It's a Miracle: Separating the Miraculous from the Mundane

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Michael R. Ransom

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This dissertation titled
It's a Miracle: Separating the Miraculous from the Mundane

by
MICHAEL R. RANSOM

has been approved for
the Department of Psychology
and the College of Arts and Sciences by

Mark D. Alicke
Professor of Psychology

Benjamin M. Ogles
Dean, College of Arts and Sciences

ABSTRACT

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It's a Miracle: Separating the Miraculous from the Mundane

Director of Dissertation: Mark D. Alicke

What aspects of events impel people to label them as miraculous? Four studies examined various factors that lead people to designate an event as a miracle. The first study was conducted in order to identify the basic elements of laypersons' miracle beliefs. To do so, we had participants define a miracle, list five events that they considered miraculous, and state what they believe to be the purpose of miracles. Results showed that people tend to view miracles as highly improbable and beneficial occurrences and that they occur to instill hope and faith in people, showing God's power in the natural world. Studies 2 and 3 investigated whether people's miracle judgments are malleable and found that people tend to label events as miracles when the events in question were of high magnitude, obtained in an unusual manner, personally affected the event's protagonist, involved a person of worthy character, and resulted in an altruistic, beneficial health outcome as well as when the events benefited another person's physical welfare, were of personal relevance, and depicted a low-probability event. Study 4 also showed that miracle events should have a low probability and demonstrated that miracle judgments can be influenced by just world and free will beliefs.

Approved: _____

Mark D. Alicke

Professor of Psychology

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CHAPTER 1: INTRODUCTION

Betsy and Leonard Jernigan claim to be witnesses to a miracle. At just four-months old, their daughter Elizabeth was diagnosed with meningioma, an extremely rare and fatal form of brain cancer. The doctor's prognosis was grim: continued growth of the aggressive tumor, paralysis and certain death. The Jernigan's were devastated and constantly prayed for Elizabeth's recovery, hoping God would hear their prayers for her survival. Along with appealing to a higher power for Elizabeth's rehabilitation, her parents also pursued more secular healing methods, electing to allow her to undergo a series of surgeries. One month after the first operation, surgeons attempted one final effort to remove the remaining cancerous tissue. However, at the outset of the procedure, when doctors examined Elizabeth's brain, they could not locate the lesion. Subsequent CAT scans revealed no evidence of a tumor, and the hospital's pathologist could not find any evidence of cancer in the ablated nerve tissue. The doctors and cancer specialists were baffled and designated what happened to Elizabeth to be a spontaneous resolution. Her parents, however, called it a miracle, but why? Before identifying the various elements and factors that lead people to label events as miracles, an even more basic question should be tackled; specifically, why are miracles a worthy area of psychological study?

Why study miracles?

An investigation into how people conceptualize and think about miracles appears to be both timely and appropriate, in part because an increasing number of people believe in them (Pew Research Center, 2010). According to a recent survey of United States

adults middle-aged and older, 80% believe miracles still occur today as they did in ancient times and 67% believe illnesses and injuries can be divinely healed (Anderson, 2008). Similarly, previous investigators reported 77% of those surveyed agreed with the statement that God sometimes intervenes to cure people who have serious illnesses (Poloma & Gallup, 1991). Additionally, a more recent Gallup poll revealed 94% of respondents express a belief in God, 82% consider religion to be very important in their lives, and 57% of people endorse the idea that religion can solve all or most of today's problems (Gallup, 2009). Based on these descriptive statistics, it appears as though people's thoughts about miracles are worthy of empirical examination.

Psychologists also have become increasingly interested in examining how religion and religious beliefs and concepts impact people's lives. Over the last few decades, a steady stream of psychological research has examined the cognitive and motivational origins and consequences of religious beliefs (see Emmons & Paloutzian, 2003; Hill & Hood, 1999; Richards & Bergin, 1997, 2000; Sedikides & Gebauer, 2010), as well as their association with mental and physical health (George, Ellison, & Larson, 2002; Koenig, 1998; Koenig, McCullough, & Larson, 2001; Larson, Swyers, & McCullough, 1998; Maton, 1989; Plante & Sherman, 2001; Seybold & Hill, 2001). McCullough and colleagues (2000), in their meta-analysis representing nearly 126,000 participants, found that people who scored high on measures of religious involvement, compared to those who scored low, had 29% higher odds of survival from cancer and cardiovascular diseases at follow-up interviews. Furthermore, people who report a closer connection with God experience less depression and higher self esteem (Maton, 1989) and tend to

feel less lonely (Kirkpatrick, Kellas & Shillito, 1993). Researchers have demonstrated empirically how people's religious beliefs are impacted by mortality salience such that participants increase their belief in God and divine intervention after being reminded of their own mortality (Norenzayan & Hansen, 2006). People's conceptions of God can also influence their feelings of personal control and authorship, and, in fact, priming God-related concepts in people leads them to behave in ways that conform to religious norms (Dijksterhuis, Preston, Wegner & Aarts, 2008; Kay, Gaucher, McGregor & Nash, 2010; Laurin, Kray, & Moscovitch, 2008; Pichon, Boccato & Saroglou, 2007; Randolph-Seng & Nielsen, 2007; Preston & Epley, 2008). Given these recent advances in the understanding of people's religious beliefs about God and God-related concepts, and how religious beliefs influence one's mental and physical health, an investigation of miracles, the products of God's intervention in the corporeal world, is warranted.

Miracle Debates

The current research addresses two long-standing debates in the miracle literature. Typically, a miracle is defined as, "an event that appears inexplicable by the laws of nature and so is held to be supernatural in origin or an act of God" (The American Heritage Dictionary of the English Language, 2000). However, some disagreement exists among scholars with regard to the relationship between miracles and natural laws, particularly whether or not miracles must violate a natural law. Whereas some past philosophers and theologians assert that miracles must violate a natural law by divine intervention or some other type of supernatural force, others emphasize that a natural law does not need to be violated when a deity intervenes in earthly affairs (Brown, 1984;

Hume, 1748/2003; Lewis, 1947/1984; Augustine, 1972/1984; Aquinas, 1274/1984; Mawson, 2001; Mumford, 2001; Wertenbaker, 1997). The present research will explore the first debate, whether a natural law violation is a core feature of laypersons' miracle beliefs.

We will also address discussion in the literature concerning the distinction between two types of miracles: the religious, strict miracle and the colloquial, secular miracle (Rowe, 2001; Wertenbaker, 1997). In the strict religious sense, a miracle refers to a supernaturally or divinely caused event that satisfies two conditions: the event in question would not have occurred in the regular course of nature and it was the result of direct intervention of God or some supernatural agent (e.g., Jesus turning water into wine). In the more secular sense, a miracle simply refers to an unexpected, beneficial experience (e.g., a student passing an exam without prior studying). Reflecting this distinction, standard dictionaries typically have two entries for *miracle*, with the first entry characterizing a miracle as an amazing occurrence due to divine intervention and the second entry describing a miracle as an extremely unusual, beneficial event without any divine intervention. The current research teases apart whether most people adopt the strict, religious conceptualization of miracles, or adhere to the secular definition.

God-Related Attributions

People consider various possibilities when attempting to explain the causes of events in their lives. They can explain occurrences using naturalistic terms such as personal traits or situational factors, as posited by classical attribution researchers and theorists (Jones et al., 1971; Kelley 1967). For example, a woman may conclude that a

fellow driver is inherently careless and aggressive, attributing his dangerous driving habits to dispositional, personal traits. Alternatively, people may justify occurrences by relying on religious attributions and employ supernatural terms such as God and Satan. For instance, a man may attribute his infidelity to the work of the Devil. Given that miracles, in the strictly religious sense are regarded as acts of divine intervention, the religious attribution research is relevant to the current experiments and will be discussed in more detail.

The main goal of religious attribution studies has been to predict, using a host of variables, when people will make religious and secular attributions. Two sets of extensively researched variables have been shown to lead people to attribute an event to God: a) participant variables (i.e., participants' religious affiliations, their religious practices and their personal preferences) and b) factors associated with the scenario or event (i.e., the outcome of the event and the magnitude of the event) (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994).

Lupfer and colleagues have explored participant factors in studies investigating elements that induce people to attribute events to God. Through a series of vignettes that depicted central figures engaging in a common, everyday activity such as going out to dinner, the researchers asked participants to read the scenarios, and then, based on a list of provided choices, to identify the most likely reasons the central figures acted as they did. Participants were also requested to select the most plausible explanation for the outcome occurring. The experimenters provided participants with five possible explanations: 1) the actor's characteristics, or disposition; 2) luck; 3) the situation or

influence of others; 4) the influence of God; and 5) the influence of Satan. Results showed that people were more likely to attribute an event to God when they endorsed conservative Christian values, when the event evoked or affirmed their conservative Christian principles, and when they approved of the event's outcome (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994). It is important to note that averaging across all the vignettes and participants, secular dispositional factors of the actors in the scenarios were most commonly chosen as causes of the central figure's actions, at 54% and 49% respectively, with God being selected about 7% of the time (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994). However, these studies are significant because they identify various factors associated with the participants themselves that may alter their miracle judgments.

Research within the religious attribution literature has also examined certain contextual features of events that lead people to attribute a happening to God (Lupfer, Tolliver & Jackson, 1996). In their examination of the various aspects of events that induce people to use God as a causal explanation, Lupfer and colleagues again used a series of vignettes. However, instead of focusing on participant variables, the researchers concentrated on the details of the events and manipulated both the positivity of the event and to what degree the event's outcome changed the character's life. Again, participants, after reading the scenarios, identified the most likely causes of the actor's actions, the event's outcome, and selected the most plausible explanation among the provided list of choices. Results demonstrated that people were inclined to attribute an event to God when perceiving the event's outcome as positive and when the event substantially

changed the central character's life (Lupfer, Tolliver & Jackson, 1996). Building upon this notion of event magnitude, subsequent research examining large-scale, significant life events has revealed another contextual feature leading people to cite God as the cause of an event, avoiding imminent death (Pepitone & Saffiotti, 1997). Correlational evidence further suggests that people view God as intervening when an event is considered extraordinary and happens to a person of good-character (Lupfer, De Paola, Brock & Clement, 1994; Lupfer, Tolliver & Jackson, 1996). This research line is noteworthy because it indicates that miracle judgments are malleable and can change based upon certain event characteristics.

However, studies within the religious attribution literature have limitations. Even though participants' religiosity levels were routinely measured in prior research, participants were never specifically asked if they believed in miracles or divine intervention. This methodological omission can be potentially problematic because if participants do not actually believe in miracles, it is highly unlikely they view God as being a causal agent in their lives. We, in contrast, along with measuring participants' religiosity, explicitly ask our participants if they believe in miracles and to define a miracle. Studies within the religious attribution literature also provide participants with a preset menu of naturalistic and supernatural attribution options, including the protagonist's traits, situational influences, God, Satan, fate, and luck. Providing participants with an assortment of options has the potential to color their attributions as demonstrated when participants cited luck and situational factors, along with God, as prominent sources of life-altering events with positive outcomes (Lupfer, Tolliver &

Jackson, 1996). The current research does not encourage participants to consider other causal factors such as fate and luck, but simply asks participants to what degree they would label an event as a miracle.

In addition, studies within the religious attribution literature encouraged participants to apply their personal religious beliefs to the attributional task and used events that deal with issues of particular importance to conservative Christians such as praying in public, prayer in schools and homosexuality (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994). The present research offers no such encouragement, but merely asks participants to what degree they consider the event miraculous; we also do not use loaded events that reflect conservative Christian values and we do not emphasize Christian principles. Furthermore, prior studies used hypothetical situations and vignettes, not real-life circumstances or events, which may have limited participants' abilities to assess real-world reactions and beliefs. Our research provides a more individual approach. In our first study, we instructed participants to construct their own possible miracle events. We then used variations of these events in realistic scenarios in our subsequent studies, enabling us to investigate factors that lead people to label real-world events as miracles. In our studies, we do use hypothetical events, but the events are based off of participants' own events lists.

The current research expands and builds upon the religious attribution literature by taking a more detailed look at miracles. We investigate other components not yet examined that may lead people to judge an event as being caused by God, to be a miracle; specifically, factors pertaining to the situation, the protagonist in the miracle event and

the research participant. Furthermore, we consider not only factors that lead people to label events as miracles, we also investigate why people think miracles occur, tease apart religious and secular miracles, and assess whether miracles must violate a natural law.

One driving force behind examining why people presume miracles occur is the psychological function of miracles. Research has indicated that religious beliefs and practices are associated with various mental and physical health benefits. Faith and hope have been linked to improved well-being (Oman & Thoresen, 2002), and a positive correlation exists between religious coping behaviors and better mental health status (Koenig, Pargament, & Nielsen, 1998). In fact, religious beliefs play a significant role in reducing death anxiety (Durkheim, 1915/1965; Freud, 1927/1961; Kierkegaard, 1843/1955). Several studies suggest a relationship between religiousness and concerns about death (Kahoe & Dunn, 1975; Templer, 1970) such that people who score high on religiosity tend to show little concern about death; their religious beliefs allow them to feel significant and secure in the conviction that they will live on in some way after dying. Scholars maintain that miracles give people hope for the future (Brown, 1984; Houston, 1994), and recent studies examine the potential impact intercessory prayer has on people's physical health (Arias, 2007; Glickman-Simon, 2004; Lundberg, 2007); so perhaps miracles also offer people psychological and physical benefits. Miracles also have the potential to satisfy egocentric motivations since believing that one has been the object of a divine miracle allows one to feel special and important (Pyysiäinen, 2002) and can help people feel less lonely and more connected to those around them (Epley, Akalis, Waytz & Cacioppo, 2008)

However, belief in miracles and divine intervention can also have detrimental effects on people's health such as when they refuse life-saving medical treatment. For example, Asser and Swan (1998) recounted numerous instances in which families substituted faith-based interventions for traditional medical care. A recent set of studies by Vess and colleagues (2009) elucidate possible reasons for refusing medical treatment. They found that people high in religious fundamentalism, when faced with their own mortality, were more likely than their low fundamentalist counterparts to rely on their faith in God and divine intervention in overcoming diseases and ailments. Furthermore, their research suggests that refusing medical treatment in favor of prayer allows those high in religious fundamentalism to fulfill the motive of buffering death concerns.

