T) + \sum_{r \in \{T,A\}} p(\{r\}|\{l, \sigma_i\}) U_r(T) \geq B(A) + \sum_{r \in \{T,A\}} p(\{r\}|\{l, \sigma_i\}) U_r(A).
\]

Examining this condition, note DM’s optimal choice in period 2 is independent of DM’s period 1 choice (atheism versus theism versus agnosticism), regardless of the realization of the signal. This is because we assume DM can switch from one religious alternative to another without cost and because we assume the likelihood of receiving a given signal is independent of the choice made in period 1. (We relax the assumption of no switching cost in the next section, and leave an examination of dependent signals to future research.)

An interesting special case is when DM perceives there is no afterlife utility if atheism is true, implying $U_A(T) = 0$. In this case, condition (2) can be written as

\[
p(\{T\}|\{l, \sigma_i\}) \geq \frac{B(A) - B(T)}{U_T(T) - U_T(A)}.
\]

Condition (3) indicates DM will always choose theism in period 2 if the in-life utility of theism exceeds that of atheism. That is, atheism can only be rational if it provides a net benefit in life relative to theism. When $B(A) > B(T)$, so that atheism may be the best choice, condition (3) implies DM will still choose theism if, following receipt of signal $\sigma_i$, the conditional probability of theism being true is sufficiently large. This sufficient probability is smaller when the difference $U_T(T) - U_T(A)$ in afterlife utilities between theism and atheism is relatively large. In presenting his famous wager, Blaise Pascal (1670 [1995], p.122-123) rationalized theism by
presuming this difference, for example the gap between perceived heavenly reward and hellish punishment, is very large for most people.

DM’s optimal choice in period 2 is signal dependent, so let it be denoted by $C: \{\sigma_1, \sigma_2\} \rightarrow \{T, A\}$. For example, $C(\sigma_1) = T$ and $C(\sigma_2) = A$ represents the case where DM chooses theism following receipt of signal $\sigma_1$ and chooses atheism following receipt of signal $\sigma_2$. With DM’s optimal choice in period 2 given by $C(\cdot)$ her expected lifetime utility from choosing action $c$ in period 1 is

\[
B(c) + (1 - q) \sum_{r \in \{T, A\}} [p(\{r\})U_r(c)]
\]

\[
+ q \sum_{i=1}^2 \left( p(\sigma_i) \left[ \sum_{r \in \{T, A\}} [p(\{r\}|\{l, \sigma_i\})U_r(C(\sigma_i))] + B(C(\sigma_i)) \right] \right).
\]

Because the period 2 choice is not dependent upon the period 1 choice, whether or not the decision maker chooses to be agnostic depends only upon the factors influencing outcomes in period 1. This includes the period 1 net benefit during life, and the afterlife payoffs if death occurs at the end of period 1, but not the signal which is received in period 2. The decision-maker will choose agnosticism over theism and atheism in period 1 if and only if

\[
\sum_{r \in \{T, A\}} p(\{r\})U_r(AG) \geq \max_{X \in \{T, A\}} \left\{ \frac{B(X)}{1 - q} + \sum_{r \in \{T, A\}} p(\{r\})U_r(X) \right\}.
\]

Condition (4) indicates that the attractiveness of agnosticism depends upon its in-life benefit and expected afterlife utility relative to those provided by the most attractive religion. Thus, agnosticism is not much different from a religion. What distinguishes it as a religious alternative is DM knows agnosticism cannot be a true religion. Condition (4) is interesting because it tells us when DM will knowingly and rationally choose agnosticism over a true religion. This occurs when DM believes it is unlikely that the true religion is true, when DM
perceives the true religion provides little afterlife utility, or when DM perceives agnosticism provides significant in-life benefits relative to the true religion.

By imposing further restrictions on the elements of the model, we can delineate circumstances under which DM may or may not rationally choose to be agnostic.

**Proposition 1**: If \( U_r(AG) \leq U_r(X) \) for \( r \in \{T,A\} \) and \( X \in \{T,A\} \), then DM will be agnostic only if the religion which could be adopted as the next best alternative generates a net cost in life relative to agnosticism.