Along with investigating the purpose of miracles, our studies explore other factors contributing to how people construe miracles and under what conditions an event is judged miraculous. In addition to focusing on beneficial outcome and high magnitude variables, we examine other situational factors such as whether the event affects the protagonist personally, if the circumstances in which the protagonist in the scenario receives the miracle matter, and to what significance are the resulting consequences of the miraculous event. We also experimentally manipulate the probability of the protagonist receiving the miracle instead of relying on correlational evidence, in order to investigate if participants would be more apt to label an event as a miracle when it has lower, rather than higher, odds of occurring.

In an additional improvement regarding characteristics specific to the scenario's protagonist, we examine if an event is more likely labeled a miracle when it happens to a

person of good character. Although this factor has been examined in past research, investigators used a correlational design whereby the judgments of only highly conservative Christians were influenced. We contend this factor warrants further investigation; therefore, we use a full sample of undergraduate students and implement a design that experimentally manipulates the character of the miracle recipient.

Previous research on religious attributions has identified participant traits that influence the likelihood they attribute an event to God: religious affiliation, approval of the event's outcome and whether the event endorses their conservative Christian values (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994). Along similar lines, we examine if a participant's religiosity contributes to labeling an event a miracle. We also explore if a participant would be more inclined to label an event as a miracle when the event in question involves them personally.

Theoretical Underpinnings of Miracles

Both cognitive and motivational constructs can be put forth to illuminate the intricacies that comprise people's miracle judgments. Norm theory, which details when and why people compare reality to its alternatives, provides a potential cognitive theoretical framework in which to discuss miracles. This theory is of particular importance since it specifies cases of surprise, delineates what constitutes an abnormal event, and identifies conditions when reality tends to be compared to counterfactual alternatives (Kahneman & Miller, 1986). Research into people's miracle conceptions can benefit from norm theory contributions considering miracles have the ability to provoke amazement and surprise in people, are characterized as abnormal acts that violate the

laws of nature, and occur in the presence of an abundant amount of alternatives (Ehrman, 1999, 2000; Gaztambide, 2008; Rowe, 2001; Wertenbaker, 1997). Furthermore, norm theory provides a potential method by which people can arrive at a typical miracle definition, whether it is secular or religious in nature.

Norm theory specifies the cognitive conditions underlying surprise, asserting that instances of surprise are produced when a contrast exists between a stimulus and a constructed counterfactual alternative. Essentially, surprise is evoked when an event or outcome violates expectancies and prior beliefs (Teigen & Keren, 2003; Kahneman & Miller, 1986). According to norm theory research, a person will feel surprise if his or her emotionally demonstrative spouse does not cry at a dearly beloved uncle's funeral because the expected behavior, crying for a dearly-loved, deceased uncle, does not occur.

This line of thinking can readily be applied to a typical miracle-type scenario and can help illustrate why religious scholars consider miracles to be surprising events. For instance, a doctor cognizant of a patient's terminal illness, grim prognosis, and extremely low odds of survival should be duly surprised and may label the patient's recovery a medical miracle if that patient experiences a full recuperation. Designating the recovery a miracle and finding it surprising should result since the stimulus, the patient surviving the terminal illness, runs in direct contrast with a very salient, constructed counterfactual alternative, the patient dying. It is worth noting that miracles do not always have to cause surprise, especially if the person making the judgment has witnessed many miracles or miracle-type events previously. For example, I would consider my brother surviving pancreatic cancer very surprising and perhaps miraculous, in part because I have never

known someone who has recovered from this type of cancer. However, someone whose parent and grandparent both survived pancreatic cancer might deem my brother's recovery not necessarily surprising, but still perhaps miraculous because my brother's recovery is evaluated and interpreted in conjunction with her relatives' cancer-surviving episodes. Still, norm theory asserts that feelings of surprise occur when a person fails to make sense of an experience and contends that notions of surprise reflect both anticipation (an a priori expectation) and an after-the-fact attempt at evaluating and making sense of the event (Kahneman & Miller, 1986; Falk, 1989). Miracles, in turn, are also cases where people attempt to make sense of events, especially when the events are unexplained by science or violate natural laws (Ehrman, 1999, 2000; Hume, 1748/2003) and when the events take place within a religious context (Swinburne, 1989). Researchers further maintain that God can assist people in finding meaning in events (Pargament & Hahn, 1986), thus allowing them to make sense of an experience.

In the context of the current research, norm theory helps edify why both religious scholars and lay people consider miracles abnormal events by detailing what constitutes an abnormal event. Norm theory contends that abnormal events are occurrences with numerous possible alternatives and maintains that notions of abnormality will be enhanced when counterfactual alternatives are highly available. A miraculous event (e.g., a person surviving a terminal illness), then, certainly falls under the umbrella of an atypical, abnormal event since numerous alternative outcomes were possible. For example, the aforementioned miraculous medical recovery is but one of many potential alternatives; among other possibilities, the infirm person may have remained in a coma,

died from the illness, or recovered but then experienced a relapse. The second feature, aberrancy, encourages people to ask causal questions, which, in the context of miracles, is significant in that a miraculous event oftentimes leads people to question why the event occurred; that is, why did this particular person recover from a terminal illness?

Norm theory further supplements miracle research, maintaining that various stimuli recruit alternatives and bring certain frames of reference into play based upon what could, might, or should have been. Essentially, stimuli elicit various counterfactuals. It is plausible that miracles also generate counterfactuals, where people entertain thoughts on “what might have been.” With miracles, instances such as “I almost died” or “I almost did not win the lottery” should elicit downward counterfactuals, whereby a person reflects on how an event could have culminated in a more adverse outcome. In addition, counterfactuals should appear “close” if they can be reached by changing certain components of reality. Miracle events align with this concept by containing mutable, modifiable aspects when, for example, someone wonders what might have happened if he had not played his lucky birthday numbers when purchasing the (ultimately) winning lottery ticket.

Contributing to the explication of why people have different conceptions of miracles (i.e. secular and religious miracles), norm theory explains that categorical knowledge is acquired by selectively calling upon certain past episodes and relevant exemplars. People essentially use backwards reasoning and an assemblage of exemplars to relate an experience or event back to prior cognitively-categorized events (Brooks, 1978; Kahneman & Miller, 1986; Medin & Schaffer, 1978). Thus, one’s knowledge of

the category “miracle” can be created by selecting past miracle episodes or previously encountered examples of miracles. In general, the theory asserts that a probe, an experience of an event or reference to a concept, (e.g., dog) recruits an evoked set of elements, representations of episodes, or classes of elements, (e.g., dachshund). These elements are then delineated or described by features or attributes (e.g., size, length). The elements, in turn, are characterized by an aggregate of those features and attributes.

This line of reasoning can contribute to the understanding of why some people have a religious conception of miracles whereas others have a secular notion. A probe (e.g. miracle) can recruit various elements or past miracle representations/episodes (e.g. winning the lottery, surviving cancer, Jesus turning water into wine, God parting the Red Sea). These elements are then described by several features (e.g., low probability, beneficial outcome, divine intervention). A person should have a predominately secular view of miracles if the probe elicits elements without religious attributes. In contrast, an individual should have a predominately religious view of miracles if the probe elicits elements that do contain religious attributes. Furthermore, some elements will contribute more to a probe than will others: the probe “bird” is likely to activate elements/representations of prototypical birds such as “robin” or “blue jay” more strongly than less prototypical birds such as “ostrich” or “kiwi”. Similarly, acknowledging the millennial generation (individuals born after 1980 and who are, in fact, our participant sample), are considerably less religious and attend fewer religious services than most older Americans, the probe “miracle” in our research is likely to activate a secular

element such as winning the lottery as opposed to a religious element like Jesus walking on water (Kahneman & Miller, 1986; Pew Institute, 2010).

Another core body of research relevant to the current experiments is just world theory (JWT, e.g., Lerner, 1980), which can provide a motivational angle to the theoretical discussion of miracles. The backbone of JWT asserts that people are motivated by a sense of entitlement and deservingness to believe that the world is a fair and just place, and asserts that individuals get what they deserve and deserve what they get (Lerner & Simmons, 1966). Just world theory is of particular importance to an analysis of miracle judgments and miracle definitions because highly religious persons tend to perceive more justice in life events than do less or nonreligious persons (Pepitone & L'Armand, 1997). In fact, one of the main goals of religion is to provide people a sense of justice since God is typically viewed as the ultimate judge, rectifying unfairness in the world (Frankl, 1963; Gray & Wegner, 2010). Research within the realm of religion has found that distinct attributes of God are called upon in different situations to help people find justice, meaning, and a sense of control in their lives. People cite a just, loving God who rewards good behavior and individuals of good character, and also an angry, yet just, God who punishes sinners and people of amoral character (Pargament & Hahn, 1986). Recent data further suggests that moral concerns are critical elements to explain the origin of religion (Wade, 2009) and, according to JWT, moral individuals should receive favorable treatment.

A person's belief in a just world may, however, be challenged. Medical situations (a common domain in which miracles may occur) can severely test one's belief in a just

world. When people's notions of a just world are threatened by contrary evidence, they engage in a variety of behaviors such as helping or compensating the victim in order to maintain a sense of justice (Miller, 1977). People can also use their beliefs to help uphold their conviction in a just world, to rationalize a person's fate, and to perceive the negative outcome as being deserved. Of relevance to the current set of experiments, people can rely on their religious beliefs in times of trouble (i.e., a belief in miracles) to sustain the notion that the world is just and meaningful. For instance, people can cite God's will when they encounter unjust situations such as being involved in a serious accident, or they can cite God's love when their child recovers from cancer. In a similar vein, when a people witness miraculous events, they can attribute them to God's will or to His love.

Just world beliefs, religion, and miracles can also fulfill other motivational goals such as maintaining a positive well-being and a sense of control. Dalbert and colleagues (1999, 2001) posit that a person needs to believe in a just world because the belief promotes a sense of well-being in the face of one's misfortunes and other negative events. Similarly, religion enhances one's well being (McCullough & Willoughby, 2009). Miracles also fulfill this motivation, offering people hope for the future and increasing their sense of optimism during tough times (Brown, 1984; Houston, 1994; Mawson, 2001). A sense of control can also be sustained by just world, religious, and miracle beliefs. Oftentimes, belief in a just world runs counter to painful events taking place in people's lives and, as a result, they look for an explanation. Unable to control or explain a difficult situation, people may turn to a higher power to restore some order, control, or

justness to their world (Kay et al., 2010). Therefore, seeking hope and wanting their world to be “just,” some people look for a miracle.

Miracles also have a methodological connection to just world theory. Studies using an experimental paradigm to investigate people’s just world beliefs (Lea & Hunsberger, 1990) tend to manipulate variables such as the victim’s innocence and moral character. Religious scholars, in turn, maintain that miracles happen only to worthy, innocent individuals (Gallois, 2007; McKenzie, 1999). Furthermore, researchers in the social sciences contend that scenarios used to investigate people’s just world beliefs should contain elements of injustice in order to challenge the notion of a just world (Hafter & Begue, 2005). Along those lines, a typical miracle scenario that involves a young child stricken with, but ultimately recovering from, a terminal illness contains elements of both innocence and injustice.

The JWT literature clearly augments miracle judgment research. Moreover, the study of miracles allows us to examine an aspect of just world theory that is often overlooked, namely when a person benefits from injustice. Surely the world is full of instances where the unjust benefit such as when the unscrupulous CEO of a large corporation receives a large severance package before bankrupting his company and laying off hundreds of employees. Unjust benefits can be easily translated into a miracle scenario such as when a murderer recovers from a terminal illness.

Miracle Features and Events

The main focus of the current research is to study people’s miracle conceptions and to examine what are the critical factors and aspects of events that lead people to

judge an event as miraculous. Many philosophers and theologians have weighed in on the concept of miracles. Hume (1748/2003) asserted miracles must violate natural laws and be caused by some type of deity or supernatural force. Scholars and theologians have further commented that miracles regularly involve a health component and tend to happen only to worthy individuals (Gallois, 2007; McKenzie, 1999). However, the few psychological studies that examined what ordinary people think about miracles (Lupfer, Brock & De Paola, 1992; Lupfer, De Paola, Brock & Clement, 1994; Lupfer, Tolliver & Jackson, 1996; Pepitone & Saffiotti, 1997; Spilka & Schmidt, 1983) focused on other supernatural causes in addition to God, including fate and Satan, disregarded whether people think miracles must violate natural laws, and did not address what people consider to be the purpose of miracles. Given that both ancient and present-day miracles are a potent source of religious ideology (Brown, 1984), and that miracles are a continuing belief of many individuals (Anderson, 2008), we seek to isolate the core features of and purpose of miracles and to clarify the types of events people categorize as miraculous.