Proposition 1 is evident from condition (4). Because DM knows agnosticism cannot be a true religion, DM might perceive the afterlife utility obtained from dying agnostic is no greater than that obtained from any other religious choice, as assumed in Proposition 1. Under this perception, Proposition 1 indicates agnostics must also perceive adopting a religion (theism or atheism) is costly in life relative to agnosticism.

**Proposition 2**: If \( B(X) < 0 \) for \( X \in \{T,A\} \) then DM will be agnostic if the probability of survival \( q \) is high enough.

Proposition 2 also follows readily from condition (4). It indicates that, if all religions impose costs in life relative to agnosticism, then agnosticism will be the best choice if the probability of survival to period 2 is high enough. This is because the agnostic can avoid the in-life costs imposed by the religions in period 1, but then capture, with relatively large probability, any perceived afterlife benefits from religion by switching to the best religion in period 2.
Proposition 3: If $U_A(AG) = U_A(A), U_T(AG) \geq U_T(A), B(A) \leq 0$ then

(i) DM will prefer agnosticism to atheism, and

(ii) DM will choose agnosticism over theism if and only if

$$
(1 - q) \sum_{r \in \{T, A\}} p(\{r\})[U_r(AG) - U_r(T)] \geq B(T).
$$

Corollary to Proposition 3: If $U_A(AG) = U_A(A) = U_A(T), U_T(AG) \geq U_T(A), B(A) \leq 0$ then
DM will choose agnosticism if and only if

$$
(1 - q)p(\{T\})[U_T(T) - U_T(AG)] \leq -B(T).
$$

Proposition 3 and its corollary each follow directly from condition (4). Under the assumptions of Proposition 3 and its Corollary, DM perceives that agnosticism dominates atheism because the afterlife payoffs are assumed to be equal if atheism is true, while the in-life payoff for agnosticism is assumed to be at least as great. Atheism is further inferior to agnosticism because DM perceives atheism will be punished more significantly in the afterlife than agnosticism when theism is true. Similar to Proposition 2, Proposition 3 also reveals that, under the assumption that atheism is dominated, agnosticism is preferred to theism if theism imposes a net cost in life (i.e., $B(T) < 0$) and the probability of surviving to period 2 is high enough. However, Proposition 3 also informs us that, no matter how high the probability of survival to period 2, theism will be the rational choice, over agnosticism, if the perceived afterlife utility for theism is high enough relative to agnosticism.

When $U_A(A) = U_A(T) = U_A(AG)$, condition (4) can be written as
(5) \[ U_T(AG) \geq \max_{X \in \{T, A\}} \left\{ \frac{B(X)}{(1-q)p(T)} + U_T(X) \right\}. \]

Condition (5) helps us readily prove the following proposition.

**Proposition 4:** If \( U_A(A) = U_A(T) = U_A(AG), \ B(A) > 0 > B(T) \) and \( U_T(AG) > U_T(A) \), then,

(i) If the prior probability \( p\{T\} \) of theism being the true religion is sufficiently small, satisfying \( p\{T\} \leq \frac{1}{1-q} \min \left\{ \frac{B(A)}{U_T(AG)-U_T(A)}, \frac{B(A)-B(T)}{U_T(T)-U_T(A)} \right\}, \) DM will choose atheism in period 1.

(ii) If the prior probability \( p\{T\} \) of theism being the true religion belongs to the range of intermediate values, satisfying \( -\frac{B(T)}{(1-q)(U_T(T)-U_T(AG))} \geq p\{T\} \geq \frac{B(A)}{(1-q)(U_T(AG)-U_T(A))}, \) DM will choose agnosticism in period 1.

(iii) If the prior probability \( p\{T\} \) of theism being the true religion is sufficiently large, satisfying \( p\{T\} \geq \frac{1}{1-q} \max \left\{ \frac{B(A)-B(T)}{U_T(T)-U_T(A)}, \frac{B(T)}{U_T(T)-U_T(AG)} \right\}, \) DM will choose theism in period 1.