In this effort, the current research assesses what people consider to be the essential elements of miracles. Scholars regard miracles as: 1) extraordinary, improbable events (Peterson, 1997; Wainwright, 2005); 2) products of God's work and intervention in the natural world (Gallois, 2007; Peterson, 1997); and 3) events that improve people's health and welfare (Gallois, 2007). These miracle elements illuminate why Elizabeth's parents labeled her recovery a miracle. Fulfilling the first element, the doctors gave Elizabeth an extraordinarily discouraging prognosis and asserted she had an extremely low probability of surviving. Next, Elizabeth's parents prayed fervently for her survival,

hoping God would intervene to save their child's life. Finally, Elizabeth's case satisfied the third element; when she beat her deadly cancer and experienced a markedly positive health outcome. The studies that follow will test whether or not laypersons agree with these scholarly perspectives on what constitutes a miraculous event.

Overview of Studies

Our first study was conducted in order to identify the core features of perceived miracles, to assess whether miracles must violate a natural law, and to clarify the types of events people categorize as miraculous. We focused specifically on examining whether most people adopt a strict, religious conceptualization of miracles or adhere to a more secular interpretation. The methodology of our first study was open-ended, and we asked participants a variety of miracle-related questions. Independent coders were then used to classify participants' responses.

Our second, third, and fourth studies were conducted to examine if people's miracle judgments are malleable and alterable by manipulating certain variables such as the personal characteristics of the miracle recipient, the personal nature of the miracle, and participants' body positions. In Studies 2 and 3, participants encountered a series of scenarios (which were based on the miracle events participants provided in Study 1) indicating the degree to which they perceived each event as surprising and miraculous. We anticipated participants would be surprised and inclined to judge an event as miraculous when it included low probability of occurrence, was of high magnitude (particularly an event that involves a large monetary magnitude that can alter someone's life), involved a worthy, innocent individual, resulted in a positive, selfless outcome that

improved someone's physical welfare, personally affected the protagonist and the participant, and occurred in an unusual way. In Study 4, participants read about a medical case in which the odds of survival were 0%, 1%, or 10% and were also either provided with a scientific explanation or not. We expected participants would be inclined to judge an event as being miraculous when the person reads about a situation when someone is given 0% survival odds and also when they are not provided with a scientific explanation.

Several factors contribute to our contention that people should judge an event to be more miraculous when it has a low-probability of occurrence. Scholars maintain that miracles defy probability and the normal function of nature (Ehrman, 1999, 2000; Gaztambide, 2008) and are rare and unusual occurrences (Paloutzian, Rogers, Swenson, Lowe, 2008). In addition, the standard dictionary definition of a miracle depicts it as an extraordinary, unexpected event (The American Heritage Dictionary of the English Language, 2000). Finally, there is some correlational support that people identify God as being a causal factor when the event is viewed as being extraordinary (Lupfer, De Paola, Brock & Clement, 1994).

There are also grounds to assume people would tend to label an event a miracle when the event is of high, compared to low, magnitude. Believers perceive God as being omnipotent, omniscient, and omnipresent. Therefore, it stands to reason God's acts should be significant ones that substantially impact people's lives. High magnitude events should also be judged more miraculous than low magnitude events since scholars assert that miracles tend to happen in situations where people feel helpless and hopeless,

and cannot imagine coping with overwhelming situations unaided (Pugh, 2008). Life-changing events result from momentous occasions, and religious attribution research also shows that people tend to attribute life-altering occurrences to God (Lupfer, Tolliver & Jackson, 1996).

Scholars further maintain that people are inclined to judge an event miraculous when received by a worthy, innocent individual, compared to a person of negative character (Gallois, 2007; McKenzie, 1999). Correlational evidence also suggests that people see God as playing a causal role when a miracle recipient is of good character (Lupfer Tolliver, & Jackson, 1996). Thus, we predict events will be judged more miraculous when the participants in our scenarios are of good character.

We also anticipate people should be more likely to label an event a miracle when it results in a positive, selfless outcome, compared to a positive, selfish outcome, especially when the event improves the recipient's welfare. People should be more inclined to label an event as miraculous when it benefits a fellow person because miracles are regarded as social phenomena (Brown, 1984). Moreover, scholars contend miracles are related to compassionate feelings for others and are not exclusively accommodating to the recipient (McKenzie, 1999). Additionally, people should judge an event as more miraculous when it results in a beneficial health outcome compared to positive outcome without health benefits since people typically turn to God in times of stress, illness, injury (Hood, Spilka, Hunsberger & Gorsuch, 1996; Pargament, 1997). People also demonstrate increased belief in God after being subliminally exposed to threat words such as death (Mikulincer et al., 2008) and tend to cite God as a causal factor when they

evade imminent death (Pepitone & Saffiotti, 1997). Finally, this relationship between miracles and good health is not surprising considering the majority of Jesus' miracles in the New Testament, upon which many people base their knowledge of miraculous events, involved curing the sick and infirm (Nichols, 2002; Gaztambide, 2008).

We surmise people should also be more inclined to judge an event as miraculous when it personally affects them, or the sympathetic protagonist in the scenario, rather than someone else. First, people tend to have a private, personal relationship with God (Granqvist & Kirkpatrick, 2008; Kirkpatrick, 2005), and God's personal relationship with the believer is an essential feature of religiosity (Batson et al., 1994; Exline, 2002). An individual's intimate relationship with God is further reflected in the etymology of "religion," which is coined from the Latin *religare*, meaning "bond between humans and gods" (etymonline.com). Additionally, the association with an almighty being has the potential to substantially elevate one's self-worth (cf. Tesser, 1988), creating a personal interest in religiosity and its ensuing possibility that one may become the recipient of a miracle.

Several reasons suggest why individuals would judge an event to be more miraculous when it occurs in an unusual compared to an ordinary manner. First, tracing the evolution of the word "miracle" reveals its etymology is from the Latin *miraculum*, "to wonder at," (Lawal, 2008) suggesting people may label an unusual, astounding event miraculous. Scholars also maintain that miracles are bestowed by God's grace, meaning they are given unexpectedly and are not everyday, normal occurrences (Pugh, 2008;

Haar, 2003). People consider miracles to be unusual incidents that constitute an exception to the normal pattern of events in the natural world (Larmer, 2001).

CHAPTER 2: EXPERIMENTS 1-4

Study 1

Study 1 sought to identify the basic elements of laypersons' miracle beliefs. To do so, we had participants define a miracle, list five events that they considered miraculous, and state what they believe to be the purpose of miracles.

Method

Participants

The sample consisted of 145 undergraduate psychology students at a large Midwestern university.

Procedure

During one experimental session, participants completed a questionnaire packet, which assessed their miracle beliefs. First, participants indicated whether or not they believed in miracles ("Do you believe in miracles? How would you describe your belief in miracles?"). Then, participants were asked to define a miracle. The instructions for this item were as follows: ("Please define a miracle. In your definition discuss what you think happens during a miracle, what distinguishes miracles from other events, and whether miracles have to be unexplainable by science"). Next, participants listed five events, in no particular order, that they considered to be miracles ("Please list 5 things that, if they happened, would be considered miraculous"). Lastly, the experimenter asked participants to state the purpose of miracles ("Why do you think miracles exist?"). Because miracle beliefs might be affected by one's religiosity, we also had participants

indicate how religious they were (“On the following scale, how would you describe your religious beliefs?”). Religious belief was indicated on a 1 to 5 scale (1= *not religious at all*, 3= *somewhat religious*, 5= *very religious*). Participants also filled out an intrinsic/extrinsic religiosity measure (Gorsuch & McPherson, 1989). They were given as much time as they needed to complete the packet. Participants were informed that there were no right or wrong answers to the questions, and that their personal opinions on miracles were of great interest to the researchers.

Data Coding and the Major Categories

The coding system was devised based on various scholarly sources including books and articles on miracles and religious attribution (Berry, 2002; Brown, 1984; Clarke, 2003; Fogelin, 2003; Houston, 1994; Larmer, 2001; Lupfer, Tolliver & Jackson, 1996; Mackie, 1982; Mawson, 2001; Odegard, 1965; Pannenberg, 2002; Pepitone & Saffiotti, 1997; Rowe, 2001; Swinburne, 1989; Wertenbaker, 1997) as well as discussions among the research team concerning lay miracle beliefs. Miracle definitions and events were independently coded by two judges into three major categories (low probability, beneficial outcomes, and divine intervention/supernatural cause) as well as various subcategories. Beliefs about the purpose of miracles were coded into two major categories (to demonstrate God’s power/existence and to give people hope or restore their faith in a higher power). Coding discrepancies were resolved through discussion with a graduate student member of the research team.

The first major category, low probability, comes from the notion that miracles are typically characterized as extraordinary, improbable events (Fogelin, 2003; Brown, 1984;

Odegard, 1965). Miracle definitions and events placed in the low probability category tended to categorize a miracle and to describe miraculous events as impossible, unexpected, out of the ordinary occurrences that happen against all odds. Indeed, the two coders looked for these exact keywords and phrases (impossible, unexpected, out of the ordinary, against all odds) while coding the participants' miracle definitions. This practice helped the coders refrain from making inferences that went beyond the participants' written definitions. Low probability miracle events were then subdivided according to whether they depicted simply highly unlikely events (winning the lottery) or very peculiar events that violated natural laws (a person being able to fly).

The second major category, beneficial outcomes, is based upon the idea that miracles can be defined and described as positive events that make peoples' lives better, especially with respect to improving their health situations (Mackie, 1982; Rowe, 2001; Wertenbaker, 1997). Miracle definitions and events placed in the beneficial outcomes category defined a miracle and depicted miraculous events as happenings that were positive, good, and beneficial, and the events often portrayed the recipient of a miracle overcoming a physical ailment. Again, the two coders looked for these specific keywords (positive, good, beneficial) while coding the participants' miracle definitions. Beneficial outcome events were then subdivided according to whether they depicted beneficial health outcomes (surviving cancer) or beneficial cultural outcomes (achieving world peace).

The third major category, divine intervention/supernatural cause, is derived from the idea that miracles are products of God's work or His intervention in the natural world

(Swinburne, 1989; Houston, 1994; Clarke, 2003). Miracle definitions and events placed in the divine intervention/supernatural cause category delineated a miracle and reported miraculous events as occurrences that involved the supernatural, God, or Jesus. Again, the two coders looked for these specific keywords (supernatural, God, and Jesus) when coding the participants' miracle definitions. Divine interventions/supernatural cause events were then further subdivided and placed in a category if the event in question illustrated an event that included either Jesus or God (the parting of the Red Sea).

The fourth and fifth major categories were used to code participants' responses as to why miracles occur. The fourth major category, to show God's power, is based on the position that miracles are demonstrations of God's power and instances of God's presence in the natural world (Brown, 1984; Larmer, 1987; Berry, 2002; Pannenberg, 2002). In order to place a miracle purpose response in this category, the coders looked for two keywords, power and presence. The fifth major category, give hope/restore faith, insinuates that miracles offer people hope for the future and redeem people's faiths in a higher power (Brown, 1984; Houston, 1994; Mawson, 2001) and was included because religion has been noted as a source of hope in times of stress (Kahoe, 1982). In order to place a miracle purpose response in the hope/faith category, the coders searched for two keywords, hope and faith.

Coder Agreement

First, the percent of agreement between the two coders concerning their placement of participants' miracle definitions into the three major categories was calculated. The lowest percentage of agreement between the coders was in the *low*

probability category, at 87.6%. The percentage of agreement of the two coders in classifying the miracle definitions in the *beneficial outcomes* category was higher, at 92.4%. The highest percentage of agreement between the two coders concerning the placement of participants' miracle definitions, 98%, occurred with regards to the *divine intervention/supernatural cause* category. The average agreement between the coders when coding participants' miracle definitions was 92.6%.

Coding agreement on the participants' miracle events also varied, ranging from 89% to 94%. The percentage of agreement between the two coders was the lowest, 89%, regarding placing miracle events in the *low probability* category. The highest agreement between the coders, 94% occurred when classifying the miracle events in the *beneficial outcome* category. The percentage of agreement between coders was 92.4% when categorizing the miracle events within the *divine intervention/supernatural cause* category. The average agreement between the coders when coding participants' miracle events was 91.8%.

Percentages of agreement between the coders were also calculated for the purpose of miracle responses. The percentage of agreement between the coders concerning the placement of the purpose of miracle responses in the *power/presence* category was 95.8%. The percentage of agreement between the two coders was 88.3% with regard to the classification of the purpose of miracle responses into the *hope/faith* category. The average agreement between the coders when coding participants' purpose of miracle responses was 92.1%.

Results

Belief in Miracles

Descriptive statistics regarding peoples' belief in miracles as well as their self-reported religious nature are presented in Table 1. The vast majority of students surveyed indicated they believed in miracles (81.4%). Moreover, there was a significant positive correlation between people's personal belief in miracles and their self-reported religious nature ($r_{pb}(145) = .451, p < .01$). That is, those participants who professed a belief in miracles tended to rate themselves higher in religiousness. Also, there was a significant positive correlation between people's personal belief in miracles and intrinsic religiosity mean scores ($r_{pb}(145) = .300, p < .01$). Those participants who expressed a belief in miracles tended to endorse intrinsic religious activities such as spending time in prayer and having a strong sense of God's presence. In addition, there was a significant positive correlation between people's personal belief in miracles and extrinsic personal religiosity mean scores ($r_{pb}(145) = .444, p < .01$). Participants who proclaimed a belief in miracles tended to endorse extrinsic social religious activities such as going to church to make and see friends. Also, 26.2% of participants indicated that miracles must be unexplained by science. For each outcome variable that follows, the same pattern of results was obtained among participants who believed in miracles and the overall sample. For the sake of simplicity, therefore, the analyses that are reported involve the entire sample.

Miracle Definitions

Table 2 presents frequencies and percentages of miracle definitions registered in the three major categories. The largest category with regard to miracle definitions was

low probability; 47.6% of participants' definitions used low probability keywords (unexpected, out of the ordinary, against all odds, or impossible) in their miracle definitions. The second largest category concerning miracle definitions was beneficial outcomes, with 37.2% of the definitions alluding to miracles as being good, positive and beneficial happenings. The divine intervention/supernatural cause category was considerably smaller and less represented than the other two, with only 21.4% of the participants' definitions mentioning the supernatural, God or Jesus. Collectively, the three major categories accounted for about 78% of the total number of miracle definitions listed; that is, 113 of the 145 miracle definitions provided by participants were coded into at least one of the three major categories. A concrete example of a miracle definition that was coded into all three miracle definition categories is: "A miracle is an act of God. They are events that the result is out of the norm, or most times wouldn't happen. Miracles are beneficiary, meaning they are always for the better of something. I believe God reveals himself during a miracle, and although they are unusual events, I don't think they have to be unexplainable by science." This definition alludes to all three major categories since it mentions a miracle being an act of God, beneficiary and an unusual event.

Miracle Events

Table 3 presents frequencies and percentages of miracle events classified in the three major categories along with their sub-classifications. The largest category concerning the miracle events was beneficial outcomes, and 80% of the surveys contained at least one event that depicted a beneficial outcome. The second largest

category regarding miracle events was low probability; 49% of the surveys listed at least one event describing a low probability occurrence. The smallest category was divine intervention; only 21.4% of the surveys listed at least one event that illustrated a supernatural event or a miracle enacted by God or Jesus. Two concrete examples of miracle events that were coded into two of the three miracle categories are: “Living through cancer; winning the lottery”. Living through cancer certainly is a beneficial event, specifically a beneficial health outcome. Winning the lottery is an event that represents a low probability occurrence.

The miracle events were then broken down into various sub-classifications based on certain commonalities. First, the low probability miracle events were further divided into two additional subcategories: those that described highly unlikely events and those that detailed very peculiar events that also violated natural laws. The most often reported unlikely event listed by participants was winning the lottery. This event occurred in 31% of the miraculous events that were coded into the low probability category. The second sub-classification within the low probability category included events that violated natural laws. The most common event within this subcategory was people flying, which occurred in 11% of the miraculous events that were coded in the low probability category.

The beneficial outcome miracle events were also further divided into two subcategories: those that depicted beneficial health outcomes, and those that described beneficial cultural outcomes. The most common beneficial health outcome event listed by participants was surviving cancer. This event was listed in 43% of the miraculous

events that were coded into the beneficial outcome category. The most common beneficial cultural outcome listed by participants was attaining world peace which was listed in 19% of the miraculous events that were coded into the beneficial outcome category.

The divine intervention/supernatural events, the least represented of the three major categories were also examined for possible subdivisions. Since we had only 22 out of 145 participants' responses to consider, this category was classified into just one subcategory: those events that involved or reiterated one of the miracles performed by Jesus or God. The most common reiteration miracle achieved by Jesus or God was Jesus coming back to earth, which was listed in 26% of the miraculous events coded into the divine intervention/supernatural cause category.

Purpose of Miracles

Table 4 presents frequencies and percentages of the purpose of miracles responses registered in the two major categories. The largest category regarding the purpose of miracles was hope/faith; 41.4% of the surveys mentioned that the purpose of miracles was to give people hope or restore their faith in a higher power. 24.1% of the surveys were classified in the second major category, power and presence, maintaining that miracles exist to show God's power and presence in the natural world. A concrete example of a miracle purpose response that was coded into both of the categories is: "I believe God creates miracles as constant reminders of his power and his love for us. He reveals himself through miracles to reassure our faith in Him and to reward us for doing well." This response mentions both God's power and a restoration of faith.

Discussion

Study 1 identified major categories of laypersons' miracle definitions: low probability, beneficial outcomes, and supernatural/divine intervention. However, the majority of participants did not mention a supernatural force (i.e., God, Jesus) in their miracle definitions. The fact that a low number of participants mentioned divine intervention in their miracle definitions is somewhat surprising considering many scholars and theologians consider miracles as acts of God (Clarke, 2003; Nichols, 2002; McKenzie, 1999). However, our results suggest that most people, when contemplating miracles, envision colloquial, secular miracles rather than strict, religious miracles. In addition, Study 1 indicated that most people consider the purpose of miracles is to provide hope to people, to restore their faiths, and to show God's power or presence in the natural world. Study 1 also pinpointed several core miracle features, showing that people believe miracles should have a low probability of occurrence and should improve people's health. Curiously, Study 1 found weak evidence that miracles must violate a natural law, with only 5.5% of the entire sample providing a miracle event that violated a natural law. Finally, Study 1 identified specific events that spontaneously come to people's minds when they conceptualize miracles. Two popular miracle events mentioned by participants were winning the lottery and recovering from cancer.

Study 2

Study 1 utilized an open-ended approach to assess miracle beliefs. Alternatively, Study 2 assessed laypersons' miracle beliefs by presenting them with a series of scenarios, then asking them the degree to which they perceived each event as miraculous

and surprising. The findings of Study 1, previous research within the religion attribution literature, and the opinions of religious scholars and theologians led us to expect participants would judge an event to be more miraculous and would be more surprised by the event when it met certain requirements. We anticipated these miraculous occurrences would be of a high- instead of low-magnitude, involve an innocent, positive individual instead of a person of negative character, result in a positive, selfless outcome (especially a beneficial health outcome), compared to a positive, selfish outcome, affect the person in the scenario directly, and be obtained in an unusual manner.

Our first and second scenario pairs investigated whether the magnitude of an event would influence participants' miracle judgments. An event's magnitude should influence people's miracle judgments because people tend to attribute life-altering occurrences to God (Lupfer, Tolliver & Jackson, 1996). In the two scenario pairs, we used an event participants listed in Study 1, winning the lottery. Using this event allowed us to easily manipulate the magnitude of the event (winning \$100 million compared to \$10,000), and is a real-life occurrence participants can relate to.

Our third scenario pair explored whether or not the manner in which someone obtains the miraculous event makes a significant difference in participants' miracle judgments. The method by which a person obtains a miracle should impact people's miracle judgments because scholars maintain miracles are unusual incidents that constitute an exception to the normal pattern of events in the natural world (Larmer, 2001). We again used winning the lottery as the miraculous event, but manipulated how

the person obtained the winning ticket, either by paying for it, or by finding it on the sidewalk.

Our fourth scenario pair examined if people would be more willing to label an event as a miracle when it happens to a person of good, instead of bad, character. The character of the miracle recipient should impact people's miracle judgments since religious scholars assert that people are inclined to judge an event miraculous when received by a worthy, innocent individual, compared to a person of negative character (Gallois, 2007; McKenzie, 1999). In this scenario pair, we used a variation of an event mentioned by participants from Study 1, recovering from cancer. Using this event made it easy for us to manipulate the character of the miracle recipient (a small child recovering from the terminal illness compared to a murder/rapist recovering from the terminal illness), and is a real-life occurrence participants mentioned in Study 1.

In our fifth scenario pair we investigated whether people would judge an event to be more miraculous when it results in a positive, selfless outcome, compared to a positive, selfish outcome, especially when the event improves the physical welfare of the person in the scenario. This factor should impact people's miracle judgment because scholars maintain miracles are related to compassionate feelings for others and are not exclusively accommodating to the recipient (McKenzie, 1999). Additionally, people should judge an event as more miraculous when it results in a beneficial health outcome compared to positive outcome without health benefits since people typically turn to God in times of stress, illness, injury (Hood, Spilka, Hunsberger & Gorsuch, 1996; Pargament, 1997). In this scenario pair, we again used the lottery, specifically whether winning the

lottery resulted in one buying one's dream house or paying for an operation for one's child.

Our sixth scenario pair explored whether people are inclined to judge an event as more miraculous when it personally affects the protagonist in the scenario. People should evaluate an event as being miraculous when it affects someone personally because people tend to have a private, personal relationship with God (Granqvist & Kirkpatrick, 2008; Kirkpatrick, 2005), and God's personal relationship with the believer is an essential feature of religiosity (Batson et al., 1994; Exline, 2002). This is the only scenario pair that does not have a connection to participants' events lists from Study 1.

Method

Participants

Participants were 107 male and 178 female undergraduate students recruited from undergraduate psychology and statistics classes at a large Midwestern university.

Materials

Several pairs of scenarios were created to test the general theories that people would be inclined to label an event as miraculous when the scenarios depicted an event of high magnitude, was obtained in an unusual manner, involved an innocent person of good character, resulted in a selfless, beneficial health outcome, and was of personal significance to the protagonist. All of the scenario pairs are reported in Table 5. As an example, in one of the scenario pairs we examined if a participant's judgment about the miracle event is augmented when the miracle recipient's character is manipulated but the beneficial health outcome is kept constant. In the first scenario in the pair, a small child

recovers from a terminal illness after his doctors gave him no chance of survival. In the corresponding scenario, a murderer/rapist recovers from a terminal illness after his doctors have given him no chance of survival. Thus, the only aspect that differs between the two events in the scenario pair is the character of the recipient of the miracle (the person who recovers from the terminal illness). For each scenario, participants judged the likelihood that the event was a miracle on a scale ranging from 0 (*very unlikely*) to 10 (*very likely*) and also rated how surprising they found the scenario from 0 (*not at all surprising*) to 10 (*extremely surprising*).

Procedure

Study 2 was conducted in large groups. Participants first characterized their personal belief in miracles on an 11-point scale ranging from 0 (*I am absolutely sure that miracles do not occur*) to 10 (*I am absolutely sure that miracles do occur*). The experimenter then passed out two different packets (A and B), each containing only one of the scenarios. That is, packet A instructed participants to indicate how surprising and judge the likelihood that a person winning a \$100 million lottery, a large-magnitude event, was a miracle; alternatively, Packet B asked participants to rate how surprising and judge the likelihood that a person winning a \$10,000 lottery, a relatively small-magnitude event, was a miracle. Thus, only the magnitude of the lottery differed between the packets for that particular scenario pair. Seven scenario pairs were dispersed across the two packets and each participant completed only one packet. By having participants only receive one of the packets and using a between-subjects design, we were able to ensure that participants were not able to compare the events to any other similar happenings in

the packet. Also, the packets contained a mixture of both “miracle events” and “non-miracle events,” to ensure participants were not continuously reading scenarios that we tailored to be miraculous.

Results and Discussion

Belief in Miracles

Similar to Study 1, the majority of our sample reported a belief in miracles. 192 out of a total of 287 participants (67%) rated themselves at least a 6 on the self-reported miracle belief scale. For analysis purposes, we selected and only used the data from those participants who scored above the midpoint. This technique of only examining and analyzing the data from those participants who actually believe in miracles makes logical sense since we are investigating if people’s miracle judgments can be altered by various factors. If participants express a low belief in miracles, it stands to reason that manipulating various factors would not significantly impact their miracle judgments. Furthermore, previous research examining religious phenomena shows that effects with religious underpinnings only occur among believers (Dijksterhuis et al., 2008; Norenzayan & Hansen, 2006; Osarchuk & Tatz, 1973). Since the following analyses are a series of t-tests, and multiple tests inflate alpha, Bonferroni correction procedures were conducted, and an adjusted alpha level of .003 was used to evaluate the hypotheses (since 14 t-tests were conducted).

First Scenario Pair

Our first scenario pair manipulated the magnitude of the event, specifically lottery winnings. Participants found the scenario in which someone wins \$100 million to be

significantly more surprising ($M = 7.76$, $SD = 2.56$) than the corresponding scenario where the person wins \$10,000 ($M = 6.00$, $SD = 2.74$), $t(190) = -4.58$, $p < .001$. Also, participants found this scenario marginally more likely to be a miracle ($M = 3.88$, $SD = 2.59$) compared to the corresponding scenario ($M = 2.85$, $SD = 2.30$), $t(190) = -2.89$, $p = .004$.

Second Scenario Pair

In a second scenario pair, we kept the odds of winning the lottery constant, a very low 1 in 3 million, and simply manipulated the magnitude of the winnings since people intuitively would think that the probability of winning a large amount of money is very small. Participants found the scenario in which someone wins \$20 million with a 1 in 3 million probability to be significantly more surprising ($M = 7.89$, $SD = 2.34$) than the corresponding scenario where someone wins \$1000 with 1 in 3 million odds ($M = 6.41$, $SD = 2.74$), $t(190) = -4.01$, $p < .001$. Also, participants found this scenario marginally more likely to be a miracle ($M = 3.97$, $SD = 2.64$) compared to the corresponding scenario ($M = 2.91$, $SD = 2.31$), $t(190) = -2.85$, $p = .003$. We were careful not to display the lottery magnitude questions on the same page since participants who received packet B read both the high-magnitude scenarios.

Third Scenario Pair

In the third scenario pair, we manipulated how the person obtained the winning lottery ticket. Participants judged the scenario in which someone finds the free winning lottery ticket on the sidewalk significantly more likely to be a miracle ($M = 4.86$, $SD =$

3.14), compared to the corresponding scenario where a person pays \$3 for the lottery ticket ($M = 3.33$, $SD = 2.73$), $t(190) = -3.58$, $p < .001$.

Fourth Scenario Pair

In the fourth scenario pair, we manipulated the character of the person who received the miracle (i.e., who recovered from a terminal illness). Participants found the scenario in which a small child recovered from a terminal illness to be significantly more surprising ($M = 8.93$, $SD = 1.19$) than the corresponding scenario where a murderer/rapist recovers from a terminal illness ($M = 7.14$, $SD = 2.20$), $t(190) = -6.81$, $p < .001$.