The assumptions underlying Proposition 4 might characterize the perceptions of some decision makers. Theism is more costly, or less beneficial, in life than agnosticism, while atheism is less costly, or more beneficial than agnosticism. Atheism is punished more in the afterlife than agnosticism, if theism is true. And, the afterlife utilities are the same for all choices if atheism is true. Theorem 4 demonstrates that, if DM’s perceived payoffs conform to these conditions, then DM’s perceived probability that theism is true can be viewed as the critical determinant of the choice. Theism is rational when this probability is high enough, atheism is
rational when this probability is low enough, and agnosticism is rational when this probability is in the intermediate range.

Under the assumptions of Proposition 4, there are situations when theism and agnosticism can be excluded as possible optimal choices, but not atheism. If
\[
\frac{1}{1-q} \max \{ \frac{B(A) - B(T)}{U_T(T) - U_T(A)}, - \frac{B(T)}{U_T(T) - U_T(A)} \} > 1
\]
then no values of \( p(T) \) exist for which theism is the optimal choice. This condition indicates theism is more likely ruled out if DM perceives (a) a high probability of survival to period 2 or (b) small differences in afterlife payoffs. If
\[
- \frac{B(T)}{U_T(T) - U_T(A)} \leq \frac{B(A)}{U_T(A) - U_T(A)}
\]
the interval in part (ii) of Proposition 4 is empty and agnosticism is never the optimal choice. This result indicates agnosticism is better supported when DM perceives agnosticism is not punished much in the afterlife when theism is true, but atheism is significantly punished. Finally, as long as parameters of the decision problem satisfy the conditions in Proposition 4, there are values (possibly very small) of the probability \( p(T) \) for which atheism is the optimal choice, which derives from the assumption that atheism provides in-life benefits relative to agnosticism and theism.

Note also that a result analogous to Proposition 4 holds for the probability of survival \( q \). Specifically, DM will choose theism in period 1 if the probability of survival is relatively small, choose atheism if the probability of survival is relatively large, and choose agnosticism for intermediate values of the probability of survival.

Finally, consider the possibility that DM will change her religious choice. If DM had chosen to adopt a religion in period 1, theism or atheism, then we know from condition (2) that she is more likely to change religions in period 2 when a more informative signal is received.
6. Extending the Model to Include Switching Costs

To this point, our model has not recognized any switching costs, but it could be costly in life to switch from one religious alternative to another. Even if there is no direct in-life persecution for switching, nor monetary loss, a variety of significant indirect costs may be incurred, like the loss of a long time friend. Let $W(X, Y)$ denote the cost of switching from choice $X \in \{T, A, AG\}$ made in period 1 to choice $Y \in \{T, A\}$ made in period 2. The cost $W(X, Y)$ is borne by DM in period 2 after the realization of the signal. We assume $W(Z, Z) = 0$ for $Z \in \{T, A\}$. That is, if DM does not change her choice, no switching cost is incurred.

As in the previous section, we solve for DM’s optimal period 1 choice using backward induction. If DM chooses $X \in \{T, A, AG\}$ in period 1, survives to period 2, and observes signal $\sigma_l$, her expected utility from choosing $Y \in \{T, A\}$ in period 2 is

$$B(Y) - W(X, Y) + \sum_{r \in \{T, A\}} p(\{r\}|\{l, \sigma_l\}) U_r(Y).$$

Hence, DM will prefer theism to atheism in period 2 if and only if the expected utility of theism is greater:

$$B(T) - W(X, T) + \sum_{r \in \{T, A\}} p(\{r\}|\{l, \sigma_l\}) U_r(T) \geq B(A) - W(X, A) + \sum_{r \in \{T, A\}} p(\{r\}|\{l, \sigma_l\}) U_r(A).$$