Participants also rated the scenario where the child recovered from a terminal illness significantly more likely to be a miracle ($M = 7.91$, $SD = 2.14$) compared to the corresponding recovery scenario that involved the murderer/rapist ($M = 4.81$, $SD = 3.02$) $t(190) = -8.02$, $p < .001$.

Fifth Scenario Pair

We also obtained statistical differences when we manipulated what the person accomplishes with the results of the miraculous event (i.e., what the winner does with the lottery money), specifically when the result is a beneficial health outcome. In the fifth scenario pair, participants found the scenario in which a person wins the lottery and is able to pay for a life-saving operation for his child significantly more likely to be a miracle ($M = 6.04$, $SD = 3.11$) compared to the scenario where a person wins the lottery then retires and builds his dream house ($M = 3.33$, $SD = 2.36$), $t(190) = 6.72$, $p < .001$. Participants also found the scenario where a person wins the lottery and is able to pay for a life-saving operation for his child to be significantly more surprising ($M = 7.67$, $SD =$

2.00) than the corresponding scenario where the lottery winner retires and builds his dream house ($M = 6.32$, $SD = 2.55$), $t(190) = 4.09$, $p < .001$.

Sixth Scenario Pair

Finally, participants were influenced by the personal nature of the scenario. In a sixth scenario pair, participants rated the scenario in which a woman saves her own child from a deadly fall to be marginally more surprising ($M = 9.03$, $SD = 1.24$) compared to the scenario where she saves someone else's child ($M = 8.41$, $SD = 1.53$), $t(190) = -2.89$, $p = .003$.

We did not obtain significant results with one of our scenario pairs. Participants did not find the scenario in which a man escapes from a burning building and survives due to a large pile of sand that had just been dumped outside to be significantly more likely a miracle ($p > .05$) nor significantly more surprising ($p > .05$) compared to the scenario where a man escapes from a burning building and survives due to a large pile of sand that had been gradually piling up outside his building for the past year.

Correlational, Regression and ANCOVA Analyses

We also explored whether participants' surprise and miracle judgments were correlated. Results showed that there were significant positive correlations between participants' surprise and miracle judgments within the scenario pairs. The correlation coefficients are presented in Table 6. These significant positive correlations inform us that participants who judged the scenario pairs as being miraculous also tended to rate the scenario pairs as being surprising. We also conducted various regression analyses to investigate if participants' surprise judgments predict their miracle likelihood judgments.

for each scenario pair that we achieved significant results on. The betas, t-statistics, and p-values for these regression analyses are presented in Table 7. Results revealed that participants' surprise judgments were significant predictors to their miracle judgments.

We also conducted various ANCOVAs to determine if the effects hold after taking into account participants' surprise judgments. For the scenario pair examining the magnitude of the event, participants still judged the scenario in which someone wins \$100 million to be significantly more miraculous ($M = 3.75$) than the corresponding scenario where the person wins \$10,000 ($M = 2.95$), $F(1, 192) = 4.67$, $p = .03$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 192) = 3.61$, $p = .05$. An ANCOVA also found that participants judged the scenario in which someone wins \$20 million with a 1 in 3 million probability to be significantly more miraculous ($M = 3.84$) than the corresponding scenario where someone wins \$1000 with 1 in 3 million odds ($M = 3.03$), $F(1, 191) = 4.67$, $p = .03$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 191) = 6.13$, $p = .01$. An ANCOVA also found that participants judged the scenario in which someone finds a winning lottery ticket on the sidewalk to be significantly more miraculous ($M = 4.80$) than the corresponding scenario where someone wins the lottery by paying for the ticket ($M = 3.38$), $F(1, 190) = 10.72$, $p = .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were not significant covariate, $p > .05$. Another ANCOVA revealed that participants judged the scenario in which a small child recovers from a terminal illness to be significantly more miraculous ($M = 7.70$) than the

corresponding scenario where a murderer rapist recovers from a terminal illness ($M = 4.99$), $F(1, 191) = 40.05$, $p < .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 191) = 4.27$, $p = .04$. A subsequent ANCOVA found that participants judged the scenario in which someone wins the lottery and pays for their child's operation to be significantly more miraculous ($M = 5.90$) than the corresponding scenario where someone wins the lottery and builds their dreamhouse ($M = 3.51$), $F(1, 191) = 32.64$, $p < .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 191) = 7.22$, $p = .008$. Finally, an ANCOVA revealed that participants did not judge the scenario in which a woman saves her own falling child to be significantly more miraculous ($M = 6.99$) than the corresponding scenario where she saves her neighbor's falling child ($M = 6.43$), $p > .05$, after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 191) = 26.03$, $p < .001$.

Study 2, using numerous scenario pairs, further identified core features of miracles and examined whether people's miracle judgments can be altered by various factors. Results demonstrated that participants' miracle judgments can be influenced by certain aspects of events. Participants tended to rate events as more miraculous and surprising when they were of high magnitude, obtained in an unusual manner, personally affected the event's protagonist, involved a person of worthy character, and resulted in an altruistic, beneficial health outcome. Also, positive correlations were found regarding participants' miracle and surprise judgments which shows that the more surprised

participants were with the scenarios, the more miraculous they judged them.

Furthermore, regression analyses revealed that participants' surprise judgments consistently predicted their miracle judgments.

Study 3

The main aim of Study 3 was to conduct a more focused investigation into key variables that have the potential to influence a person's decision to label an event as a miracle. To that end, we created groups of scenario pairs that centered on themes identified in the previous two studies. The first scenario pair group examined the character of the miracle recipient (all three scenario pairs in this group involved a health component, just the character of the person who received the miracle differed). The second scenario pair group investigated what the person does with the results of the miracle event (the three scenario pairs in this group differed as to whether the miracle ultimately resulted in personal gain or others' gain). Along with examining this altruism factor, we included two scenarios in this group that did not result in a positive health outcome since the corresponding scenario pair in Study 2 associated with this scenario-pair group manipulated both who ultimately benefitted from the miracle and whether the event improves a person's physical welfare. The third scenario pair group inspected the personal nature of the miracle (the two scenario pairs in this group differed as to whether the miracle influenced the central figure as well as the participant personally or not). Finally, the last scenario pair group, using a miracle component identified in Study 1 but not investigated in Study 2, explored how the probability associated with the miraculous

event influences people's miracle judgments (the two scenario pairs in this group varied with regards to the odds of receiving the miracle).

Method

Participants

Participants were 104 male and 191 female undergraduate students recruited from an introduction to psychology course at a large Midwestern university.

Materials

To further expand upon the scenarios used in Study 2, we created several scenario pair groups. The scenario pair groups are presented in Table 8. For example, in one scenario pair group, we examined if a participant's judgment about the miracle event is augmented when the miracle recipient's character is manipulated but the beneficial health outcome is kept constant. Specifically, in one scenario from the first group, a small child is suddenly able to walk years after becoming paralyzed due to an auto accident. In the corresponding scenario, a serial killer is suddenly able to walk years after becoming paralyzed due to an auto accident. Thus, the only aspect that differs between the two scenario events is the character of the recipient of the miracle (i.e., both the child and the serial killer recover and are able to walk after years of paralysis).

We created several of these miracle scenario groups, manipulating various key features such as the character of the miracle recipient, whether the miracle ultimately resulted in personal gain, the personal nature of the miracle, and the probability associated with the miraculous event. Participants judged the scenarios using the two 11-point scales from Study 2. Using the first scale, participants rated how surprising they

found the scenario from 0 (*not at all surprising*) to 10 (*extremely surprising*); the second scale requested they judge the likelihood that the event was a miracle from 0 (*very unlikely*) to 10 (*very likely*).

Procedure

Similar to Study 2, Study 3 was conducted in large groups, and like they performed in Study 2, participants characterized their personal belief in miracles on an 11-point scale ranging from 0 (*I am absolutely sure that miracles do not occur*) to 10 (*I am absolutely sure that miracles do occur*) before reading the groups of scenarios. Also as in Study 2, two different packets were used (A and B), each containing various scenarios from the scenario groups identified above. Both the A and B packets requested participants indicate how surprising and judge the miracle likelihood of various events. Additionally, the packets contained a mixture of both “miracle events” and “non-miracle events” so participants were not continuously reading scenarios that we tailored to be miraculous.

Results and Discussion

Belief in Miracles

Comparable to Studies 1 and 2, the majority of our sample in Study 3 reported a belief in miracles. 198 out of a total of 300 participants (66%) rated themselves at least a 6 on the self-reported miracle belief scale. Again, for analysis purposes and to be consistent with Study 2, we selected and only used the data from those participants who scored above the midpoint on the miracle belief scale. Again, since the following analyses are a series of t-tests, Bonferroni correction procedures were again employed,

and an adjusted alpha level of .003 was used to evaluate the hypotheses (since 18 t-tests were conducted).

Scenario Group One

Our first scenario pair group examined whether the character of the miracle recipient impacts people's miracle judgments. Participants found the scenario in which a child recovers from a terminal illness after his doctors had given up all hope significantly more likely to be a miracle ($M = 7.11$, $SD = 5.18$) than the corresponding scenario where a murder/rapist recovers from a terminal illness after doctors had given up all hope ($M = 5.51$, $SD = 2.64$), $t(196) = -5.49$, $p < .001$. Participants also found the scenario in which a child is suddenly able to walk after becoming paralyzed due to an auto accident significantly more likely to be a miracle ($M = 7.06$, $SD = 2.69$) than the corresponding scenario where a serial killer is suddenly able to walk after becoming paralyzed due to an auto accident ($M = 5.24$, $SD = 2.88$), $t(196) = -4.59$, $p < .003$. Finally, participants rated the scenario in which a child recovers from a terminal illness and grows up to win the Noble Peace Prize significantly more likely to be a miracle ($M = 6.85$, $SD = 2.66$) than the corresponding scenario where a child recovers from a terminal illness and grows up to deal drugs to children ($M = 2.39$, $SD = 2.91$), $t(196) = 11.25$, $p < .001$.

Scenario Group Two

Our second scenario group investigated whether people will significantly alter their miracle judgments depending on how the scenario's central figure uses the benefits received from the miracle event (specifically, the three pairs scenarios in this group differed as to whether the miracle ultimately resulted in personal gain or another's gain).

One scenario pair achieved significant results. Participants found the scenario in which a person wins the lottery and is able to pay for a life-saving operation for his child significantly more likely to be a miracle ($M = 6.71$, $SD = 2.90$) compared to the scenario where a person wins the lottery then retires and builds his dream house ($M = 3.57$, $SD = 2.78$), $t(196) = -7.78$, $p < .001$. Participants also found the scenario in which a person wins the lottery and is able to pay for a life-saving operation for his child to be significantly more surprising ($M = 8.39$, $SD = 1.53$) compared to the scenario, where a person wins the lottery and retires and builds his dream house ($M = 6.16$, $SD = 2.87$), $t(196) = -6.80$, $p < .001$. The other two scenario pairs did not achieve significance, and did not include a health component, suggesting it is more important for a miracle to improve a person's physical welfare, than to be altruistic.

Scenario Group Three

The third group of scenarios examined whether the personal nature of a miracle impacts participants' judgments. One scenario pair yielded a marginally significant result. Participants judged the scenario that describes their future son surviving a head-on car collision marginally more likely to be a miracle ($M = 6.80$, $SD = 2.87$) compared to the scenario that describes their best friend's son surviving a head-on car collision ($M = 5.62$, $SD = 2.71$), $t(196) = 2.93$, $p = .004$.

Scenario Group Four

The fourth scenario group examined how the probability of the miraculous event occurring influences people's miracle judgments. One scenario pair yielded significant results. Participants judged the scenario in which a child recovers from a disease that her

doctors predicted a mere 2% chance of survival significantly more likely to be a miracle ($M = 7.22, SD = 2.44$) compared to the scenario where a child recovers from a disease that her doctors anticipate an 85% chance of survival ($M = 5.16, SD = 3.01$), $t(196) = -5.29, p < .001$. Participants also found the scenario in which a small child recovered from the illness with the 2% survival rate to be significantly more surprising ($M = 8.61, SD = 1.29$) than the corresponding scenario where a child recovers from a disease in which her doctors predicted an 85% chance of survival ($M = 5.97, SD = 2.46$), $t(196) = -9.44, p < .001$.

Correlational, Regression and ANCOVA Analyses

We again explored whether participants' surprise and miracle judgments were correlated. Once again, results showed that there were significant positive correlations between participants' surprise and miracle judgments regarding the scenario pairs. The correlation coefficients are presented in Table 9. These significant positive correlations inform us that participants who judged the scenario pairs as being miraculous to also tended rate the scenario pairs as being surprising. Like Study 2, we also conducted various regression analyses to investigate if participants' surprise judgments predict their miracle likelihood judgments for each scenario pair that we achieved significant results on. The betas, t-statistics, and p-values for these regression analyses are presented in Table 10. Results revealed that participants' surprise judgments were significant predictors to their miracle judgments.

We again conducted various ANCOVAs to determine if the effects hold after taking into account participants' surprise judgments. For the scenario pair examining the

character of the miracle recipient, participants still judged the scenario in which a small child recovers from a terminal illness to be significantly more miraculous ($M = 6.97$) than the corresponding scenario where a murderer recovers from a terminal illness ($M = 5.31$), $F(1, 198) = 23.17$, $p < .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 15.73$, $p < .001$.

An ANCOVA also found that participants judged the second scenario examining the character of the miracle recipient, the one involving a small child recovering from paralysis and being able to walk, to be significantly more miraculous ($M = 6.82$) than the corresponding scenario where a serial killer is able to walk years after paralysis ($M = 5.47$), $F(1, 198) = 12.90$, $p < .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 34.03$, $p < .001$.

An ANCOVA also found that participants judged the third scenario examining the character of the miracle recipient, the one involving a small child surviving a terminal illness and growing up to win the Nobel Peace prize to be significantly more miraculous ($M = 6.73$) than the corresponding scenario where a child survives a terminal illness and grows up and deals drugs to children ($M = 3.38$), $F(1, 198) = 132.43$, $p < .001$, even after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 36.39$, $p < .001$.

Much like Study 2, another ANCOVA revealed that participants judged the scenario in which someone wins the lottery and pays for their child's operation to be significantly more miraculous ($M = 6.23$) than the corresponding scenario where someone wins the lottery and builds their dreamhouse ($M = 4.05$), $F(1, 198) = 26.81$, $p < .001$, even after taking into account their surprise

judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 27.06, p < .001$. An ANCOVA revealed that that participants did not judged the scenario in which the participants' future son survives a head-on car collision to be significantly more miraculous ($M = 6.52$) than the corresponding scenario where the participant's best friend's son survives a head-on car collision ($M = 5.92$), $p > .05$, after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 86.89, p < .001$. Similarly, an ANCOVA revealed that that participants did not judged the scenario in which the a small child recovers from an illness with 2% survival odds to be significantly more miraculous ($M = 6.24$) than the corresponding scenario where a small child recovers from an illness with 85% survival odds ($M = 6.11$), $p > .05$, after taking into account their surprise judgments. Also, participants' surprise judgments were a significant covariate $F(1, 198) = 107.51, p < .001$.

Study 3 further supports the notion that people's miracle judgments can be altered by various situational factors. Participants displayed a consistent tendency to judge an event as more miraculous when it involved a person of positive character. Participants also rated events as more miraculous when the events in question benefited another person's physical welfare, was of personal relevance, and depicted a low-probability event. Much like Study 2, Study 3 found positive correlations between participants' miracle and surprise judgments which suggests that that the more surprised participants were with the scenarios; the more miraculous they judged them. Furthermore, regression analyses revealed that participants' surprise judgments consistently predicted their miracle judgments.

Study 4

Study 4 had several objectives. First, we hoped to further investigate miracles within a medical context, specifically whether participants' miracle judgments are impacted by scientific evidence in the form of the fatality of the disease and a scientific explanation. Study 4 also examined if reading about miracles makes people feel more optimistic and investigated whether miracle judgments are moderated by just world and free will beliefs and possibly mediated by notions of surprise.

To explore these objectives, Study 4 employed an experimental design that manipulated the scientific evidence. In particular, participants read about a man who recovers from a disease in which the odds of survival are 0%, 1%, or 10% and that doctors meet and are able to offer a possible explanation for his recovery, doctors meet and are not able to provide an explanation, or no information is provided about a meeting and possible explanation. Study 4 also measured how optimistic and uncertain participants felt after reading about the events, established how surprising participants found the events, ascertained whether participants thought they will receive a miracle in the near future and measured their religiosity, just world and free will beliefs.

In Study 1, participants' miracle events lists routinely mentioned beneficial health outcomes such as recovering from cancer. Examining miracles within a health context is further warranted since the Vatican routinely investigates medical miracles. The Vatican uses several criteria, established by Pope Benedict XIV, to judge an event to be miraculous. The disease must be serious, organic or caused by injuries, there must be no treatment and the miraculous cure must be instantaneous, permanent without any relapse

and without scientific explanation (Wilson, 2008). Moreover, at least three of the five doctors on the Consulta Medica, a board established by the Vatican in the mid-1900s to oversee miracle claims, must agree that the event is a miracle after reviewing the appropriate medical evidence (Duhigg, 2003).

Historically, religion has been an institution that expresses the propensity to be hopeful. Reflecting this notion, we anticipate that reading about miracles should impact people's feelings, particularly optimism. From a psychological perspective, it would be interesting to examine whether or not people's sense of optimism is impacted, along with investigating if people feel as though they will receive a miracle in the near future after reading the miracle scenarios. One would expect, given our findings from Study 1 suggesting that people think miracles exist to give people hope, that individuals would feel more optimistic and also predict that they would receive a miracle in the near future after reading about the medical miracle scenarios.

Another factor, specifically an individual difference variable, that could potentially influence people's miracle judgments, is their belief in a just world (Lerner, 1980). It stands to reason that those who score high on a belief in a just world, and tend to think that people get what they deserve and deserve what they get, would be very receptive to labeling a small, innocent child recovering from a terminal illness as a miracle, but less receptive to labeling a murder/rapist recovering from a terminal illness as a miracle. This notion of belief in a just world affecting people's miracle judgments is supported by our findings that participants rated scenarios as more miraculous when the miracle recipient was of good character. Also, many religions comment on moral

instruction in terms of fairness and justice such as the *lex talionis* (e.g., “an eye for an eye,” Exodus 21: 23-25) Furthermore, intuitively, it seems it would be difficult for people to rationalize that a just and fair God, who dispenses rewards and punishments throughout the universe, would bestow a miracle upon someone of poor character like a murder/rapist or a serial killer.

Method

Participants and Design

Participants were 231 (66 male and 165 female) undergraduate students enrolled in introductory psychology and other courses at a large Midwestern university and were randomly assigned to one of nine conditions. Participants (those from the PsychPool system) were recruited in exchange for partial course credit toward fulfillment of course requirements and were randomly assigned to the conditions of a 3 (odds survival: 0% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 1% of the people diagnosed with this disease survive and experience a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a explanation for recovery vs. scientists meet and do not provide a explanation for recovery vs. no mention of scientists meeting and trying to provide an explanation for recovery) between-subjects factorial design.

Materials and Procedure

Upon entering the lab, the experimenter told participants that the experiment is interested in people’s reactions to medical stories and hopes to help the medical school

get a better sense as to how people react to life and death situations within a medical context.

Participants first answered various demographic and background questions. Participants then read one of nine scenarios depicting a man who overcomes a disease that had certain survival odds according to the medical literature and doctors meet and are able to provide an explanation for his recovery or not (there will be no mention of a meeting in the no meeting conditions). For example, participants in the 0% medical odds/scientific explanation condition read about a man who recovers from a deadly disease in which 0% of people survive and doctors convene and provide a scientific explanation for his recovery. Specifically, participants read:

A man has just gotten back from his doctor where he was told disturbing news. His doctor informed the man he has contracted a deadly blood disease. According to the medical literature, 0% of the people diagnosed with this disease survive (nobody, 0 people out of 100, with this disease has experienced a spontaneous remission). Two days after the diagnosis, the man's right kidney begins to shut down. The man goes to see his doctor the next week and is astonished to find out he is completely cured. A month after this event, a group of medical scientists meet at an annual conference and discuss what happened in this medical case. The scientists discuss the case for a long time and unanimously come to settle on a scientific explanation as to how the man recovered (the man's body has a unique protein that was able to fight off the illness).

Participants in the 0% medical odds/no scientific explanation condition read about a man who recovers from a deadly disease in which 0% of people survive and doctors convene and cannot provide a possible scientific explanation. Participants in the 0% medical odds/no mention of scientific explanation condition read about a man who recovers from a deadly disease in which 0% of people survive and were not presented with any attempt to finding out a medical explanation.

Participants in the 1% medical odds/scientific explanation condition read about a man who recovers from a deadly disease in which 1% of people survive and doctors convene and provide a scientific explanation. Participants in the 1% medical odds/no scientific explanation condition read about a man who recovers from a deadly disease in which 1% of people survive and doctors convene and cannot provide a scientific explanation. Participants in the 1% medical odds/no mention of explanation condition read about a man who recovers from a deadly disease in which 1% of people survive and will not be presented with any attempt to finding out a scientific explanation.

Participants in the 10% medical odds/scientific explanation condition read about a man who recovers from a deadly disease in which 10% of people survive and doctors convene and provide a scientific explanation. Participants in the 10% medical odds/no scientific explanation condition read about a man who recovers from a deadly disease in which 10% of people survive and doctors convene and cannot provide a scientific explanation. Participants in the 10% medical odds/no mention of explanation condition read about a man who recovers from a deadly disease in which 10% of people survive and will not be presented with any attempt to finding out a scientific explanation.

After reading one of these various medical scenarios, participants used an 11-point scale to indicate whether they think the event is a miracle. Participants judged whether or not they find the event to be a miracle from 0 (*no, not at all*) to 10 (*yes, definitely*). Along with indicating whether or not they find the event to be a miracle, participants also indicated how confident they are in calling the event a miracle by giving a percentage from 0 to 100 and specified how optimistic they feel towards the upcoming

academic term using an 11-point scale with 0 (*not optimistic at all*) to 10 (*very optimistic*). Furthermore, participants indicated how surprising they found the above event on an 11-point scale with 0 (*not at all surprising*) to 10 (*extremely surprising*) as well as indicated how uncertain they feel after reading the scenario using an 11-point scale with 0 (*not uncertain at all*) to 10 (*very uncertain*). Participants also indicated how likely it is for them to receive a miracle in the near future using an 11-point scale from 0 (*very unlikely*) to 10 (*very likely*), stated whether they believe in miracles using a yes, no format and gave their religious affiliation. Participants also characterized their miracle beliefs on an 11-point scale from 0 (*I am absolutely sure that miracles do not occur*) to 11 (*I am absolutely sure that miracles do occur*). Finally, participants specified their belief in a just world using a seven-item Global Belief in a Just World Scale (Lipkus, 1991), indicated their belief in free will or determinism using a six-item subscale of the Free Will-Determinism Scale (Stroessner and Green, 1990), filled out a religiosity measure (Gorsuch & McPherson, 1989) and finally stated how optimistic they are using a ten-item optimism scale (Scheier, Carver & Bridges, 1994).

Dependent Variables

Participants indicated whether the event they just read about was a miracle and stated their confidence in labeling the event a miracle. Study 4 also had participants indicate their optimism using a 10-item optimism scale as well as how likely it is for them to receive a miracle in the near future. Also, since Study 4 was interested in whether people's miracle judgments are influenced by just world and free will beliefs, participants' just world and free will beliefs were measured. These just world and free

will beliefs could potentially be important covariates to consider and perhaps participants will only judge an event as miraculous when they have high just world beliefs and feel as though they have a little amount of free will in their lives. Finally, Study 4 examined if people's miracle judgments are mediated by notions of surprise.

Results and Discussion

Belief in Miracles

Comparable to the previous three studies, the majority of our sample in Study 4 reported a belief in miracles. 172 out of a total of 231 participants (74%) rated themselves at least a 6 on the self-reported miracle belief scale. Again, for analysis purposes and to be consistent with Studies 2 and 3, we selected and only used the data from those participants who scored above the midpoint, 6, on the miracle belief scale.

Miracle Judgment and Miracle Confidence

The miracle judgment and miracle confidence dependent measures were submitted to a 3 (odds survival: 0% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 1% of the people diagnosed with this disease survive and experience a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a possible scientific explanation for recovery vs. scientists meet and do not provide a possible scientific explanation for recovery vs. no mention of scientists meeting to try to provide an explanation for recovery) analysis of variance (MANOVA). Descriptive statistics for the dependent measures are presented in Table 11.

The MANOVA did not reveal a main effect for scientific explanation, $F (<1)$ or a main survival odds, $p >.05$. An interaction between scientific explanation and survival odds was also not found, $F (<1)$. One potential reason for these non-significant results could be due to participants treating the 0 % and 1% survival odds as the same probability and viewing the two values as psychologically the same, therefore not discerning any difference between the two percentages. Indeed, as Table 11 shows, participants' overall miracle judgment and confidence means for 0% and 1% were very close. Thus, we collapsed across those two survival percentage conditions to create a 2 (odds survival: 0%/1% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a possible scientific explanation for recovery vs. scientists meet and do not provide a possible scientific explanation for recovery vs. no mention of scientists meeting to try to provide an explanation for recovery) factorial design.

However, this collapsing still did not yield any statistically significant results with no main effect for scientific explanation, $F (<1)$ or a main survival odds ($p >.05$). An interaction between scientific explanation and survival odds was also not found, $F (<1)$. Though, this lack of a main effect for survival odds could be due in part by not having enough participants in the 10% condition. Thus, we changed our restrictions to include those participants who rated themselves at least a 5 on the self-reported miracle belief scale. This procedure seems reasonable since 74% of participants who rated themselves

at least a 5 on the self-reported miracle belief scale also stated that they believed in miracles.

The subsequent 2 (odds survival: 0%/1% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a possible scientific explanation for recovery vs. scientists meet and do not provide a possible scientific explanation for recovery vs. no mention of scientists meeting to try to provide an explanation for recovery) MANOVA revealed a significant main effect of survival odds, $F(1, 173) = 3.15, p = .04, \eta^2 = .035$. An examination of the between subjects effects revealed a main effect of survival odds on the participants' miracle judgments, $F(1, 173) = 4.31, p = .039, \eta^2 = .024$, such that participants who read about a person overcoming 0% and 1% survival odds judged the event to be more miraculous ($M = 6.77$) than participants who read about a person overcoming 10% survival odds ($M = 5.74$). Also, the between subjects effects revealed a main effect of survival odds on participants' miracle confidence judgments, $F(1, 173) = 6.20, p = .014, \eta^2 = .034$, such that participants who read about a person overcoming 0% and 1% survival odds were more confident in calling the event a miracle ($M = 66.6$) than participants who read about a person overcoming 10% survival odds ($M = 55.1$). As before, the MANOVA did not reveal a main effect for scientific explanation, $F(<1)$ and the interaction between scientific explanation and survival odds was also not found, $F(<1)$.