Because of the switching cost, DM’s optimal choice in period 2 now may depend upon DM’s choice in period 1, along with the realization of the signal. Therefore, let the optimal period 2 choice be denoted by the function $F: \{\sigma_1, \sigma_2\} \times \{T, A, AG\} \rightarrow \{T, A\}$. For example,

$$F(\sigma_1, T) = F(\sigma_2, T) = T, F(\sigma_1, AG) = T, F(\sigma_2, AG) = A, F(\sigma_1, A) = F(\sigma_2, A) = A$$

represents the case where DM chooses theism if she chose theism in period 1, atheism if she chose atheism in period 1, theism if she chose agnosticism in period 1 and received signal $\sigma_1$, and atheism if she chose agnosticism in period 1 and received signal $\sigma_2$. 19
With DM’s optimal choice in period 2 given by $F(\cdot, \cdot)$ her expected lifetime utility from choosing action $c$ in period 1 is equal to

$$B(c) + (1 - q) \sum_{r \in \{T,A\}} [p(\{r\})U_r(c)]$$

$$+ q \sum_{i=1}^{2} \left( p(\sigma_i) \sum_{r \in \{T,A\}} [p(\{r\}|\{l, \sigma_i\})U_r(F(\sigma_i, c)) - W(c, F(\sigma_i, c))\right) + B(F(\sigma_i, c))\right),$$

Hence, DM will choose agnosticism over theism and atheism in period 1 if and only if

$$(6) \quad (1 - q) \sum_{r \in \{T,A\}} [p(\{r\})U_r(AG)] + q \sum_{i=1}^{2} \left( p(\sigma_i) \sum_{r \in \{T,A\}} [p(\{r\}|\{l, \sigma_i\})U_r(F(\sigma_i, AG)) - W(AG, F(\sigma_i, AG)) + B(F(\sigma_i, AG))] \right) \geq \max_{X \in \{T,A\}} \left( B(X) + (1 - q) \sum_{r \in \{T,A\}} [p(\{r\})U_r(X)] + q \sum_{i=1}^{2} \left( p(\sigma_i) \sum_{r \in \{T,A\}} [p(\{r\}|\{l, \sigma_i\})U_r(F(\sigma_i, X)) - W(X, F(\sigma_i, X)) + B(F(\sigma_i, X))]\right)\right).$$

Contrasting inequalities (4) and (6), we observe that the latter includes period 2 factors. In particular, the choice in period 1 is not independent of the signal, and it is influenced by the switching cost.

In a world without switching costs, Proposition 1 informed us that, when the afterlife utility obtained from dying agnostic is no greater than that obtained from any other religious choice, agnosticism is rational only if there is a net cost in life to adopting the most preferred religion. However, in a world with switching costs, it is possible for the preferred religion to offer a net benefit in life but for agnosticism still to be the rational period 1 choice. This is because the signal may inform DM it is best to switch religions, and switching from agnosticism to the best period 2 religion may cost less than switching from an alternative choice.
Proposition 2 indicates that, when the two religions generate net costs in life, agnosticism is more likely rational when there is a higher probability life will continue. However, with switching costs, it is not necessarily true that an increase in survival probability provides greater support for agnosticism. This is because the signal, when combined with switching costs, now also influences the period 1 choice. If it costs to switch from agnosticism but does not cost to continue practicing the same religion, as we have assumed, then a higher probability of survival implies a higher probability of experiencing the cost of switching from agnosticism. If the cost of switching from agnosticism is higher than the net cost in life of adopting the preferred religion, it will not be rational to adopt agnosticism if the probability of survival is high enough.

The conditions of Proposition 3 ensure agnosticism weakly dominates atheism in a world without switching costs, and then the proposition shows when agnosticism will be preferred to theism. Once switching costs are added, the conditions of Proposition 3 no longer ensure agnosticism weakly dominates atheism. The cost of switching from agnosticism to atheism in period 2 can offset the in-life costs atheism may generate in period 1, so atheism may be preferred to agnosticism in period 1. When the signal is expected to be informative, the religious alternative with relatively low switching costs would become relatively more attractive as the period 1 choice. We might expect this to be agnosticism, but in general it could be any of the three alternatives.

Now, we again impose the assumptions of Proposition 4 and delineate the conditions under which atheism, agnosticism, and theism are rationally chosen by DM, but now in a world with switching costs. The key assumption is $U_A(A) = U_A(T) = U_A(AG)$, implying DM perceives the same afterlife utility is received when atheism is true, regardless of the religious choice. Under this assumption, the inequality (6) reduces to
(7) \( (1 - q)p(\{T\})U_T(AG) + p(\{T, l, \sigma_1\})U_T(F(\sigma_1, AG)) + p(\{T, l, \sigma_2\})U_T(F(\sigma_2, AG)) + q \sum_{i=1}^{2}(p(\sigma_i)B(F(\sigma_i, AG)) - W(AG, F(\sigma_i, AG))) \geq \max_{x \in \{T, A\}} \{B(X) + (1 - q)p(\{T\})U_T(X) + p(\{T, l, \sigma_1\})U_T(F(\sigma_1, X)) + p(\{T, l, \sigma_2\})U_T(F(\sigma_2, X)) + q \sum_{i=1}^{2}(p(\sigma_i)B(F(\sigma_i, X)) - W(X, F(\sigma_i, X))) \}\).

Moreover, the assumption \( U_A(A) = U_A(T) = U_A(AG) \) implies DM will prefer theism to atheism in period 2 if and only if

(8) \( p(\{T\}|l, \sigma_1) \geq \frac{[B(A) - B(T)] + [W(X,T) - W(X,A)]}{[U_T(T) - U_T(A)]} \).

Proposition 5 follows readily from condition (8).

**Proposition 5:** If \( U_A(A) = U_A(T) = U_A(AG) \), \( B(A) > 0 > B(T) \) and \( U_T(AG) > U_T(A) \),

(i) If the probability of theism being the true religion conditional on the signal \( \{\sigma_1\} \) is sufficiently small, satisfying \( p(\{T\}|l, \sigma_1) \leq \frac{[B(A) - B(T)] + [W(X,T) - W(X,A)]}{[U_T(T) - U_T(A)]} \), DM will choose atheism in period 2 regardless of the signal.

(ii) If the probability of theism being the true religion conditional on the signal \( \{\sigma_2\} \) is sufficiently small while the probability of theism being the true religion conditional on the signal \( \{\sigma_1\} \) is sufficiently large,

satisfying \( p(\{T\}|l, \sigma_2) \leq \frac{[B(A) - B(T)] + [W(X,T) - W(X,A)]}{[U_T(T) - U_T(A)]} \leq p(\{T\}|l, \sigma_1) \), DM will choose atheism in period 2 when signal \( \sigma_2 \) is received and theism when \( \sigma_1 \) is received.
(iii) If the probability of theism being the true religion conditional on the signal \( \{\sigma_2\} \) is sufficiently large, satisfying
\[
\frac{[B(A) - B(T)] + [W(X,T) - W(X,A)]}{[u_T(T) - u_T(A)]} \leq p(\{T\}|\{l, \sigma_2\}),
\]
DM will choose theism in period 2 regardless of the signal.

As before, we assume the signal \( \sigma_1 \) increases DM’s belief that theism is true, while receiving \( \sigma_2 \) decreases this belief. That is, it is assumed that \( p(\{T\}|\{l, \sigma_1\}) > p(\{T\}|\{l, \sigma_2\}) \). Therefore, if DM chooses theism after receiving signal \( \sigma_2 \), she will also choose theism after receiving \( \sigma_1 \). Analogously, if DM chooses atheism after receiving \( \sigma_1 \), she will choose atheism after receiving \( \sigma_2 \). This understanding is the key to Proposition 5. When the signal is more informative, or when the difference \( p(\{T\}|\{l, \sigma_1\}) - p(\{T\}|\{l, \sigma_2\}) \) is relatively large, case (ii) has more possibility of arising. This intermediate case (ii) is interesting because the signal matters, with DM choosing theism upon receiving \( \sigma_1 \) and atheism upon receiving \( \sigma_2 \).