Furthermore, a weighted contrast showed that participants who read about someone overcoming 0 or 1% odds rated the scenario as significantly more miraculous ($M = 6.77$) than did the participants who read about someone overcoming 10% odds ($M = 5.74$), $F(1,188) = 6.50$, $p = .012$. A weighted contrast also demonstrated that participants were significantly more confident in labeling an event a miracle when they read about someone overcoming 0 or 1% odds ($M = 66.6$) than were the participants who read about someone overcoming 10% odds ($M = 55.1$), $F(1,177) = 6.40$, $p = .012$.

Next, participants' just world and free will belief mean scores along with feelings of uncertainty were entered into the analysis as covariates. It was anticipated that with the addition of these variables to the analysis, participants' miracle judgments and confidence estimations will become attenuated. When entering participants' uncertainty responses, the effect did not go away $F(1, 172) = 3.31$, $p = .039$. However, supporting our predictions, with the addition of participants' Just World averages into the MANOVA, the main effect of survival odds became marginal, $F(1,70) = 2.86$, $p = .060$. The most support for our predictions came when we entered participants' free-will/determinism averages into the MANOVA. With the addition of this covariate, the main effect of survival odds became nonsignificant, $F(1,69) = 1.93$, $p = .149$.

Finally, participants' surprise judgments were examined to see if they would be a potential mediator. It was expected that participants' surprise judgments would be a potential mediator since their surprise judgments were correlated with their miracle likelihood judgments and significantly predicted their miracle judgments from Study 1. To do so, we first ran a regression analysis in which survival odds was used to predict

participants' surprise judgments. This regression analysis revealed a marginally significant main effect for survival percentage ($\beta = -.120$, $SE = .337$), $t(190) = -1.67$, $p = .09$. Next, we ran a regression analysis with survival odds and judgments of surprise predicting miracle judgments. This regression analysis revealed a significant main effect for both survival odds ($\beta = -.132$, $SE = .377$), $t(190) = -2.03$, $p = .04$ and surprise judgments ($\beta = .422$, $SE = .081$), $t(190) = 6.47$, $p < .001$. However, the Sobel test was non-significant $p > .05$ which suggests that there is no mediation between surprise judgments and miracle judgments.

Miracle Future and Optimism

The miracle future judgments and average optimism scores dependent measures were submitted to two separate 3 (odds survival: 0% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 1% of the people diagnosed with this disease survive and experience a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a possible scientific explanation for recovery vs. scientists meet and do not provide a possible scientific explanation for recovery vs. no mention of scientists meeting to try to provide an explanation for recovery) analysis of variance (ANOVAs).

We again selected and only used the data from those participants who scored above the midpoint, 6, on the miracle belief scale. The two ANOVAs did not reveal a main effect for scientific explanation, $F (<1)$ or a main survival odds, $F (<1)$. An interaction between scientific explanation and survival odds was also not found, $F (<1)$.

We then used the same procedures as before, collapsing the 0 and 1% conditions and choosing participants who scored 5 and above on the miracle characterization scale. With these alterations, the 2 (odds survival: 0%/1% of the people diagnosed with this disease survive and nobody with this disease has experienced a spontaneous remission vs. 10% of the people diagnosed with this disease survive and experience a spontaneous remission) X 3 (science explanation: scientists meet and provide a possible scientific explanation for recovery vs. scientists meet and do not provide a possible scientific explanation for recovery vs. no mention of scientists meeting to try to provide an explanation for recovery) ANOVAs still did not yield a main effect for scientific explanation, $F(<1)$ or a main survival odds, $F(<1)$. An interaction between scientific explanation and survival odds was also not found, $F(<1)$.

Finally, a planned comparison was conducted on participants' optimism measures. It was hypothesized that participants' sense optimism will be much higher after reading about a man who recovers from an illness in which 0% of people within the medical literature have survived compared to reading about a man who recovers from an illness in which 1% and 10% of people within the medical literature have survived. This planned comparison did not yield a significant result, $p > .05$.

Demographics

Some demographic variables are worth noting and could possibly explain why our participants tended to not endorse the traditional view that miracles must violate a scientific law. 58.4% of our sample was above the age of 19 and 41.7% of our participants were juniors and seniors. These demographic variables could potentially

shed some light on why participants endorsed the secular view on miracles because research has found a negative correlation between education and religiosity (Glaeser & Sacerdote, 2008). Indeed, our intrinsic and extrinsic religiosity measure means were quite low, 3.49 and 3.12 respectively, given we used a 7-point scale. The intrinsic and extrinsic religiosity means are still low, 3.58 and 3.32 respectively, after selecting out those participants who characterized their miracle beliefs as 5 and above (the participants we used in our data analyses).

Results from Study 4 further buttress the notion that miracles must have low probabilities since participants found the 0 and 1% survival rate events to be significantly more miraculous, and were more confident in labeling that event a miracle, compared to the 10% survival rate event. Study 4 also leads us to believe that people routinely have a secular notion of miracles in their minds, since participants did not find an event that had no scientific explanation to be more miraculous compared to an event in which a scientific explanation was provided. Finally, Study 4 suggests that something other than surprise leads people to label an event to be miraculous.

CHAPTER 3: GENERAL DISCUSSION

Miracles provide a catalyst for research, in part due to the disparate views and various explanations surrounding the nature of miracles. Some scholars insist miracles must violate a natural law, whereas others contend that an inconsistency between natural science and miracles is not necessary to label an event a miracle (Berry, 2002; Hume, 1748). Discussion continues, too, among religious scholars regarding how people conceptualize and construe miracles (Rowe, 2001; Wertenbaker, 1997). Reflecting the religious notion of miracles, multiple Biblical terms signify *miracle*, including *'ot* (sign) in the Hebrew Scriptures, and *terata* (wonders) and *dunamis* (acts of power) in the New Testament (Nichols, 2002). However, more recently the meaning of the word miracle has been stretched to encompass any event that is extraordinary. This usage ranges from sports commentators exclaiming unusual football catches are miracles to advertisers insisting their product is a miracle cure for baldness. As illustrated in the present research, participants' miracle conceptions mirror these debates; moreover, several key points can be extracted from the current studies.

Miracle Beliefs and Conceptions

Our studies found that many people believe in miracles. A large percentage of participants from Study 1 (81.4%) indicated that they believe in miracles, and a good portion of people from Study 2 (66%) and Study 3 (67%) rated themselves at least a 6 on the 11-point self-reported miracle belief scale ranging from 0 (*I am absolutely sure that miracles do not occur*) to 10 (*I am absolutely sure that miracles do occur*). A

comparable percentage of our sample from Study 4 (74%) also rated themselves at least a 6 on the self-reported miracle belief scale, and 81.7% of participants indicated that they believe in miracles. However, these descriptive statistics only tell us the percentage of people who believe in miracles. These percentages do not answer more crucial miracle questions such as what people consider the essential aspects of a miraculous event to be and whether people spontaneously conceive secular, colloquial miracles or divine, religious miracles.

Study 1 provides additional data that suggests lay people's miracle conceptions tend to fall in line with expert opinion. As our major categories demonstrated, a substantial number of participants' miracle definitions and events mentioned low probability and beneficial outcomes, reflecting miracle notions maintained by religious scholars. However, one surprising finding with regard to participants' miracle definitions and events should be noted. Participants' miracle definitions and events lists typically did not mention or depict divine intervention, which, according to theologians and religious scholars, is a major component of a miraculous event (Gallois, 2007; Peterson, 1997). One might suppose this finding is a result of our participants not supporting Christian ideals and beliefs. However, we do not consider this explanation valid. Even though we did not obtain participants' religious endorsements in Study 1, we surmise they support Christian principles since participants from other studies in our lab, using the same population, consistently identify themselves as Christian. Perhaps millennials, veering away from participation in a formal religion, are searching for a means of making sense of unusual occurrences in their lives.

Drawing from norm and just world theories, we can suggest that people's beliefs in miracles that do not contain a religious component could stem from their considering counterfactuals or from a need for justice. It is very plausible that miracle events generate counterfactuals, impelling people to think about what could or should have been and encouraging them to entertain thoughts on "what might have been." With miracles, instances of downward counterfactuals should be prevalent, whereby a person reflects on how an event could have culminated in a more adverse outcome. Miracle events such as recovering from cancer and winning the lottery should impel people to consider the possibility of almost dying or almost not winning the lottery. Further, these counterfactuals might not elicit religious thinking since people who construe these counterfactuals may be asking themselves, "what just, fair God would let an innocent person die and not recover from cancer?"

In a similar vein, just world theory contends that parents of a child experiencing a terminal illness would be reluctant to cite God as a source of suffering since God is, presumably, the ultimate moral agent, rectifying unfairness in the world. Regarding secular miracles, in a portion of the common miracle events participants cited, for example winning the lottery, the notion of an injustice being done is very low and there are no religious undertones.

Entertaining counterfactuals also sheds light on why people display positive affect after experiencing miracle events since downward counterfactuals have been shown to elicit positive affect (Markman, Gavanski, Sherman, & McMullen, 1993, 1995). Moreover, miracle-type events offer a fertile area of counterfactual research since

numerous miracle events contain multiple mutable aspects, appear “close, and can be attained by changing certain components of reality. Counterfactuals, as shown in norm theory, also play an integral role in explaining why religious scholars consider miracles to be surprising, abnormal events.

To clarify the lack of participants including divine intervention in their definitions, a subsequent avenue of research identifying two different types of miracle conceptions is recommended. In the first type, a miracle would be defined in the traditional, religious sense, depicting an improbable, beneficial occurrence involving divine intervention. In the second type, a miracle would be defined in the secular, colloquial sense, detailing an event without alluding to any divine intervention, but still containing the low probability and beneficial nature elements. These distinct miracle definitions would then be investigated by explicitly instructing participants to define a religious miracle or to define a non-religious miracle. Next, coders could independently code the definitions. It would be expected that participants, when requested to provide a definition of a religious miracle would thereby include the three requisite elements (low probability, beneficial outcome, and divine intervention). Additionally, the context of the miracle event may matter to participants. For instance, people may be more inclined to identify an event as a religious miracle if it takes place during a religious service. Future research could examine whether or not factors such as a scenario recipients’ prayer or participation in organized religious services would lead people to label events as either religious miracles or colloquial miracles.

Malleability of Miracle Judgments

In addition to the aforementioned findings, our research suggests that people's conceptions of miraculous events are, in fact, altered by various factors pertaining to the miracle situation. Situational aspects such as the magnitude of the miracle event, the probability of the miracle occurring, the method by which a person receives a miracle, and the end result of the miraculous event were all shown to impact participants' miracle judgments. Accordingly, our participants tended to label an occurrence as a miracle when the event exhibited a considerable impact on a person's life, had a very low probability of occurring, the person received the miracle in an unusual manner, and the miracle event improved another person's physical welfare. The low probability results echo norm theory in that a low probability event evoked more surprise and, thus, a greater change of the event being labeled a miracle. Our findings also fall in line with religious scholars who assert miracles a) tend to be monumentous events that happen in situations where people feel helpless and hopeless, and cannot imagine coping with overwhelming situations unaided, b) are unusual incidents that constitute an exception to the normal pattern of events in the natural world, and c) are regarded as social phenomena, and are related to compassionate feelings for others (Brown, 1984; McKenzie, 1999; Larmer, 2001; Pugh, 2008).

Variables associated with the protagonist in the miracle event also played a significant role in people's miracle judgments. Participants tended to judge an event as being more miraculous when the event involved an innocent, worthy individual and when the protagonist was personally influenced by the miracle event. These findings are

congruent with expert opinion suggesting people are inclined to judge an event miraculous when received by a worthy, innocent individual, compared to a person of negative character (Gallois, 2007; McKenzie, 1999). Our findings align with research that indicates people have private, personal relationships with God (Granqvist & Kirkpatrick, 2008; Kirkpatrick, 2005) and that God's personal relationship with believers is an essential feature of religiosity (Batson et al., 1994; Exline, 2002).

Study 4 failed to find a main effect of scientific explanation, which suggests that participants typically construe a secular, instead of religious, notion of miracles. This finding was unexpected inasmuch as the typical definition of a miracle states the miracle should be inexplicable with the laws of nature (The American Heritage Dictionary of the English Language, 2000). However, results from Study 4 (participants found both the 0 and 1% survival scenarios to be significantly more miraculous compared to the scenario in which a man has a 10% survival rate) do support the notion that miracles must have a low probability of occurrence. Due to these discrepancies, we believe additional variables not focused on in the present research have the potential to influence people's miracle conceptions and judgments.

Future Directions

Future research should broaden the scope of the study of miracles by exploring how other arenas and domains influence miracle judgments. First, examining miracles under a diverse cultural lens is a feasible avenue of future study. The majority of current miracle research almost exclusively emphasizes a Western, or individualistic cultural approach, characterizing miracles as a Western Judeo-Christian phenomenon (Haar,

2003). Different cultural aspects should be examined as contributing factors in people's miracle judgments. Future research should investigate if people from an Eastern, collectivistic culture are more inclined to label an event as miraculous if it benefits society as a whole instead of benefiting one person in particular. Participants who adhere to a collectivistic cultural values, in which interdependence, cooperation, and social harmony take priority over personal goals and who believe an individual is primarily a loyal member of a family or group, should judge an event as miraculous if it benefits the entire society rather than an just an individual. For instance, people living in a collectivistic culture should judge a scenario depicting an entire village escaping unscathed from a massive earthquake as more miraculous than a lone individual escaping from the same devastating quake. A study examining this cultural element would be add new information to the current research, especially when noting that miracles play a significant role in and maintain a significant part of Eastern religions (Nichols, 2002).