Proposition 5 indicates the switching cost difference \( [W(X,T) - W(X,A)] \), to theism versus to atheism, is one factor determining the period 2 choice. When \( [W(X,T) - W(X,A)] \) is relatively small, which includes possibly negative values, case (iii) is more likely, and in case (iii) DM will choose theism regardless of the signal. Alternatively, for very large values of \( [W(X,T) - W(X,A)] \) case (i) is more likely, and in case (i) DM will choose atheism irrespective of the signal. Case (ii), in which the signal matters, is more likely for intermediate values of \( [W(X,T) - W(X,A)] \).

The conditions within Proposition 5 also demonstrate how switching costs affect the choice in period 1. When \( X = A \), \( [W(X,T) - W(X,A)] = [W(A,T) - W(A,A)] = W(A,T) \geq 0 \), making case (i) more likely. Alternatively, when \( X = T \), \( [W(X,T) - W(X,A)] = [W(T,T) - W(T,A)] = -W(T,A) \leq 0 \), making case (iii) more likely.
More interestingly, we learn how choosing agnosticism in period 1 may impact the period 2 choice. When \( X = AG \), we see that, if \( W(AG, T) \) is substantially larger than \( W(AG, A) \), it is more likely that case (i) will arise so DM will choose atheism in period 2, regardless of the signal. Conversely, if \( W(AG, T) \) is substantially smaller than \( W(AG, A) \), case (iii) is more likely so DM will choose theism, regardless of the signal. Case (ii), in which the signal makes a difference in the choice, is more likely when the difference between \( W(AG, T) \) and \( W(AG, A) \) is neither very large nor very small.

Comparing the model with switching costs to the model without, consider the following scenario. Suppose that without switching costs case (ii) in Proposition 5 materializes, so the signal matters. Further, suppose \( W(A, T) \) and \( W(T, A) \) are so large that if DM chooses theism in period 1 then she will choose theism in period 2 (case (iii) will materialize) and if DM chooses atheism in period 1 then she will choose atheism in period 2 (case (i) will materialize). Furthermore, suppose that \( W(AG, T) \) and \( W(AG, A) \) are such that case (ii) materializes if DM chooses agnosticism in period 1. This possible case is one in which information is valuable only if DM chooses agnosticism. Hence, under the assumptions of this scenario, DM will be more likely to choose agnosticism when the signal is more valuable in the sense of definition (1). More generally, when the signal is more valuable, DM will choose an alternative in period 1 that has low switching costs.

Formally, suppose \( U_A(A) = U_A(T) = U_A(AG) \) and
\[
F(\sigma_1, T) = F(\sigma_2, T) = T, F(\sigma_1, AG) = T, F(\sigma_2, AG) = A, F(\sigma_1, A) = F(\sigma_2, A) = A. \text{ Condition (7) can then be re-written as}
\]
Proposition 6, which follows from the inequalities (9) and (10), indicates agnosticism is supported when factors that tend to motivate a commitment to a particular religion, theism or atheism, are not too extreme.

Proposition 6: Suppose \( U_A(A) = U_A(T) = U_A(AG) \) and \( F(\sigma_1, T) = F(\sigma_2, T) = T, F(\sigma_1, AG) = T, F(\sigma_2, AG) = A, F(\sigma_1, A) = F(\sigma_2, A) = A \). DM will choose agnosticism if and only if

(i) the in-life benefit of atheism is an intermediate value, satisfying

\[
\frac{1}{q p(\sigma_2)} \left\{ q \left[ p(\sigma_1) W(AG, T) + p(\sigma_2) W(AG, A) \right] + \left[ 1 + q - q p(\sigma_1) \right] B(T) + \right.
\]

\[
\left. (1 - q) p(\{T\}) \left[ U_T(T) - U_T(AG) \right] + q p([T, \sigma_2]) \left[ U_T(T) - U_T(A) \right] \right\} \leq B(A) \leq
\]

\[
\frac{1}{1 + q - q p(\sigma_2)} \left\{ -q \left[ p(\sigma_1) W(AG, T) + p(\sigma_2) W(AG, A) \right] + (1 - q) p(\{T\}) \left[ U_T(AG) - U_T(A) \right] + \right.
\]

\[
\left. q p([T, \sigma_1]) \left[ U_T(T) - U_T(A) \right] + q p(\sigma_1) B(T) \right\}.
\]

(ii) the in-life benefit of theism is an intermediate value, satisfying:
\[ \frac{1}{qp(\sigma_1)} \{ -q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] - (1 - q)p(\{T\})[U_T(AG) - U_T(A)] \} + q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] + [1 + q - qp(\sigma_2)]B(A) \} \leq B(T) \leq \]
\[ \frac{1}{[1 + q - qp(\sigma_1)]} \{ -q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] + qp(\sigma_2)B(A) - (1 - q)p(\{T\})[U_T(T) - U_T(AG)] \} - qp(\{T\})[U_T(T) - U_T(A)] \} \].

(iii) the net afterlife benefit of adopting theism when it is true, relative to adopting atheism, has intermediate values given by:
\[ \frac{1}{qp(\{T, \sigma_1\})} \{[1 + q - qp(\sigma_2)]B(A) - qp(\sigma_1)B(T) \]
\[ + q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] \]
\[ - (1 - q)p(\{T\})[U_T(AG) - U_T(A)] \} \leq [U_T(T) - U_T(A)] \]
\[ \leq \frac{1}{qp(\{T, \sigma_2\})} \{ -q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] \]
\[ + qp(\sigma_2)B(A) - [1 + q - qp(\sigma_1)]B(T) \]
\[ - (1 - q)p(\{T\})[U_T(T) - U_T(AG)] \} \]

Inequalities (9) and (10) can be used to obtain a proposition that relates adopting agnosticism to the posterior probabilities.

**Proposition 7**: Suppose \( U_A(A) = U_A(T) = U_A(AG) \) and \( F(\sigma_1, T) = F(\sigma_2, T) = T, F(\sigma_1, AG) = T, F(\sigma_2, AG) = A, F(\sigma_1, A) = F(\sigma_2, A) = A \). DM will choose agnosticism if and only if (11)
\[ p(\{T\}|\{\sigma_1\}) \geq \frac{1}{qp(\{\sigma_1\}|U_T(T) - U_T(A))} \} \{[1 + q - qp(\sigma_2)]B(A) - qp(\sigma_1)B(T) + q[p(\sigma_1)W(AG,T) + p(\sigma_2)W(AG,A)] - (1 - q)p(\{T\})[U_T(AG) - U_T(A)] \} \]
and
Proposition 7 is a formal statement of the informal argument made above that agnosticism is more likely to be chosen when the signal is relatively more informative. Conditions (11) and (12) within Proposition 7 provide a characterization of just how informative the signal must be in order for agnosticism to be the rational period 1 choice. In general, this is when \( p(\{T\}|\{\sigma_1\}) \) is relatively large while \( p(\{T\}|\{\sigma_2\}) \) is relatively small.

7. Conclusion

The theory of religious choice we present here contains some lofty assumptions as premises, which may not hold. For example, it may not be that (a) people choose their religion, (b) people pursue their own self interest as they choose their religion, (c) people can partition their religious views into mutually exclusive religious alternatives, (d) people can represent the extent of their faith in the various alternatives by conceiving a probability distribution, or (e) people perceive agnosticism as the risky temporal alternative of choosing not to choose a religion. Yet, the theory derived from these assumptions seems to offer some reasonable explanations of agnosticism, and a number of empirically testable hypotheses.