Ingroup and outgroup social settings provide a further domain in which to explore miracle judgments. Our expectation is that people will be more likely to label an event as a miracle when it happens to a member of their ingroup compared to an outgroup member because intergroup comparison research demonstrates people tend to favor members of ingroups over outgroup members. For instance, participants allocate more money to ingroup members compared to outgroup members and evaluate members of their ingroup more favorably than outgroup members (Messick & Mackie, 1989). Thus, considering people favor fellow ingroup members, and given that miracles have been characterized as beneficial occurrences, it stands to reason that people more likely will

label an event as a miracle when it benefits a fellow ingroup member. Similarly, when regarding religion specifically, intergroup research indicates that people who strongly identify with a certain religion derogate out-group members (Jackson & Hunsberger, 1999). In addition, many religious teachings and their accompanying credos stress ingroup loyalty and advocate a preference for one's religious community. For instance, the adage in the Hebrew Bible, "love your neighbor as yourself" most version say thy neighbor (Leviticus 19:18) originally was intended to apply only to fellow Israelites (Wright, 2009). Religion also has been identified as a group phenomenon involving norms that detail beliefs, attitudes, and behaviors and connects people through a shared ideology and worldview (Hunsberger & Jackson, 2005; Koenig, McCullough, & Larson, 2001). Therefore, expanding miracle studies into an ingroup and outgroup research program by involving both the secular and the religious realms may prove beneficial.

Time offers another important factor to consider when investigating people's miracle judgments and conceptions because time is one of the criteria used by the Vatican to validate miracles. Intuition dictates, and religious scholars maintain, that one should experience a miracle instantaneously (Wilson, 2008). For future study, using a descriptive scenario involving the prompt delivery of a miracle will help illustrate how a temporal component could influence miracle judgments. We expect that people would judge an event in which a child recovers from a terminal illness instantaneously, immediately following prayer, for example, to be more miraculous than a situation in which a child recovers from a terminal illness several months after the prayer was offered.

Future research should also examine how miracles are related to the associated terms fate and luck. Indeed, participants routinely cited “luck” or “fate” when asked in Study 4 to indicate what else could potentially explain the man recovering from the illness. Reasons such as “he was very lucky” or “it wasn’t his time yet; he was meant to survive” were two common responses. Further investigation into how people conceptualize fate and luck suggests a possible connection to miracles. In Greek mythology, an oracle (a revealer of fates and a mediator between the gods and humans) and the Fates were only concerned with major life events, and people at the time typically used fate as a way to explain how bad things happen to good people (Bargdill, 2006). Similarly, miracles are events that are high in magnitude and also serve an explanatory function. In a related vein, the Greeks routinely prayed to the Fates in Greek mythology requesting justice and the punishment of nefarious people. Similarly, people in modern times, following the premise of JWT, often pray to God, beseeching Him to rectify matters. Fate also embodies the notion that certain events in everyday life happen by chance, or accidentally, and specifies that there are many factors beyond human control and choice (Young & Morris, 2004). Miracles, in a traditional religious sense, are also events over which individuals have no control, thus people, feeling powerless, may resort to praying for a miracle. Fate and miracles also serve similar psychological functions in that people seek comfort in both fate and miracle beliefs (Greenberg, Solomon, & Pyszcznski, 1997; Brown, 1984). Correspondingly, luck and miracles share the same psychological function and can lead to optimistic and hopeful feelings in people (Day & Maltby, 2003, 2005).

An essential distinction, though, exists between miracles, fate, and luck. Of importance, both fate and luck can be associated with negative feelings and consequences. Fatalism is related to a host of negative consequences such as risky health behaviors (Henson, Carey, Carey, & Maisto, 2006) and unwillingness to seek social support in times of trouble (Goodwin et al., 2002). Luck, too, has been associated with negative effects; considered an irrational, maladaptive belief (Ellis, 1971, 1973), and can have detrimental effects on a person's well-being (Rotter, 1966). Miracles, on the other hand, tend to only be positive, beneficial happenings (Mackie, 1982; Rowe, 2001; Wertenbaker, 1997).

Conclusions: Summary and Limitations

Altogether, the picture of a miraculous event that emerges from our four studies is as follows: 1) miracles are rare and have a low probability of occurrence and 2) when miracles do occur, they positively impact people's lives, most commonly improving health situations. These two miracle characteristics, then, help explain why Betsy and Leonard Jernigan considered Elizabeth's recovery from cancer a miracle. Her medical odds of survival were very grim and her recovery from cancer was an improvement in health.

Furthermore, Elizabeth was an innocent child and, as our second and third studies illustrate, people tend to label events as more miraculous when they happen to small, innocent children. Indeed, our second, third, and fourth studies demonstrate that in addition to the recipient's characteristics, people's miracle judgments can be pushed and

pulled around by a variety of factors including the magnitude, probability and nature of the event, the personal relevance of the event, and end result of the event.

Limitations

The present research, of course, offers only a snapshot of people's miracle judgments. First, all of our samples consisted of college-aged students. Future endeavors should investigate how the miracle conceptions of a different population, the elderly, would compare to the miracle definitions obtained in the current studies. We expect one main difference. When asked to define a miracle, we anticipate the elderly to include divine intervention in their definitions and to spontaneously think of a religious miracle instead of a secular one since they are more religious than are millennials and also are more aware of their own mortality (Pew Institute, 2010). One other limitation of the sample population in the current studies involves context. Our samples were drawn from a non-religious university, so future research should examine miracles within the context of a religious institution because context influences a person's miracle judgments (Nichols, 2002). A final limitation deals with our approach to data collection. Except for the first study, our research used a scenario-based format. Using scenarios is a good first step in investigating people's miracle judgments, but a more involved methodology should be employed in future research. For example, showing our participants videos of reenactments portraying or news footage depicting miracle events and then asking them to state the defining features of miraculous events, future research can gain a better understanding of the processes that lead participants to construe and judge events as miracles.

Taken together, the current results add several contributions to the literature. First, the results from Study 1 provide insight into people's miracle conceptions, showing that people view miracles as improbable, beneficial occurrences. The results also demonstrate that people think miracles occur to show God's power or presence in the natural world. Second, our results from Studies 2-4 provide emerging evidence and support the notion that people's miracle judgments can be pushed and pulled by a variety of factors and variables. Furthermore, it should be expected that other variables not studied, such as time, and group membership would impact a person's miracle judgments. Together, the findings from the four studies provide a springboard for future research and open many doors of exciting empirical study.

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Table 1:
Miracle Beliefs and Religious Nature

Miracle/Religious Belief	Frequency	Percentage of Total
Believe in Miracles		
Yes	118	81%
No	27	19%
Religious Belief		
Not religious at all	10	6.9%
Somewhat religious	59	40.7%
Extremely religious	4	2.8%

Table 2:
Frequencies and Percentages of Miracle Definitions in Major Categories

Miracle Category	Frequency	Percentage of Total
Low probability	69	47.6%
Beneficial outcomes	54	37.2%
Divine intervention	31	21.4%

Table 3:
Frequencies and Percentages of Miracle Events in Categories

Miracle Category	Frequency	Percentage of Major Category	Percentage of Total
Low probability	71		49%
Highly unlikely	22	31%	15.1%
Peculiar	8	11%	5.5%
Beneficial outcomes	116		80%
Health	50	43%	34.5%
Cultural	22	19%	15.2%
Divine intervention	31		21.4%
Deity	8	25.8%	5.5%

Table 4:
Frequencies and Percentages of Miracle Purposes in Major Categories

Miracle Category	Frequency	Percentage of Total
Power/presence	35	24.1%
Hope/Faith	60	41.4%

Table 5:
Miracle Scenario Pairs, Study 2

Scenario Pair	Packet	Scenario Text
1	A	A person wins a \$10,000 lottery.
1	B	A person wins a \$100 million lottery.
2	A	A person wins a \$1,000 lottery where the chances of having the winning number are 1 in 3 million.
2	B	A person wins a \$20 million lottery where the chances of having the winning number are 1 in 3 million.
3	A	A person finds a lottery ticket while walking along the sidewalk and wins a \$50 million lottery.
3	B	A person buys a lottery ticket for \$3 and wins a \$50 million lottery.
4	A	A convicted murderer/rapist recovers from a terminal illness after doctors told him and his family that he had no chance of survival.
4	B	A small child recovers from a terminal illness after doctors told him and his family that he had no chance of survival.
5	A	A person wins the lottery. With the money, he is able to pay for a life-saving medical operation for his child.
5	B	A person wins the lottery. With the money, he is able to retire and build his dream house.
6	A	A woman is walking outside her apartment building when she sees a child fall from a 10 th story window. The woman is able to safely break the child's fall, and the child is completely unharmed. As it turns out, it was her child who she saved (the babysitter she hired accidentally fell asleep while watching a movie).
6	B	A woman is walking outside her apartment building when she sees a child fall from a 10 th story window. the woman is able to safely break the child's fall, and the child, a stranger, is completely unharmed.

Table 6:
Correlations Between Participants' Surprise and Miracle Judgments, Study 2

Scenario Pair	Correlation Coefficient
1- lottery magnitude	$r = .192^{**}$
2- lottery magnitude same odds	$r = .226^{**}$
3- obtain ticket unusual manner	$r = .153^{*}$
4- character of recipient	$r = .339^{**}$
5- lottery outcome	$r = .290^{**}$
6- personal nature	$r = .372^{**}$

Note. * indicates significance at .05 level; ** indicates significance at .01 level.

Table 7:
Regression Results- Predicting Miracle Judgments from Surprise Judgments, Study 2

Scenario	β	t-statistic
Lottery magnitude	.192	2.69**
Lottery magnitude, same odds	.226	3.19**
Obtain ticket unusual manner	.153	2.13*
Character of recipient	.339	4.95**
Lottery outcome	.290	4.16**
Personal nature	.372	5.51**

Note: *indicates significance at .05 level; ** indicates significance at .01 level.

Table 8:
Miracle Scenario Groups, Study 3

Scenario Group	Packet	Scenario Text
1	A	A convicted murderer/rapist recovers from a terminal illness after doctors told him and his family that he had no chance of survival.
1	B	A small child recovers from a terminal illness after doctors told him and his family that he had no chance of survival.
1	A	A serial killer is suddenly able to walk after becoming paralyzed due to an auto accident.
1	B	A small child is suddenly able to walk after becoming paralyzed due to an auto accident.
1	A	A child recovers from a terminal illness and grows up to win the Nobel Peace Prize.
2	A	A person wins the lottery. With the money, he is able to retire and build his dream house.
2	B	A person wins the lottery. With the money, he is able to pay for a life-saving medical operation for his child.
2	A	A man recovers from a terminal illness, starts up numerous philanthropic organizations in the community, including homeless shelters and soup kitchens.
2	B	A man recovers from a terminal illness, starts up numerous successful businesses in the area, including an internet startup company and a software consulting firm and he becomes a millionaire.
2	A	A child survives a deadly car accident and grows up to become a successful businessperson and CEO of his/her own company.
2	B	A child survives a deadly car accident and grows up to become a leader for Habitat for Humanity, building houses for the poor.
3	A	A woman is walking outside her apartment building when she sees a child fall from a 10 th story window. The woman is able to safely break the child's fall, and the child is completely unharmed. As it turns out, it was her child who she saved (the babysitter she hired accidentally fell asleep while watching a movie).

Table 8: continued

3	B	A woman is walking outside her apartment building when she sees a child fall from a 10 th story window. The woman is able to safely break the child's fall and the child, stranger, is completely unharmed.
3	A	Your best friend's future son survives a head-on car collision.
3	B	Your future son survives a head-on car collision.
4	A	A child recovers from a disease in which her doctors gave her an 85% chance of survival.
4	B	A child recovers from a disease in which her doctors gave her a 2% chance of survival.
4	A	A man wins the \$1 million lottery where the odds of winning are 1 in a million.
4	B	A man wins the \$1 million lottery where the odds of winning are 1 in a thousand.

Table 9:

Correlations Between Participants' Surprise and Miracle Judgments, Study 3

Scenario Group/Pair	Correlation Coefficient
Character/child-murderer	$r = .321^{**}$
Character/child-killer	$r = .425^{**}$
Character/peace-drugs	$r = .374^{**}$
End result/child-dreamhouse	$r = .487^{**}$
Personal nature/own son-neighbor's son	$r = .572^{**}$
Low probability/2%-85% survival	$r = .660^{**}$

Note. ** indicates significance at .01 level.

Table 10:
Regression Results- Predicting Miracle Judgments from Surprise Judgments, Study 3

Scenario Group/Pair	β	t-statistic
Character/Child-Murderer	.321	4.74**
Character/Child-Killer	.425	6.56**
Character/Peace-Drugs	.374	5.65**
End result/Child-Dreamhouse	.487	7.80**
Personal nature/Own son-Neighbor's son	.572	9.75**
Low probability/2%85% survival	.660	12.30**

Note. ** indicates significance at .01 level.

Table 11:
Means and Standard Deviations for Miracle and Confidence Judgments, Study 4

Survival Odds	0%	1%	10%
Scientific Explanation			
Miracle	6.67 (2.76)	6.50 (2.72)	5.79 (2.75)
Confidence	67.61 (28.17)	63.5 (29.11)	57.78 (27.45)
No Scientific Explanation			
Miracle	6.26 (2.58)	7.36 (2.71)	6.83 (2.48)
Confidence	60.79 (28.49)	73.78 (26.02)	65.27 (28.67)
No mention of explanation			
Miracle	7.11 (2.94)	7.05 (2.68)	6.05 (2.15)
Confidence	77.77 (29.27)	65.28 (28.02)	56.38 (26.16)

Note. Standard deviations appear in parentheses.