While our model is generic, in that it canonically includes two religions and agnosticism in period 1, and two religions in period 2, we have chosen here to impose restrictions on the model’s parameters so that we can distinguish what we might label a generic theist from a generic atheist, from a generic agnostic. The model has provided testable relationships between the religious alternatives chosen and the parameters:

- **Atheists** will tend to perceive (a) adopting theism generates net costs in life relative to atheism, (b) any given theism is not likely true, or (c) the after-death payoff for a particular theism is not high relative to atheism, if there is an afterlife and the particular theism is true.
- **Theists** will tend to perceive (a) a particular theism does not generate significant net costs in life relative to atheism, (b) a particular theism has some likelihood of truth, or (c) the afterlife payoff for a particular theism is high relative to atheism when the theism is true.
- **Agnostics** will tend to perceive (a) any religion generates in life costs relative to agnosticism, (b) the payoff for agnosticism in the afterlife, if there is an afterlife, is not too much less than any true religion, (c) no religion has a high likelihood of truth, (d) death is not imminent, (e) atheism will be punished more significantly in the afterlife if a theism is true, or (f) there is a considerable likelihood that an informative signal may be received in life as to the truth of various religions while it is also less costly to switch from agnosticism to a given religion than from one religion to another.

Our model not only indicates differential switching costs may explain agnosticism, but it also indicates switching costs make the attractiveness of agnosticism sensitive to informative signals. An informative signal, by definition, changes beliefs, and the change in beliefs may change the decision maker’s preferred religion. If there are no switching costs, changing from one religion to another is just as easy as changing from agnosticism to a religion, and the decision maker need not factor in the possibilities that beliefs might change until the signal is received. That is, with no switching costs, how agnosticism is evaluated relative to other religious alternatives will depend upon factors other than the possibility of receiving an informative signal. However, if changing from one religion to another is more costly than changing from agnosticism to a religion, it may be best to remain agnostic until the signal is received.

Our model offers explanations for why agnosticism is not a popular religious alternative, a fact reported in the opening of this paper. First, because agnosticism is known not to be a true religion, it is risky choice relative to the preferred religion, and this risk increases as age increases the probability of death. Second, while switching from agnosticism to a religion may be less than from religion to religion, the decision maker must perceive that an informative signal will be forthcoming in order for this lower decision cost to promote agnosticism. Ironically, this implies the lack of information that makes this religious choice difficult contributes to decisiveness. Finally, in presenting his “Jamison wager,” Jorden (2006) provides survey evidence that indicates the typical person finds net in-life benefits to adopting a religion, rather than net in-life costs, which in our model not only helps explain the observed unpopularity of
agnosticism, but also the unpopularity of atheism in its various forms. Regarding the distaste for agnosticism, being in a state of indecisiveness may impose more of a cost in the form of anxiety than the faithful act of adopting a religion while still holding significant doubts.

Looking to future work, we agree with Montgomery (1996, p. 444) that “economists studying religious behavior need to more clearly specify the processes by which both utilities and beliefs are formed.” In the decision theory context, Oppy (2006, p. 255) is concerned about the “use of preferences to alter probability.” It could be that a decision maker cannot independently (1) identify possible religious alternatives and (2) assign probabilities to those alternatives. Oppy’s hypothesis seems to be that, when the decision maker thinks about the problem, she will first recognize her own preferred alternative and then construct the utilities and probabilities to rationalize the preference. That is, rather than utilities and probabilities determining religious choice as Pascal proposes, the causation could be reversed so that the decision maker’s religious view determines the utilities and probabilities the decision maker will admit.

We see promise in extending the understanding of agnosticism through empirical work, extending this model to admit ambiguity, and extending this model to allow the signals received to be affected by religious choice. As we have seen here, a purely theoretical model can produce testable predictions. The process of trying to design a survey to collect data that would allow these predictions to be tested would likely provide insight about how people do and do not think about religion, even if the issues surrounding survey data discount the usefulness of the data for testing the theory. Adding ambiguity to this model of agnosticism would provide the opportunity to examine how the choice of agnosticism depends upon the decision maker’s degree of optimism versus pessimism. Finally, it could be that believing is seeing, in the sense that the choice of a particular religion leads one to receive informative signals that are not otherwise perceived, which may provide explanations for strongly held religious perspectives in ways not provided by this model.
References


